



Department of Environmental Protection

Jeb Bush
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

November 1, 2001

Mr. John Brinkman, President
Imbibitive Technologies America, Inc.
4800 James Savage Road
Midland, Michigan 48642-6528

Re: Imbiber Beads

Dear Mr. Brinkman:

The Bureau of Petroleum Storage Systems hereby accepts Imbiber Beads as an innovative product for in situ and ex situ absorption of petroleum contaminants from groundwater at contaminated sites in Florida, pursuant to Chapter 62-770, Florida Administrative Code. As the information you provided indicates, the beads are predominantly composed of alkylstyrene copolymer, but they also contain some polyolefin and less than 1 percent kaolin clay to retard static, and are capable of absorbing organic liquids in quantities up to 27 times their own volume. They do not absorb water. Enclosure 1 contains additional information about Imbiber Beads that the bureau would like to pass along to readers of this letter.

This acceptance is applicable to the remediation of petroleum-contaminated sites within the regulatory jurisdiction of this bureau, which is primarily the cleanup of subsurface petroleum contaminants in groundwater and soil, typically from leaking underground storage tanks at gasoline service stations. For applications that are not within our jurisdiction, it is possible that other bureaus within the Florida Department of Environmental Protection, or other state agencies in Florida may honor this acceptance letter if it meets their needs and regulatory requirements. If not, then at the least, they may find the information herein helpful in identifying additional considerations that need to be taken into account before Imbiber Beads are used for applications within their jurisdiction.

Submitters of site-specific Remedial Action Plans that propose the use of Imbiber Beads may place a copy of this letter in the appendix of their plans, so that technical reviewers throughout the state will be informed that the bureau has evaluated the acceptability of the product from a regulatory standpoint. There is, however, no requirement that any product or process first obtain an acceptance letter to be proposed in a site-specific remediation plan, so long as sufficient information is included in the plan to show that it meets all applicable and appropriate regulations.

While the bureau does not endorse specific or brand name remediation products or processes, it does recognize the need to determine their acceptability from an environmental standpoint with respect to applicable rules and regulations, and the interests of public health, safety and welfare. Vendors must then market the products and processes on their own merit regarding

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performance, cost and safety in comparison to competing alternatives in the marketplace. In no way, however, shall this regulatory acceptance letter be construed as certification of product or process performance.

The bureau reserves the right to revoke its acceptance of a product or process if any aspect of its nature, components, constituents, or performance has been falsely represented. Additionally, bureau acceptance of any product or process does not imply it has been deemed applicable for all cleanup situations, or that it is preferred over other treatment or cleanup techniques in any particular case. A site-specific evaluation of applicability and cost-effectiveness must be considered for any product or process, whether conventional or innovative, and adequate site-specific design details must be provided in Remedial Action Plans prescribing the product or process. You may contact me at (850) 487-3299 if there are any questions.

Sincerely,

Rick Ruscito, P.E.
Bureau of Petroleum Storage Systems

c: Jim Watkins
Imtech - Southeast
P.O. Box 29486
Atlanta, Georgia 30359

Tom Conrardy - PCS3, Tallahassee

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ENCLOSURE 1

ADDITIONAL INFORMATION ABOUT IMBIBER BEADS

1. Description: The Material Safety Data Sheet for Imbiber Beads indicates they are predominantly composed of cross-linked alkylstyrene copolymers, but they also contain some polyolefin and less than 1 percent kaolin clay to retard static. Bead diameter ranges from 200 to 300 microns, which is equivalent to approximately .008 to .012 inches, and they have a specific gravity of less than 1.0. They are capable of absorbing organic liquids in quantities up to 27 times their own volume, depending on the type of organic liquid, and swell to 3 times their original diameter in the process. The absorption is selective, allowing only organic liquid to enter the bead, but not water. They are available in packets, pillows, blankets, cartridges, floating booms, and mini booms.
2. Absorption times: The manufacturer provides information about the absorption times for a list of organic liquids. For the following petroleum products, the approximate absorption times are as follows: gasoline, 10 minutes or less; #2 diesel, 15 minutes or less; and motor oil, more than 15 minutes. Per discussion with a manufacturer's representative, it is suggested that an absorption capacity of only 16 times the volume of the beads be used for diesel, rather than 27. Also, the representative indicated that Imbiber Beads can absorb motor oil, but the user should understand that more time will be needed, and this should be taken into account before selecting Imbiber Beads for such an application.
3. Disposal of used beads: The onus shall be on the user of Imbiber Beads to properly dispose of spent Imbiber Beads from remediation sites in Florida, taking into account the physical and chemical properties of the fluid that was absorbed. A list of Class I, Class II (and Class III if lined) landfill sites in Florida that may accept petroleum-contaminated soil for disposal is available at web page www.dep.state.fl.us/waste/categories/pcp/default.htm. Any local requirements that also apply should be observed. And in cases where Imbiber Beads are used to adsorb organic liquids other than petroleum, the user is responsible for determining whether the absorbed material meets the definition of hazardous waste and must manage the waste in accordance with applicable regulations of state and local authorities.

