**Section 391.420 Heavy Metal Loading**

a) Heavy metal loading rates on sludge application projects are limited to prevent significant increases of heavy metals in the food chain, phytotoxicity and water pollution. Generators shall sample their sludge for metals in accordance with Subpart E and accordingly limit annual and total cumulative sludge application rates.

b) Sites which have a lifetime of sludge application less than 5 years due to metal loading rates in Subsection c below shall be identified in a permit application. The Agency shall not issue a permit for sludge application on such sites unless the following items are considered in the application:

1) Groundwater monitoring;

2) Soil monitoring;

3) Plant tissue sampling and analyses;

4) Additional operational controls.

c) Soil cation exchange capacity (CEC) plays a major role in enabling the soil to retain the heavy metals contained in the sludge. Soils having a CEC in the range from 5 to 15 meq/100gm are acceptable for sludge utilization providing sludge application rates do not result in heavy metals being applied to land in excess of those amounts listed in Table II below.

|  |  |  |
| --- | --- | --- |
| TABLE II | | |
|  | | |
| MAXIMUM ACCEPTABLE HEAVY  METAL LOADING RATES OVER  THE LIFE OF A PROJECT SITE  (pounds per acre) | | |
| Metal | Total | Annual |
|  |  |  |
| Pb | 1000 | – |
| Mn | 900 | – |
| Zn | 500 | – |
| Cu | 250 | – |
| Ni | 100 | – |
| Cd | 10 | 2 |

d) There are some areas in Illinois which have low soil CEC (<5 meq/100g) and should be avoided for sludge application whenever possible. If a sludge management plan includes sludge application in these areas, the sludge generator or user shall apply only half of the heavy metal loading rates set forth in Table II.

e) Permits may be issued which allow application of double the amounts listed in Table II providing it is demonstrated that the soil CEC is greater than 15 meq/100g. However, an extensive soil survey must be performed prior to and during the sludge application period to demonstrate the consistency of high soil CEC values at the sludge application site.

f) The Agency may request an applicant to analyze a sludge for elements other than those in Table II and to limit sludge application based on other elements due to potential for groundwater or surface water pollution, phytotoxicity, mammalian toxicity or other environmental concerns. If the Agency determines that metals other than those in Table II should restrict the proposed application rate, the following loading rates shall be utilized for the land application project:

|  |  |  |
| --- | --- | --- |
| TABLE III | | |
|  | | |
| ACCEPTABLE LOADING RATES  (pounds per acre) | | |
| Metal | Total | Annual |
|  |  |  |
| Antimony | 700 |  |
| Arsenic | 100 |  |
| Chromium (trivalent) | 3500 | 89 |
| Chromium (hexavalent) | 440 | 44 |
| Mercury |  | 7 |
| Selenium | 8 |  |
| Silver | 178 |  |

g) If sludge concentrations of molybdenum and/or selenium exceed 4.0 mg/kg (dry weight basis) the Agency shall restrict the crops to be grown on land receiving applications of that sludge or shall restrict the use of crops for livestock forage as necessary to prevent toxicity to livestock.

h) The Agency will consider allowing loading rates greater than those specified in this Section provided the generator or user addresses the following items:

1) Soil testing results with particular attention to plant available metals and phosphorus;

2) Groundwater monitoring results and adjacent groundwater use;

3) Plant tissue sampling and analyses and the ultimate use of the crop;

4) Availability of additional application sites;

5) Hydrogeology of the application site;

6) Operational constraints of the application site;

7) Ultimate use of the application site.