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Fish Toxicity testing for Soil Guard® Bonded Fiber Matrix

In December of 1993, the liquid portion of Soil Guard® was tested for fish toxicity and the impact on water quality. The tests were done by the Environmental Science and Technology Division at the Weyerhaeuser Analytical Laboratory in Federal Way, WA.

In particular, Weyerhaeuser conducted some acute rainbow trout toxicity tests on the liquid portion of Soil Guard®. It was discussed that expectations of this liquid in its undiluted form would not support fish. This expectation was based on the high viscosity of Soil Guard® (the thick solution would prevent fish movements) and the fact that most chemicals at high enough concentration exert a toxic effect; even naturally occurring chemicals such as alcohol, sugar and salt exert a toxic or preservative effect at high concentration. The goal of the testing then was to establish a practical dilution ration at which the Soil Guard® liquid would exert no toxic effect in the acute rainbow trout toxicity test.

Experimental Procedure

The liquid portion of a fresh mix of Soil Guard® was separated from the fibrous component by filtering through an inert gauze material. This liquid was diluted with varying amounts of fresh water and the resultant solutions were each tested in accordance with WDOE 80-12, rev.6/91 static acute fish toxicity test. In this test the mortality of ten fingerlings of rainbow trout is tracked for a period of four days.

Results

It was observed that when the Soil Guard® liquid was diluted by a factor of 2.8 or greater (e.g., 1 gallon Soil Guard® liquid diluted with 2.8 gallons water) that all ten fish survived the four day testing period.

Conclusions

This test indicated that only a modest dilution of the Soil Guard® liquid component is necessary to achieve maximum survival rate in this acute fish toxicity test. The nitrogen level is 0.02% of the total by weight. This makes the product of beneficial use for land application. The metals were all at least two orders of magnitude below the existing limits. The volatile organics were well below the guidelines. Attached are the results of the analysis.

You can reach the Weyerhaeuser lab at 253-924-6640. Contact person is Marie Chesser.

Results Of Chemical Analysis Of Soil Guard ® For Various Constituents

Federal Leachate Limits For Reference Only:

- 1) Toxicity Characteristic Leaching Procedure (TCLP)
- 2) Land Application Criteria (LAC)

Constituent	Analytical Results - ppm	TCLP-ppm	LAC-ppm
Silver	<0.001	5	NA
Arsenic	<0.1	5	41
Barium	0.2	100	NA
Cadmium	<0.01	1	39
Chromium	<0.01	5	1,200
Copper	0.05	NA	1,500
Mercury	<0.001	0.2	17
Molybdenum	<0.01	NA	18
Nickel	<0.03	NA	210
Lead	<0.05	5	300
Selenium	<0.2	1	36
Zinc	0.11	NA	2,800
Vinyl Chloride	<0.10	0.2	0.525
1, 1-Dichloroethylene	<0.10	0.7	11.6
Chloroform	<0.10	6	1.24
Carbon Tetrachloride	<0.10	0.5	35.2
1, 2-Dichloroethane	<0.10	0.5	20
Methyl Ethyl Ketone	0.4	200	NA
Trichloroethylene	<0.10	0.7	0.84
Benzene	<0.10	0.5	5.3
Tetrachloroethylene	<0.10	0.7	0.84
Chlorobenzene	<0.10	100	0.15
Nitrogen	0.02%	Beneficial Use	Beneficial Use
Formaldehyde	39	No # limits at this time	

Soil Guard ® Water "Land Application Criteria"

TCLP Report SR# 13085

ND = Not Detected above the
Quantitation Limit Listed

E.P.A.	Constituent	Soil Guard Water (mg/L)	Quantity Limit (mg/L)	(TCLP) Maximum (mg/L)
012	Insecticides/Herbicides Endrin	ND	0.0001	0.02
013	Lindane	ND	0.00005	0.40
014	Methoxychlor	ND	0.0005	10.00
015	Tozaphene	ND	0.005	0.50
016	2,4-D	ND	0.04	10.00
017	2,4,5-TP Silvex	ND	0.001	1.00
	Semivolatiles			
023	o-Cresol	ND	0.05	200.00
024	m-Cresol	ND	0.05	200.00
025	p-Cresol	ND	0.05	200.00
026	Cresols	ND	0.15	200.00
027	1,4-Dichlorobenzene	ND	0.05	7.50
031	2,4-Dinitrotoluene	ND	0.05	0.13
032	Hezachlorobenzene	ND	0.05	0.13
033	Hexachlorobutadiene	ND	0.05	0.50
034	Hezachloroethane	ND	0.05	3.00
036	Nitrobenzene	ND	0.05	2.00
037	Pentachlorophenol	ND	0.12	100.00
038	Pyridine	ND	0.05	5.00
041	2,4,5- Trichlorophenol	ND	0.12	400.00
042	2,4,6- Trichlorophenol	ND	0.05	2.00