Spent beads can also be disposed by incineration, provided that incineration of the absorbed liquid does not create a hazard and applicable air emission regulations can be met. For incineration of spent beads as a fuel (e.g. to fire a cement plant) it may be helpful to know that burning of the beads alone will yield approximately 17,000 BTUs per pound.
4. Retention of absorbed liquids: The manufacturer indicates that because absorbed organic liquids physically diffuse into the Imbiber Beads' polymer structure, rather than reside on the surface, there is no release of liquid once it is absorbed. Neither gravitational pull nor compression will cause a release of the liquid, nor will leaching occur in the presence of water. Additionally, if a bead is cut or broken, it will not release the liquid it has absorbed. There will, however, be some vapor that is released, depending on the vapor pressure of the

liquid absorbed. For this reason, the manufacturer provides vapor containment bags for the handling of spent beads.

5. Citations: It is indicated that Imbiber Beads meet ASTM Performance Standard F716 for Absorbents. The standard defines an absorbent as a "material that picks up and retains a liquid distributed throughout its molecular structure causing the solid to swell (50% or more). The absorbent is at least 70% insoluble in excess liquid".

In Canada, an Environmental Technology Verification (ETV) Program Technology Fact Sheet was issued after tests were conducted to verify the performance of Imbiber Beads. The ETV Program indicated that the beads did perform as stated by the manufacturer when tested on xylene and #2 diesel fuel. The beads immobilized the xylene and the diesel, and did not release any absorbed liquid when flattened to twice their swollen diameter. A review of Imbiber Beads was also conducted by the US EPA's Office of Solid Waste and Emergency Response. A letter was issued by that office on December 11, 1995 indicating that the product met the definition of a sorbent as specified in Title 40 of the Code of Federal Regulations, sections 300.5 and 300.915(g) of the National Contingency Plan.

6. A clear warning: The manufacturer, in its Material Safety Data Sheet, indicates that Imbiber Beads do not change the properties of the fluid that is imbibed, with the exception of mobility. The MSDS clearly states: "If the fluid is toxic - the imbibed units should be considered toxic. If the fluid is flammable - the imbibed units should be considered flammable". Heed this warning when handling and disposing spent Imbiber Beads. A reminder note is also provided about the potential incompatibility of some chemical combinations, and that it is not a good practice to use oxidizing materials in contact with high surface area organic products. Presumably, the high surface area organic is the Imbiber Beads themselves, but it should also be remembered that the organic liquids absorbed by Imbiber Beads, including petroleum, will react with oxidizing agents.
7. Fire safety: Useful and simply worded fire and other safety information about Imbiber Beads is included in literature from the manufacturer. The Bureau of Petroleum Storage Systems suggests that users read this information for themselves but provides some highlights here. Imbiber Beads will not entirely eliminate a vapor hazard but will minimize it to a point where it may be less of an inhalation problem to personnel and less of a fire hazard in the case of flammable substances imbibed.

The beads have the beneficial effect of reducing fire hazard by raising the flash point of flammable liquids that are imbibed. In the case of flash point testing by Cleveland Open Cup, the flash point of a #2 fuel oil sample was raised 36°C, from 95°C for the unimbibed baseline sample to 131°C of the imbibed sample at a weight ratio of oil to Imbiber Beads of 6:1. For gasoline, however, the manufacturer points out that its flash point is so low (the literature reports it as approximately -43°C) that even a 24°C increase by imbibing it would only bring it to -16°C. For this reason, when working with gasoline in a confined space, it is recommended that a nitrogen purge be used to avoid explosions.

8. Possible uses: The Bureau of Petroleum Storage Systems believes there are potential applications for Imbiber Beads in the cleanup of petroleum contaminated sites pursuant to Chapter 62-770, F.A.C. Aside from the obvious application of absorbing free product from either a well or the surface of water that has filled an excavation pit, there may be cases where it may serve to protect equipment items in a groundwater treatment system. Specifically, the Imbiber Beads may have the potential to prevent fouling of the equipment items by either replacing or augmenting a conventional oil/water separator that does not adequately separate an emulsion. Users are encouraged to identify other potential applications.