ON SITE
TECHNOLOGIES, LTD.

BIODEGRADABILITY REPORT

SUBMITTED BY

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AND

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The U.S. Environmental Protection Agency recently established a set of regulations to govern the use of sorptive materials in Hazardous Waste Land Fills (Federal Register / Vol. 57. No. 233) it is very important to clarify that the intent of this new body of regulations and rules apply only to Hazardous Waste Land Fills and does not apply to other levels of land fills (Federal Register / Vol. 57 No 233)

ENVIRONMENTAL PROTECTION
AGENCY
40 CFTL Parts 260. 264. 265 and 271
IF AL -45-06-J1
AMN 2-050-AAJ4

Hazardous Waste Management
Liquids in Landfills

Agency Land Federal Projection
Agent:
Action: Final rule

Summary: Under authority of the Resource Conservation and Recovery Act [RCRA] as amended by the Hazardous and Solid Waste Amendments of 1954 [HSWA]. EPA is promulgating this final rule regarding the landfill disposal of containerized liquids mixed with sorbents. This rule satisfies the statutory requirement that EPA issue a rule that prohibits the disposals in hazardous waste landfills of liquids that have been sorbed in materials that biodegraded of that release liquids when compressed as might occur during routine landfill operations. This rule will help assure the stability of materials in hazardous waste landfills.

Recent articles have indicated that this new EPA ruling applied to all land fills. This is a gross error and this EPA law does not apply to Sanitary Land Fills nor incineration Regulations for Sanitary Land Fills are developed within each state and in some states. Even at the county level

The ideal sorbent would have three basic characteristics. First, the sportive material, by some mechanism, should bind large quantities of hazardous substance (high binding capacity). The second characteristic is that the binding of the hazardous compound(s) to the sorbent molecules must be sufficiently tight as to prevent movement as the toxic material from the sorbent under the pressures that might be experienced in routine hazardous landfill operations (non Leaching). The final important characteristic for an absorbent in hazardous landfill use is that if be non-biodegradable. This means that the absorbent will not break down in hazardous landfill when it is exposed to microorganism founds there. It is interesting that biodegradable is a desirable characteristic in a sanitary and land fill and undesirable in a hazardous land fill. In the hazardous land fill if the sorbent degrades, then the hazardous material is released much the same as in leaching free flowing liquids are the major problem in hazardous land fills.

In Summary, an ideal sportive material for hazardous waste use would have a high binding capacity, non-leaching properties and would be non-biodegradable. There are three tests that measure these properties. The paint filter test measures the sorption capacity (ASTM Method 9095), the liquids release test measures leaching and either ASTM G21-70(1984a) or ASTM G22-76(1984b) measures biodegradability using fungi or bacterial, respectively. In the new regulations (Federal Register / Vol. 57. 223), EPA chose to only use criteria #1 and #3. Sorptive capacity (Paint filter test) and biodegradability to evaluate sorptive materials.

Several types of sorbents are available on the market and none of these are ideal, based on the evaluation of the three ideal characteristics. The two groups of absorbents which easily qualify under the new regulations are synthetic polymers, such as polypropylene and diatomaceous earth (clays). It is interesting that neither of these two would perform well under routine land fill operations since both have relatively low absorptive capacity and leach readily, that is score poorly on the liquids release test (see Table1). ***Spahg Sorb***, a peat-derived product, performs well on all three tests (see Table1)

The biodegradation discussion in the new ruling would indicate the peat-derived products would be considered biodegradable because they have biological origin. The ***Sphag Sorb*** can be considered non-biodegradable because of it's large molecular mass. ***Spahg Sorb*** is derived from peat, but is dehydrated and sized to yield a very dry (<10% water) uniform product. The drying induces cross linking between the polymeric chains which make up peat decreasing the probability of significant biodegradation.

Table 1 summarizes the relative merits of some absorbents available today. Looking at the paint filler (capacity), liquids release (leaching) and biodegradation test, ***Sphag Sorb*** is clearly the best performing sorbent. The biodegradaton studies (ASTM G22-76 [1984b]) have been completed recently and show conclusively that ***Sphag Sorb*** can be considered as non-biodegradable. From the measured comparative data, it is clear that ***Spahg Sorb*** out performs it's sorptive competitors and is overwhelmingly superior for hazardous waste as well as for non-hazardous waste disposal. It is also apparent that if you use the criteria listed in the summary of this new EPA ruling, that of the currently available sorbents, only ***Spahg Sorb*** clearly meets all criteria. Polypropylene and Diatomaceous Earth barely pass the pain filter test and bid only one-fifth of the oil that ***Sphag Sorb*** can. Both leach easily and both have positive characteristic that they are non-biodegradable.

Respectfully Submitted,

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Table 1

SORBENT EVALUATIONS

Sorbent	Capacity[1] W / W		Leaching[2]		Biodegradation[3]
	Oil	Gas	Oil	Gas	
Diatomaceous Earth (Clay)	1:1	fail	failed	failed	Pass
Polypropylene	1:1	fail	failed	failed	Pass
Sphag Sorb	1:5	1:3:5	passed	passed	Pass
Corn Cob Particle	1:1	fail	failed	failed	Fail

[1] Passed Paint Filter test at 1:1
[2] Liquids Release test (pass/fail) conditions; 1:1 – Sorbent, Oil 40 PSI, 5 minute interval (gasoline under same conditions).
[3] Based on Federal Register / Vol. 57, No. 233