



Department of Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary

May 2, 2003

Mr. Thomas A. Reed
Deep Earth Technologies, Inc.
9530 West 54th Place, Suite 1000
Arvada, CO 80002

Re: Controlled In-Situ Chemical Oxidation (CISCO) TM Process, also known as CISCOP TM or Cool-Ox TM

Dear Mr. Reed:

The Bureau of Petroleum Storage Systems (Bureau) hereby accepts Controlled In-Situ Chemical Oxidation (CISCO) TM Process for remediation of petroleum and other suitable contaminants in groundwater and soil, in situ and ex situ. The CISCO TM Process is a chemical oxidation process based upon the use of hydrogen peroxide as a source of oxidizing components. Fenton-like reactions produce intermediate compounds more easily degraded by naturally occurring microbes. Unlike the Fenton reaction, the CISCO TM Process is not exothermic. In addition, the inclusion of nutrients and the production of metabolic oxygen aid microbial activity and the breakdown of contaminants. The CISCO TM Process is available in three closely related formulas (A, B, and C) all of which are proprietary mixtures of oxidizing agents, stabilizers and nutrients which degrade or enhance the degradation of contaminants, ultimately to carbon dioxide, water, and molecular oxygen. Enclosure 1 is a voucher for a confidential disclosure of the CISCO TM Process proprietary ingredients' proportions, submitted by Deep Earth Technologies, Inc. to the Florida Department of Environmental Protection.

This acceptance applies only to the regulatory jurisdiction and the remediation needs of the Bureau, which is primarily the cleanup of subsurface petroleum contamination, pursuant to Chapter 62-770, Florida Administrative Code (F.A.C.). Other state agencies and local governments may choose to recognize this acceptance if their needs and regulations are similar. This Bureau, however, is not responsible for applications beyond its jurisdiction.

For vadose remediation, where the underlying groundwater will not be affected by the leaching of CISCO TM, 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 Chapters 62-770 and 62-777, F.A.C. However, for injection-type in situ groundwater remediation, via direct injection of CISCO TM into an aquifer, there are underground injection control (UIC) regulations that must be observed. Since injection-type in situ aquifer remediation 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 the CISCO TM Process 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 variance from Rule 62-522.300(3), F.A.C., allowing a temporary zone of discharge for ammonia nitrogen in the CISCO TM Process is granted by the Department's Division of Water Resource Management; and (c) a site-specific Remedial Action Plan is submitted pursuant to

Chapter 62-770, F.A.C., and approved by the Department for each site where the use of the CISCO™ Process is proposed. Some major environmental and regulatory considerations that apply to the CISCO™ Process are discussed in Enclosure 2.

While the Department of Environmental Protection does not provide endorsement of specific or brand name remediation products or processes, it does recognize the need to determine their acceptability from an environmental standpoint with respect to applicable rules and regulations, and the interests of public health, 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 Department certification of product or process performance. Additionally, the Department emphasizes a distinction between its regulatory "acceptance" letters and an approval. Products and processes are accepted but they are not approved.

In addition, 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 and appropriate rules and regulations, especially those of the Florida Administrative Code pertaining to underground injection control.

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 to inquire about the environmental acceptability of the CISCO™ Process. 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 or process if its nature, performance, or any other significant aspect has been falsely represented. Additionally, Department acceptance of any product or process does not imply it has been deemed applicable for all cleanup situations, or that it is preferred over other treatment or cleanup techniques in any particular case. A site-specific evaluation of applicability and cost-effectiveness must be considered for any product or process, whether conventional or innovative, and adequate site-specific design details must be provided in a Remedial Action Plan. You may contact me at 850/877-1133 ext.29 if there are any questions.

