From:	Tabor, Cynthia L
To:	Delistraty, Damon; Julie Robertson; Lyon, Jeffery; Barnes, Michael; Caggiano, Joseph; Rochette, Beth; Skorska, Maria; Whalen, Cheryl (Washington Department of Ecology)
Cc:	Aly, Alaa H; Bergeron, Marcel P; Mahmudur Rahman (mrahman@intera.com); Singleton, Kristin M
Subject:	RE: Updated BRA and RFI/BRA comments
Date:	Monday, February 22, 2016 2:21:12 PM
Attachments:	MEMO Arsenic Cleanup Level at Hanford 6-11-2013 FINAL.pdf Responses_To_Damon"s_Comments_02182016.pdf

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Hi Damon
Based on the below, we have provided additional information for discussion tomorrow. Thank you for taking the time to review and give us feedback.

Cindy

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CONTRACTOR TO THE UNITED STATES DEPARTMENT OF ENERGY

From: Delistraty, Damon A. (ECY) [mailto:DDEL461@ECY.WA.GOV]
Sent: Thursday, February 18, 2016 8:54 AM
To: Tabor, Cynthia L; Julie Robertson; Lyon, Jeffery; Barnes, Michael (ECY); Caggiano, Joseph; Rochette, Beth; Skorska, Maria; Whalen, Cheryl (Washington Department of Ecology)
Subject: RE: Updated BRA and RFI/BRA comments

Hi Cindy,

Here's my response to USDOE updated responses to my initial comments on the RFI (RPP-RPT-58339, Rev A Draft) and BRA (RPP-RPT-58329, Rev 0) that you have selected in this email.

The following comments are OK: Damon RFI 21, Damon RFI 31, Damon BRA 9, and Damon BRA 15.

The following comments need discussion:

Damon RFI 6, Damon BRA 5, Damon BRA 45
The point of this comment is that COPCs without toxicity data should be treated as a source of uncertainty in the risk assessment. The updated Table 8-1 (RPP-RPT-57218) lists 20 detected VOCs (not 2), 38 detected SVOCs (not 11), and 1 detected pesticide (not 4) with no toxicity data.

Damon RFI 18

Remove the reference to WAC 173-340-745 for the CERCLA youth trespasser scenario.

Damon BRA 6

State in the text that the 37 COPCs (reported as not detected at MDLs that exceed required detection limits) are a source of uncertainty in the risk assessment.

Damon BRA 12

The updated Figure 3-1 should be titled, "Human health conceptual exposure model." Footnote 2 applies to nonrad COPCs (not rads). Also, add contaminants transported from groundwater to surface water and sediment with subsequent ingestion of contaminated surface water, sediment, and fish by the WAC resident (unrestricted land use), CERCLA resident, and tribal receptors.

Damon BRA 18

Re the first bullet (samples with nondetects), 95UCL is not always less than the max. 95UCL may exceed sample max if variability is high, more adequately representing the population mean. Therefore, in this case, ProUCL 5.0 (suggesting 95UCL) may be more conservative than ProUCL 4.0 (defaulting to sample max).

Damon BRA 38

The point of the comment is that EPC should be compared against both CUL and background. A COPC should be retained if EPC exceeds both CUL and background. Please clarify why sample size (n) for a given analyte/EA combination differs in Table 3-2 vs Table 3-14 ([shallow] vs [shallow+deep] samples?). Also, re arsenic for EA C, text (p. 3-72, line 13) states, "EPC is less than both concentrations." However, Table 3-14 notes that EPC (11682 ug/kg)>3 phase model CUL (34 ug/kg) for arsenic at EA C. What is the basis of this EPC (11682 ug/kg)? Also, it is not clear how the 3 phase model result (34 ug/kg) is calculated for arsenic. MTCA/CLARC lists 2.92 mg/kg (2920 ug/kg) as the soil concentration to protect groundwater for arsenic. Text (p. 3-70, line 31) refers to ECF-HANFORD-10-0442, as the basis and calculations for soil concentrations protective of groundwater. However, the pdf file for this report somehow has the correct title page (ECF-HANFORD-10-0442), but the report body is actually ECF-HANFORD-10-0439 (soil concentration to protect surface water)….

Damon BRA 53

Cite Gallegos et al (2007) and Carlsen (1996) in the new text to support inhalation exposure to VOCs by burrowing animals.

