## Sager, John E - DNR

**From:** Saari, Christopher A - DNR
**Sent:** Wednesday, December 11, 2019 1:37 PM
**To:** Sager, John E - DNR
**Subject:** FW: Koppers- Human Health Risk Assessment Comments

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**From:** Streiffer, Adam B - DHS <Adam.Streiffer@dhs.wisconsin.gov>
**Sent:** Friday, January 22, 2016 4:01 PM
**To:** Saari, Christopher A - DNR <Christopher.Saari@wisconsin.gov>
**Cc:** Fassbender, Judy L - DNR <Judy.Fassbender@wisconsin.gov>; Streiffer, Adam B - DHS <Adam.Streiffer@dhs.wisconsin.gov>
**Subject:** Koppers- Human Health Risk Assessment Comments

Chris,
Below are DHS's comments related to the 2009 Koppers/Crawford Creek Human Health portion of the risk assessment (HHRA).
I tried to summarize each point with a summary sentence or two in bold.

Thanks again for the opportunity to provide these comments and observations.
Please don't hesitate to call with questions or to discuss any of the above further.

1. **The Human Health Risk Assessment does not address the acute risk from contact with free product. Any remedial efforts must address this acute risk to protect human health.**
   DHS (Henry Nehls-Lowe) provided comments in 2011 that the HHRA does not address the risk of acute exposure via dermal contact with creosote product in the sediments, soils and surface waters of the site. Henry's specific comment was "one-time, direct contact and dermal exposure with the creosote product can cause irritation and damage to human skin and eyes." Our opinion at DHS remains that any remedial efforts must adequately address and remove this acute exposure risk or the site will continue to pose a human health hazard for all current and future use scenarios.

   If DNR concurs with Beezer's contention that all areas of the site have been adequately characterized, and that free product is at depths such that human exposure is very unlikely, then DHS is satisfied that the acute exposure risk has been adequately addressed. However, if DNR believes that sufficient doubt and uncertainty exists as to the existence of product at depths that humans may come into contact with via residential and recreational land uses (such as ATV use, trapping and hunting, etc.) then the acute exposure risk remains and must be addressed via corrective action.

2. **The Human Health Risk Assessment was performed before the Area D (HHERA Area 3) was characterized. Conclusions made in the HHERA on Area D are made with very limited data.**
As you and others have pointed out in prior meetings and phone calls, the HHRA was conducted in 2009, which was before the subsequent characterization work was performed in Area D (from the RR embankment on Crawford Creek to the confluence with the Nemadji River). Therefore, the conclusions in the HHRA do not necessarily apply to Area D, even though their risk assessment states that Area D (HHERA Area 3) has be assessed.

3. **(Related to # 2 above) We do not understand the basis for calling these samples "representative", and using very small numbers of "surrogate" samples is of questionable adequacy or appropriateness for making risk determinations.**
Tables 2-11, 2-12, & 2-13 are called "List of Samples Representative of Area 1,2 & 3", respectively. The document states on p.23 that "samples assumed to be representative are presented in Tables 2-11, 2-12, and 2-13", however,
1) We were unable to find the explanation as to what went into this assumption that they are representative, and
2) Very few samples are used for calculating some of the Exposure Point Concentrations (EPCs) (upper 95th confidence interval of the mean of the "Representative" samples ) which are the concentrations used for the risk assessment.

For example, as seen in the table below, the soil EPC for Area 1 is based on only three samples. While Area 3 soil EPC is based on literally zero soil samples from that area. As such, we question the representativeness of these very small sample sets. Furthermore, these "representative" samples are then used then to calculate the Exposure Point Concentrations (EPCs) which are the basis for the entire risk calculations. If these areas are distinct enough geologically and topographically to separate them into distinct areas for analysis, then we should be using discrete data for assessing each area, and using enough data to adequately characterize these large areas of land. As such, we are not comfortable with this approach, and question if these areas are being actually represented and fairly assessed for human health risks.

