



Department of Environmental Protection

Jeb Bush
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

March 9, 2000

Frederick E. Farley, Ph.D.
Biodyne, Inc.
959 Paschal Place
Sarasota, Florida 34232-2847

Re: **ENVIRONOC**

Dear Dr. Farley:

The Bureau of Petroleum Storage Systems hereby accepts ENVIRONOC as a bioremediation product for both in situ and ex situ bioremediation of petroleum and other suitable degradable contaminants in groundwater or soil. As Biodyne has indicated, there are other applications for this product, albeit not within the regulatory jurisdiction of this bureau, such as grease control in restaurants and wastewater collection and treatment systems, surface water applications, oily sludge control, and biofilter-type air emissions control systems.

ENVIRONOC is a proprietary, non-toxic formulation of natural-occurring, non-pathogenic, non-opportunistic bacteria and fungi. Enclosure 1 is a voucher for its proprietary microbial composition. The product is shipped in two separate containers: one containing a very small volume of liquid "starter" nutrients called ENVIROBREW, the other containing freeze-dried microorganisms called ENVIRONOC. The user, prior to application, prepares a batch of inoculum by first mixing the ENVIROBREW nutrients with water, and then adding the ENVIRONOC microorganisms, followed by aeration to multiply the microbial population. Regulatory information regarding ENVIRONOC is provided in enclosure 2, and a more detailed explanation of inoculum batch preparation is included with the supplemental information of enclosure 3.

For vadose remediation where the underlying groundwater will not be affected by leaching of this product, there are no special concerns beyond those which would normally need to be addressed in preparing a Remedial Action Plan and conducting a cleanup in accordance with the petroleum cleanup requirements of Chapter 62-770, Florida Administrative Code (F.A.C.). For ex situ groundwater treatment, where an aboveground treatment system produces effluent meeting the petroleum cleanup criteria of Chapter 62-770, F.A.C., and the drinking water standards of Chapter 62-550, F.A.C., for disposal via recharge gallery or NPDES permit, there are no special concerns. But for in situ groundwater remediation, via direct injection of ENVIRONOC into an aquifer, there are underground injection control (UIC) regulations that must be observed. Since in situ aquifer remediation via injection is likely to be the most common application of this product, the bulk of the regulatory requirements discussed herein will be directed to that topic.

The bureau recognizes ENVIRONOC as a viable product for the bioremediation of petroleum contaminated sites in Florida. There are no objections to its use provided: (a) the considerations of this letter

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are taken into account; (b) a Remedial Action Plan is approved by the Department; and (c) applicable and appropriate underground injection control regulations are observed when the product is used for in situ aquifer remediation via injection.

While the Department of Environmental Protection does not endorse 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, safety, and welfare. Vendor's must then market the products and processes on their own merits regarding performance, cost, and safety in comparison to competing alternatives in the marketplace.

Preparers of Remedial Action Plans may include a copy of this letter in the appendix of plans they submit, and call attention to it in the text of their document. In this way, technical reviewers throughout the state will be informed that you have contacted the Department of Environmental Protection to inquire about its environmental acceptability. To aid those reviewers, the Bureau of Petroleum Storage Systems provides supplemental information as enclosure 3.

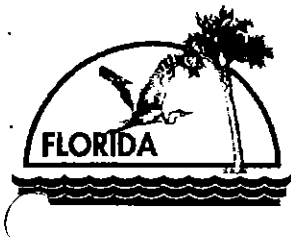
The Department reserves the right to revoke its acceptance of a product if the nature, composition, or proportions of its ingredients, or its performance has been falsely represented. Additionally, Department acceptance of any product or process does not imply it has been deemed applicable for all cleanup 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 Remedial Action Plans prescribing the product or process. You may contact me at 850/487-3299 if there are any questions.

Sincerely,



Rick Ruscito, P.E.
Bureau of Petroleum Storage Systems

cc: G. Heuler - FDEP/Tallahassee
T. Conrardy - FDEP/Tallahassee



ENCLOSURE 1

ENVIRONOC PROPRIETARY COMPOSITION VOUCHER

Department of Environmental Protection

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Frederick E. Farley, Ph.D.
Biodyne, Inc.
959 Paschal Place
Sarasota, Florida 34232-2847

Re: **ENVIRONOC Proprietary Composition Voucher**

Dear Dr. Farley:

The Bureau of Petroleum Storage Systems hereby acknowledges receipt of a confidential disclosure dated January 23, 2000, from Biodyne Incorporated, regarding the proprietary blend of microorganisms in ENVIRONOC, a product for the bioremediation of petroleum hydrocarbons and other suitable biodegradable contaminants.

