Department of
Environmental Protection

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

Jeb Bush
Governor

Colleen M. Castille
Secretary

May 2, 2005

Mr. Barney Cherry
International BioTech, Inc.
P.O. Box 6978
Seffner, Florida 33583

Re: **Environmental Reserves (ER)**

Dear Mr. Cherry:

The Bureau of Petroleum Storage Systems hereby accepts Environmental Reserves (ER) for the bioremediation of petroleum contaminants in soil and groundwater, in situ or ex situ. As indicated, ER is a three-component system consisting of ER Microbial Consortia, ER Biocatalyst Nutrient, and ER Controlled-Release Oxygen Generator (named CRO_2).

This acceptance applies only to the regulatory jurisdiction and the remediation needs of the Bureau of Petroleum Storage Systems, which is primarily the cleanup of subsurface petroleum contamination pursuant to Chapter 62-770, Florida Administrative Code (F.A.C.). Other state agencies and local governments may choose to recognize this acceptance if their needs and regulations are similar. This Bureau, however, is not responsible for applications beyond its jurisdiction.

For vadose remediation, where the underlying groundwater will not be affected by the leaching of ER, there are no special concerns beyond those that would normally need to be addressed in preparing a Remedial Action Plan and conducting a cleanup in accordance with Chapters 62-770 and 62-777, F.A.C. However, for in situ groundwater remediation, via direct injection of ER into an aquifer, there are underground injection control regulations that must be observed. Since injection-type, in situ aquifer remediation is likely to be a common application of ER, the bulk of the regulatory requirements discussed herein will be directed to that topic.

The Bureau recognizes ER as a viable product for the remediation of petroleum contaminated sites in Florida. There are no objections to its use provided: (a) the considerations of this letter are taken into account; (b) a site-specific Remedial Action Plan is submitted pursuant to Chapter 62-770, F.A.C., and approved by the Department for each site where the use of ER is proposed; and (c) pH of the groundwater is addressed and monitored pursuant to Rule 62-522.300(2)(c), F.A.C. Some major regulatory considerations that apply to ER are discussed in Enclosure 1.

While the Department of Environmental Protection does not provide endorsement of specific remediation products or processes, it does recognize the need to determine their acceptability from an environmental regulation standpoint, and the interests of public health and safety. Vendors must then market the products and processes on their own merits regarding performance, cost, and safety in comparison to competing alternatives in the marketplace. In no way, however, shall this regulatory acceptance letter be construed as Department certification of performance. Additionally, the Department emphasizes a distinction between its regulatory "acceptance" letters and an approval. Products and processes are accepted but they are not approved.

Also, it is not a requirement that a particular remediation product or process have an official acceptance letter in order for it to be proposed in a site-specific Remedial Action Plan. The plan, however, must contain sufficient information about the product or process to show that it meets all applicable and appropriate rules and regulations.

Those who prepare Remedial Action Plans are advised to include a copy of this letter in the appendix, and call attention to it in 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 acceptability of ER. To aid those reviewers, the Bureau of Petroleum Storage Systems provides supplemental information as Enclosure 2.

The Department reserves the right to revoke its acceptance of a product or process if it 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. Please contact Rick Ruscito at (850) 877-1133, extension 29, if there are any questions.

Sincerely,

Rick Ruscito, P.E.
Ecology and Environment, Inc.
Bureau of Petroleum Storage Systems
Petroleum Cleanup Section 6

Rebecca S. Lockenbach
FDEP Section Leader
Bureau of Petroleum Storage Systems
Petroleum Cleanup Section 6

enc: (1) Regulatory Information
(2) Supplemental Information
(3) Underground Injection Control Memorandum

c: T. Conrardy – FDEP, Tallahassee/MS 4530

ENCLOSURE 1

REGULATORY INFORMATION

a. Groundwater regulations and cleanup standards: The onus shall be on users of ER to ensure that all applicable groundwater standards are met at the time of project completion, for the contaminants of concern, any residuals associated with the ingredients of ER, and any byproducts produced as a result of chemical or biochemical reactions involving those ingredients. The following chapters of the Florida Administrative Code are cited: Chapter 62-550, F.A.C., for primary and secondary water quality standards; Chapter 62-520, F.A.C., for groundwater classes and standards; Chapter 62-522, F.A.C., for groundwater permitting and monitoring requirements; Chapter 62-528, F.A.C., for underground injection control, particularly Part V, for Class V, Group 4 aquifer remediation projects; and Chapter 62-777, F.A.C., for cleanup target levels.

