

Florida Department of Environmental Protection

Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Rick Scott
Governor

Jennifer Carroll
Lt. Governor

Herschel T. Vinyard Jr.
Secretary

May 30, 2012

Via Electronic Mail

Matt@CliftIndustries.com

Matt Barnhill
Clift Industries, Inc.
P.O. Box 67153
Charlotte, North Carolina 28226

Re: BioRem-2000 Nutrient Blend

Dear Mr. Barnhill:

The Division of Waste Management (Division) hereby accepts BioRem-2000 Nutrient Blend for the bioremediation of petroleum hydrocarbons and other suitable contaminants in soil and groundwater, in situ and ex situ. BioRem-2000 contains only nutrients. It does not contain microbes. Enclosure 1 contains a voucher for your confidential disclosure of the proprietary ingredients. Enclosure 2 contains regulatory information and Enclosure 3 contains supplemental information.

The Division does not provide endorsement of specific or brand name remediation products or processes, but it does recognize the need to determine their acceptability in the context of environmental regulations, safety and the protection of public health. For that reason, the Division issues an "acceptance" letter, not an approval. In no way shall an acceptance be construed as a certification of performance. Additionally, vendors, upon receipt of an acceptance, must market their product or process on its own merits regarding performance, cost, and safety in comparison to competing alternatives in the marketplace.

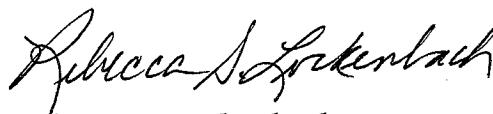
Remedial Action Plans that propose the use of an accepted product or process should include a copy of the acceptance letter in the plan's appendix, and reference it in the text of the document. It is not a requirement that a particular remediation product or process have an official acceptance letter 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 rules and regulations.

The Division reserves the right to revoke its acceptance of a product or process if it has been falsely represented. Additionally, Division 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 submitted for Department review and approval. If you have any questions, please contact Rick Ruscito at (850) 877-1133, extension 3722 or by e-mail at RRuscito@ene.com.

Sincerely,



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



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

enc: (1) Proprietary Ingredients Voucher
(2) Regulatory Information
(3) Supplemental Information

c: Tom Conrardy, P.E. - FDEP/Tallahassee

History

PPL #449
INN_189 - 5/30/12
ITR 62794
BurLabs #1159

ENCLOSURE 1
PROPRIETARY INGREDIENTS VOUCHER



Florida Department of
Environmental Protection

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May 30, 2012

Matt Barnhill
Clift Industries, Inc.
P.O. Box 67153
Charlotte, North Carolina 28226

**Re: BioRem-2000 Nutrient Blend
Proprietary Ingredients Voucher**

Dear Mr. Barnhill:

The Division of Waste Management (Division) hereby acknowledges receipt of a May 29, 2012 confidential disclosure that identifies the proprietary ingredients and their proportions in BioRem-2000 Nutrient Blend, for the bioremediation of petroleum hydrocarbons and other suitable contaminants in groundwater and soil, in situ and ex situ.

Having reviewed the confidential disclosure, the Division hereby vouches for its content, and provides advice in Enclosure 2 on how to comply with applicable regulations of the Florida Administrative Code (F.A.C.) when BioRem-2000 Nutrient Blend is used for the cleanup of contamination in accordance with a Department-approved, site-specific Remedial Action Plan. The Department, in offering its advice, has been careful to mention only enough general information about the ionic chemical species and parameters that must be monitored by users in order to comply with Underground Injection Control regulations when BioRem-2000 Nutrient Blend is used, but not so much information as to compromise the identity of the specific proprietary molecular ingredients.

For Underground Injection Control purposes, injection-type aquifer remediation plans must specify both the volume and the complete chemical composition of the fluid to be injected. But since the details of the ingredients and their proportions in BioRem-2000 Nutrient Blend are proprietary, it will suffice to indicate just the volume of the BioRem-2000 Nutrient Blend fluid to be injected, and then provide a note that a confidential disclosure of the proprietary details has already been submitted to the

Matt Barnhill
May 30, 2012
Page 2

BioRem-2000 Nutrient Blend

Voucher

Department and accepted. Reference should be made to this voucher, and a copy of it should be included as an appendix to the plan. If you have any questions, please contact Rick Ruscito at (850) 877-1133, extension 3722 or by e-mail at RRuscito@ene.com.

Sincerely,



Rick Ruscito, P.E.
Ecology and Environment, Inc.
Bureau of Petroleum Storage Systems
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Rebecca S. Lockenbach
FDEP Section Leader
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REGULATORY INFORMATION

- a. Regulations: Chapters of the Florida Administrative Code (F.A.C.) that may be applicable, either in part or in their entirety, include but are not necessarily limited to Chapter 62-550, F.A.C., for primary and secondary water quality standards; Chapter 62-520, F.A.C. for groundwater classes and standards, and groundwater permitting and monitoring requirements; Chapter 62-528, F.A.C., for Underground Injection Control (UIC), particularly Part V, for Class V, Group 4 aquifer remediation projects; Chapters 62-770, 62-780, 62-782, and 62-785 F.A.C., for cleanup criteria; and Chapter 62-777, F.A.C., for cleanup target levels.

Users of BioRem-2000 Nutrient Blend shall comply with all applicable regulations. This includes meeting applicable groundwater cleanup target levels for the contaminants of concern, the residual concentrations of reagent ingredients, and any byproducts of concern produced by chemical and biological reactions induced by those ingredients during the timeframe of the cleanup project. For the ingredients of concern that are present in excess of their groundwater standards, the timeframe is that which is permitted for a temporary injection zone of discharge (ZOD) as described below.

