**Section 232.310 Procedures for Determining the Toxicity Score**

The Toxicity Score is the sum of the Acute Lethality Score and the Chronic Toxicity Score. The Acute Lethality Score is a number which indicates a contaminant's potential to cause death. The Chronic Toxicity Score is a number which indicates a contaminant's potential to cause adverse health effects after chronic exposure.

a) Procedure for Determining the Acute Lethality Score

1) The Acute Lethality Score is derived from toxicological studies using laboratory rats. One of two routes of exposure is used: inhalation or ingestion. Values derived from inhalation are used in preference to values derived from ingestion.

2) The Acute Lethality Score is derived from the following table:

|  |  |
| --- | --- |
| Inhalation Concentration (LC50) | Acute Lethality Score |
|  |  |
| Less than: 500 mg/cu. m | 3 |
| 500-4,999 mg/cu. m | 2 |
| 5,000-50,000 mg/cu. m | 1 |
| Greater than: 50,000 mg/cu. m | 0 |

 or, if the above data are not available:

|  |  |
| --- | --- |
| Ingestion Dose (LD50) | Acute Lethality Score |
|  |  |
| Less than: 500 mg/kg | 3 |
| 500-499 mg/kg | 2 |
| 500-5,000 mg/kg | 1 |
| Greater than: 5,000 mg/kg | 0 |

b) Procedure for Determining the Chronic Toxicity Score

The Chronic Toxicity Score is the product of the Lowest Toxic Dose Score and the Severity of Effects Score.

1) Procedure for Determining the Lowest Toxic Dose Score

The Lowest Toxic Dose Score is a number based upon the lowest dose of a contaminant that causes an observable adverse health effect. The Lowest Toxic Dose Score is derived from the following table:

|  |  |
| --- | --- |
| Dose | Lowest Toxic Dose Score |
|  |
| Less than: 5 mg/kg | 1 |
| 5-50 mg/kg/day | ⅔ |
| Greater than: 50 mg/kg/day | ⅓ |

2) Procedure for Determining the Severity of Effects Score

 The Severity of Effects Score is a number based upon the category of organ(s) affected and the level of effect upon the organ(s).

A) Organ Categories

There are three categories of organs or organ systems which are identified as follows:

i) Category I includes: organs, the impairment or loss of which is fatal or usually cannot be compensated for by the body; gonads, the loss of which prevents the transmission of genetic material; and, adverse reproductive outcome including stillbirth, miscarriage, or reduced litter size (animal studies). The Category I organs are: Lungs, Heart, Brain, Spinal Cord, Kidneys, Liver, Bone Marrow, and Gonads.

ii) Category II includes: organs, the impairment or loss of which may be fatal, but which can be compensated for by drug or replacement therapy; adverse effect on an immune function which may be life threatening; changes in the composition or function of blood constituents which may be life threatening; and, certain fetotoxic effects including premature birth, reduced birth weight, and reduced morphometric parameters. The Category II organs are: Adrenals, Thyroids, Parathyroids, Pituitary, Pancreas, Esophagus, Stomach, Small Intestine, Large Intestine, Lymph Nodes, Thymus, Trachea.

iii) Category III includes: organs, the impairment or loss of which is not life threatening but may result in functional or emotional handicaps; adverse effect on an immune function which is not life threatening; changes in composition or function of blood which are not life threatening but may result in functional handicaps. Category III organs include, but are not limited to: Oviducts, Epididymides, Uterus, Prostrate, Seminal Vesicles, Ductus Deferens, Penis, Vagina, Eyes, Bone, Nose, Peripheral Nerves, Muscles, Urinary Bladder, Blood Vessels, Ears, Gallbladder, Larynx, Mammary Glands, Salivary Glands, Skin, Spleen, Tongue, Teeth, Ureter, Urethra, Pharynx.

B) Levels of Effect

There are four levels of effect: Serious Irreversible ("SI"); Serious Reversible ("SR"); Non-serious Irreversible ("NI"); and Non-serious Reversible ("NR").

i) A serious effect is an incapacitating condition or a condition which significantly contributes to an increase in mortality.

ii) A non-serious effect is a non-incapacitating condition or a condition which is unlikely to contribute to an increase in mortality.

iii) An irreversible effect is one that is permanent or would require medical treatment to correct.

iv) A reversible effect is a temporary effect.

1. Table of Severity of Effects Scores

The Severity of Effects Score for any level of effect observed in an organ belonging to a specified organ category is derived from the following table:

|  |  |  |
| --- | --- | --- |
|  |  | Organ Category |
|  |  | I | II | III |
|  |  |  |  |  |
| Level of Effect | SI | 6 | 5 | 4 |
|  | SR | 5 | 4 | 3 |
|  | NI | 4 | 3 | 2 |
|  | NR | 3 | 2 | 1 |
|  |  |  |  |  |
| No Observed Effect |  | 0 | 0 | 0 |

D) When a study identifies an adverse health effect on multiple organs within the same category at the lowest observed adverse effect level, the Severity of Effects Score is increased by a value of 1. In no event can the Severity of Effects Score be greater than 6.

3) Additional procedures for calculating the Chronic Toxicity Score are described in Section 232.Appendix B.