We hereby vouch for Biodyne's disclosure, which identifies the bacteria and fungi species contained in the proprietary blend. The disclosure states that ENVIRONOC contains only natural-occurring, nonpathogenic microorganisms isolated from petroleum contaminated soils in the United States. Additionally, Biodyne indicates that ENVIRONOC is tested to verify the absence of *Salmonella*, *Shigella*, *Staphylococcus aureus*, and *Escherichia coli*.

The bureau is therefore reasonably assured that the product will not violate the minimum criteria for groundwater set forth in Section 62-520.400, Florida Administrative Code, (F.A.C.), which requires that the groundwaters of the state be free from substances which are harmful to plants, animals, and organisms, and free from substances that are carcinogenic, mutagenic, teratogenic or toxic to human beings. However, the obligation to comply with the minimum groundwater criteria, and all other applicable rules and regulations, ultimately rests with Biodyne and users of the product, not the Bureau of Petroleum Storage Systems. No ingredients, chemical species, or byproducts formed as a result of using ENVIRONOC shall result in a violation of any applicable and appropriate rules and regulations.

For underground injection control purposes, remediation plans prescribing the use of ENVIRONOC must disclose the volume and composition of the fluid to be injected into an aquifer. Since ENVIRONOC is a proprietary product, it will suffice in remedial action plans to describe its composition as a "blend of natural-occurring, non-pathogenic microorganisms in water", and then provide a footnote indicating that a one-time confidential disclosure regarding the microbial composition has been submitted to the Department and accepted. Reference should be made to the original January 23, 2000 disclosure, and a copy of this voucher may be included as an appendix in the plan.

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Remediation plan reviewers for petroleum contaminated site applications involving ENVIRONOC may contact me at (850) 487-3299.

Sincerely,

A handwritten signature in cursive script that reads "Rick Ruscito".

Rick Ruscito, P.E.
Bureau of Petroleum Storage Systems

ENCLOSURE 2

ENVIRONOC: ENVIRONMENTAL AND REGULATORY INFORMATION

For ENVIRONOC, the major environmental and regulatory concerns are listed below.

- a. Groundwater cleanup standards: The onus shall be on users of ENVIRONOC to ensure that all applicable groundwater contaminant standards will be met at the time of project completion, for the contaminants of concern, any residuals associated with the ingredients of ENVIRONOC, and any byproducts produced as a result of chemical or biochemical reactions involving those ingredients. The following chapters of the Florida Administrative Code 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; and Chapter 62-770, F.A.C., for petroleum cleanup criteria.

A noteworthy aspect of the minimum criteria set forth in Chapter 62-520, F.A.C., is that it requires groundwater to be free from substances which are harmful to plants, animals, and organisms, and free from substances that are carcinogenic, mutagenic, teratogenic or toxic to human beings. In effect, these "free from" requirements form a catchall. They close what would otherwise be a loophole in the regulations by preventing indiscriminate injection of a potentially harmful product in the event that any of its ingredients is not regulated as a specific primary or secondary drinking water contaminant.

- b. Injection well permit: The issuance of a site specific Remedial Action Plan Approval Order by either the Bureau of Petroleum Storage Systems or the Bureau of Waste Cleanup, for remediation via injection of ENVIRONOC into an aquifer, constitutes the granting of a Class V injection well permit.
- c. Groundwater injection standards: For in situ aquifer remediation, the composition of an injected fluid must meet the drinking water standards set forth in Chapter 62-550, F.A.C., pursuant to underground injection control Rule 62-528.600(2)(d), F.A.C.
- d. Nutrients option: If injection of ENVIRONOC into an aquifer is to be augmented by nutrients or other substances, then the Remedial Action Plan for the project must provide a complete chemical analysis of the augmenting nutrient mixture. These additional nutrients are not to be confused with the miniscule volume of "starter" nutrients called ENVIROBREW, which is used to prepare a batch of inoculum prior to injection.

