



Florida Department of Environmental Protection

Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Charlie Crist
Governor

Jeff Kottkamp
Lt. Governor

Michael W. Sole
Secretary

September 18, 2007

Catherine R. Miceli, P.E.
VeruTEK Technologies, Inc.
65 West Dudley Town Road, Suite 100
Bloomfield, Connecticut 06002

Re: **S-ISCO™ (Surfactant-Enhanced In Situ Chemical Oxidation)**

Dear Ms. Miceli:

The Bureau of Petroleum Storage Systems hereby accepts Surfactant-Enhanced In Situ Chemical Oxidation (S-ISCO™) for the remediation of dissolved, adsorbed and non-aqueous phase liquid petroleum contaminants in groundwater and soil. As VeruTek Technologies has indicated, S-ISCO™ is a Coelution Technology™ that utilizes VeruSOL™, a proprietary nonionic surfactant, to solubilize immiscible organic contaminants in the presence of an oxidant. A voucher for the confidential disclosure of the surfactant's constituents is provided in Enclosure 1. The oxidant, in the case of this acceptance, is FMC Corporation's Klotz™ brand sodium persulfate. The regulatory citations in the Bureau's February 25, 2005 acceptance of Klotz™ apply when it is used as the oxidant in the S-ISCO™ process, and the February 25, 2005 acceptance of it is hereby incorporated by reference.

In the S-ISCO™ process, an aqueous mix of VeruSOL™ surfactant, sodium persulfate and an activator is prepared and introduced to the subsurface, where it produces what is essentially a simultaneous dissolution and oxidation of the contaminants. It takes advantage of the fact that the oxidation reaction occurs in the aqueous phase, so it draws, by elution, NAPL and sorbed contaminants into the groundwater as a microemulsion, where they are quickly destroyed by the activated sodium persulfate. The ultimate products of the reaction are salt, sulfate, carbon dioxide and water. As indicated by the Bureau of Petroleum Storage Systems in its acceptance of the sodium persulfate, a choice of activators is available: divalent metals such as ferrous sulfate, chelated metals such as chelated iron, hydrogen peroxide, basic pH modifiers such as sodium hydroxide, or heat.

The Bureau recognizes S-ISCO™ as a viable process for the remediation of contaminated sites in Florida. There are no objections to its use provided: (a) the considerations of this letter are taken into account; (b) a site-specific Remedial Action Plan is submitted for approval by the Department for each site where the use of S-ISCO™ is proposed; and (c) the Remedial Action Plan specifies the temporary injection zone of discharge size and duration for ammonia nitrogen, iron, manganese, pH, sodium, sulfate, surfactant and total dissolved solids, and proposes adequate groundwater monitoring for them pursuant to Rule 62-522.300(2)(c), F.A.C. Some major regulatory

considerations that apply to S-ISCO™ are discussed in Enclosure 2. Since injection-type, in situ aquifer remediation is likely to be the most common application of S-ISCO™, the bulk of the regulatory requirements discussion will be directed to that topic.

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 and safety. 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 be construed as Department certification of performance. Additionally, the Department emphasizes a distinction between its regulatory acceptance and an approval. Products and processes are accepted but they are not approved.

Also, 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.

Those who prepare Remedial Action Plans are advised to include a copy of this letter in the appendix, and call attention to it in the text of their document. In this way, technical reviewers will be informed that you have contacted the Department of Environmental Protection to inquire about the environmental acceptability of S-ISCO™. 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 it 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, extension 3722, if there are any questions.

