



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

August 31, 2012

Via Electronic Mail
Matt@CliftIndustries.com

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

Re: **BioRem-2000**

Dear Mr. Barnhill:

The Division of Waste Management (Division) hereby reaffirms its May 30, 2012 acceptance of BioRem-2000 Oil Digester - Nutrient Blend, and accepts three additional products for the bioremediation of petroleum hydrocarbons and other suitable contaminants in soil and groundwater, in situ and ex situ. The four products are listed below.

BioRem-2000 Oil Digester - Nutrient Blend	(nutrients)
BioRem-2000 Oil Digester - MTBE - Anaerobic	(nutrients, microbes, nonionic surfactants)
BioRem-2000 Oil Digester - MTBE - Aerobic	(nutrients, microbes, nonionic surfactants, enzymes)
BioRem-2000 Oil Digester - Anaerobic	(nutrients, microbes, nonionic surfactants, enzymes)

Enclosure 1 is a voucher for the confidential disclosure of 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.

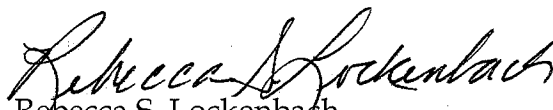
Remedial Action Plans that propose the use of an accepted product or process should include a copy of the acceptance letter in the plan's appendix, and reference it in the text of the document. It is not a requirement that a particular remediation product or process have an official acceptance letter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

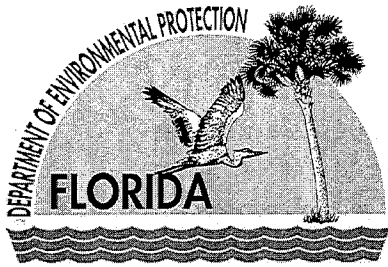
c: Tom Conrardy, P.E. - FDEP/Tallahassee

History

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

PPL #453
INN_192 - 8/31/12
ITR 63565
BurLabs #1175

ENCLOSURE 1
PROPRIETARY INGREDIENTS VOUCHER



Florida Department of
Environmental Protection

Bob Martinez Center
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Tallahassee, Florida 32399-2400

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August 31, 2012

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

Re: BioRem-2000 Products' Proprietary Ingredients Voucher

Dear Mr. Barnhill:

The Division of Waste Management (Division) hereby reaffirms receipt of a May 29, 2012 confidential disclosure that identifies the proprietary ingredients and their proportions in BioRem-2000 Nutrient Blend, and hereby acknowledges receipt of an August 17, 2012 confidential disclosure that identifies the proprietary ingredients and their proportions in BioRem-2000 Oil Digester - MTBE - Anaerobic, BioRem-2000 Oil Digester - MTBE - Aerobic, and BioRem-2000 Oil Digester - Anaerobic. All four products are used for the bioremediation of petroleum hydrocarbons and other suitable contaminants in groundwater and soil, in situ and ex situ.

Having reviewed the confidential disclosures, the Division hereby vouches for their content, and provides advice in Enclosure 2 on how to comply with applicable regulations of the Florida Administrative Code (F.A.C.) when each product 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 parameters that must be monitored by users in order to comply with Underground Injection Control regulations when each product is used, but not so much information as to compromise the identity of its specific proprietary molecular ingredients.

Underground Injection Control regulations require that injection-type aquifer remediation plans specify both the volume and the complete chemical composition of the fluid to be injected. But since the identity of the ingredients and their proportions are proprietary, it will suffice to indicate just the overall concentration of each BioRem 2000 product in the fluid to be injected, and the volume of that fluid, and then

Matt Barnhill
August 31, 2012
Page 2

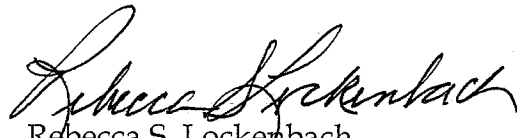
BioRem-2000
Voucher

provide a note that a confidential disclosure of the proprietary ingredients and their proportions has already been submitted to the 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
Petroleum Cleanup Program Section 6