The injected mixture cannot exceed the drinking water standards set forth in Chapter 62-550, F.A.C., pursuant to underground injection control Rule 62-528.600(2)(d), F.A.C. Additionally, if the injected mixture contains substances not regulated as primary or secondary drinking water contaminants by Chapter 62-550, F.A.C., then none of them shall be harmful. For nutrient mixtures that do not meet the primary and secondary drinking water standards of

Chapter 62-528, F.A.C., or the minimum groundwater criteria of Chapter 62-520, F.A.C., it is necessary to obtain a variance. Remedial Action Plans prescribing injection of nutrients, as augmentation to the ENVIRONOC formula, shall indicate which chemical species associated with the nutrients warrant tracking.

- e. Utilization of wells: If a remediation site happens to have an abundance of monitoring wells, then the Department has no objection to the use of some wells for the application of ENVIRONOC. However, no "designated" monitoring well, dedicated to the tracking of remediation progress (by sampling), shall be used to apply ENVIRONOC. 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.
- f. Groundwater monitoring:
 - 1. Active remediation petroleum monitoring: During the period of active remediation, groundwater shall be monitored in accordance with the requirements set forth in Section 62-770.700, F.A.C. Two noteworthy rules within that section are 62-770.700(3)(i), F.A.C., for frequency of sampling, and 62-770.700(5)(f), F.A.C., which requires a sampling schedule for bioremediation. For non-petroleum cleanups, the monitoring should be conducted in accordance with the provisions of an approved Remedial Action Plan.
 - 2. Post remediation petroleum monitoring: At least one (1) year of quarterly post remediation groundwater monitoring shall be conducted at a minimum of two (2) wells, one located in the area of maximum petroleum contamination, the other downgradient of the area of maximum petroleum contamination, pursuant to Section 62-770.750, F.A.C. For non-petroleum cleanups, the monitoring should be conducted in accordance with the provisions of an approved Remedial Action Plan.
 - 3. Underground injection control monitoring: Since no ingredient of ENVIRONOC exceeds a maximum contaminant level (MCL) allowed by the drinking water standards of Chapter 62-550, F.A.C., the Department, pursuant to Rules 62-528.615(1)(b)1 and (2), F.A.C., has determined that the tracking of any particular ingredient shall not be mandatory for underground injection monitoring purposes.
- g. Background samples: Prior to commencement of in situ injection-type aquifer remediation projects, the Department recommends the sampling of at least one (1) monitoring well located upgradient of the petroleum contamination plume, or at least one (1) non-upgradient monitoring well, located beyond the edge of the plume, for the background concentration of selected key bioremediation parameters. If more than one well is sampled, then the average value of each parameter can be used as the background value for the site.

Since no ingredient of ENVIRONOC exceeds an MCL set forth by the drinking water standards of Chapter 62-550, F.A.C., the measurement of background concentrations, for injection control purposes, shall not be mandatory. Such sampling, however, is recommended as a

matter of good bioremediation practice. In the opinion of the Bureau of Petroleum Storage Systems, the most comprehensive sampling of key bioremediation parameters would not only include determination of upgradient background values, but measurement of the changes that occur to those key parameters as groundwater travels through the contamination source area and downgradient as well.

- h. Underground injection control inventory: Remedial Action Plans prescribing in situ aquifer injection-type remediation shall include information pursuant to Rule 62-528.630(2)(c)1 through 6, F.A.C., for the inventory purposes of underground injection control. Per Rule 62-528.630(2)(c), F.A.C., aquifer remediation projects involving injection wells may be authorized under the provisions of a Remedial Action Plan, provided the construction, operation, and monitoring requirements of Chapter 62-528, F.A.C., are met. A memorandum outlining the inventory information about injection-type aquifer remediation plans to be transmitted by Department reviewers to the Underground Injection Control Section is provided as enclosure 4. Only reviewers within the Department, including its district offices, may approve in situ injection-type remediation plans in which the approval constitutes a Class V injection permit; local programs are not authorized to grant such approvals. See enclosure 3.
- i. Operation:
 - 1. Avoidance of migration: For in situ injection-type aquifer remediation projects, injection of ENVIRONOC 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, 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 petroleum contamination plume is expected to accompany the ENVIRONOC 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. Additionally, each Remedial Action Plan should clearly indicate the total volume of ENVIRONOC inoculum that will be injected.
 - 3. Operating parameter measurements: Rule 62-770.700(9)(h), F.A.C., sets forth frequency requirements for the measurement of bioremediation operating parameters such as dissolved oxygen levels, rates of nutrient addition, temperature, etc. It also includes an option for reduction in the frequency or discontinuation of some measurements in situations when appropriate.
- j. 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

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the Department shall be notified so that the injection wells can be removed from the inventory list.

