



Florida Department of Environmental Protection

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

Charlie Crist
Governor

Jeff Kottkamp
Lt. Governor

Michael W. Sole
Secretary

May 25, 2010

Steven Kennedy
Bioremediation Incorporated
3959 East 275th Street
Knox, Indiana 46534

Re: **BioRem-2000 Oil Digester™**
(aka Baad Bugs Oil Digester)

Dear Mr. Kennedy:

The Bureau of Petroleum Storage Systems (the Bureau) hereby accepts BioRem-2000 Oil Digester™, a proprietary mixture of non-pathogenic microbes, nutrients, enzymes and nonionic surfactants for the biodegradation of petroleum contaminants in groundwater and soil, in situ and ex situ. Enclosure 1 is a voucher for the confidential disclosure of the proprietary ingredients.

The Bureau of Petroleum Storage Systems does not provide endorsement of specific or brand name remediation products or processes. It does, however, recognize the need to determine their acceptability in the context of environmental regulations, safety and the protection of public health. For that reason, the Bureau issues an "acceptance" letter, not an approval. Such acceptance shall not be construed as a certification of performance, nor shall it be construed as approval for uses that are beyond the Bureau's jurisdiction, which is the cleanup of petroleum pursuant to Chapter 62-770, Florida Administrative Code (F.A.C.). 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 Bureau reserves the right to revoke its acceptance of a product or process if it has been falsely represented. Additionally, Bureau 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

Steven Kennedy
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Oil Digester™

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. Enclosure 2 contains regulatory information that is applicable to Oil Digester™; Enclosure 3 contains supplemental information; and Enclosure 4 is an Underground Injection Control Notification. Please contact Rick Ruscito at (850) 877-1133, extension 3722, 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) Proprietary Ingredients Voucher
- (2) Regulatory Information
- (3) Supplemental Information
- (4) Underground Injection Control Notification

c: T. Conrardy - FDEP/Tallahassee

History

INN_172 5/25/10
PPL 406

PROPRIETARY INGREDIENTS VOUCHER



Florida Department of
Environmental Protection

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May 25, 2010

Steven Kennedy
Bioremediation Incorporated
3959 East 275th Street
Knox, Indiana 46534

Re: **Proprietary Ingredients Voucher for
BioRem-2000 Oil Digester™**
(aka Baad Bugs Oil Digester)

Dear Mr. Kennedy:

The Bureau of Petroleum Storage Systems (the Bureau) hereby acknowledges receipt of a confidential full-disclosure Material Safety Data Sheet on May 20, 2010 listing the ingredients and their proportions in BioRem-2000 Oil Digester™, a proprietary mixture of non-pathogenic microbes, nutrients, enzymes and nonionic surfactants for the biodegradation of petroleum contaminants in groundwater and soil.

Having reviewed the confidential disclosure, the Bureau hereby vouches for its content, and provides advice in Enclosure 2 on how to comply with applicable requirements of the Florida Administrative Code (F.A.C.) when Oil Digester™ is used for the cleanup of petroleum pursuant to Chapter 62-770, F.A.C. The Bureau, in offering its advice, has been careful to mention only in general terms the parameters that must be monitored by users in order to comply with groundwater and underground injection control requirements, but not so much as to compromise their exact identity or their proprietary concentrations.

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 chemical constituents and their proportions in Oil Digester™ are proprietary, it will suffice to indicate just the overall concentration of Oil Digester™ in the fluid that will be injected, and the volume of that fluid, and then indicate that a confidential disclosure of the proprietary details 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.

Reviewers of Remedial Action Plan's proposing the use of Oil Digester™ for the cleanup of petroleum-contaminated sites may contact Rick Ruscito at (850) 877-1133, extension 3722.

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
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REGULATORY INFORMATION

Since biological remediation products like Oil Digester™ are most often applied by injection, and the bulk of the regulatory concern in regard to such products is often in regard to injection, the advice offered below is focused on that subject.

- a. Rules: Bioremediation Incorporated and users of Oil Digester™ shall comply with all applicable regulations. This includes meeting applicable groundwater cleanup target levels during the timeframe of a cleanup project for the contaminants of concern, the residual concentrations of Oil Digester™ ingredients, and any byproducts of concern produced by chemical and biological reactions induced by those ingredients.

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 62-520, 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; Chapter 62-550, F.A.C., for primary and secondary drinking water quality standards; Chapter 62-770, F.A.C., for petroleum cleanup criteria; and Chapter 62-777, F.A.C., for cleanup target levels.

