



Florida Department of Environmental Protection

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

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Jonathan P. Steverson
Secretary

August 31, 2015

Via Electronic Mail
Info@Regenesis.com

Craig Sandefur
Regenesis
1011 Calle Sombra
San Clemente, California 92673

Re: **PlumeStop™ Colloidal Biomatrix**

Dear Mr. Sandefur:

The Florida Department of Environmental Protection's Division of Waste Management (Division) hereby accepts PlumeStop™ Colloidal Biomatrix (PlumeStop™) for in-situ biodegradation of petroleum hydrocarbons, chlorinated solvents, and other suitable contaminants in groundwater and soil.

PlumeStop™ is an aqueous mixture of finely ground (micron-scale) activated carbon and proprietary food grade additives that is typically injected into the subsurface as aqueous slurry. As Regenesis has indicated, PlumeStop™ disperses quickly and widely in the subsurface, where it sorbs dissolved contaminants from the groundwater and concentrates them within its structure. It then provides a large amount of surface area for microbial colonization and growth in order to accelerate biodegradation.

The considerations of this letter should be taken into account for the use of PlumeStop™, and a site-specific Remedial Action Plan should be submitted for review and approval by the Department. A voucher for the confidential disclosure of the proprietary ingredients and a chemical analysis of PlumeStop™ is provided in Enclosure 1. Regulatory information is provided in Enclosure 2.

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. Vendors, upon receipt of an acceptance, must market the product or processes 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 either 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 the product or process meets all applicable and appropriate rules and regulations. For PlumeStop™, a copy of this acceptance letter should be included in the appendix of each site-specific 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 Rick Ruscito at (850) 877-1133, extension 3722, through Mail Station 4590 at the letterhead address or by E-mail at RRuscito@ene.com.

Sincerely,



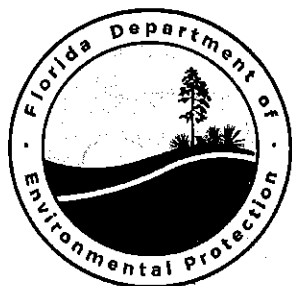
Rick Ruscito, P.E.
Ecology & Environment, Inc.
Petroleum Restoration Program Section 6
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Jamie Luten Lopez
Environmental Consultant
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Enclosure: (1) Voucher for Disclosure of Proprietary Ingredients and a Chemical Analysis of
PlumeStop™ Colloidal Biomatrix
(2) Regulatory Information

cc: Andy Lowy - ALowy@Regenesis.com



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San Clemente, California 92673

Re: Voucher for Disclosure of Proprietary Ingredients and a Chemical Analysis
of PlumeStop™ Colloidal Biomatrix

Dear Mr. Sandefur:

The Division of Waste Management (Division) hereby acknowledges a confidential disclosure by Regenesis dated August, 28, 2014 regarding the specific proprietary additives and their proportions in PlumeStop™, and a supplemental disclosure dated November 20, 2014 providing the results of a chemical assay for metals. Having reviewed the disclosures, the Division hereby vouches for the information provided. The table below is not the detailed confidential information that was provided to the Division but rather the overall chemical composition provided on the Internet as a Material Safety Data Sheet.

PlumeStop™

(Aqueous mixture of activated carbon and other food grade additives.)

<u>Ingredient</u>	<u>CAS No.</u>	<u>Concentration</u>
Colloidal Activated Carbon ≤ 2.5 microns	7440-44-0	< 25%
Water	7732-18-5	> 75%
Proprietary Additives		≤ 2%

Without this voucher for disclosures of the proprietary ingredients and the chemical assay, and the advice provided by the Division in Enclosure 2 based on its review of those disclosures, users of PlumeStop™ would not know how to comply with the requirements of rule 62-520.310(8)(c), Florida Administrative Code (F.A.C.) for a temporary Zone of Discharge.

For underground injection control purposes, aquifer remediation plans proposing the use of PlumeStop™ must indicate the volume and complete chemical composition of the fluid to be injected. Since the identities and proportions of some ingredients are proprietary, as well as the chemical assay, it will suffice to indicate just the overall volume and concentration of PlumeStop™ to be injected, and provide a footnote indicating that one-time confidential disclosures dated August, 28, 2014 and November 20, 2014, identifying all of the ingredients, their proportions, and the results of a chemical assay are already on file with the Division. Please direct questions regarding this voucher to Rick Ruscito at (850) 877-1133, extension 3720.

