Saari, Christopher A - DNR

From:	Yang, Sarah P - DNR
Sent:	Friday, January 15, 2016 2:33 PM
To:	Fassbender, Judy L - DNR
Subject:	FW: Crawford Creek Characterization Report Draft
Attachments:	WDNR_2014_CrawfordCreekHHRA_Notes (SY141119).docx

Hi Judy,
Attached are my notes from a year ago when Scott Inman asked me to review this HHERA. Basically, I just highlighted areas from the document that may be reason for concern and/or areas that need more investigation. I'm not sure if you have a copy of these already.

Sarah

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Sarah Yang, Ph.D.
Phone: (608) 266-9262
Sarah.Yang@Wisconsin.gov

From: Yang, Sarah P - DNR
Sent: Friday, December 05, 2014 1:02 PM
To: Inman, Scott T - DNR
Subject: RE: Crawford Creek Characterization Report Draft

Hi Scott,
I have attached a copy of my notes. I am going to be examining a few things in more detail before drafting my comments.

Sarah

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Sarah Yang, Ph.D.
Phone: (608) 266-9262
Sarah.Yang@Wisconsin.gov

From: Inman, Scott T - DNR
Sent: Tuesday, October 21, 2014 2:08 PM
To: Yang, Sarah P - DNR
Subject: FW: Crawford Creek Characterization Report Draft

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Scott T. Inman

Office: (608) 264-9201
Cell: (608) 576-4912

Scott.Inman@Wisconsin.gov

From: Graham, Joseph R - DNR
Sent: Monday, October 20, 2014 10:46 AM
To: Saari, Christopher A - DNR; Inman, Scott T - DNR; Fitzpatrick, William - DNR; Killian, James - DNR
Cc: Galarneau, Stephen G - DNR
Subject: Crawford Creek Characterization Report Draft

I placed a copy of the Crawford Creek characterization report under Scott's folder at the link below. The draft was received by e-mail late on 10/16/2014.

S:\Inmans\Crawford Creek\Crawford Creel Characterization Draft Report 10-16-2014

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Joe Graham
Lake Superior Sediment and Monitoring Coordinator
Wisconsin Department of Natural Resources
Phone: (715) 292-4925
joseph.graham@wisconsin.gov

dnr.wi.gov

Human Health

- *Used oral dose-response info to estimate risk associated with both oral and dermal exposure (1.2.1-pg. 11)*
- *Surrogate toxicity values used for constituents that did not have dose-response values (1.2.1-pg. 11)*
- BaP comparative potency factors (CPFs) were used (1.2.2-pg. 12)
- Toxicity equivalent factors (TEFs) were used (1.2.2-pg. 12)
- Absorption adjustment factors (AAFs) were used (1.2.3-pg. 12)
- *Dermal permeability constants were derived from scientific literature (1.2.4-pg. 13)*
  - *Used surrogate values instead of EPA default values*
- Two exposure scenarios discussed (see figure below)
  - Scenario 1 (AMEC): using AMEC derived AAFs
  - Scenario 2 (WDNR): using default AAFs
- Chronic average daily dose (CADD) – potential daily intake from oral and dermal exposure to non-carcinogens; calculated by averaging period over which exposure is assumed and compared to RfD to estimate potential hazard index (1.3.2-pg. 19)
- Lifetime average daily dose (LADD)-potential daily intake to carcinogens; calculated by averaging exposure over lifetime (70 yrs); combined with cancer slope factor to estimate excess cancer risk due to exposure (1.3.2-pg. 19)
- *Hands, forearms, and face exposed to soils → weighted soil adherence factors (1.3.2-pg. 21)*
  - *What about feet and legs?*
- *Hands, forearms, feet exposed to sediment and surface water → weighted soil adherence factors (1.3.2-pg. 22)*
  - *What about legs?*
- *Samples were assumed to be representative of each exposure area (1.3.3-pg. 23)*
  - *No sediment data from area 1*
  - *No soil data from area 2*
- Exposure point concentration – concentration in media representing exposure area; estimated as lower of either (1.3.3-pg. 23)
  - Maximum detected concentration
  - 95% upper confidence interval mean concentration
  - For substances that were not detected, value = ½ of LOD was used as surrogate for 95% CI method
- Hazard quotient used to determine risk for non-carcinogens (1.4.1-pg. 25)
  - HQ = CADD/RfD
  - If $HQ_{total} < 1$, no risk assumed
- Potential excess lifetime cancer risk (PELCR) used to determine risk for carcinogens (1.4.1-pg. 26-27)
  - PELCR = CSF x LADD
  - If $PELCR_{total}$ is between 10^{-4} and 10^{-6}, risk is allowable
- *EPA (1997b) recommends soil ingestion rate for young children of 200 mg/day (1.5.3-pg. 33)*
  - *Definition of small children?*
- Assumed that the potential effects of different COPCs are additive (1.5.4-pg. 34)
- Observation: WDNR and AMEC exposure routes compared directly but not sure direct comparison are appropriate between more than 1 factor is different between the routes