- b. Pilot study: For petroleum cleanup, pursuant to Rule 62-770.700(2), F.A.C., it is required that a pilot study proposal be submitted for review, and that a pilot test be performed prior to the design of a full-scale treatment system. If conditions at a site do not warrant a pilot study, then a proposal explaining the rationale to forego it must be submitted for review.
- c. Underground Injection Control permit: 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.
- d. Underground Injection Control notification: Remedial Action Plans proposing in situ, 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 Underground Injection Control program. Reviewers of those plans, upon issuance of an enforceable Remedial Action Plan Approval Order by the Department, must submit this inventory information to the Underground Injection Control Section by using the notification memorandum in Enclosure 4.
- e. Temporary injection zone of discharge (ZOD): The Bureau of Petroleum Storage Systems advises that it will almost always be necessary to seek permission via Rule 62-520.310(8)(c), F.A.C., [formerly numbered as 62-522.300(2)(c) until July 12, 2009] for a temporary ZOD

for the injection of Oil Digester™, since its chemical composition, as indicated by a May 20, 2010 confidential disclosure does not meet the injection criteria for surfactants and total dissolved solids. The only exceptions, per the Bureau's dilution calculations, that do not trigger a need for ZOD permission are injection mixtures of Oil Digester™ and water that are so dilute that they are either unlikely or impractical. The Bureau will nevertheless provide the concentrations of those mixtures. If the fluid to be injected contains 1 part Oil Digester™ (as shipped by the manufacturer) and more than 200 parts water by volume, then it is not necessary to seek ZOD permission for total dissolved solids. And if the fluid to be injected contains 1 part Oil Digester™ and more than 250,774 parts water by volume, then it is not necessary to seek ZOD permission for surfactant.

In order to obtain ZOD permission, each site-specific Remedial Action Plan proposing the use of Oil Digester™ must: (a) indicate that the concentrations of surfactant and total dissolved solids in the fluid to be injected will be in excess of their groundwater standards; (b) specify a temporary injection zone size; (c) specify the period of time for which the temporary zone will be needed; and (d) propose groundwater monitoring of the ZOD parameters. In most cases, monitoring on a quarterly basis should be sufficient. The number of monitoring wells to be sampled will depend on the size of the area treated, but for most applications, a minimum of two (2) wells should suffice: one in the center of the treatment area, the other near the downgradient edge. Zone size for a single injection point, in most cases, is likely to be the same as the point's injection radius of influence. And for a cluster of injection points, the overall zone size can be defined as the agglomeration of all its individual points.

The current groundwater standards for the Oil Digester™ zone of discharge parameters are 0.5 milligrams per liter (mg/L) for surfactant, and 500 mg/L for total dissolved solids. Upon expiration of the time requested for the ZOD, the concentration of those two parameters must meet their respective groundwater standards, or their natural-occurring background values at the site, whichever is less stringent.

Department issuance of an enforceable, site-specific Remedial Action Plan Approval Order for a Remedial Action Plan that meets the requirements of Rule 62-520.310(8)(c), F.A.C., constitutes the granting of permission for the temporary injection zone of discharge.

- f. Analytical method for surfactant: Chapter 62-550, F.A.C., regulates surfactants as a secondary contaminant and establishes a maximum allowable concentration of 0.5 milligrams per liter (mg/L) for them as "foaming agents". For the quantification of surfactant in groundwater monitoring samples taken to comply with temporary injection ZOD rule 62-520.310(8)(c), F.A.C., an allowable method per Chapter 62-550, F.A.C., is Standard Method SM 5540. This method covers several classes of surfactants. To measure the concentration of nonionic surfactant in groundwater samples taken from sites treated with Oil Digester™, use method SM 5540D.
- g. Utilization of wells: If a remediation site happens to have an abundance of monitoring wells, then the Bureau of Petroleum Storage Systems has no objection to the use of some wells for the application of Oil Digester™. However, no "designated" monitoring well, dedicated to

the tracking of remediation progress (by sampling) shall be used to apply Oil Digester™. 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: Pursuant to Rule 62-528.630(3), F.A.C., for in situ injection-type aquifer remediation projects, injection of remediation fluids such as Oil Digester™ shall be performed in such a way, and at such a rate and volume, that no undesirable migration of either the product's ingredients or the contaminants of concern in the aquifer results.
- i. Abandonment of wells: Upon issuance of a petroleum 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 the injection wells can be removed from the inventory-tracking list.
- j. Open-pit application: Open-pit application is not an injection, and notification of the Underground Injection Control Section is not required, but users of Oil Digester™ must still be mindful of groundwater quality. Therefore, for open-pit application, the Bureau suggests that groundwater in the application area be monitored for the same parameters that would have required zone of discharge monitoring, had the application actually been an injection.

SUPPLEMENTAL INFORMATION

- a. Application: The Bureau of Petroleum Storage Systems advises users of Oil Digester™ to consult Bioremediation Incorporated for site-specific recommendations regarding the pre-application dilution ratio of Oil Digester™ per parts water by volume, the amount of the diluted mixture to be applied per cubic yard of contaminated soil and/or aquifer to be treated, and the frequency of application.

**Florida Department of
Environmental Protection**

Memorandum

TO: Cathy McCarty, P.G.
Florida Department of Environmental Protection
Bureau of Water Facilities Regulation
Underground Injection Control Section - MS 3530
2600 Blair Stone Road, Tallahassee, FL 32399-2400

FROM: _____ (Note 1.)

DATE: _____

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

Pursuant to paragraph 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.

