

Department of Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary

November 5, 2001

Mr. Bill Scogin, President
Verde Environmental, Inc.
7309 Schneider Street
Houston, Texas 77093

Re: **MicroBlaze**

Dear Mr. Scogin:

The Bureau of Petroleum Storage Systems hereby accepts MicroBlaze® for both in situ and ex situ bioremediation of contaminated sites in Florida.

Acceptance is for applications within the jurisdiction of this bureau, which is generally the remediation of petroleum in subsurface soil and groundwater. It is noted that there are other uses for MicroBlaze® in areas beyond the jurisdiction of this bureau, such as grease cleanups, odor control, fire fighting, emergency response cleanups, and the remediation of chlorinated organic hydrocarbons and other suitable compounds.

The product contains a synergistic blend of biodegradable nonylphenol ethoxylate surfactants, nutrients, and naturally occurring, non-toxic, non-pathogenic microbes. MicroBlaze® is a concentrated liquid that is diluted to a 3% mixture with water and is user-applied.

For in situ vadose remediation, when the underlying groundwater will not be affected by the 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, when an aboveground treatment system produces effluent meeting the petroleum cleanup criteria of Chapter 62-777, 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 injection of the product 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 within the jurisdiction of this bureau, the bulk of the regulatory requirements discussed in enclosure 2 will be directed to that topic.

A new rule, 62-522.300(2)(c), F.A.C., effective August 27, 2001, now covers some of the items formerly addressed by the terms of a September 12, 2001 zone of discharge variance that allows the injection of MicroBlaze® into groundwater for remediation purposes. The new rule, however, does not entirely negate or supersede the need for variances, but now covers by rule,

rather than by variance, the zone size, duration, and monitoring requirements for injected fluids that do not meet all primary and secondary drinking water standards. In the specific case of MicroBlaze®, the parameters now covered by rule are the primary drinking water contaminant nitrate, and the secondary drinking water parameters total dissolved solids and chloride. But since the new rule does not apply to contaminants that fall into the category of minimum groundwater criteria, the portion of the variance associated with the monitoring of ammonia nitrogen, nonylphenol, nonylphenol monoethoxylate, and nonylphenol diethoxylate when MicroBlaze® is injected still applies.

The bureau recognizes MicroBlaze® 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 are taken into account; (b) a Remedial Action Plan is approved by the Department; and (c) the terms of the September 12, 2001 variance granted by the Department to Verde Environmental, Inc., are observed. Enclosure 2 includes a summary of the terms of the variance that allows a temporary zone of discharge for the injection of MicroBlaze® to remediate groundwater at a contaminated site.

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, safety and welfare. Vendors must then market the products and processes on their own merits regarding performance, cost and safety in comparison to competing alternatives in the marketplace. In no way, however, shall this regulatory acceptance letter be construed as certification of product performance.

Those who prepare Remedial Action Plans are advised to 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 in regard to MicroBlaze®. To aid those reviewers, the Bureau of Petroleum Storage Systems provides supplemental information as enclosure 3.

The Department reserves the right to revoke acceptance of any product or process if its ingredients or 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

Mr. Bill Scogin, President
November 5, 2001
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Enclosures (4)

c: John Kusnerek
AirSafe, Inc.
929 Richmond Avenue
Pollard, Alabama 36441

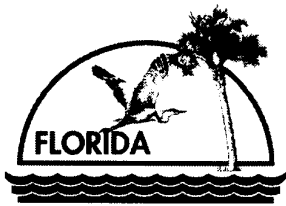
Cynthia Christen - OGC, FDEP/Tallahassee

Donna Cline - PCS5/Tallahassee

George Heuler - UIC/Tallahassee

T. Conrardy - FDEP/Tallahassee

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ENCLOSURE 1

MICROBLAZE® PROPRIETARY INGREDIENTS VOUCHER

Department of Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
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November 5, 2001

Mr. Bill Scogin, President
Verde Environmental, Inc.
7309 Schneider Street
Houston, Texas 77093

Re: **MicroBlaze®**

Dear Mr. Scogin:

The Bureau of Petroleum Storage Systems hereby acknowledges receipt of confidential disclosures dated January and February 2001 from Verde Environmental, Incorporated. The disclosures provide the proprietary proportions of ingredients in MicroBlaze®.

