

Colorado Department of Health

Review and Comment

Technical Memorandum (TM) #5 - Exposure Scenarios  
for Operable Unit 2  
August, 1992

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General Comments:

1) Lengthy discussions and meetings concerning the OU 1 Public Health Risk Evaluation (PHRE) have been conducted over the past several months. At these meetings, all parties worked out a PHRE format which included certain site-specific items, but also included items which we thought would become common to all RFP PHRES. The Division assumed that DOE and EG&G would be able to separate the programmatic items in the OU 1 PHRE from the OU 1-specific items and include any programmatic items in subsequent risk assessment submittals for other OUs. Based on this submittal, apparently this is not the case and the OU 1 meetings were only partially successful.

2) Related to the above comment, exposure scenarios for current on-site workers and future on-site residents must be included in this TM.

3) Within the future on-site residential exposure scenario, the following pathways must be quantitatively evaluated:

- |                                 |                           |
|---------------------------------|---------------------------|
| - inhalation of gnd water VOCs  | - soil ingestion          |
| - homegrown vegetable ingestion | - soil dermal contact     |
| - inhalation of particulates    | - surface water ingestion |
| - surface water dermal contact  | - sediment ingestion      |
| - sediment dermal contact       | - ground water ingestion  |
| - ground water dermal contact   | - radiation from soils    |

4) Within the current on-site worker exposure scenario, the following pathways must be quantitatively evaluated:

- |                                |                           |
|--------------------------------|---------------------------|
| - inhalation of particulates   | - soil ingestion          |
| - surface water dermal contact | - surface water ingestion |
| - sediment dermal contact      | - sediment ingestion      |
| - soil dermal contact          | - radiation from soils    |

5) In addition to the pathways proposed for quantitative evaluation in the future on-site ecological researcher exposure scenario, the following additional pathways need to be evaluated:

- sediment ingestion
- sediment dermal contact

6) The quantification methodology for the external irradiation pathway needs to be presented in the text of this TM.

7) The soil matrix effect used on many of the Section 5.0 tables is inappropriate for the calculation of a generic intake factor. Soil matrix effects are dependent on a variety of factors including soil loading, surface area exposed, site of application, soil organic content, and the chemical of concern. The Poiger and Schlatter matrix effect used in the text of this TM is based on TCDD and specific soil matrix and site application parameters. Therefore, it cannot be applied to all chemicals and all exposure scenarios. The Division believes that, unless more information can be presented as to the applicability of the matrix effect used in this TM, the matrix effect should not be used in exposure point intake calculation.

#### Specific Comments:

Section 2.1: The depth of contaminants needs to be more clearly defined. For example:

- How deeply was the 903 Lip site excavated and what is the depth of clean top soil covering the site?
- At what depth were the residues, primarily lithium carbonate, buried at the Reactive Metal Destruction Site?
- What is the actual depth of the uranium and plutonium chips at the Trench T-1 site?
- At what depth were the wastes buried in the East Trenches Area?

Section 2.5.3: The third paragraph of this section needs clarification. As with the French Drain in OU 1, the Surface Water Interim Measure/Interim Remedial Action (IM/IRA) in OU 2 will not play a role in risk assessment. Any surface water exposure pathway considered quantitatively in the OU 2 PHRE should evaluate conditions assuming no action, which would not include any positive effects accomplished by the IM/IRA.

Figure 3-3: Apparently the key to this map explaining the numbered land-use codes shown on the map was inadvertently omitted. Please include this on a revised Figure 3-3. In addition, DOE should be aware that this figure does not photocopy well.

Figure 3-4: The Division is unsure why this figure was included in this TM. Additionally, the location of RFP off the southern edge of the map should be clarified.

Section 4.2: Related to previous comments, the IM/IRA currently in place on South Walnut Creek to collect, treat, and release contaminated surface water may not be considered within the framework of the PHRE. The RFI/RI risk assessment assumes no action, including those already implemented. Therefore, the surface water seeps in South Walnut Creek must be considered in both an exposure pathway and exposure point concentration context.

Figure 4-1: Text on page 4-14 states that this table presents a summary of the pathways that will be quantitatively evaluated. However, there is no indication on the table which pathways will be included in a quantitative assessment. Please correct this problem.

In addition, once an indication has been added to the table indicating the pathways for quantitative evaluation, rationale needs to be included for each pathway stating why the pathway will or will not be included in the quantitative evaluation.

The pathway "Contaminated Soil - Bioconcentration - Ingestion of Fruits and Vegetables Grown On-site" needs to be added to this figure.

Section 5.0: The text states that, because contact rates are approximately proportional to body weight, child residential intakes are not estimated for any exposure pathway except soil ingestion. The Division disagrees with this statement. Certain parameters are approximately proportional to body weight like body surface area. However, even in these cases, factors unique to children and/or adults can affect the parameter values for other portions of the exposure scenario (e.g. exposure time, exposure frequency, etc.). Other parameters, like inhalation rate, are inversely related to body weight. Therefore, the Division requests that "child" equations be generated for each exposure pathway.

Table 5-1: The Division disagrees with the approach presented regarding "Fraction Ingested" or FI. Footnote 3 to this table states that it is assumed that residents are in contact with contaminated soils 50% of their time at home. If their home is built in and on contaminated soil, please clarify for the Division what soil a resident comes in contact with the other 50% of the time. The Division requests that FI be changed to 1.00.

On page 6-39 of RAGS (Section 6.6.2 - Calculate Soil, Sediment, or Dust Intakes) it states that the values for the exposure parameters presented on Exhibit 6-14 (Residential Exposure: Ingestion of Chemicals in Soil) should be viewed as representative of long-term average daily ingestion rates for children and should be used in conjunction with an exposure frequency of 365 days/year. Therefore, the Division asks that the EF for children be changed to 365 days/year.

Table 5-3: As mentioned earlier, the inhalation rate for children and adults is significantly different. Therefore, the Division requests that separate values for IR for children and adults be incorporated into the inhalation evaluation.

In addition, an intake factor for inhalation of particulates should include a particulate emission factor. EPA recommends  $4.63 \times 10^9$  m<sup>3</sup>/kg as a default value. This would also be applicable to Table 5-10.

Table 5-4: Based on the differences in activity type and clothing between children and adults and their relative differences in body surface area, the Division requests that children and adults be considered separately in the risk evaluation for dermal exposure to soil.

The Division does not believe it is reasonable to only consider exposure of face, hands, and forearms. At least the addition of legs and feet would be appropriate. This would also be true for Tables 5-12 and 5-18.

Table 5-5: Future on-site activities at RFP may include large construction projects. Therefore, the fraction ingested from contaminated sources should include construction people and outdoor maintenance people who would be exposed to contaminated soil more than 1 hour per 8 hour workday. This would also be true for Table 5-8.

Table 5-7: This table includes FC in the equation, but does not define what value will be used.

Table 5-8: This table defines a value for FC, but does not include this term in the intake equation. FI is included in the equation, but is not defined.

Tables 5-17 and 5-19: The Division notes that surface water ingestion and surface water dermal contact, while considered here for future off-site residents, have not been included for consideration in the current off-site exposure scenario. Please explain why these scenarios have not been considered.

Based on the differences in activity type and clothing between children and adults and their relative differences in body surface area, the Division requests that children and adults be considered separately in the risk evaluation for dermal exposure to surface water.

Bibliography: A bibliography needs to be generated and included in this document.