Sincerely,

Dona J. Milinkovich, Ph.D.
Ecology and Environment, Inc.
Bureau of Petroleum Storage Systems
Petroleum Cleanup Section 6

Rebecca Marx
FDEP Section Leader
Bureau of Petroleum Storage Systems
Petroleum Cleanup Section 6

/dm

Enclosures: 4

c: R. Ruscito – FDEP/Tallahassee
T. Conrardy - FDEP/Tallahassee

ENCLOSURE 1

Department of Environmental Protection

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Twin Towers Office Building
2600 Blair Stone Road
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David B. Struhs
Secretary

May 2, 2003

Mr. Thomas A. Reed
Deep Earth Technologies, Inc.
9530 West 54th Place, Suite 1000
Arvada, CO 800002

Re: The CISCO[™] Process (CISCOP[™] and Cool-Ox[™]) Proprietary Information Voucher

Dear Mr. Reed:

The Bureau of Petroleum Storage Systems (Bureau) hereby acknowledges the confidential disclosures by Deep Earth Technologies, Inc., regarding its Controlled In-Situ Chemical Oxidation (CISCO)[™] Process. The Bureau hereby acknowledges receipt of confidential disclosures dated February 21, 2003 and February 24, 2003, submitted by Deep Earth Technologies, Inc., regarding the ingredients and their proprietary proportions in the bioremediation oxidation products known as Controlled In-Situ Chemical Oxidation (the CISCO[™] Process, CISCOP[™] or Cool-Ox[™]), for petroleum cleanup in groundwater and soil, pursuant to Chapter 62-770, Florida Administrative Code (F.A.C.). CISCO[™] is a mixture of oxidizing agents, buffers/stabilizers, and nutrients that degrade contaminants and stimulate naturally occurring microorganisms to degrade contaminants ultimately to carbon dioxide and water.

Having reviewed the confidential disclosures, we hereby vouch for the composition. Without divulging any proprietary aspects of the product, we herein provide a minimum amount of necessary information -- in as general terms as possible -- to potential users of the CISCO[™] Process and reviewers of plans proposing the CISCO[™] Process. This is done below for five categories, each of which is labeled in bold-faced type. By reading the information that the bureau has provided for each category, users and reviewers will know when there is an obligation to comply with a regulation. Additionally, for each category, the bureau has either indicated why a particular ingredient or parameter is a problem (or is not a problem) with respect to underground injection control regulations. For those categories in which the bureau has exercised judgment, an explanation is given.

pH. The CISCO[™] Process may employ one of three formulas (designated A, B and C) based on site-specific conditions. The pH of all three formulas is adjusted to 8 prior to injection. The pH of the fluid to be injected therefore meets the state's underground injection control requirement that it be in the range of 6.5 to 8.5

Ammonia. The CISCO[™] Process formulas A, B and C each employ a nitrogen source for bioremediation/bioaugmentation. Based on our calculations using the composition for each formula that may be injected, the Bureau has determined that ammonia is likely to exceed the 2.8 milligram per liter (mg/L) minimum groundwater criterion set forth by Chapter 62-777, F.A.C. Per the underground injection control regulations of Chapter 62-528, F.A.C., a fluid to be injected must meet minimum groundwater criteria and the drinking water standards of Chapter 62-550, F.A.C. Deep Earth Technologies, Inc. must therefore petition for a zone of discharge variance to temporarily exceed the 2.8 mg/L ammonia nitrogen criterion before CISCO[™] can be injected into an aquifer in Florida. Deep Earth Technologies, as of the date of this letter, has submitted a petition for a variance from Rule

62-522.300(3), F.A.C. The reader may also check this web site www.dep.state.fl.us/waste/categories/pcp/pages/innovative.htm for information regarding the status of the variance.

Nitrogen Source. The CISCO™ Process formulations do not contain nitrite or nitrate. Furthermore, the Bureau notes that according to Mr. Reed of Deep Earth Technologies, the formulas utilize a “high grade” nitrogen source. Given the quality of the nitrogen source and the relatively small percentage of the total formula represented by the nitrogen source the Department feels that concerns regarding possible impurities are not warranted. In addition, the nitrogen source for two of the three formulas (Formula A and Formula C) can be found on the Food and Drug Administration (FDA) list for EAFUS (Everything Added to Food in the United States list). Therefore, the Department is concerned only with levels of ammonia to be injected when these formulas are used during remediation. The onus, however, will be on Deep Earth Technologies, Inc. and the submitter of the remedial action plan to comply with Rule 62-522.300(2) (c) F.A.C.