- k. Surface water applications: The regulatory jurisdiction of the Bureau of Petroleum Storage Systems is primarily that of subsurface soil and groundwater. And while subsurface contamination at a petroleum cleanup site may sometimes migrate underground to a nearby surface water body, it has historically been the strategy to treat the subsurface source of petroleum contamination, so that it no longer adversely affects the surface water body. It generally has not been necessary to directly treat the surface water body itself.

If in the course of a subsurface petroleum cleanup, however, there is a need to directly treat a nearby impacted surface water body with ENVIRONOC, then the surface water quality regulations set forth in Chapter 62-302, F.A.C., should be observed. Surface water cleanup criteria for petroleum and a number of other contaminants can be found in Chapter 62-777, F.A.C.

For surface water applications of ENVIRONOC that are not petroleum remediation projects administered under the jurisdiction of the Bureau of Petroleum Storage Systems, such as algae control and emergency response to surface water discharges of petroleum, the appropriate bureaus within the Department of Environmental Protection should be consulted.

ENCLOSURE 3

ENVIRONOC: SUPPLEMENTAL INFORMATION

The information below, compiled from several sources, may be helpful to reviewers of Remedial Action Plans prescribing bioremediation.

- a. Department of Environmental Protection reviewers of in situ injection-type aquifer remediation plans, regardless of whether in Tallahassee or district offices, must fill in the blanks on the enclosure 4 memorandum, whose subject is "Proposed Injection Well(s) for In Situ Aquifer Remediation at a Petroleum Remedial Action Site". The completed form must be submitted to the Underground Injection Control Section at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400.

Only reviewers within the Department and its district offices may approve in situ injection-type remediation plans in which the approval constitutes the issuance of a Class V injection permit; local programs are not authorized to grant such approvals. Reason: Although an arrangement between the Environmental Protection Agency and the Department delegates underground injection control authority to the Department, it does not allow the Department to delegate that authority any further. This includes delegation to the Department's contracted remediation review agencies such as those operated by the counties and other local governments. Injection approval instructions to the local programs can be found in the Bureau of Petroleum Storage Systems guidance document BPSS-10 for in situ chemical additives at web page [/www.dep.state.fl.us/dwm/programs/pcp/geninfo/active.htm](http://www.dep.state.fl.us/dwm/programs/pcp/geninfo/active.htm).

- b. Pilot study: For bioremediation, per rule 62-770.700(2), F.A.C., a pilot study proposal shall be submitted for review, and a pilot test shall be performed prior to designing a treatment system. If conditions or the situation at a site do not warrant a pilot study, then a proposal explaining the rationale for the decision not to perform a pilot study shall be submitted for review. The state's technical reviewers are encouraged to use judgment in balancing cost and the need for technical information to be obtained from a pilot study. In some cases, only a biotreatability test may suffice. In other cases, perhaps only a sampling of the site for parameters indicative of bioremediation could serve in lieu of a pilot test, to show that the site is already conducive to bioremediation and therefore likely to respond to further bioenhancements. And in other cases still, especially those where a contamination plume is small and its contaminant concentration levels only in need of polishing, no pilot study, biotreatability study, or sampling at all may be necessary.
- c. ENVIRONOC biotreatability studies: Biodyne indicates that ENVIRONOC has already been tested for its ability to degrade most hydrocarbon contaminants of concern at a petroleum remediation site, and that users can expect at least a 15 to 82 percent reduction in hydrocarbon contaminant levels. Users of the product, and the state's technical reviewers as well, may want to take this already available information into account when making a determination in regard to the necessity of a biotreatability study. This may be an area where costs can be reduced on some projects. The following is a list of petroleum contaminants that ENVIRONOC is known to

degrade: aliphatics (i.e., straight-chain hydrocarbons); paraffins (i.e., the alkanes having the molecular formula C_nH_{2n+2}); methyl tert-butyl ether (MTBE); aromatics (e.g., benzene and other 6-carbon ring hydrocarbons); and polynuclear aromatic hydrocarbons (e.g., naphthalenes, acenaphthene, and other multi-ring hydrocarbons).