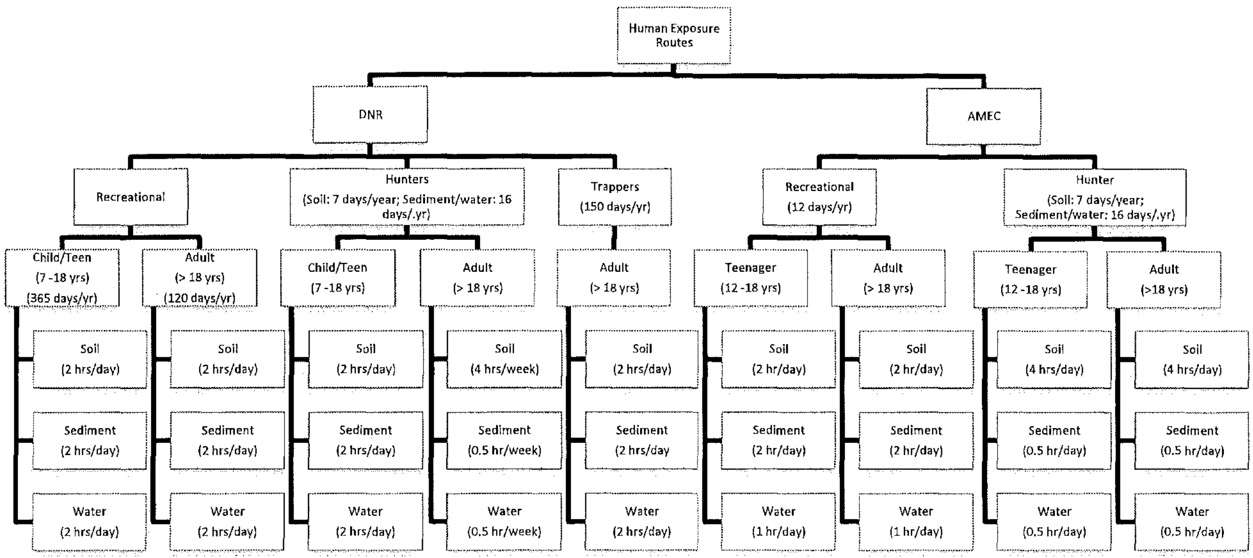

Figure 1. Diagram depicting WDNR and AMEC exposure scenarios

Ecological

Substances Detected in Environmental Matrix (2.3.1.1-pg. 38-39)			
	PAHs	Pentachlorophenol	Dioxins & Furans
Floodplain Soil	X	X	X
Sediment	X	X	X
Forage Fish	X	X	X
Surface Water	X	X	
Flying Insects	X		X

- Specific ecological receptors were selected to representing feeding guilds-used to represent species that occupy similar guilds and may potentially exist on site (2.3.1.3-pg. 43)
- Potential risk for reptiles lower than estimated for avian species (2.3.1.3-pg. 45)
- *Used soil-to-earthworm BTFs to estimated COPEC concentrations in earthworms (2.3.1.4-pg. 47)*
- Aerial insectivores are assumed to be opportunistic feeders and eat whatever is most abundant - not just those insects that emerged from the creek (2.3.1.4-pg. 47)
- *Site-specific fish concentrations were used as surrogate EPCs for aquatic macroinvertebrates (2.3.2.1-pg. 52)*
- *Concentrations of COPECs in soil invertebrates or plants were estimated by combining floodplain soil EPCs with BTF (2.3.2.1-pg. 52)*
- TEFs were used to calculated TCDD TEQ concentrations form mammals and birds (2.3.2.1-pg. 53)
- *Because benthic macroinvertebrates have limited mobility, they are likely exposed to COPEC concentrations equal to those in sediment in the immediate vicinity- potential effects evaluated for each sampling location, when available* (2.3.2.1 –pg 53)
- *Research references used for toxicity reference values (2.3.2.2-pg. 55)*
- The highest NOAEL that is lower than the lowest NOAEL was used when available. Chronic NOAELS were derived when necessary. (2.3.2.2-pg. 55)
- *If not toxicity values were available, surrogate chemicals were selected based on structural chemistry (2.3.2.2-pg. 55)*
- *A conversion based on weight were used to extrapolate TRVs between mammals (2.3.2.2-pg. 56)*
- Toxicity Quotients (TQs)