Phosphate. The Bureau has considered the phosphate compound present in formula B that serves as a source of phosphorus for bioremediation purposes. This element, which is essential for life, is not a regulated groundwater contaminant in Florida. It occurs naturally in Florida’s groundwater. At a Panama City, Florida site, total phosphorus in the groundwater was measured at 800 to 1,100 micrograms per liter (ug/L). At a Volusia County site in Florida, it was measured at 1,200 ug/L, as PO₄. For comparison purposes, the European Community Guide level for phosphorus in drinking water is 400 ug/L, as P₂O₅. While phosphorus may not be a matter of great toxicological concern for in situ injection-type groundwater remediation projects, the Bureau would like to remind users of the CISCO™ Process that it could become an environmental concern if surface water is very close or present at a remediation site. In that case, if there could be any interaction between the groundwater being remediated and the nearby surface water body, then the state’s surface water regulations should be reviewed first for information about phosphorus.

Other. There may be rare instances where site-specific conditions require the use of a specific formula at an unusually high concentration. Please note, any deviation from the formulation for which a petition is granted must meet injection standards. If the modified formulation does not meet injection standards then another variance and/or compliance with rule 62-522.300 (2) (c), F.A.C. may be necessary.

For underground injection control purposes, remediation plans proposing the CISCO™ Process must provide the volume and composition of the formula (A, B, or C) to be injected into an aquifer. Since the composition is proprietary, it will suffice to indicate the overall volume of the CISCO™ formula to be injected, and provide a footnote indicating that a one-time confidential disclosure regarding the proprietary composition has been submitted to the Department. Reference should be made to the original February 21, 2003 and February 24, 2003 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 the CISCO™ Process may contact me at (850) 877-1133 ext.29.

Sincerely,

Dona J. Milinkovich, Ph.D.
Ecology and Environment, Inc.
Bureau of Petroleum Storage Systems
Petroleum Cleanup Section 6

ENCLOSURE 2

CISCO™ Process (CISCOP™ and Cool-Ox™) : ENVIRONMENTAL AND REGULATORY CONSIDERATIONS

For CISCO™ Process applications, the major environmental and regulatory considerations are listed below.

- a. Groundwater cleanup standards: The onus shall be on users of the CISCO™ Process to ensure that all applicable groundwater contaminant standards will be met at the time of project completion, for petroleum, other contaminants that may be present, any residuals associated with the ingredients of the CISCO™ Process and any byproducts produced as a result of chemical or biochemical reactions involving those ingredients. The following chapters of the Florida Administrative Code (F.A.C.) are cited: Chapter 62-550, F.A.C., for primary and secondary water quality standards; Chapter 62-520, F.A.C. for groundwater classes and standards, and minimum criteria; 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; Chapter 62-770, F.A.C., for petroleum cleanup criteria; and Chapter 62-777, F.A.C., also for minimum groundwater 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 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 Division of Waste Cleanup, for remediation via injection of the CISCO™ Process 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. Variance: As indicated in both the cover letter and the proprietary ingredients voucher, Deep Earth Technologies, Inc. must obtain a variance for a deviation from Rule 62-522.300(3), F.A.C., in order for the CISCO™ Process to be used as an injection-type in situ aquifer remediation product. Such a variance will allow a temporary zone of discharge for the ammonia nitrogen in the CISCO™ Process. Once granted, a variance will allow a temporary zone of discharge of specified dimensions around each injection point (usually expressed as a radius of influence) for a specified period of time. The measurement of the time period usually begins after the final injection. By the end of the time period, the groundwater concentration of any residual ammonia nitrogen in the zone of discharge must not exceed the 2.8 mg/L maximum allowed by Chapter 62-777, F.A.C. If the groundwater’s natural-occurring background concentration of this contaminant at a specific remediation site is already in excess of the established minimum groundwater criterion, then its residual concentration at the completion of remediation shall be no greater than the pre-existing background concentration.

If the variance granted by the Department is not site-specific, then it may be considered as portable from one CISCO™ Process cleanup project to another in Florida, provided a Remedial Action Plan is submitted for each site. With a portable variance, Deep Earth Technologies, Inc. and users of the CISCO™ Process do not have to petition for a new variance each time the CISCO™ Process is proposed for the remediation of a site, provided there is no deviation from the terms of the variance.