- d. Bacteria: It is generally reported (on a total weight basis) that bacteria are approximately 70 to 80 percent water. On a dry weight basis, approximately 95 percent of the composition is represented by 5 elements: carbon, oxygen, nitrogen, hydrogen, and phosphorus. At a petroleum remediation site, it is intended that the source of carbon for the growth of bacteria will come from the petroleum hydrocarbons themselves. Natural-occurring organic carbon at a site can also serve as a carbon source for bacteria. Depending on site's specific conditions, the remaining four elements must either be available naturally, or added as macronutrients in order to stimulate bioremediation. Micronutrients must also be present for bacteria to grow.
- e. Degradation products: Carbon dioxide and water are the ultimate products of aerobic and most anaerobic biodegradations of hydrocarbons. In the case of methanogenesis, an anaerobic process, carbon dioxide and methane are produced. The intermediate products of aerobic degradation may include simple acids, alcohols, and fatty acids. Aerobic processes use oxygen as an electron acceptor to produce carbon dioxide and water.
- f. General information about bioremediation parameters: The following parameters may be useful in determining the potential for bioremediation at a site, or whether bioremediation is already occurring. They were selected from a list that appears in the publication "In Situ Treatment Technology" by E. Nyer et al., Lewis Publishers, 1996. The parameters are: dissolved oxygen; redox potential; pH; temperature; specific conductance; volatile organic compounds; nitrate; nitrite; ammonia nitrogen; manganese (total and dissolved); iron (total, dissolved, and ferrous); sulfate; sulfide; and total organic carbon. Gaseous parameters include: carbon dioxide, oxygen, nitrogen, and methane. Other parameters that may be helpful are chemical oxygen demand, biochemical oxygen demand, and total organic carbon. Preparers of bioremediation plans and their reviewers should determine which parameters, if any, should be investigated on a site specific basis.
- g. ENVIRONOC design considerations:
 1. Delivery of inoculum: Biodyne indicates it is critical that the user design a delivery system that promotes good distribution and ensures contact of ENVIRONOC with the contaminants to be degraded. The Bureau of Petroleum Storage Systems would like to add that "good dispersion" means both horizontally and vertically throughout the area to be cleaned up at a remediation site.
 2. Oxygen: If adequate oxygen is not available in the soil or groundwater to be remediated, then it may be necessary for the user of ENVIRONOC to design a system that artificially introduces oxygen.

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- h. ENVIRONOC operating conditions: A summary of the most important operating conditions for ENVIRONOC is given in the table below.

Parameter	Range	Optimum
pH	6.0-8.5	7.0
Temperature	45-115 °F	78 °F
Dissolved Oxygen *	>0.4 parts per million	
Salinity	<5%	
Macronutrients †		

* There is no optimum dissolved oxygen level, and the presence of dissolved oxygen at concentrations greater than 0.4 parts per million is not harmful to ENVIRONOC. At sites where the supply of dissolved oxygen (an electron acceptor) is limited, either natural-occurring or artificially introduced nitrate may serve as an electron donor, since some of the microbes in ENVIRONOC are capable of utilizing nitrate (NO_3^-). Any nitrate that is injected into an aquifer for this purpose must meet the drinking water standards of Chapter 62-550, F.A.C., or a variance must be obtained.

† In most cases, the availability of a food source (i.e., petroleum hydrocarbons) will be sufficient for microbial growth. If at some sites, however, it is determined that nitrogen and phosphorus are not available in sufficient quantity, then it may be necessary to artificially introduce these two macronutrients. They are generally considered the two most important nutrients needed for microbes to thrive, after a carbon food source need has been satisfied.

- i. Inoculum preparation: The user of ENVIRONOC prepares a fresh batch of inoculum prior to application, to ensure that the greatest number of living microbes is put to work at a site. The following is a recipe for a 10-liter batch. First, 30 milliliters of ENVIROBREW "starter" nutrients is mixed into 10 liters (approximately 2.5 gallons) of water. Next, approximately 600 milligrams of freeze-dried ENVIRONOC (approximately 10^{10} microbes) is added, and then aerated for 48 hours at approximately 78 °F. At this point, the batch is ready for application.