Sincerely,



Rick Ruscito, P.E.
Ecology & Environment, Inc.
Petroleum Restoration Program Section 6
RRuscito@ene.com



Jamie Luten Lopez
Environmental Consultant
Petroleum Restoration Program
Jamie.L.Lopez@dep.state.fl.us

REGULATORY INFORMATION

- a. Groundwater cleanup standards: The onus shall be on users of PlumeStop™ to ensure that all applicable groundwater standards will be met at the time of project completion for the contaminants of concern being remediated, and any by-products produced as a result of chemical or biochemical reactions induced or assisted by PlumeStop™. The following chapters of the Florida Administrative Code (F.A.C.) 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; Chapters 62-780, 62-782, and 62-785 F.A.C., for cleanup criteria; and Chapter 62-777, F.A.C., for cleanup target levels.
- b. Injection well permit: 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 [by PlumeStop™] constitutes the granting of a Class V injection well construction/clearance permit.
- c. Underground Injection Control (UIC): 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. 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". 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.
- d. General information about temporary Zones of Discharge (ZOD): For groundwater remediation, the composition of a fluid to be injected 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 as follows. Permission for a temporary ZOD may be obtained via rule 62-520.310(8)(c), F.A.C. If permission for a ZOD cannot be obtained by rule, then 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 covered by all the injection points, located side-by-side with overlapping radii of influence.

- e. Site-specific Remedial Action Plans shall indicate the volume and concentration of the aqueous PlumeStop™ slurry that will be injected.
- f. Specific ZOD information for PlumeStop™: Obtain permission for a temporary injection ZOD by way of rule 62-520.310(8)(c), F.A.C., for aluminum, a secondary drinking water contaminant in Florida, and monitor the receiving groundwater for aluminum in order to comply with UIC ZOD requirements. For the aluminum, reviewers of Remedial Action Plans, when filling out the UIC Notification memorandum, should check the box labeled *"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"*.
- g. ZOD monitoring advice for PlumeStop™: For the ZOD parameter aluminum, quarterly monitoring of groundwater should suffice in most cases. The current secondary groundwater standard for is aluminum is 0.2 milligrams per liter (mg/L). Upon expiration of the time period granted for the ZOD by way of rule 62-520.310(8)(c), F.A.C., the concentration of aluminum must meet its groundwater standard or its natural-occurring background value at the specific cleanup site, whichever is less stringent.
- h. Utilization of wells: If a remediation site happens to have an abundance of monitoring wells, then the Division of Waste Management has no objection to the use of some wells for the injection of PlumeStop™ slurry if the wells are suitable for the purpose. However, no "designated" monitoring well, dedicated to the tracking of remediation progress (by sampling) shall be used to apply PlumeStop™. This will avoid a premature conclusion that the entire site meets cleanup goals. By making sure that designated tracking wells are not 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.
- i. Three categories of groundwater monitoring:
 - 1. Active remediation monitoring for a cleanup site's contaminants of concern: During the period of active remediation, groundwater shall be monitored in accordance with the requirements set forth in Section 62-780.700, F.A.C.
 - 2. Post Active Remediation Monitoring for a cleanup site's contaminants of concern: At least one (1) year of quarterly post remediation groundwater monitoring for the contaminants of concern shall be conducted at a minimum of two (2) wells: one located in the area of highest contamination, the other at the downgradient edge of the contamination plume, pursuant to Section 62-780.750, F.A.C.

3. Monitoring of the UIC zone of discharge for aluminum: For PlumeStop™, in order to comply with rule 62-520.310(8)(c), F.A.C., monitor the ZOD for aluminum as discussed in paragraph g above.

j. Operation:

1. Avoidance of migration: For injection-type, in-situ aquifer remediation projects, injection of PlumeStop™ shall be performed in such a way, and at such a rate and volume that no undesirable migration of either the PlumeStop™ or the contaminants of concern in the aquifer results, pursuant to rule 62-528.630(3), F.A.C.
 2. Underground Injection Control operating permit: Although an operating permit is not required for aquifer remediation wells pursuant to rule 62-528.640(1)(b), and 62-528.640(1)(c), F.A.C., since no movement of the contamination plume is expected to accompany the treatment process, the Department requests that the information items listed in rule 62-528.640(1)(b), F.A.C., be considered and included in Remedial Action Plan proposals as a matter of good and thorough design practice. Briefly summarized, they are: quality of water in the aquifer; quality of the injected fluid; existing and potential uses of the affected aquifer; and well construction details.
- k. 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 the injection wells can be removed from the inventory-tracking list.
- l. Open-pit application: There is no objection to the introduction of PlumeStop™ to an open excavation pit in which the groundwater has been exposed. Open-pit application is not injection, and it is not necessary to notify the Underground Injection Control Section, but this should not be construed as carte blanche to introduce to the pit any substance at any concentration with no regard to potential toxicological effects. The Division of Waste Management therefore recommends that the groundwater in the area of the pit be monitored for the same zone of discharge parameters that would have been monitored (if any) had the application actually been an injection.
- m. Limitation: PlumeStop™ is not intended for bulk removal of free product. Remove the bulk of the free product by other means prior to the use of PlumeStop™.