



Section of Emergency Medicine

March 21, 1994

Tim Cash
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Dear Tim,

I am enclosing my comments on the latest corrective action rule. I will fax and mail this to you because of the time frame. I have not thoroughly reviewed the verbal content, but am sure that the industrial representatives will do that. My main comments are on Table 2 of Appendix III. Table 1 appears to be based on EPA's MCLs and I agree with that approach.

The values in Table 2 for metals in soil do not appear to be consistent and are too low in many cases. I refer you to the publication: Shacklette HT, Boerngen JG. Elemental Concentrations in Soils and Other Superficial Materials of the Conterminous United States, U.S. Geological Survey Professional Paper #1270, 1984. Many of the values in Table 2 are very close to the mean concentration of naturally occurring elements in soil in the U.S. Please remember that naturally occurring soil concentrations are not a single value, but are a natural distribution. For example the arithmetic mean concentration of arsenic in soils in the eastern U.S. is 7.4 (geometric mean is 4.8), with a geometric deviation of 2.56. This means that 95% of naturally occurring arsenic concentrations should fall between 0.7 and 31 mg/kg and 68% of the naturally occurring arsenic concentrations should fall between 1.8 and 12.3 mg/kg. Thus with the value of 10 in Table 2, you would be requiring cleanup to levels that could be below naturally occurring ones. It could be entirely feasible that a spill could be 100% removed and new soil brought in and the arsenic concentration in the imported soil could still be above 10. I recommend a cleanup value of 23 mg/kg for arsenic in soil. That is the current EPA RBC value. If you use this, realize that ATSDR still has a value of 15 mg/kg for arsenic as a RMEG. They have been told that this is too low based on too much overlap with naturally

occurring soil concentrations but do not seem to be able to grasp this concept or anything to with statistical variations.

Similar arguments can be raised for other values given in Table 2. I have prepared another Table with the information that I can find in this short time. I personally would be very cautious about requiring cleanup to levels below the 95% range of naturally occurring concentrations. I don't know what to do with situations where the toxicologic reference value is far below the naturally occurring concentrations (beryllium). Another potential problem is lead, which is widely contaminated in urban areas at concentrations many times above those given in the Table. I hope that this is hopeful.

Sincerely,

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Draft of environmental data on natural concentrations of metals in soils and suggested changes to Table 2.

Regulated Substance	EPD Type 1-Soil	Geometric Mean Conc.	Geometric Deviation	Upper 95% Range †	EPA-RBC	Recommended Value (Cox)
all values in mg/kg						
Antimony	2	0.52	2.38	3	31	3
Arsenic	10	4.8	2.56	31	23	23
Barium	500	290	2.35	1600	5500	1600
Beryllium	2	0.55	2.53	3.5	0.15	
Cadmium	2	0.15*			39	2
Chromium	100	33	2.6	220	390	220
Cobalt	20	5.9	2.57	39		40
Copper	100	13	2.8	102	2900	100
Lead	75	14	1.95	53		75
Mercury	0.5	0.081	2.52	0.5	23	0.5
Nickel	50	11	2.64	77	1600	75
Selenium	1	0.3	2.44	1.8	390	2
Silver	1	0.13*			390	2
Thallium	2	0.3-0.7			6.3	6
Vanadium	50	43	2.51	270	550	250
Zinc	100	40	2.11	44		50

*Arithmetic mean, no standard deviation available.

† Geometric mean*(geometric deviation)²