- b. UIC and ZOD permits: Per Rule 62-528.630(2)(c), F.A.C., Class V injection-type aquifer remediation wells are exempt from the permitting requirements of Rule 62-528.635, F.A.C., when authorized by a Department-approved Remedial Action Plan or other enforceable mechanism, provided the requirements of the rules governing the remediation project, as well as the construction, operation, and monitoring requirements of Chapter 62-528, F.A.C., are met. 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. And per Rule 62-520.310(8)(c), F.A.C., if a temporary ZOD is necessary, and permissible by way of that rule, then the issuance of the site-specific Remedial Action Plan Approval Order also constitutes the granting of permission for the temporary ZOD.
- c. UIC notification: Remedial Action Plans proposing injection-type aquifer remediation shall include information pursuant to Rules 62-528.630(2)(c)1 through 6, F.A.C., for the inventory purposes of the UIC program. Reviewers of those plans, upon issuance of an enforceable Remedial Action Plan Approval Order by the Department, must submit a completed copy of the UIC inventory notification form to the UIC program in Tallahassee.
- d. General information about temporary ZODs: For groundwater remediation, the composition of an injected material must meet the primary and secondary drinking water standards set forth in Chapter 62-550, F.A.C., and the minimum groundwater criteria of Chapter 62-520, F.A.C., pursuant to UIC Rule 62-528.600(2)(d), F.A.C.

Aquifer remediation products that do not meet these requirements must seek relief from water quality criteria by one of two mechanisms. Permission for a temporary ZOD may be obtained via Rule 62-520.310(8)(c), F.A.C. If a ZOD cannot be obtained by rule, it will be necessary to seek a variance from Department rules in accordance with Section 120.542, Florida Statutes.

Rule 62-520.310(8)(c), F.A.C., allows for a temporary ZOD for closed-loop re-injection systems, for the prime constituents of the reagents used to remediate site contaminants, and for groundwater secondary standards. In order to obtain permission for a temporary ZOD by rule, a site-specific Remedial Action Plan must indicate: (a) the chemical ingredients of concern in the fluid to be injected that will be present in excess of groundwater standards; (b) the size of the ZOD that is needed; (c) the amount of time that the ZOD will be needed; and (d) a plan for monitoring the injected chemical ingredients of concern. The size of the 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 of the cluster formed by all the injection points, located side-by-side with overlapping radii of influence.

- e. Specific ZOD information for BioRem-2000 Nutrient Blend: Site-specific Remedial Action Plans shall indicate the volume of proprietary BioRem-2000 Nutrient Blend to be injected, and seek permission for a temporary ZOD by way of Rule 62-520.310(8)(c), F.A.C., as described in paragraph d above for ammoniacal nitrogen, manganese, sulfate, and total dissolved solids. These four (4) parameters are for full-strength, "as-shipped" BioRem-2000 Nutrient Blend, which is the concentration at which Clift Industries instructs the user to apply it.
- f. ZOD monitoring advice for BioRem-2000 Nutrient Blend: For the four (4) ZOD parameters listed in paragraph e above, quarterly monitoring of groundwater should suffice in most cases. The current groundwater standards for those chemical species and parameters are as follows: ammoniacal nitrogen, 2.8 milligrams per liter (mg/L); manganese, 0.05 mg/L; sulfate, 250 mg/L; and total dissolved solids, 500 mg/L. Upon expiration of the time period granted for the ZOD, the concentration of each must meet its respective groundwater standard, or its natural-occurring background value at the specific cleanup site, whichever is less stringent.
- g. Utilization of wells: If a remediation site happens to have an abundance of monitoring wells, then the Division has no objection to the use of some wells for the application of BioRem-2000 Nutrient Blend. However, no "designated" monitoring well, dedicated to the tracking of remediation progress (by sampling) shall be used to apply reagents. 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.

- h. Avoidance of migration: For injection-type, in-situ aquifer remediation projects, pursuant to Rule 62-528.630(3), F.A.C., injection of BioRem-2000 Nutrient Blend shall be performed in such a way, and at such a rate and volume, that no undesirable migration of either the ingredients of concern, site contaminants, or remediation byproducts results.
- i. Abandonment of wells: Upon issuance of a Site Rehabilitation Completion Order, injection wells shall be abandoned pursuant to Section 62-528.645, F.A.C., and the Underground Injection Control Section of the Department shall be notified so that the treatment wells can be removed from the injection well inventory-tracking list.
- j. Open-pit application: Applications of BioRem-2000 Nutrient Blend to an open pit in which the groundwater is exposed is not an injection and notification of the UIC Section is not required. However, the applied material must still meet the requirements of paragraph 62-520.310(8)(c), F.A.C., and groundwater in the application area should be monitored in the same manner as if the material had actually been injected.

SUPPLEMENTAL INFORMATION

- a. End products: Carbon dioxide and water are the ultimate products of aerobic bioremediation of petroleum hydrocarbons. If chlorinated hydrocarbons are oxidized, then chloride will also be present as an end product. If the anticipated concentration of chloride is expected to be in excess of its 250-mg/L secondary groundwater standard at any time during a cleanup, then it should be included amongst the parameters for which permission for a zone of discharge is sought.
- b. Application rate: The Division of Waste Management recommends that users contact Clift Industries for advice regarding the frequency at which BioRem-2000 Nutrient Blend should be applied, since site conditions will vary from project to project. Clift Industries also indicates that BioRem-2000 should not be diluted prior to application.