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

Facility owner's name: _____
Facility owner's address: _____

Well contractor's name: _____ (Note 2.)
Well contractor's address: _____

AFFECTED AQUIFER

Name of aquifer: _____
Depth to groundwater (feet): _____
Aquifer thickness (feet): _____
Areal extent of contamination (square feet): _____

INJECTION WELLS

A site map showing the location and spacing of injection wells, the areal extent of the groundwater contamination plume, and associated monitoring wells is attached. The injection well(s) features are summarized below, and/or a schematic of the injection well(s) is attached.

Direct-push or HSA/Mud rotary (*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 land surface
Grouted interval: _____ to _____ feet below land surface
Casing diameter, if applicable (inches): _____
Cased depth, if applicable: _____ to _____ feet below land surface
Casing material, if applicable: _____

PROJECT DESCRIPTION

The in situ, injection-type aquifer remediation product/process remediates contaminants by:
(check those that apply)

- ☐ bioremediation,
☐ chemical oxidation, or
☐ other (describe) _____

Brief description of the project:

Summary of major design considerations and features of the project:

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

FLUID TO BE INJECTED

Composition of injected fluid:
(ingredient, wt. %) (Note 3.): _____

TEMPORARY INJECTION ZONE OF DISCHARGE (ZOD)

(check those that apply)

- ☐ No ZOD needed. The fluid to be injected meets the primary and secondary groundwater standards of Chapter 62-550, F.A.C., and the minimum groundwater criteria of Chapters 62-520 and 62-777, F.A.C.
- ☐ ZOD permission by rule 62-520.310(8)(c), F.A.C., for reagent chemical species and/or parameter(s) in the fluid to be injected (or re-injected) that exceed secondary groundwater standards. ZOD permission by this rule also applies to chemical species in the fluid to be injected that exceed primary groundwater standards or minimum groundwater criteria, provided those species are prime constituents of the reagents used to remediate site contaminants. The list of chemical species and parameters for which the approved Remedial Action Plan identifies zone size, duration and groundwater monitoring are as follows:

- ☐ ZOD permission by rule 62-520.310(8)(c), F.A.C., for the following contaminants of concern that exceed their groundwater standards in the fluid to be re-injected as part of a closed-loop re-injection system for which the approved Remedial Action Plan identifies zone size, duration and groundwater monitoring:

- ☐ ZOD permission by variance because fluid to be injected contains the following impurities that are not prime constituents of the reagents used to remediate the site's contaminants, and the concentration of those impurities in the fluid to be injected are in excess of their primary groundwater standards:

- ☐ A variance needs to be granted before the remediation can be conducted.
- ☐ A variance has already been granted for the impurities listed above:

Date variance granted: _____ Zone size (feet): _____ Duration (time): _____

..... ◆◆ ◆.....

- ☐ If ZOD permission by rule 62-520.310(8)(c), F.A.C., or by variance is checked above, then a figure that delineates the ZOD is attached, or ☐ the ZOD is described as follows:

CLEANUP CRITERIA AND ENFORCEABLE APPROVAL ORDER

In situ injection-type aquifer remediation of the contaminants of concern at this site is intended to meet the groundwater cleanup target levels established for them in accordance with applicable and appropriate chapters of the Florida Administrative Code and cited in the approved Remedial Action Plan. 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 Chapters 62-520 and 62-777, 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 which 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.

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Note 1. This notification memorandum is primarily for use by state technical reviewers, but remediation contractors may fill in all blanks except those labeled "FROM" and "DATE" on page 1, and the "approval date", and "telephone number" blanks in the last paragraph on page 4. Those blanks are filled only by the regulator. In the case that the memorandum form is partially completed by the remediation contractor, the FDEP technical reviewer must verify that the information provided by the contractor is accurate and complete. Local programs are not authorized to approve underground injections into aquifers. Reason: Per agreement with EPA, the FDEP cannot delegate this authority. Local programs, after reviewing a Remedial Action Plan or an injection proposal document, should follow the instructions in the March 16, 2000, memorandum to arrange for Department headquarters' execution of an approval order, and then complete this memorandum.

Note 2. 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 3. Complete chemical analysis of the fluid to be injected is required by Chapter 62-528, F.A.C. Some remediation products and processes may have already submitted this information at the time of application for acceptance by the Innovative Technology Acceptance Program. For those situations, when completing the Fluid To Be Injected section of this memorandum, it will suffice to indicate: (1) an Innovative Technology Acceptance letter has been issued; (2) the date of the acceptance letter; (3) the acceptance letter contains the chemical analysis, or a voucher for the confidential disclosure of the injected fluid's chemical composition if it is a proprietary formulation; and (4) the fluid will be injected at concentrations that are less than or equal to those cited in the acceptance letter. For products and processes that do not hold an Innovative Technology Acceptance letter, but for which the site-specific Remedial Action Plan provides a complete description of the chemical composition of the fluid to be injected, it will be necessary to enter this information into the Fluid To Be Injected section of this memorandum.