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

October 4, 2011

Stephen D. Richardson, Ph.D.
EOS Remediation, LLC
1101 Nowell Road
Raleigh, NC 27607

Re: **BAC-9™**

Dear Mr. Richardson:

The Bureau of Waste Cleanup (the Bureau) hereby accepts BAC-9™ for in-situ anaerobic bioremediation of chlorinated hydrocarbons in groundwater. There are no objections to the use of BAC-9™ for the remediation of contaminated sites in Florida, provided a site-specific Remedial Action Plan is approved by the Department. The product is a bioaugmentation culture and the specific microbial make-up of the product has been declared proprietary. Therefore, a proprietary analysis voucher is provided in Enclosure 1. Regulatory information is provided in Enclosure 2.

The Bureau 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. 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 <u>not</u> 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 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 us at the numbers below.

Sincerely,

X 

Gary Millington, P.E.
Bureau of Waste Cleanup
Program and Technical Support Section
gary.millington@dep.state.fl.us
(850) 245-7502

Enclosures: Proprietary Analysis Voucher
Regulatory Information

c: Tom Conrardy, P.E. – FDEP/Tallahassee
Rob Cowdery, P.E. – FDEP/Tallahassee
Richard Ruscito, P.E., – Ecology & Environment, Inc.

ENCLOSURE 1

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

October 4, 2011

Stephen D. Richardson, Ph.D.
EOS Remediation, LLC
1101 Nowell Road
Raleigh, NC 27607

Re: **BAC-9™ Proprietary Analysis Voucher**

Dear Mr. Richardson:

The Bureau of Waste Cleanup (Bureau) hereby acknowledges receipt of a disclosure dated August 15, 2011, by Shaw Environmental, Inc., regarding the proprietary analysis of the EOS Remediation product BAC-9™.

Having reviewed the disclosure, the Bureau hereby vouches for the analysis and that this product meets the requirements of Chapters 62-522 and 62-528, F.A.C. A temporary injection zone of discharge is not needed for this product.

Each site-specific Remedial Action Plan that proposes to use BAC-9™ must include information that is required by Chapters 62-522 and 62-528, F.A.C. Enforceable approval orders for Remedial Action Plans containing this information, when issued by the Department, will constitute approval of the site-specific plan and will meet the requirements of the underground injection control (UIC) program.

For underground injection control purposes, remediation plans proposing to use the BAC-9™ product must disclose the volume and composition of the fluid to be injected into an aquifer. Since the composition is proprietary, it will suffice to indicate the overall concentration of the solution and then provide a footnote indicating that a one-time disclosure regarding the proprietary analyses has been submitted to the Department and accepted. Reference should be made to the original August 15, 2011, disclosure, and a copy of this voucher should be included as an appendix in the plan.

Reviewers of cleanup site remedial plans involving the use of BAC-9™ may contact me at 850.245.7502.

Sincerely,

X 

Gary Millington, P.E.
Program and Technical Support Section
Bureau of Waste Cleanup

c: T. Conrardy, P.E. - DEP/Tallahassee
R. Cowdery, P.E. - DEP/Tallahassee
Richard Ruscito, P.E. - Ecology & Environment, Inc.

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 62-770, 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 BAC-9™ shall comply with all applicable regulations. This includes meeting applicable groundwater cleanup target levels for the contaminants of concern, the residual concentrations of BAC-9™ ingredients, and any byproducts of concern produced by chemical and biological reactions induced by the product during the timeframe of the cleanup project. The timeframe is that which is permitted for a temporary injection zone of discharge (ZOD) as described below.

b. UIC 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. If a temporary ZOD is necessary, 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 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 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 in-situ aquifer 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 in accordance with paragraph 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 Section120.542, Florida Statutes.

   Paragraph 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 BAC-9™: A ZOD is not needed for the BAC-9™ material itself because it is a microbial consortium that does not have the potential to exceed any groundwater cleanup target levels. <u>If other materials are injected along with the BAC-9™, such as nutrient or electron donor source material, a ZOD evaluation would be required as a part of the remedial action plan review</u>.

f. Utilization of wells: If a remediation site happens to have an abundance of monitoring wells, then the Bureau has no objection to the use of some wells for the application of BAC-9™. However, no "designated" monitoring well, dedicated to the tracking of remediation progress (by sampling) shall be used to apply BAC-9™. 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.

g. Avoidance of migration: For injection-type, in-situ aquifer remediation projects, pursuant to Rule 62-528.630(3), F.A.C., injection of BAC-9™ and any supporting materials 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.

h. 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.