The purpose of the 48-hour aeration is to multiply the initial freeze-dried microbial population of 10^{10} to approximately 10^{13} in the 2.5-gallon batch of inoculum. Biodyne indicates that the small volume of ENVIROBREW starter nutrients is almost entirely consumed by the time the aeration is complete, therefore the resulting inoculum is almost purely a mixture of living microbes and water.

- j. Dosage and application: The following information about dosage and application of ENVIRONOC is provided for rule-of-thumb and cost estimating purposes. The exact dosage should be determined on a site by site basis, taking into account the site-specific conditions. Batches of inoculum, as prepared in paragraph i above, should be applied as soon as practically possible, to ensure that the highest number of fresh, living microbes are put to work.

For soil, 10 liters of inoculum (approximately 2.5 gallons) at roughly 10^9 microbes per milliliter, can treat approximately 250 tons of soil (roughly 179 cubic yards). This equates to a dosage of approximately 44,050 microbes per gram. At a minimum, for soil treatment, Biodyne recommends delivery of no less than 10,000 colony-forming units (cfu) of microbes per gram of soil (or sludge). For groundwater (in situ or ex situ) or surface water treatment, the recommendation is no less than 10,000 cfu per

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milliliter. For situations where the level of contamination is high, a dosage greater than 10,000 cfu per gram or milliliter may be necessary.

Biodyne recommends multiple applications of ENVIRONOC, to ensure that microbial populations remain high as contaminant concentrations decrease. A minimum of four (4) applications is suggested. There was no recommendation regarding the time period between applications, but it was suggested that the nature of the delivery system should be one of the factors in determining a frequency of application.

- k. Case studies: Biodyne has listed a number of projects in which ENVIRONOC has been used. While the details about these projects were not provided, the list did indicate that the ENVIRONOC was used to treat a range of petroleum contaminants in soil, and oily sludge, gasoline, diesel, crude oil, and Bunker C.

**Florida Department of
Environmental Protection**

Memorandum

TO: Richard Deuerling, Mail Station 3530
Division of Water Facilities
Bureau of Resource Protection
Underground Injection Control Section

FROM: _____ (Local programs
see Note 1.)

DATE: _____

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

This is to notify you of proposed injection well(s) construction for the in situ remediation of groundwater at a petroleum contaminated site. The following is a description of the site location.

Name: _____
Address: _____
City/County: _____
Latitude/Longitude: _____
FDEP Facility Number: _____

The design of the injection-type aquifer remediation system consists of the following:

Areal extent of contamination (square feet): _____
Number of injection wells: _____
Composition of injected fluid (See note 2)
(ingredient, wt. %): _____

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

Note 1. Local programs are not authorized to approve underground injections into aquifers.
Reason: The Department, per agreement with EPA, has been delegated this authority but is not allowed to delegate it any further. Local programs, after reviewing a Remedial Action Plan or an injection proposal document, should follow instructions in a September 29, 1998 memorandum to arrange for Department headquarters' execution of an approval order.

Note 2. Complete chemical analysis of injected fluid is required by Chapter 62-528, Florida Administrative Code (no exceptions). Proprietary formulations shall make confidential disclosure. Injected fluids must meet drinking water standards of Chapter 62-550, F.A.C., unless an exemption or variance has been granted.

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Date: _____

Site name: _____
FDEP facility no.: _____

A site map showing the areal extent of the groundwater contamination plume and the location and spacing of injection wells is attached.

Excerpts from the remediation plan which describe the site lithology are attached. The following is a summary description of the affected aquifer:

Name of aquifer: _____
Depth to groundwater (feet): _____
Aquifer thickness (feet): _____

A schematic of the injection well(s) is attached. The following is a summary:

Depth of well (feet): _____
Screened interval: _____ to _____ feet below surface
Well casing diameter (inches): _____
Bore hole diameter: _____
If direct-push type well(s), indicate
diameter (inches): _____ and depth (feet): _____

The in situ injection-type aquifer remediation plan for this petroleum contaminated site is intended to meet the groundwater petroleum cleanup criteria set forth in Chapter 62-770, F.A.C. 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 contaminating petroleum 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 Chapter 62-520, 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.