Sincerely,

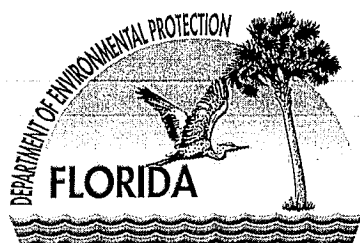


Rick Ruscito, P.E.
Ecology and Environment, Inc.
Bureau of Petroleum Storage Systems
Petroleum Cleanup Section 6



Rebecca S. Lockenbach
FDEP Section Leader
Bureau of Petroleum Storage Systems
Petroleum Cleanup Section 6

c: Tom Conrardy - FDEP/Tallahassee



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September 18, 2007

Catherine R. Miceli, P.E.
VeruTEK Technologies, Inc.
65 West Dudley Town Road, Suite 100
Bloomfield, Connecticut 06002

Re: **Voucher for Disclosure of the Proprietary Surfactant Ingredients of VeruSol™**

Dear Ms. Miceli:

The Florida Department of Environmental Protection hereby acknowledges the submittal of a September 6, 2007 confidential disclosure by VeruTEK Technologies Incorporated, listing the proprietary ingredients and their concentrations in the nonionic surfactant blend known as VeruSol™. This surfactant is used in combination with an oxidant during the Surfactant-Enhanced In Situ Chemical Oxidation (S-ISCO™) treatment process for the remediation of contaminated soil and groundwater. The Department hereby vouches for the content of the confidential disclosure.

Without divulging the identity of any specific proprietary ingredient, we now provide the minimum amount of information that is necessary for prospective users to know, in order to comply with the requirements of Rule 62-522.300(2)(c), Florida Administrative Code (F.A.C.). This rule requires that a Department-approved Remedial Action Plan, for injection-type aquifer remediation, indicate a temporary injection zone of discharge size and duration for any primary and secondary groundwater standards, and any minimum groundwater criteria that will not be met by the fluid to be injected. It also requires that the Department-approved Remedial Action Plan include groundwater monitoring of those chemical species that do not meet their standards. Having reviewed the list of ingredients for VeruSol™, the Department has determined that users of this surfactant blend will need to monitor the groundwater at a remediation site for surfactants and ammonia nitrogen.

Explanation. Since the concentration of VeruSol™ surfactant in the fluid to be injected during the S-ISCO™ treatment process exceeds the 0.5-milligram per liter maximum surfactant concentration allowed by the secondary drinking water standards of Chapter 62-550, F.A.C., it is necessary for users of VeruSol™ to request permission for a temporary injection zone of discharge via Rule 62-522.300(2)(c), F.A.C.) Ammonia nitrogen has also been included because

it is present, in that form, in one of the constituents of VeruSol™. It will also be present in the ethylene diamine tetra acetic acid (EDTA) portion of the iron-chelate activator for the sodium persulfate oxidant when that particular activator is used.

For underground injection control purposes, aquifer remediation plans proposing the use of VeruSol™ must indicate the volume and composition of the fluid to be injected. Since the individual ingredients and their proportions are proprietary, it will suffice to indicate just the overall concentration VeruSol™ in the fluid to be injected and the total volume of that fluid, and then provide a footnote indicating that a one-time confidential disclosure dated September 6, 2007 identifying the individual ingredients and their proportions has already been submitted to the Department.

This voucher is issued solely for the purposes of the Florida Department of Environmental Protection, for the remediation of contaminated sites. Other state agencies and local governments may choose to recognize this voucher if their needs are similar. This Department, however, is not responsible for applications beyond its jurisdiction. Please direct any questions regarding this voucher to Rick Ruscito at (850) 877-1133, extension 3722.

Sincerely,



Rick Ruscito, P.E.
Ecology and Environment, Inc.
Bureau of Petroleum Storage Systems
Petroleum Cleanup Section 6



Rebecca S. Lockenbach
FDEP Section Leader
Bureau of Petroleum Storage Systems
Petroleum Cleanup Section 6

REGULATORY CONSIDERATIONS

For Surfactant-Enhanced In Situ Chemical Oxidation (S-ISCO™) applications, the major regulatory considerations are listed below.

