**Section 232.APPENDIX B Additional Procedures for Calculating the Chronic Toxicity Score**

a) Procedures to be used in selecting chronic toxicity studies.

1) Chronic toxicity studies in which all of the items in subsection (a)(1)(A) of this appendix are identified or measured with adequate specificity to use the equations in subsection (b) of this appendix are to be given first preference.

A) Study items to be identified or measured:

i) Test species;

ii) Contaminant dose;

iii) Duration of exposure must be at least 21 days, except for developmental studies in animals, in which case the duration of exposure must be during critical gestation days;

iv) Route of exposure; and

v) Effect of exposure.

B) In the event that two or more studies are available in which the items in subsection (a)(1)(A) are deemed to have been identified or measured, but which give inconsistent results, the study must be selected by the following procedures:

i) In the event that two or more studies are laboratory animal toxicity studies, the study that is conducted in accordance with or consistent with Good Laboratory Practice Standards must be used. Good Laboratory Practice Standards are incorporated by reference in Section 232.110.

ii) In the event that the application of the procedure in subsection (i) fails to result in the selection of one study, then the study that results in the highest Chronic Toxicity Score must be used.

2) Studies that identify or measure all of the items in subsection (a)(1)(A) of this appendix, except for the contaminant dose, must be given second preference.

A) For a second preference study, the Lowest Toxic Dose Score for a given species and a given route of exposure must be determined according to the following table:

|  |  |  |
| --- | --- | --- |
| Species | Route of Exposure | Lowest Toxic Dose Score |
|  |
| Human | Inhalation | 1 |
| Human | Non-inhalation | ⅔ |
| Non-human | Inhalation | ⅔ |
| Non-human | Non-inhalation | ⅓ |

B) In the event that two or more second preference studies are available, the study that results in the highest Chronic Toxicity Score must be used.

3) A contaminant for which there is insufficient data in the study to identify the elements of either a first or second preference study must be determined to have no data and be assigned a Chronic Toxicity Score of 0.

b) The following general equation must be used to obtain the dose in units of milligram per kilogram per day for the oral, gavage and inhalation routes of exposure: Dose = (I)(C)(TCF)/UF

1) For the routes of exposure listed below, use the following:

|  |  |  |
| --- | --- | --- |
| TCF | = | Time Correction Factor of 1, unless the exposure was intermittent, in which case the fraction of time during which exposure occurred is used (e.g., 5 days/week = 5/7 = 0.71). |
|  |  |  |
| UF | = | Uncertainty Factor of 10, used only when data are for exposure periods less than 90 days. In the case of fetotoxicity and teratogenicity studies, an Uncertainty Factor of 1 must be used. |

2) Where the exposure is oral use the following:

A) Oral Exposure via Food:

|  |  |  |
| --- | --- | --- |
| I | = | Food Intake in kilogram of food ingested per kilogram of body weight per day (kg/kg-d) (refer to Chart 1 for standard values); |
|  |  |  |
| C | = | Contaminant Concentration in food in units of milligram per kilogram (mg/kg); or |

B) Oral Exposure via Water:

|  |  |  |
| --- | --- | --- |
| I | = | Water Intake in liter of water ingested per kilogram of body weight per day (L/kg-d) (refer to Chart 1 for standard values); |
|  |  |  |
| C | = | Contaminant Concentration in water in units of milligram per liter (mg/L); |

3) Where the exposure is via gavage use the following:

The product (I X C) in the above equation must be replaced by Gavage Dose (GD) in units of milligram of contaminant ingested per kilogram of body weight per day (mg/kg-d); or

4) Where the exposure is via inhalation use the following:

|  |  |  |
| --- | --- | --- |
| I | = | Air intake in cubic meter of air inhaled per kilogram of body weight per day (cu.m3/kg-d) measured as the product of Ventilation Rate (VR) (refer to Chart 1 for standard values) and Inhalation retention factor (RF) (assumed to be 0.5 for this procedure); |
|  |  |  |
| C | = | Contaminant Concentration in air in units of milligram per cubic meter (mg/cu.m). |

|  |
| --- |
| Chart 1 |
| Summary of Physiological Parameters |
|  |  |  |  |
|  | Water Intake L/kg/day | Food Intake kg/kg/day | Ventilation cu.m/kg/day |
| Species |  |  |  |
|  |  |  |  |
| Cat | 0.100 | 0.050 | 0.46 |
| Dog | 0.025 | 0.025 | 0.31 |
| Guinea Pig | 0.075 | 0.040 | 0.58 |
| Human | 0.029 | 0.025 | 0.26 |
| Monkey | 0.14 | 0.07 | 0.32 |
| Mouse | 0.25 | 0.15 | 1.44 |
| Rabbit | 0.065 | 0.030 | 0.46 |
| Rat | 0.10 | 0.050 | 0.66 |