Damon

From: Tabor, Cynthia L [mailto:Cynthia_L_Tabor@rl.gov]
Sent: Tuesday, February 02, 2016 10:48 AM

To: Julie Robertson <JulieRobertson@gofreestone.com>; Beach, Ryan E <Ryan_E_Beach@orp.doe.gov>; Johnson, Jeremy M <Jeremy_M_Johnson@orp.doe.gov>; Lyon, Jeffery (ECY) <JLYO461@ECY.WA.GOV>; Barnes, Michael (ECY) <miba461@ECY.WA.GOV>; Caggiano, Joseph (ECY) <Jcag461@ECY.WA.GOV>; Rochette, Beth (ECY) <Broc461@ECY.WA.GOV>; Delistraty, Damon A. (ECY) <DDEL461@ECY.WA.GOV>; Skorska, Maria (ECY) <msko461@ECY.WA.GOV>; Faulk, Dennis (EPA) <faulk.dennis@epa.gov>; Gerhart, Rebecca <Gerhart.rebecca@epa.gov>; Rutland, Paul L <Paul_L_Rutland@rl.gov>; Parker, Dan L (Danny) <Danny_L_Parker@rl.gov>; Radloff, Anna W <Anna_W_Radloff@rl.gov>; Robertson, Julie R <Julie_R_Robertson@rl.gov>; Bergeron, Marcel P <Marcel_P_Bergeron@rl.gov>; Singleton, Kristin M <Kristin_M_Singleton@rl.gov>; Aly, Alaa H <Alaa_H_Aly@rl.gov>; Mahmudur Rahman <MRahman@intera.com>; Hopkins, Andrea M <Andrea_M_Hopkins@rl.gov>
Subject: Updated BRA and RFI/BRA comments

Hi All
The attached file includes updated responses with respect to Damon's BRA comments and also RFI Section 7 comments, which summarize the BRA. The file shows the original responses (for reference) and the updated responses. Additionally attached are an update figure and table from the BRA (i.e., Figure 3-1 and Table 8-1).

The original responses and updates were discussed in the November 18th meeting (link: http://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=0078955H) and the January 7 meeting (notes are not yet in the Administrative Record). The January 7th meeting led to updating the following Damon RFI comment responses : 6, 18, 21, and 31.

Damon – please let us know if you agree with the updates. I have a note that you already approved Damon BRA 5.

Appreciate your all input and a new set of responses will be going out this week.
Thank you

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DEPARTMENT OF ECOLOGY
Toxics Cleanup Program

June 11, 2013

TO: Jane Hedges, Program Manager
Nuclear Waste Program

John Price, Section Manager
Nuclear Waste Program

THROUGH: Jim Pendowski, Program Manager
Toxics Cleanup Program

FROM: Dave Bradley, Section Manager
Toxics Cleanup Program

SUBJECT: Issues Associated with Establishing Soil Cleanup Levels for Arsenic

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Over the last several months, the Nuclear Waste Program has identified several questions associated with establishing soil cleanup levels at the Hanford Nuclear Reservation Superfund Site (Hanford Site). The purpose of this memorandum is to provide responses to two questions related to arsenic soil cleanup levels at the Hanford site.

1. Can the Method A soil cleanup level (20 mg/kg) be used to define natural background levels when developing Method B soil cleanup levels for the Hanford site?

   Yes. The Method A arsenic soil cleanup level (20 mg/kg) can be used to define natural background levels when developing Method B soil cleanup levels for the Hanford site. This is one of two approaches that can be used to implement the MTCA regulations. Alternatively, the person conducting the cleanup can perform a site-specific evaluation to establish a site-specific natural background concentration.

   The rationale for this conclusion includes the following:

   - MTCA Regulatory Definition: Ecology has adopted a statewide natural background level in the MTCA rule. This rule provision reflects a policy decision on a statewide natural background level for arsenic.[1]

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[1] Footnote "b" in WAC 173-340-900 (Table 740-1) states "…[c]leanup level based on direct contact using equation 740-2 and protection of ground water for drinking use using the procedures in WAC 173-340-747(4), adjusted for natural background for soil..." Studies completed in the mid-1990's provide information that could support the selection of lower natural background levels for arsenic in soils (Ecology, 1994). Ecology considered these studies when adopting the 2001 MTCA rule amendments and elected to continue using 20 mg/kg to define a statewide natural background level for Method A. Ecology may revisit this policy decision in future MTCA rulemaking proceedings.