- a. Groundwater cleanup standards: The onus shall be on users of S-ISCO™ to ensure that all applicable groundwater contaminant standards will be met at the time of project completion, for the contaminants of concern at a cleanup site, any residuals associated with the ingredients of S-ISCO™ 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 cleanup and 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 the Department for remediation via injection of S-ISCO™ reagents into an aquifer constitutes the granting of a Class V injection well permit. [62-528.630(2)(c) and 62-528.640(1)(c), F.A.C.]
- c. Groundwater injection standards and temporary injection zone of discharge: 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., and the minimum groundwater criteria of Chapter 62-520, F.A.C., pursuant to underground injection control Rule 62-528.600(2)(d), F.A.C. Aquifer remediation fluids that do not meet these requirements must seek permission for an injection zone of discharge. Depending on the ingredients of the fluid, it will be necessary to obtain an injection zone of discharge by either one or both of the following methods: by Rule 62-522.300(2)(c), F.A.C., or by variance from Rule 62-522.300(3), F.A.C. For the S-ISCO™ reagents that are the subject of this acceptance letter (VeruSol™ surfactant, FMC Klotür™ brand sodium persulfate, and an activator) permission for a temporary injection zone of discharge can be obtained conveniently by way of Rule 62-522.300(2)(c), F.A.C., provided the concentration of sodium persulfate in the fluid to be injected does not exceed 20 percent by weight. If concentrations in excess of 20 percent are desired, then permission for a temporary injection zone of discharge for chromium will also be necessary, and must be sort by way of variance.

- d. Zone of discharge by rule: For the injection of S-ISCO™ reagents that are the subject of this acceptance letter (VeruSol™ surfactant, FMC Klotzür™ brand sodium persulfate, and an activator) Rule 62-522.300(2)(c), F.A.C., applies to the following 8 parameters: ammonia nitrogen, iron, manganese, pH, sodium, sulfate, surfactant and total dissolved solids. Some of these parameters are associated with more than one of the reagents, as shown in the table below.

	Ammonia Nitrogen	Iron	Manganese	pH	Sodium	Sulfate	Surfactant	Total Dissolved Solids
VeruSol™ surfactant	√						√	
Sodium Persulfate		√	√	√	√	√		√
Activators								
Ferrous Sulfate		√		√		√		√
Iron-EDTA chelate	√	√		√	√			√
Hydrogen Peroxide				√				
Sodium Hydroxide				√	√			√

Each site-specific Remedial Action Plan proposing the use of S-ISCO™ must: (a) indicate that ammonia nitrogen, iron, manganese, pH, sodium, sulfate, surfactant and total dissolved solids in the fluid to be injected will be in excess of their groundwater injection standards; (b) specify a temporary injection zone of discharge size; (c) specify the period of time for which the temporary zone of discharge will be needed; and (d) propose groundwater monitoring of these parameters. The current groundwater standards for these parameters are: ammonia nitrogen (2.8 milligrams per liter, mg/L); iron (0.3 mg/L); manganese (0.05 mg/L); pH (range 6.5 to 8.5); sodium (160 mg/L); sulfate (250 mg/L); surfactant (0.5 mg/L); and total dissolved solids (500 mg/L). If the groundwater's natural-occurring background level of any of these 8 parameters at a specific remediation site does not meet the established groundwater standard, then the residual level of that parameter by the time remedial action ends shall be no worse than the pre-existing, pre-injection background level.

- e. Other reagents and surfactants: This acceptance, including its instructions regarding permission for a temporary injection zone of discharge in paragraph *d* above applies only to the configuration of the S-ISCO™ process that involves the use of VeruSol™ surfactant, FMC Klotzür™ brand sodium persulfate, and an activator. If the conditions at a specific cleanup site in the future require the use of an oxidant other than sodium persulfate, or a metal chelate other than iron-EDTA, or a surfactant other than VeruSol™, then the site-specific Remedial Action Plan must provide a full chemical analysis of the substituting reagent in order to determine whether or not it is necessary to seek permission for a temporary injection zone of discharge.

