Florida Department of Environmental Protection

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2600 Blair Stone Road
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Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Jonathan P. Steverson
Secretary

April 14, 2016

Via Electronic Mail
sgans@pathwaybiologic.com

Stephen Gans
Pathway BioLogic, LLC
111 East Tever Street
Plant City, Florida 33563

Re: **Repair**

Dear Mr. Gans:

The Florida Department of Environmental Protection's Division of Waste Management (Division) hereby accepts Repair, a three-component system consisting of microbial consortia, a biocatalyst nutrient, and a controlled-release oxygen generator for the remediation of petroleum and other suitable contaminants in groundwater and soil, in-situ and ex-situ.

Repair, formerly known as Environmental Reserves and associated with Environmental Reserves Incorporated, was originally accepted by the Division on April 24, 2005. The formulation has not changed since that time, with the exception of the some changes in the microbial mix, but the name of the firm is now Pathway BioLogic LLC, and the numbering of some of the applicable Florida Administrative Code rules has changed as well.

This acceptance applies only to the regulatory jurisdiction and the remediation needs of the Petroleum Restoration Program (PRP), which is primarily the cleanup of subsurface petroleum contamination pursuant to Chapter 62-780, 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, but this Program is not responsible for applications beyond its jurisdiction.

For vadose remediation, where the underlying groundwater will not be affected by the leaching of Repair, 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 62-780 and 62-777, F.A.C. However, for in situ groundwater remediation, via direct injection of Repair into an aquifer, there are underground injection control regulations that must be observed. Since injection-type, in situ aquifer remediation is likely to be the most common application of Repair, the bulk of the regulatory requirements discussed herein will be directed to that topic. Enclosure 1 contains regulatory information. Enclosure 2 contains supplemental information.

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 and safety. Upon receipt of an acceptance, vendors must market their product or process on its own merits regarding performance, cost, and safety in comparison to competing alternatives in the marketplace. This acceptance letter shall not be construed as an approval of the product or a certification of its performance.

It is not a requirement that a remediation product or process obtain an acceptance from the Department in order to be proposed for use in a site-specific Remedial Action Plan, but the plan must contain sufficient information to show that it meets all applicable and appropriate rules and regulations. For Repair, a copy of this acceptance letter containing regulatory compliance advice should be included in the appendix of each Remedial Action Plan that proposes its use.

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. If you have any questions, contact Elena Compton at (850) 245-8911, through Mail Station 4580 at the letterhead address, or by E-mail at Elena.Compton@dep.state.fl.us.

Sincerely,

Elena G. Compton

Elena Compton, M.S., P.E.
Professional Engineer II
PRP Team 2, FDEP
850-245-8911

Enclosures: (1) Regulatory Information
(2) Supplemental Information

ec: John Wright - FDEP, Tallahassee - John.Wright@dep.state.fl.us

History:
04/24/2005 inn_133 burlab #1256
04/14/2016 inn_133a - Repair burlab #1535

ENCLOSURE 1

REGULATORY INFORMATION

a. Groundwater regulations and cleanup standards: The onus shall be on users of Repair 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 Repair, 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.

b. Zone of Discharge (ZOD): Due to the pH of the oxygen generator component of Repair, seek permission for a temporary injection ZOD for pH by way of Rule 62-520.310(8)(c), F.A.C., when Repair is used for in-situ aquifer remediation. In order to obtain ZOD permission by way of this rule, Remedial Action Plans proposing the use of Repair must: (a) indicate that the pH of the fluid to be injected will not be meeting the secondary groundwater standard; (b) specify the size of the temporary injection ZOD that is needed; (c) indicate the period of time for which the temporary ZOD is needed; and (d) identify which monitoring wells in the ZOD will be used to track pH, and specify the frequency at which pH will be measured at those wells.

   The secondary groundwater for pH is range 6.5 to 8.5. By the end of the time period granted for the temporary ZOD, the pH of the groundwater must be in the range of 6.5 to 8.5, or be no worse than the natural-occurring, background level of pH at the site, whichever is <u>less</u> stringent. The size of a temporary ZOD will usually be the injection well radius of influence when the treatment system is a single injection point. For a multiple point system, the ZOD can usually be expressed and illustrated as the total area covered by all the injection points, located side-by-side with overlapping radii of influence.

c. Injection well permit: <u>Per Rule 62-528.630(2)(c), F.A.C., the issuance of an enforceable, site-specific Remedial Action Plan Approval Order by the Department for injection-type aquifer remediation constitutes the granting of a Class V injection well construction/clearance permit</u>.

d. Underground Injection Control (UIC) notification: Remedial Action Plans proposing injection-type aquifer remediation shall include the information required by Rules 62-528.630(2)(c) 1 through 6, F.A.C., for the purposes of the UIC program. <u>Reviewers of those plans, upon issuance of a Department-enforceable Remedial Action Plan Approval Order must transmit this information to the UIC program in Tallahassee by submitting a completed copy of the "UIC Notification"</u>. The notification is in the form of a memorandum currently located on the Internet at www.dep.state.fl.us/waste/categories/pcp/pages/innovative.htm.

e. 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 Repair. However, no "designated" monitoring well, dedicated to the tracking of remediation progress (by sampling) shall be used as an injection point of Repair. 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.

f. Avoidance of migration: For injection-type, in situ aquifer remediation projects, injection of Repair 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 Repair injection wells can be removed from the inventory-tracking list.

SUPPLEMENTAL INFORMATION

a. Microorganisms: The Repair microbial consortia is provided in either a powdered or liquid form, and Pathway Biologic indicates that the microorganisms are naturally occurring and not genetically engineered.

b. Nutrients: The Repair 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 Petroleum Restoration Program, 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 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.

c. Oxygen source: The Material Safety Data Sheet for the Repair oxygen generator named CRO_2 identifies it as a powder that contains <3% calcium, <.05% magnesium, and bionutrients. Pathway BioLogic indicates that it provides oxygen from 2 to 6 weeks as microorganisms utilize the bionutrients.

d. Dosage: Pathway BioLogic suggests that prospective users of Repair contact Pathway BioLogic for advice on how to determine a site-specific dosage of Repair per cubic yard of contaminated media, and also for advice in regard to frequency of application.

e. Open pit applications: For non-injection-type applications, such as the addition of Repair 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 for pH in order to demonstrate that the oxygen generator had either no effect at all on the pH of the groundwater, or only a temporary effect.