- MTCA Rule Consistency: This approach provides a consistent statewide arsenic natural background level for sites being addressed under Methods A, B and C. It is consistent with Ecology guidance and responses to comments on the 2001 MTCA rule revisions. During the 2001 MTCA rulemaking process, several people recommended that Ecology revise the rule to clarify that Method A cleanup levels could be used in combination with Method B cleanup levels. Ecology declined to modify the proposed rule, but reiterated in the Concise Explanatory Statement that the rule provided the flexibility to use a combination of Method A and Method B cleanup levels. In particular, Ecology stated that "…[w]hen using Method B, Method A cleanup levels may be used, but not Method C cleanup levels…" (Ecology, 2001, page 105). However, Ecology also cautioned that "…[m]ethod A values based on background or PQLs need to be examined for applicability at a specific site based on site-specific information…"

- Implementation at Other Sites: This approach is consistent with approaches being used at other large sites in Washington State. For example, Ecology has used 20 mg/kg as the arsenic cleanup level at the Everett Smelter Site and to establish interim action levels at schools and child care facilities within the Tacoma Smelter Plume and at former orchard lands. This value has been found to be a workable concentration for distinguishing site-related contamination from other sources. In addition, Ecology has determined that 20 mg/kg provides a reasonable basis for evaluating the protectiveness of cleanup actions being evaluated during periodic reviews.

2. Can the cancer risks associated with natural background concentrations be zeroed out when calculating total site risks?

   Yes. Under Method B, cleanup levels for individual substances must be adjusted downward to take into account cancer risks associated with multiple exposure pathways and/or multiple hazardous substances.[2] When making those adjustments, the cancer risks associated with natural background levels can be zeroed out when calculating total site risk.

   The rationale for this conclusion includes the following:

   - Distinction Between Site Risks and Other Risks: This approach is consistent with the overall MTCA decision framework which is designed to address health and environmental threats posed by a specific release of a hazardous substance. MTCA is not intended to address health risks from other sources, including natural background.

   - Cancer Risk Definition: This approach is consistent with MTCA cancer risk definitions. For example, the term "***upper bound on the estimated cancer risk of one in one million***" is defined to mean "…the upper ninety-fifth percent confidence limit on the estimated risk of one additional cancer above the ***background cancer rate*** per one million individuals…" This approach is also consistent with the definition for the term "***total***

[2] WAC 173-340-708(5)(a).

excess cancer risk" which is defined as "…the upper bound on the estimated ***excess cancer risk*** associated with exposure to multiple hazardous substances and multiple exposure pathways".[3]

- Implementation: This approach provides a common sense mechanism for addressing additive risk. The alternate approach (including background risks when performing total site risk calculations) could result in the establishment of cleanup levels below natural background concentrations, which is not allowed under the rule,[4] or even "zero", which may not be technically possible to achieve in many circumstances.

If you have further questions regarding these issues, please contact Dave Bradley at 360-407-6907 or dbra461@ecy.wa.gov.

References:

Ecology, 1994. Natural Background Soil Metals Concentrations in Washington State, October, 1994. Ecology Publication No. 94-115.

Ecology, 2001. Concise Explanatory Statement for the Amendments to The Model Toxics Control Act Regulation, Chapter 173-340, February 12, 2001. Ecology Publication No. 01-09-043.

[3] WAC 173-340-200.
[4] WAC 173-340-705(6).