Having reviewed the disclosures, we hereby vouch for the proportions of the MicroBlaze® ingredients. We also vouch for the correct identification of parameters for which a variance was granted to Verde Environmental on September 12, 2001 for a temporary zone of discharge when MicroBlaze® is injected into an aquifer for remediation purposes. Details about the terms of the variance and its groundwater monitoring requirements are described in enclosure 2, or the variance itself may be viewed at web page www.dep.state.fl.us/waste/categories/pcp/pages/innovative.htm.

When MicroBlaze® is injected in concentrations of 3 percent or less, only the concentrations of ammonia nitrogen and total dissolved solids in the injected fluid will exceed their respective standards set forth in the minimum criteria of Chapter 62-777, F.A.C., and the drinking water standards of Chapter 62-550, F.A.C. When MicroBlaze® is injected in concentrations of 3 percent or greater, not only will the standards for ammonia nitrogen and total dissolved solids be exceeded, but the minimum groundwater criteria for the following surfactant degradation products may be exceeded: nonylphenol, nonylphenol monoethoxylate, and nonylphenol diethoxylate.

Additionally, it should be noted that the concentration of nitrate in MicroBlaze® does not exceed the 10 milligrams per liter primary drinking water standard but that it is significant in comparison to the standard. And lastly, when aquifers contaminated by chlorinated hydrocarbon solvents are remediated using MicroBlaze®, the concentration of chloride in the groundwater may temporarily exceed its secondary drinking water standard of 250 milligrams per liter, depending on the concentration of chlorinated solvent initially present.

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Mr. Mr. Bill Scogin, President
November 5, 2001
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Based on the information provided, the bureau is reasonably assured that no other drinking water or groundwater criteria set forth in the Florida Administrative Code will be exceeded when MicroBlaze® is injected for the remediation of a contaminated aquifer.

Section 62-520.400, F.A.C., requires that the groundwater of the state be free from substances that 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 Verde Environmental, Inc. and users of MicroBlaze®, not the Bureau of Petroleum Storage Systems. No ingredients, chemical species, or byproducts formed as a result of using MicroBlaze® shall result in a violation of any applicable and appropriate rule or regulation.

For underground injection control purposes, remediation plans prescribing the use of MicroBlaze must disclose the volume and composition of the fluid to be injected into an aquifer. Since the proportions of the ingredients in MicroBlaze® is proprietary, it will suffice to indicate the overall concentration of the solution and then provide a footnote indicating that a one-time confidential disclosure regarding the ingredients and their proportions has been submitted to the Department and accepted. Reference should be made to the original January and February disclosures, and a copy of this voucher should be included as an appendix in the plan. Remediation plan reviewers for petroleum contaminated site applications involving MicroBlaze may me at (850) 487-3299. Questions about the remediation of sites contaminated by chlorinated organic compounds should be directed to the Bureau of Waste Cleanup at (850) 488-0190.

Sincerely,

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

ENCLOSURE 2

MICROBLAZE®: ENVIRONMENTAL AND REGULATORY INFORMATION

For MicroBlaze®, the major environmental and regulatory concerns are discussed below.

- a. Applicable rules and regulations: The onus shall be on Verde Environmental Incorporated and users of MicroBlaze® to comply with all applicable regulations, particularly those regarding underground injection control and groundwater quality. All applicable groundwater contaminant standards shall be met at the time of project completion for the contaminants of concern, any residuals associated with the ingredients of MicroBlaze®, 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 as applicable but should not be construed as an exhaustive list: 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 wells; Chapter 62-770, F.A.C., for petroleum cleanup; and Chapter 62-777, F.A.C., for contaminant cleanup target levels.

A new rule, Chapter 62-522.300(2)(c), became effective August 27, 2001. The new rule no longer requires a variance for the primary and secondary drinking water parameters when injecting a fluid for the purpose of aquifer remediation. However, if the injected fluid contains a substance that is not a primary or secondary parameter, and the substance is of toxicological concern, then a variance is still necessary for a temporary exemption from minimum groundwater requirements.

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 that 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 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 injection-type aquifer remediation 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., and the minimum groundwater criteria set forth in Chapter 62-520, F.A.C., including the minimum criteria for contaminants listed in Chapter 62-777, F.A.C. If the

manufacturer of MicroBlaze® makes any changes to its formulation in the future, then the bureau should be notified and provided with a complete chemical analysis of the reformulated product.

