



**FLORIDA DEPARTMENT OF
ENVIRONMENTAL PROTECTION**

BOB MARTINEZ CENTER
2600 BLAIRSTONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

RICK SCOTT
GOVERNOR

CARLOS LOPEZ-CANTERA
LT. GOVERNOR

HERSCHEL T. VINYARD JR.
SECRETARY

June 13, 2014

Via Electronic Mail
mts@cl-solutions.com

Michael Saul
CL Solutions, LLC
1776 Mentor Avenue, Suite 305
Cincinnati, Ohio 45212

Re: Petrox EC

Dear Mr. Saul:

The Petroleum Restoration Program (PRP) hereby accepts Petrox EC for in situ and ex situ bioremediation of petroleum and other suitable hydrocarbons in groundwater and soil. Petrox EC is an aqueous mixture of biodegradable nonionic surfactant and nonpathogenic petroleum-degrading microorganisms that is typically diluted 1 to 8 ounces per gallon of water prior to use depending on site-specific conditions, but may be used at full strength for the recovery of light non-aqueous phase liquid (LNAPL). Methods of application include direct injection, and flushing accompanied by recovery of the hydrocarbon contaminants. In the case of flushing with recovery, a population of petroleum-degrading microorganisms is left in place to continue destruction of the hydrocarbons not flushed by the surfactant. Enclosure 1 is a voucher for the confidential disclosure of the specific ingredients and their proportions in Petrox EC; Enclosure 2 contains regulatory information; and Enclosure 3 contains supplemental information.

The PRP 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 PRP 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,

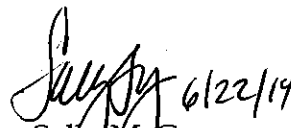
however, must contain sufficient information about the product or process to show that it meets all applicable rules and regulations.

The PRP reserves the right to revoke its acceptance of a product or process if it has been falsely represented. Additionally, PRP 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 me at the number below.

Sincerely,



Rick Ruscito, P.E.
Ecology & Environment, Inc.
Petroleum Restoration Program - Section 6



Sally McGregor
Petroleum Restoration Program

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

cc: Robert Cowdery, P.E. – FDEP/Tallahassee

CReuter@ospreybiotechnics.com

History:

6/13/14
PPL #479
BurLab #1465
ITR #72168
INN_208

PROPRIETARY INFORMATION VOUCHER

**FLORIDA DEPARTMENT OF
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June 13, 2014

Via Electronic Mail
mts@cl-solutions.com

Michael Saul
CL Solutions, LLC
1776 Mentor Avenue, Suite 305
Cincinnati, Ohio 45212

Re: Proprietary Information Voucher for Petrox EC

Dear Mr. Saul:

The Petroleum Restoration Program (PRP) is in receipt of a confidential disclosure dated May 13, 2014, and a supplement to that disclosure received June 10, 2014, submitted by manufacturer Osprey Biotechnics Incorporated, Sarasota, Florida that specifically identifies the ingredients and their proportions in Petrox EC. Having reviewed the disclosure, the PRP hereby vouches for its content, and in exchange provides advice in Enclosure 2 on how to comply with applicable regulations of the Florida Administrative Code (F.A.C.) when Petrox EC is used for the cleanup of contamination in accordance with a Department-approved, site-specific Remedial Action Plan. The PRP, in offering its advice, has been careful to mention only enough general information about the chemical species and parameters that must be monitored by users in order to comply with Underground Injection Control regulations, but not so much information as to compromise the proprietary aspects of the product.

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 Petrox EC are proprietary, it will suffice to indicate just the fluid volume to be injected and the overall concentration of Petrox EC in that fluid, and then provide a note that a confidential disclosure of the proprietary details has already been submitted and accepted. Reference should be made to this voucher, and a copy of it should be included as an appendix to the plan. Contact Rick Ruscito at (850) 877-1133, extension 3722, if there are any questions.

