

November 9, 1998

Mr. John M. Glover  
Matrix Environmental Technologies  
P.O. Box 427  
Orchard Park, New York 14127-0427

Re: **Matrix Oxygen Injection System**

Dear Mr. Glover:

The Bureau of Petroleum Storage Systems hereby accepts the Matrix Oxygen Injection System as an innovative product for either in situ or ex situ biodegradation of petroleum contaminants in groundwater. At the heart of the trailer-mounted system is an AirSep AS80 pressure swing adsorption oxygen generator, capable of producing up to 80 standard cubic feet per hour (scfh) of oxygen at 95 percent purity. The system includes a 60-gallon receiver tank, and the oxygen can be pulse sparged into the groundwater via injection points at rates typically in the range of 7 to 16 cubic feet per minute per injection point, thereby raising the concentration of dissolved oxygen in the groundwater to the 6 to 20 parts per million range, as indicated in case histories.

The bureau recognizes the Matrix Oxygen Injection System as a viable product for the bioremediation of petroleum contaminated sites in Florida. There are no objections to its use provided a Remedial Action Plan for the cleanup of petroleum contamination, pursuant to Chapter 62-770, F.A.C., is approved by the Department.

While the Department of Environmental Protection does not provide endorsement of 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. Vendor's must then market the products and processes on their own merits regarding performance, cost, and safety in comparison to competing alternatives in the marketplace.

For the Matrix Oxygen Injection System, like any other equipment item used for the remediation of petroleum contaminated sites, the Department expects that all appropriate safety precautions and codes associated with the design and operation of electrical equipment and machinery, fire safety, the use of chemicals and their compatibility with other chemicals, and the personal protection of workers and passersby will be observed. In general, the design of equipment items such as the Matrix system should include automatic shutdown features in the event of power failure or unsafe operating conditions, pressure relief devices, and other safety features as necessary.

Preparers of Remedial Action Plans are advised to include a copy of this letter in the appendix of plans they submit, and call attention to it in

Mr. John M. Glover  
November 9, 1998  
Page Two

the text of their document. In this way, technical reviewers throughout the state will be informed that you have contacted the Department of Environmental Protection to inquire about the environmental acceptability of this product. Additionally, to aid those reviewers, it may be helpful to know that oxygen itself is not flammable but that it is necessary for the combustion of other materials. Also, the dissolution of as much as 20 milligrams per liter [which is equivalent to 20 parts per million (ppm) by weight] of oxygen in water at 20 °C should be achievable in a number of applications, as this is the practical solubility cited by some sources in the literature. Other sources indicate a higher solubility, which in the opinion of the Bureau of Petroleum Storage Systems would be beneficial to bioremediation if achieved, although 20 ppm is quite satisfactory. If necessary, reviewers can find more information about oxygen's physical properties, toxicology, and compatibility with other chemicals in publications such as "Dangerous Properties of Industrial Materials" by N. Irving Sax. Overall, however, the bureau believes that the use of the Matrix system for the production and injection of oxygen for bioremediation purposes does not pose risks to the environment and public safety that are any greater than those associated with other types of petroleum remediation equipment and products already in use.

The Department reserves the right to revoke its acceptance of any product or process it has accepted if the nature or composition of either or any of its principal and proprietary ingredients, its performance, or any other aspect has been falsely represented. Additionally, Department 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 a Remedial Action Plan. You may contact me at 850/487-3299 if there are any questions.

Sincerely,

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

cc: T. Conrardy - FDEP/Tallahassee

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