   A noteworthy aspect of the minimum criteria set forth in Chapter 62-520, F.A.C., is that it requires groundwater to be free from substances that are harmful to plants, animals, and organisms, and free from substances that are carcinogenic, mutagenic, teratogenic or toxic to human beings. In effect, these "free from" requirements form a catchall. They close what would otherwise be a loophole in the regulations by preventing injection of a potentially harmful product in the event that any of its ingredients is not regulated as a specific primary or secondary drinking water contaminant.

b. pH considerations for injection-type applications of ER: The Bureau of Petroleum Storage Systems, having considered the ER Oxygen Generator component of the ER system, believes the requirements of Rule 62-522.300(2)(c), F.A.C., should be applied to pH. In order to comply with this rule, those who prepare Remedial Action Plans must indicate for pH in their plans: (a) the size of a temporary injection zone of discharge (i.e. radius of influence from each injection point; (b) the period of time for which a temporary zone of discharge is needed; and (c) a monitoring schedule. The secondary groundwater for pH is range 6.5 to 8.5. By the expiration of the time period of the temporary zone of discharge, the pH of the groundwater must be in the 6.5 to 8.5 range, or be no worse than the natural-occurring, background level of pH at the site, whichever is less stringent.

c. Injection well permit: The issuance of a site-specific Remedial Action Plan Approval Order by the Department for injection-type aquifer remediation using ER constitutes the granting of a Class V injection well permit. [Ref. Chapter 62-528, F.A.C.]

d. Utilization of wells: If a remediation site happens to have an abundance of monitoring wells, then the Department has no objection to the use of some wells as injection points for ER. However, no "designated" monitoring well, dedicated to the tracking of remediation progress (by sampling) shall be used as an ER injection point. This will avoid premature conclusions that the entire site meets cleanup goals. By making sure that designated tracking wells are not also used for treatment, there will be more assurance that the treatment process has permeated the entire site and that it did not remain localized to the area immediately surrounding each injection well.

e. Underground injection control inventory: Remedial Action Plans proposing injection-type, in situ aquifer remediation shall include information pursuant to Rule 62-528.630(2)(c)1 through 6, F.A.C., for the inventory purposes of underground injection control. Per Rule 62-528.630(2)(c), F.A.C., aquifer remediation projects involving injection wells may be authorized under the provisions of a Remedial Action Plan, provided the construction, operation, and monitoring requirements of Chapter 62-528, F.A.C., are met. A memorandum outlining the inventory information about injection-type aquifer remediation projects to be transmitted by Department reviewers to the Underground Injection Control Section is provided as Enclosure 3.

f. Avoidance of migration: For injection-type, in situ aquifer remediation projects, injection of ER shall be performed in such a way that no undesirable migration of either its ingredients or the contaminants of concern in the aquifer results, pursuant to Rule 62-528.630(3), F.A.C.

g. Abandonment of wells: Upon issuance of a Site Rehabilitation Completion Order, or a declaration of "No Further Action", injection wells shall be abandoned pursuant to Section 62-528.645, F.A.C. The Underground Injection Control Section of the Department shall be notified so that ER injection wells can be removed from the inventory-tracking list.

ENCLOSURE 2

SUPPLEMENTAL INFORMATION

a. Department of Environmental Protection reviewers of injection-type, in situ aquifer remediation plans, regardless of whether in Tallahassee or district offices, must complete the Enclosure 3 memorandum, whose subject is "Proposed Injection Well(s) for In Situ Aquifer Remediation at a Remedial Action Site". The completed form must be submitted to the Underground Injection Control Section at 2600 Blair Stone Road, Tallahassee, Florida, 32399-2400.

b. Microorganisms: The ER Microbial Consortia is provided in either a powdered or liquid form, and Environmental Reserves Incorporated indicates that the microorganisms are naturally occurring and not genetically engineered.

c. Nutrients: The ER Biocatalyst Nutrient is provided as either a powder or a liquid, and contains biodegradable materials derived from B vitamins, soy-based amino acids, and plant-based sugars. At the request of the Bureau of Petroleum Storage Systems, samples were analyzed for ammonia nitrogen. The "as-shipped" liquid concentrate of the nutrient formula contained 1.3 milligrams per liter (mg/L) of ammonia nitrogen. However, the nutrient formula will not be applied at full strength, but rather diluted first with water at a 10:1 volumetric ratio. The result of an ammonia nitrogen analysis of the 10:1 diluted formula was 0.64 mg/L. In the case of ER Biocatalyst Nutrient, both the concentrate and the diluted solution meet the current maximum allowable 2.8-mg/L ammonia nitrogen standard for groundwater that is set by Chapter 62-777, F.A.C.