Comment From (ECY)	Item	Comment (s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/resolve the discrepancy/ problem indicated.)	Doc	Updated Response based on Damon Email 02_18_16
Damon	Damon RFI 6, Damon BRA 5, Damon BRA 45	The point of this comment is that COPCs without toxicity data should be treated as a source of uncertainty in the risk assessment. The updated Table 8-1 (RPP-RPT-57218) lists 20 detected VOCs (not 2), 38 detected SVOCs (not 11), and 1 detected pesticide (not 4) with no toxicity data.	RFI BRA	The updated table 8-1 includes soil sample results for both shallow (up to a depth of 15' bgs) and deep locations (>15' bgs). However, the deep results were not utilized in the human health direct contact and ecological risk evaluations. Therefore, only shallow results (2 VOCs, 11 SVOCs, and 4 pesticides) were described in the summary. A footnote will be added to Table 8-1 to clarify the discrepancy. Finally, the uncertainty evaluation will include this discussion.
Damon	Damon RFI 18	Remove the reference to WAC 173-340-745 for the CERCLA youth trespasser scenario.	BRA	The youth trespasser exposure scenario is one of six CERCLA scenarios identified to represent the range of receptors that could be exposed to COPCs in soil from WMA C. It was not evaluated as a part of WAC receptor scenario. Text changes will be made throughout the document to represent each receptor as either CERCLA or WAC receptor. As requested in the comment, reference related to WAC 173-340-745 will be removed from all CERCLA receptor scenarios.
Damon	Damon BRA 6	State in the text that the 37 COPCs (reported as not detected at MDLs that exceed required detection limits) are a source of uncertainty in the risk assessment.		Concur with the statement. The following text will be added to the uncertainty evaluation to describe this uncertainty for clarification: "Both human health risk-based screening levels and ecological screening values were considered during the selection of the detection limits achievable for each of the analytes evaluated. The results for WMA C Phase 2 RFI samples were reported to the laboratories' method detection limit (MDL). The MDL is the lowest concentration at which an analyte can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte. If an analyte is not detected at a concentration greater than or equal to the MDL, it cannot be stated that the analyte is not present in the sample; but rather, with 99% certainty, the analyte is not present at a concentration greater than or equal to the MDL. Sampling results for 37 primary and secondary contaminants were reported as not detected at MDLs exceeding required detection limits listed in RPP-PLAN-38777. "

Damon	Damon BRA 12	The updated Figure 3-1 should be titled, “Human health conceptual exposure model.” Footnote 2 applies to nonrad COPCs (not rads). Also, add contaminants transported from groundwater to surface water and sediment with subsequent ingestion of contaminated surface water, sediment, and fish by the WAC resident (unrestricted land use), CERCLA resident, and tribal receptors.		This figure will be updated as requested.
Damon	Damon BRA 38	The point of the comment is that EPC should be compared against both CUL and background. A COPC should be retained if EPC exceeds both CUL and background. Please clarify why sample size (n) for a given analyte/EA combination differs in Table 3-2 vs Table 3-14 ([shallow] vs [shallow+deep] samples?). Also, re arsenic for EA C, text (p. 3-72, line 13) states, “EPC is less than both concentrations.” However, Table 3-14 notes that EPC (11682 ug/kg)>3 phase model CUL (34 ug/kg) for arsenic at EA C. What is the basis of this EPC (11682 ug/kg)? Also, it is not clear how the 3 phase model result (34 ug/kg) is calculated for arsenic. MTCA/CLARC lists 2.92 mg/kg (2920 ug/kg) as the soil concentration to protect groundwater for arsenic. Text (p. 3-70, line 31) refers to ECF-HANFORD-10-0442, as the basis and calculations for soil concentrations protective of groundwater. However, the pdf file for this report somehow has the correct title page (ECF-HANFORD-10-0442), but the report body is actually ECF-HANFORD-10-0439 (soil concentration to protect surface water)….		1. Table 3-14 includes the sample results for shallow and deep locations whereas Table 3-2 includes the sample results for shallow locations. 2. Text will be updated as follows: “The EPC for arsenic is higher than its corresponding 3-phase model CUL. However, it is less than its soil background concentration. ” It should be noted that soil background concentration for arsenic was determined based on Department of Ecology ‘s Memo related Arsenic Cleanup Level at Hanford (06-11-2013). 3. The EPC for arsenic was selected based on 95% Approximate Gamma UCL. 4. For inorganics, soil concentrations for groundwater protection are calculated using Equation 747-1 from the 2007 WAC 173-340-747. Based on CLARC database, MTCA Method B Groundwater cleanup criteria and Kd values for arsenic are 0.058 µg/L and 29 mL/g, respectively. Those values are used during the determination of arsenic soil concentration for groundwater protection. Instead of MTCA Method B groundwater CLU, CLARC database determined arsenic soil concentration for groundwater protection based on its corresponding background groundwater concentration of 5 µg/L. 5. The ECF reference will be corrected.
Damon	Damon BRA 53	Cite Gallegos et al (2007) and Carlsen (1996) in the new text to support inhalation exposure to VOCs by burrowing animals.		Reference will be included.