		Kingfisher	Mink	American Robin	Swallow	Vole	Bat
Area 1	LOAEL	< 1	<1	<1	<1	<1	<1
	NOAEL	4.6	1.1	1.5	1.7	1.2	<1
	-Sediment COPECs were dominant source of concern for kingfisher, mink, and swallow -Soil dioxins and furans were dominant source of concern for vole and American robin **Note: no sediment data was available for area 1 so sediment data from area 2 was used to estimate potential exposure in area 1 (2.3.2.1-pg. 52)						
Area 2	LOAEL	< 1	<1	<1	<1	<1	<1
	NOAEL	4.6	1.1	≤1	≤1	≤1	≤1
	PAHs within the creek (fish, invertebrates, insects) were dominant source of concern for kingfisher						
Area 3	LOAEL	< 1	< 1	< 1	< 1	< 1	< 1
	NOAEL	< 1	< 1	< 1	< 1	< 1	< 1

- Sediment Evaluation (2.3.3.2-pg. 59-62)

- Weight of evidence approach with 5 lines of evidence
  1) >1 PAH concentration exceeds PECs for >1 WNDR CBSQG benchmarks → potential risk
  2) Total PAH concentration in all samples exceeds TEC and MEC → potential risk
  3) Sum Toxicity Unit (TU) > 1.0 for all locations → potential risk
  4) *Compared PAH concentrations to "ranges, in Beazer's experience, not expected to be adversely affect benthic organisms" (2.3.2.2-pg. 56)→ PAH concentrations lower than these ranges →may not pose risk*
     a. *Has this work been published in a peer-reviewed scientific journal?*
  5) Benthic invertebrate community analyses → BBL did not consider differences significant →DNR "IBI" scores indicate moderate to severe impact
     a. Is the DNR method published?
- Combined – *"Five lines of evidence do not permit a firm conclusion about whether COPECs in Crawford Creek are affecting the benthic macroinvertebrate community"*

• *Wood-treating PAHs are of pyrogenic origin and such PAHs are suspected of being substantially less toxic than PAHs of petrogenic origins (2.3.3.2-pg. 62)*
  - *Aare there are literature references from peer-reviewed scientific journals demonstrating this?*
• Fish community evaluation (2.3.3.3-pg. 62-64)
  - Weight of evidence approach with 2 lines of evidence
    1) *Compared lipid-normalized TCDD concentrations in Crawford Creek fish to allowable body burden ranges from study by Steevens et al. →WNDR noted that ranges in study were based on gamefish and not forage fish like those found in Crawford Creek→ AMEC: little reason to believe forage fish are substantially more sensitive →do not pose risk*
    2) Fish community analysis→BBL concluded that habitant was responsible for differences between sites and references; WDNR found lower IBI scores in areas 2 and 3 which indicate impact→unclear whether differences are related to COPECS, habitat, or both
  - Combined – "lines of evidence do not permit firm conclusion about whether COPECs in Crawford Creek are affecting the fish community"
• Food chain exposures for avian species may be underestimated (2.3.4-pg. 65)
• WDNR: PAH sediment sampling locations not representative of locations in benthic study. Effects to benthic organisms may be underestimated (2.3.4-pg. 65)
• Sampling only done one season of the year. Data not representative of seasonal fluctuations in COPEC concentrations (2.3.4-pg. 65)
• Conclusions (3.0-pg. 68)
  - Actual adverse effects in areas 1 and 2 seem unlikely given that
    1) Uncertainty factors used to derive TRVs →estimated exposure do not exceed actual effect levels
    2) Upper trophic level receptors are unlikely to forage in only a single area
    3) All LOAEL-based TRVs are less than 1.0