d. Oxygen source: The Material Safety Data Sheet for the ER CRO_2 Oxygen Generator identifies it as a powder that contains <3% calcium, <.05% magnesium, and bionutrients. Environmental Reserves Incorporated indicates that it provides oxygen from 2 to 6 weeks as microorganisms utilize the bionutrients.

e. Dosage: The Bureau of Petroleum Storage Systems suggests that prospective users of ER contact Environmental Reserves Incorporated for advice on how to determine a site-specific dosage of ER per cubic yard of contaminated media, and also for advice in regard to frequency of application.

f. pH considerations for non-injection-type applications of ER: For non-injection-type applications, such as the addition of ER to groundwater exposed by an open excavation pit, it is not necessary to notify the Underground Injection Control Section. However, the groundwater should still be monitored in order to demonstrate that the ER Oxygen Generator has had either no effect at all on the pH of the groundwater, or only a temporary effect.

ENCLOSURE 3

Florida Department of

Memorandum **Environmental Protection**

TO: Richard Deuerling, Mail Station 3530
Division of Water Facilities
Underground Injection Control Section
Florida Department of Environmental Protection
2600 Blair Stone Road, Tallahassee, FL 32399-2400

FROM: _____
_____
_____

DATE: _____

SUBJ: **Proposed Injection Well(s) for In Situ Aquifer Remediation at a Remedial Action Site**

Pursuant to Rule 62-528.630(2)(c), F.A.C, inventory information is hereby provided regarding the proposed construction of temporary injection well(s) for the purpose of in situ aquifer remediation at a contaminated site.

Site name: _____
Site address: _____
City/County: _____
Latitude/Longitude: _____
FDEP Facility Number: _____

Site owner's name: _____
Site owner's address: _____
_____
_____
_____

Well contractor's name: _____ (Note 1.)
Well contractor's address: _____
_____
_____
_____

Brief description of the in situ injection-type aquifer remediation project:

_____
_____

Summary of major design considerations and features of the project:

Areal extent of contamination (square feet): _____
Number of injection wells: _____
Composition of injected fluid (Note 2)
(ingredient, wt. %): _____
_____
_____

Injection volume per well (gallons): _____
Single or multiple injection events: _____
Injection volume total (all wells, all events): _____

Site name: _____
FDEP facility no.: _____

A site map showing the areal extent of the groundwater contamination plume, and the location and spacing of injection wells and associated monitoring wells is attached.

The following is a summary description of the affected aquifer:

Name of aquifer: _____
Depth to groundwater (feet): _____
Aquifer thickness (feet): _____

The injection well(s) features are summarized below, and/or a schematic of the injection well(s) is attached.

Direct-push or Conventional *(circle the appropriate well type)*
Diameter of well(s) (i.e., riser pipe & screen)(inches): ____
Total depth of well(s) (feet): _____
Screened interval: _____ to _____ feet below surface
Grouted interval: _____ to _____ feet below surface
Casing diameter, if applicable (inches): _____
Cased depth, if applic.: _____ to _____ feet below surface
Casing material, if applic.: _____

The in situ injection-type aquifer remediation plan for this contaminated site is intended to meet the applicable groundwater cleanup criteria set forth in Chapter 62-777, F.A.C., for the contaminants of concern. Additionally, all other groundwater standards will be met at the time of project completion for any residuals associated with the ingredients of the injected remediation products, and any by-products or intermediates produced as a result of the chemical or biochemical transformation of those ingredients or the contaminants of concern during their use. Applicable primary and secondary drinking water standards are set forth in Chapter 62-550, F.A.C., and additional groundwater quality criteria are set forth in Chapter 62-520, F.A.C.

The remediation plan estimates that site remediation will take _____ months. We will notify you if there are any modifications to the remediation strategy that will affect the injection well design or the chemical composition and volume of the injected remediation product(s).

The proposed remediation plan was approved on _____ by an enforceable approval order. A copy is attached. The remediation system installation is expected to commence within 60 days. Please call me at _____ if you require additional information.

_____

Note 1. If an injection well installation contractor has not yet been selected, then indicate the name and address of the project's general remediation contractor/consultant.

Note 2. Complete chemical analysis of injected fluid is required by Chapter 62-528, Florida Administrative Code. Proprietary formulations shall make confidential disclosure. Injected fluids must meet drinking water standards of Chapter 62-550, F.A.C., unless an exemption or variance has been granted.