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

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 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 groundwater ZOD information for BioRem-2000: Site-specific Remedial Action Plans shall indicate the volume of proprietary BioRem-2000 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 the parameters shown in Table 1, 2, 3 or 4, depending on the BioRem-2000 product that will be present in the fluid to be injected. If more than one BioRem-2000 product will be present in the fluid to be injected, then use the appropriate combination of tables to determine the ZOD parameters. Since Clift Industries indicates that each of the four BioRem-2000 products will usually be applied at full-strength for groundwater applications, the ZOD parameters listed in the full-strength bottom row of each table will usually apply. ZOD trigger concentrations for less than full-strength BioRem-2000 injection fluids are included in the tables by the Division of Waste Management for future use, should a situation arise in which a product will be injected at less than full-strength.
- f. ZOD monitoring advice for BioRem-2000: For each of the ZOD parameters listed in Tables 1-4, quarterly monitoring of the groundwater should suffice in most cases. The current groundwater standards for those parameters are as follows: ammoniacal nitrogen, 2.8 milligrams per liter (mg/L); nonionic surfactant, 0.5 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. Per Chapter 62-550, F.A.C., Standard Method 5540 D is an acceptable analytical method for the measurement of nonionic surfactant concentrations.

- 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. 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 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 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.
- k. Soil applications: For soil remediation, Clift Industries indicates that BioRem-2000 Oil Digester - Anaerobic is diluted 1:25 to 1:10 with water prior to application, depending on site conditions. For a specific gravity that is close to 1.0, this corresponds to a concentration range of approximately 3.85-9.09% by either weight or volume. Notification of the UIC Section is not required. If the soil depth to which the BioRem-2000 Oil Digester - Anaerobic is applied, or the soil conditions are such that the product will percolate or leach into the underlying groundwater, then monitor the underlying groundwater for the same ZOD parameters that would be monitored when the full-strength product is injected below the water table.

Table 1. ZOD Trigger Concentrations for BioRem-2000 Oil Digester Nutrient Blend

If the overall concentration of this product in the fluid to be injected is ...
...then ZOD permission via Rule 62-520.310(8)(c), F.A.C., and groundwater monitoring is required for...

	<u>Ammoniacal Nitrogen</u>	<u>Total Dissolved Solids</u>	<u>Sulfate</u>
66 mg/L (0.0066% by weight)	X		
2,381 mg/L (0.2381% by weight)	X	X	
31,348 mg/L (3.1348% by weight to full strength)	X	X	X

Dilution calculations by the Division of Waste Management to produce the table above used a Specific Gravity of 1.0 for the "as-shipped" product.

Table 2. ZOD Trigger Concentrations for BioRem-2000 Oil Digester MTBE - Anaerobic

If the overall concentration of this product in the fluid to be injected is ...
...then ZOD permission via Rule 62-520.310(8)(c), F.A.C., and groundwater monitoring is required for...

	<u>Nonionic Surfactants</u>	<u>Total Dissolved Solids</u>
4.0 mg/L (0.0004% by weight)	X	
5,000 mg/L (0.5% by weight to full strength)	X	X

Dilution calculations by the Division of Waste Management to produce the table above used a Specific Gravity of 1.0 for the "as-shipped" product.

Table 3. ZOD Trigger Concentrations for BioRem-2000 Oil Digester MTBE - Aerobic

If the overall concentration of this product in the fluid to be injected is ...
...then ZOD permission via Rule 62-520.310(8)(c), F.A.C., and groundwater monitoring is required for...

	<u>Nonionic Surfactants</u>	<u>Ammoniacal Nitrogen</u>	<u>Total Dissolved Solids</u>
2.38 mg/L (0.000238% by weight)	X		
339 mg/L (0.0339% by weight)	X	X	
12,500 mg/L (1.25% by weight to full strength)	X	X	X

Dilution calculations by the Division of Waste Management to produce the table above used a Specific Gravity of 1.0 for the "as-shipped" product.

Table 4. ZOD Trigger Concentrations for BioRem-2000 Oil Digester - Anaerobic

If the overall concentration of this product in the fluid to be injected is ...
...then ZOD permission via Rule 62-520.310(8)(c), F.A.C., and groundwater monitoring is required for...

	<u>Nonionic Surfactants</u>	<u>Ammoniacal Nitrogen</u>	<u>Total Dissolved Solids</u>
2.63 mg/L (0.000263% by weight)	X		
678.79 mg/L (0.067879% by weight)	X	X	
8,333 mg/L (0.8333% by weight to full strength)	X	X	X

Dilution calculations by the Division of Waste Management to produce the table above used a Specific Gravity of 1.0 for the "as-shipped" product.

ENCLOSURE 3

BioRem-2000
August 31, 2012

SUPPLEMENTAL INFORMATION

- a. Dosage and application: The Division of Waste Management recommends that users of BioRem-2000 products contact Clift Industries for advice regarding the dosage per cubic yard of contaminated media, and the frequency of application since conditions will vary from site to site.