Sincerely,

Rick Ruscito, P.E.
Ecology & Environment, Inc.
Petroleum Restoration Program - Section 6

Sally McGregor
Petroleum Restoration Program

ENCLOSURE 2

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 62-780, 62-782, and 62-785 F.A.C., for cleanup criteria; and Chapter 62-777, F.A.C., for cleanup target levels.

Users of Petrox EC 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 Petrox EC: ZOD permission and monitoring is necessary for nitrate, ammonia, sodium, and nonionic surfactant. Site-specific Remedial Action Plans shall indicate the volume and concentration at which Petrox EC will 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.

The "as-shipped", liquid Petrox EC (specific gravity 1.0) is typically diluted volumetrically prior to use by adding 1 to 8 ounces of it to 1 gallon of water depending on site-specific conditions, but it may be used at full strength for the recovery of light non-aqueous phase liquid (LNAPL). The Petroleum Restoration Program does not object to its use at full strength, but from a ZOD-duration standpoint recommends, with emphasis, application of only the minimum amount needed to remediate a site's contaminants of concern.

- f. ZOD monitoring advice for Petrox EC: For the four ZOD parameters discussed in above paragraph e, quarterly monitoring of them in the groundwater should suffice in the case of most cleanup sites. Upon expiration of the time period granted for the ZOD, the concentration of each of these four parameters must meet its groundwater standard or its natural-occurring background value at the specific cleanup site, whichever is less stringent. The groundwater standards for these ZOD parameters are as follows:
nitrate, 10 milligrams per liter (mg/L); ammonia, 2.8 mg/L; sodium, 160 mg/L; and surfactant 0.5 mg/L. Chapter 62-550, F.A.C., covers surfactants as foaming agents, although every surfactant does not necessarily cause foam. Standard Method 5540 D is an acceptable analytical method for the measurement of nonionic surfactant.
- g. Utilization of wells: If a remediation site happens to have an abundance of monitoring wells, then the Petroleum Restoration Program has no objection to the use of some wells for the application of Petrox EC. However, no "designated" monitoring well, dedicated to the tracking of remediation progress (by sampling) shall be used to apply reagents. This will avoid premature conclusion 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 Petrox EC 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 Petrox EC to an open pit in which the groundwater is exposed is not 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 the groundwater in the application area should be monitored in the same manner as if the material had actually been injected.
- k. Additives: If an additive is used with Petrox EC in the future, then a site-specific Remedial Action Plan must include a complete description of the additive's chemical composition and physical properties, the concentration of the additive in the fluid to be injected, the volume of the fluid to be injected, and seek permission for a temporary ZOD as described in paragraph d above if the fluid does not meet primary, secondary, and minimum groundwater standards.

ENCLOSURE 3

SUPPLEMENTAL INFORMATION

- a. Application: Petrox EC is typically injected at a volume that is less than 1 percent of the volume of the porosity of the receiving matrix. This information is passed along by the Petroleum Restoration Program as rule-of thumb information, and it is not intended to be an upper limit to the volume of Petrox EC fluid that may be injected. As indicated in paragraph h of Enclosure 2, injection shall be such that there is no undesirable migration of either the Petrox EC ingredients of concern or the cleanup site's contaminants of concern.
- b. Facultative behavior: CL-Solutions LLC indicates that the microorganisms in Petrox EC are facultative, which means that they can live in both aerobic and anaerobic environments. For anoxic conditions (depleted oxygen) an alternative electron acceptor such as nitrate is necessary. The Petroleum Restoration Program has no objection to the use of alternative electron acceptors with Petrox EC, provided the advice in paragraph k of Enclosure 2 regarding the use of additives is followed.
- c. Limitations: CL-Solutions LLC indicates that the microbes in Petrox EC cannot survive at temperature greater than 105 degrees Fahrenheit, pH less than 4.5, and pH greater than 9.0. For RCRA-listed metals in dissolved concentrations greater than 10 milligrams per liter, which may be toxic to the microbes, bench scale testing prior to field application of Petrox EC may be needed.