- d. Variance: On September 12, 2001, the Florida Department of Environmental Protection granted a variance to Verde Environmental Incorporated for a temporary zone of discharge when MicroBlaze® is injected for the purpose of aquifer remediation. The zone of discharge for MicroBlaze® is described in the variance as a thirty-five (35)-foot radius of influence from each injection point, for the temporary period of one (1) year. The variance is not site-specific and is portable from one remediation project site to another in Florida, provided a site-specific Remedial Action Plan for the use of MicroBlaze® is approved prior to the commencement of activities.

The variance parameters that apply when MicroBlaze® is injected in concentrations of 3 percent or less are ammonia nitrogen and total dissolved solids, which exceed their respective standards set forth in the minimum criteria of Chapter 62-777, F.A.C., and the drinking water standards of Chapter 62-550, F.A.C. However, the variance also requires monitoring of nitrate in the groundwater when MicroBlaze® is injected because the concentration of nitrate in the injected solution is significant in comparison to the 10 milligrams per liter primary drinking water standard for nitrate. It also requires the monitoring of groundwater for chloride when MicroBlaze® is used to remediate the aquifer at a site contaminated by chlorinated hydrocarbons.

The variance requires monitoring of groundwater for the following additional surfactant degradation products when MicroBlaze® is injected in concentrations of 3 percent or greater: nonylphenol, nonylphenol monoethoxylate, and nonylphenol diethoxylate.

The monitoring for all parameters mentioned in the variance shall be conducted before and after the injection of MicroBlaze®, and shall include the sampling of a downgradient monitoring well during the one-year period after the last injection. At that time, the monitored parameters must meet their respective groundwater standards or their naturally occurring background concentrations at a site, whichever is less stringent. The applicable standards for their allowable maximum concentrations are as follows: nitrate, 10 milligrams per liter (mg/L); chloride, 250 mg/L; total dissolved solids, 500 mg/L; ammonia nitrogen, 2.8 mg/L; nonylphenol, .0084 mg/L; nonylphenol monoethoxylate, .0084 mg/L; and nonylphenol diethoxylate, .0084 mg/L. The minimum groundwater criteria for nonylphenol, nonylphenol monoethoxylate, and nonylphenol diethoxylate were validated by the University of Florida Center for Environmental and Human Toxicology, and will be included in the publication of some future update of Chapter 62-777, F.A.C.

- 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 MicroBlaze®. However, no "designated" monitoring well, dedicated to the tracking of remediation progress (by sampling) shall be used to apply MicroBlaze®. This will avoid premature

conclusions 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.

f. Groundwater monitoring:

1. Active remediation petroleum monitoring: During the period of active remediation, groundwater shall be monitored for petroleum contaminants of concern 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. If MicroBlaze® will be used for the cleanup of non-petroleum hydrocarbons, then 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 for petroleum contaminants of concern 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 Chapter 62-770.750, F.A.C. If MicroBlaze® will be used for the cleanup of non-petroleum hydrocarbons, then the monitoring should be conducted in accordance with the provisions of an approved Remedial Action Plan.
3. Underground injection control monitoring: For situations in which the injected concentration of MicroBlaze® is 3 percent or less, as discussed in paragraph d, the monitoring of ammonia nitrogen, total dissolved solids, and nitrate is required for underground injection control purposes. However, for situations in which the injected concentration of the MicroBlaze® is greater than 3 percent, the groundwater monitoring shall also include nonylphenol, nonylphenol monoethoxylate, and nonylphenol diethoxylate, all of which have a minimum groundwater criterion of .0084 mg/L. Additionally, in the case of chlorinated solvent cleanups, groundwater monitoring shall include chloride.

g. Operation:

1. Avoidance of migration: For in situ injection-type aquifer remediation projects, injection of MicroBlaze® 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 MicroBlaze® 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 fluid and the concentration of MicroBlaze® that will be injected.

3. Operating parameter measurements: Petroleum cleanup 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.
- h. 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 Chapter 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.

ENCLOSURE 3

MICROBLAZE®: SUPPLEMENTAL INFORMATION

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

- a. Nature of the product: MicroBlaze® augments the bioremediation of contaminants by the application of a mixture of biodegradable nonylphenol ethoxylate surfactants, nutrients, and naturally occurring, non-toxic, non-pathogenic microbes. MicroBlaze® is a concentrated liquid that is diluted to a 3% mixture with water and is user applied. For maximum effectiveness, the Bureau of Petroleum Storage Systems believes that designers of remediation systems should make sure MicroBlaze® is applied in such a way that adequate vertical and horizontal coverage throughout the volume of soil and/or groundwater to be remediated is achieved.
- b. 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. A similar form is available through the Bureau of Waste Cleanup for notification of injection at a non-petroleum remediation site.