**Table. Number and source of "representative" samples used for calculating Exposure Point Concentrations (EPCs)**

| | Sediment | Soil |
|---|---|---|
| Area 1 (table 2-11) | **Zero samples** from Area 1 (Uses the 3 samples from Area 2 as surrogate) | 3 samples (to depth of 6") |
| Area 2 (table 2-12) | 3 samples (to depth of 3") | 20 samples (to depth of 6") |
| Area 3 (table 2-13) | 4 samples (to depth of 3") | **Zero samples** from Area 1 (Uses the 20 samples from Area 2 as surrogate) |

4. **The Off-property FCMS repeatedly mentions institutional controls for restricting land use, which as you have mentioned enters into legally questionable terrain** (See Off Property Focused CMS Appendix A, P.2, response to WDHS comment).

5. **We think that evaluating the site using a residential scenario is warranted.**
Regarding the comment from the phone call on Tuesday regarding whether future residential land uses have been adequately addressed, our opinion is that while the site does encompass private land, and those land owners have the right to use their land as they chose, due to the nature of the site, it is unlikely that any landowner would use their property in a manner consistent with the default residential exposure assumptions (for example by building a child's swing set in the flood plain).

In other words, the default residential exposure assumptions *may* be too stringent. However, upon review of the exposure assumptions used (and reproduced in the Table below), we *do* feel that evaluating the site using a residential scenario with some modifications may be warranted. In other words, it is our opinion that it would be justified to evaluate a residential exposure scenario, however, when doing so, some modifications to the default residential exposure assumptions may be reasonable. DHS would be happy to discuss and advise on what modifications may be appropriate if and when the residential scenario is evaluated.

6. **We question some of the methodological approaches that Beezer used in determining their exposure assumptions. This results in a risk determination that is considerably lower than if the assessment was done using more standard methods.**
    - Incidental Soil Ingestion- They are using the term "Contact Rate" in the HHERA to mean incidental soil ingestion rate (See P17 &p18 of the HHERA). The values used that are *half* of the default values that are prescribed in NR 720.12. (See the comparison table below).
      The values they are using are the central tendency value from EPA, whereas the default values in NR720 are the upper percentile values for the general population, which are a more conservative value. We disagree with their use of these lower values here, because 1) the default values are the more conservative approach which we advocate, and 2) due to the nature of the site, and the presumed uses of the site, it is likely that soil and dust exposure and incidental ingestion would be higher than during a normal average person's day (hunting, ATV use, trekking, etc. around the site vs. going to school or work, and driving in a car, etc.)

    - Surface area exposed- What is the rational for deviating from the default NR 720 values for surface area exposed? Also, why do these surface area values change for soil vs sediment, and what are the assumptions based on? Why does it go down for a hunter in sediment, but up for trapper and recreational user? There should a rationale behind the use of these values. This bullet is probably a minor point, but clarification would be useful.

    - Fraction from Site –The Fraction Intake from the site (see p17) is a ratio of the hours on site (See "exposure time" in table below) divided by the hours in a day. They use this to reduce the calculated exposure to estimate a percentage of exposure that would come from the site. I am not a trapper or a hunter, but the hour values used in their assumptions (table below) strike me as low.

      Furthermore, I question the entire validity of their approach in using this fraction. By using a 24 hour period as the denominator, they are saying that the default assumption is that we are all being exposed equally to soil and dust all day for 24hours a day. This is obviously not the case, as we are sleeping for 7-8hrs, eating meals for 2-3hours, lounging inside, going to school, driving in our cars, etc. Conceptually they are correct that only a percentage of one's daily exposure to soil would come from the time spent on-site. However, their method of accounting for this percentage is questionable**. Incidental ingestion of soil is not time dependent, it is behavior dependent**. As such, it is reasonable to assume that the majority (if not *all)* of ones incidental ingestion of soil in the day would occur during the on-site field activity. In other words using their method significantly underestimates the exposure occurring from the site.

      I would suggest that a better, more reasonable method for estimating a percentage of exposure resulting from the site be developed. Without a more reasonable method, we would advocate for assuming that the full default incidental ingestion rates of 200mg/day for child and 100mg/day for adult be used at the site.