- 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 the CISCO™ Process. However, no “designated” monitoring well, dedicated to the tracking of remediation progress (by sampling) shall be used to apply the CISCO™ Process. 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. Additional nutrients: If, in the future, either Deep Earth Technologies, Inc. or a user of the CISCO™ Process decides to augment it with other nutrients and/or chemicals, the injection of such nutrients and other chemicals into an aquifer must also be in accordance with the underground injection control requirements of Chapter 62-528, F.A.C., which requires that substances injected meet the drinking water standards set forth Chapter 62-550, F.A.C., and the minimum groundwater criteria of Chapter 62-520, F.A.C.
- g. 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.
 - 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.
 - 3. Underground injection control monitoring: A variance from Rule 62-522.300(3), F.A.C., when granted, allowing a temporary zone of discharge, will include groundwater monitoring requirements for underground injection control purposes, for the ammonia nitrogen in the CISCO™ Process. Such monitoring will occur before and after the injection of the CISCO™ Process.
- h. Underground injection control inventory: Remedial Action Plans prescribing injection-type in situ 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. 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 injection-type in situ aquifer remediation projects, injection of the CISCO™ Process 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 petroleum contaminants 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 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 the CISCO™ Process 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 the Department shall be notified so that the injection wells can be removed from the inventory-tracking list.

ENCLOSURE 3

The CISCO™ Process (CISCOP™ and
Cool-Ox™): 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 injection-type in situ 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 (Mail Station 3530).

Only reviewers within the Department and its district offices may approve injection-type in situ 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.

- b. Pilot study: For bioremediation, per rule 62-770.700(2), Florida Administrative Code (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 does 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. For state funded projects, reviewers are encouraged to use judgment in balancing cost and the need for technical information to be obtained from a pilot study.
- c. Dosage and application rate: The Bureau of Petroleum Storage Systems (Bureau) recommends that users consult Deep Earth Technologies, Inc. when determining the formula best suited to on-site conditions, a site-specific dosage and application rate for the CISCO™ Process.
- d. Oxidation Reaction: Deep Earth Technologies, Inc. indicates that the CISCO™ Process reagents oxidize contaminants via a “Fenton-like” reaction. These reagents are similar to those employed by other technologies such as ORC®, Permeox®, and Envirofirst®. The reagents oxidize contaminants, producing intermediates that are more easily biodegradable. Unlike the Fenton reaction, the CISCO™ Process is not exothermic. Furthermore, the ability to control and delay the oxidation reaction (reaction does not begin prior to contacting the contaminant) allows the reagent to penetrate the contaminated media prior to the initiation of the reaction. This aspect of the CISCO™ Process suggests it would be particularly effective in heavy clay soils.
- e. Oxygen: Deep Earth Technology, Inc. indicates that the CISCO™ Process provides molecular oxygen that stimulates aerobic biodegradation pathways. The Bureau therefore reminds users and technical reviewers to make sure that sufficient oxygen is available at each site where the CISCO™ Process will be used. If sufficient oxygen is not available, then it will have to be added, in order to create conditions conducive for microorganisms to thrive. For aquifer remediation, the concentration of dissolved oxygen in the groundwater can be increased by either installing air sparge points, direct

injection of oxygen from a gas cylinder, or chemically by way of a peroxide. Users should contact the manufacturer to determine which method would be most appropriate for a given set of site-specific conditions. The bureau wants to emphasize that one of the most important factors in the success of aerobic biodegradation is the availability of oxygen.

- f. Nitrogen Source: The CISCO™ Process formulas A, B, and C each employ a nitrogen source for bioremediation/bioaugmentation. Based on site-specific conditions, concentrations of ammonia may temporarily exceed the 2.8 mg/L ammonia nitrogen criterion. As indicated in both the cover letter and the proprietary ingredients voucher, Deep Earth Technologies, Inc. must obtain a variance for a deviation from Rule 62-522.300(3), F.A.C., in order for the CISCO™ Process to be used as an injection-type in situ aquifer remediation product.
- g. Degradation products: Carbon dioxide and water are the ultimate products of aerobic and most anaerobic biodegradations of petroleum hydrocarbons. The intermediate products may include simple acids, alcohols, and fatty acids. Aerobic processes use oxygen as an electron acceptor to produce the carbon dioxide and water.
- 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. Those who prepare bioremediation plans, and their reviewers, should determine which parameters, if any, should be measured on a site-specific basis.

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 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.

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- 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. Those blanks should be completed only by a state or local program reviewer.
- 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. Complete chemical analysis of injected fluid is required by Chapter 62-528, Florida Administrative Code. 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.