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 US 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 titled "In Situ Chemical Additives" at web page www.dep.state.fl.us/waste/categories/pcp/pages/active.htm.

- c. Pilot study: For innovative technologies and 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 treatability 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 some bioremediation is already occurring naturally and that the site may be conducive to enhancements.

- d. Bioremediation indicator samples: Prior to preparation of a Remedial Action Plan for full-scale in situ injection-type aquifer remediation of a site, the bureau recommends the sampling of monitoring wells that are upgradient, within, and downgradient of the groundwater contamination plume for bioremediation parameters, and then comparing the results in order to determine whether intrinsic bioremediation is already occurring across the plume. Paragraph *h* below lists some of the bioremediation parameters that may be sampled. This sampling suggestion is for technical, not regulatory purposes. It is not mandatory but is recommended as a matter of good practice.
- e. Underground injection control inventory: Remedial Action Plans prescribing in situ injection-type aquifer 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.
- f. 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 may also compete with the petroleum or other contaminants being remediated as a carbon source for bacteria. Depending on a 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.
- g. Degradation products: Carbon dioxide and water are the ultimate products of aerobic and most anaerobic biodegradations of hydrocarbons. 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. When chlorinated organic compounds are biodegraded, the degradation products will include chloride.
- h. 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.

- j. Dosage and application rate: Per information submitted by Verde Environmental, Inc. to the Bureau of Petroleum Storage Systems, MicroBlaze® is user-prepared. The general rule of thumb application rate for the MicroBlaze® solution is equivalent to 10% of the total volume of contaminated area that is being treated. Usual application strengths of the product range from a ½ to 6 percent aqueous solution.
- k. NCP Federal Preapproval: The Environmental Protection Agency (EPA) maintains a schedule, called the National Contingency Plan (NCP) Product Schedule, of dispersants and other chemicals or bioremediation products that may be used on oil discharges in accordance with procedures set forth in 40 Code of Federal Regulations Section 300.910. MicroBlaze® is listed in the NCP Product schedule and the 1997 toxicology test information was furnished in the application.

Memorandum**Florida Department of
Environmental Protection**

TO: Richard Deuerling, Mail Station 3530
Division of Water Facilities
Underground Injection Control Section
Florida Department of Environmental Protection
2600 Blair Stone Road, Tallahassee, FL 32399-2400

FROM: _____ (Note 1.)

DATE: _____

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

Pursuant to Rule 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 petroleum-contaminated site.

Site name: _____

Site address: _____

City/County: _____

Latitude/Longitude: _____

FDEP Facility Number: _____

Site owner's name: _____

Site owner's address: _____

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

Well contractor's address: _____

Brief description of the in situ injection-type aquifer remediation project:

Summary of major design considerations and features of the project:

Areal extent of contamination (square feet): _____

Number of injection wells: _____

Composition of injected fluid (Note 3)

(ingredient, wt. %): _____

Injection volume per well (gallons): _____

Single or multiple injection events: _____

Injection volume total (all wells, all
events): _____

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

The following is a summary description of the affected aquifer:

Name of aquifer: _____

Depth to groundwater (feet): _____

Aquifer thickness (feet): _____

The injection well(s) features are summarized below, and/or a schematic of the injection well(s) is attached.

Direct-push or Conventional (*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 surface

Grouted interval: _____ to _____ feet below surface

Casing diameter, if applicable (inches): _____

Cased depth, if applic.: _____ to _____ feet below surface

Casing material, if applic.: _____

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 that 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.

Note 1. 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 a March 16, 2000 memorandum to arrange for Department headquarters' execution of an approval order, and then complete this form. This form is primarily for use by state and local program technical reviewers, but petroleum remediation contractors may fill in all blanks except those labeled "FROM", "DATE", and "approval date", and "telephone number" blanks in the last paragraph. Only a state or local program reviewer should complete those blanks.

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. Chapter 62-528, Florida Administrative Code, requires complete chemical analysis of injected fluid. 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.