**Table- Exposure Assumptions Comparison** (See HHERA Table 2-21).

| | **NR 720.12 default assumptions** *(Alternative values may be chosen with written approval by DNR)* | | **Beezer HHERA Exposure assumptions Table 2-21** | |
|---|---|---|---|---|
| | **Non-cancer** | **Cancer** | **Floodplain Soil** | **Sediment** |
| Risk | HQ=1 | $1 \times 10^{-6}$ (i.e. 1 in 1,000,000) | HQ=1 | $1 \times 10^{-6}$ (i.e. 1 in 1,000,000) |
| Cumulative risk | HI=1 | $1 \times 10^{-5}$ (i.e. 1 in 100,000) | HI=1 | $1 \times 10^{-5}$ (i.e. 1 in 100,000) |
| Incidental Soil Ingestion | 200mg/day for child<br>100mg/day for adult (industrial) | 200mg/day for child<br>100mg/day for adult (non-industrial)<br>100mg/day for adult (industrial) | 100 mg/day- child<br>50 mg/day- adult | Same |
| Exposed Skin Surface Area | 2,800 $cm^2$ for child<br>3,300 $cm^2$ for adult (industrial) | 2,800 $cm^2$ for child<br>5,700 $cm^2$ for adult (non-industrial)<br>3,300 $cm^2$ for adult (industrial) | 2,433 $cm^2$/d for rec. child<br>2,518 $cm^2$/d for rec. adult & trapper<br>2,433 $cm^2$/d for hunter child<br>2,518 $cm^2$/d for hunter adult | 3133 $cm^2$/d for rec. child<br>3,341 $cm^2$/d for rec. adult & trapper<br>928 $cm^2$/d for hunter child<br>904 $cm^2$/d for hunter adult |
| Skin-soil adherence factor | 0.2 mg/$cm^2$ for child<br>0.2 mg/$cm^2$ for adult (industrial) | 0.2 mg/$cm^2$ for child<br>0.07 mg/$cm^2$ for adult (non-industrial)<br>0.2 mg/$cm^2$ for adult (industrial) | 0.14 mg/$cm^2$ (child & adult recreational, and trapper)<br>0.14 mg/$cm^2$ (Hunter) | 0.18 mg/$cm^2$ (child & adult recreational, and trapper)<br>0.2 mg/$cm^2$ (Hunter) |
| Averaging period for exposure | 6yrs for child<br>25yrs for adult (industrial) | 30yrs for child during a 70yr lifetime<br>24yrs for adult (non-industrial) during a 70yr lifetime<br>25yrs for adult (industrial) during a 70yr lifetime | Exposure duration = 11yrs child/teen<br>Exposure duration = 24yrs adult<br><br>Child Cancer Lifetime = 70yrs (25,550 days)<br>Child Non-cancer Lifetime = 11yrs (4,015 days)<br>Adult Cancer Lifetime = 70yrs (25,550 days)<br>Adult Non-cancer Lifetime = 24yrs (8,760 days) | Same |
| Fraction from Site (Unitless) | N/A | N/A | 0.08 (Child & adult Rec & trapper)<br>0.17 (child & adult hunter) | 0.08 (child & adult Rec & trapper)<br>0.02 (child & adult hunter) |
| Exposure Time (hr/day) (Used to calculate | | | Rec child & adult, Trapper = 2hr/d<br>Hunter child & adult = 4hr/d | Rec child & adult, Trapper = 2hr/d<br>Hunter child & adult = 0.5hr/d |

| | | | | |
|---|---|---|---|---|
| Fraction from site) | | | | |
| Exposure Frequency (days/yr) | | | Rec child=365 d/yr<br>Rec adult =120 d/yr<br>Hunter child & adult = 28 d/yr<br>Trapper =150 d/yr | Rec child=365 d/yr<br>Rec adult =120 d/yr<br>Hunter child & adult = 16 d/yr<br>Trapper =150 d/yr |

Regards,
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Wisconsin Dept. of Health Services
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