- f. Analysis of groundwater samples for surfactant: Chapter 62-550, F.A.C., refers to surfactants as foaming agents, albeit not all surfactants cause foam. The laboratory method cited in that chapter for their measurement is Standard Method SM 5540. Since VeruSol™ is a blend of nonionic surfactants, it is suggested that Standard Method SM 5540D for nonionic surfactant quantification be used.
- g. 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 S-ISCO™. However, no "designated" monitoring well, dedicated to the tracking of remediation progress (by sampling) shall be used to apply S-ISCO™ reagents. 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 immediate area surrounding each injection well.
- h. Groundwater monitoring:
 - 1. Active remediation 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., for the contaminants of concern.
 - 2. Post remediation monitoring: At least one (1) year of quarterly post remediation groundwater monitoring for the contaminants of concern shall be conducted at a minimum of two (2) wells, one located in the area of maximum contamination, the other downgradient of the area of maximum contamination, pursuant to Section 62-770.750, F.A.C.
 - 3. Underground injection control monitoring: For Underground Injection Control purposes, when S-ISCO™ sodium persulfate is injected at concentrations of 20 percent or less, by weight, the groundwater must be monitored pursuant to Rule 62-522.300(2)(c), F.A.C., for the 8 parameters discussed above in paragraph *d*. And for the injection of S-ISCO™ sodium persulfate at concentrations greater than 20 percent, the groundwater will also have to be monitored for chromium, per the terms of an injection zone of discharge variance that must be obtained.
- i. Underground injection control inventory: Remedial Action Plans proposing 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.

j. Operation:

1. Avoidance of migration: Pursuant to Rule 62-528.630(3), F.A.C., for injection-type, in situ aquifer remediation projects, injection of the S-ISCO TM reagents shall be performed in such a way, and at such a rate and volume, that no undesirable migration of either the reagents or the contaminants of concern in the aquifer results.
 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 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 S-ISCO TM reagents that will be injected.
- k. 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.
- l. Open-pit applications: While open-pit application of S-ISCO TM reagents is not an injection-type application, and notification of the Underground Injection Control Section therefore not required, the user of S-ISCO TM must still be mindful of groundwater quality. For open-pit applications, the Bureau of Petroleum Storage Systems suggests that groundwater in the application area be monitored for the same parameters that would be monitored had the application been an injection.

SUPPLEMENTAL INFORMATION

- 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 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 for 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. Other capabilities: Although this acceptance by the Bureau of Petroleum Storage Systems is focused on the cleanup of petroleum pursuant to Chapter 62-770, F.A.C., S-ISCO™ is capable of treating other suitable organic contaminants, including chlorinated hydrocarbons and dense non-aqueous phase liquids. And while the process is primarily intended for in situ treatment of contaminants, the use of it for ex situ treatment applications is also feasible.
- c. Pilot study: 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 the design of a full-scale treatment system. VeruTEK Technologies Incorporated has indicated that treatability studies are also an integral to the S-ISCO™ method per Section 62-770.700, F.A.C. However, if the conditions or the situation at a site do not warrant a pilot study, then a proposal explaining the rationale for a recommendation to forego it shall be submitted for review.
- d. Reagent dosages and injection concentrations: VeruTEK Technologies Incorporated indicates that the dosage of reagents used with the S-ISCO™ process is determined on a site-specific basis, depending on the location, geological conditions, and type and extent of contaminants. However, for information purposes, the anticipated dose ratio ranges have been provided and are shown below.

Persulfate:Contaminant ratio	5:1 to 30:1 (mass:mass)
VeruSol™:Contaminant ratio	0.5:1 to 30:1 (mass:mass)

The anticipated range of concentrations for the reagents to be injected are shown below.

VeruSol™ (surfactant)	1 to 100 grams per liter
Sodium persulfate (oxidant)	5 to 100 grams per liter
Iron-EDTA (activator) *	0.5 to 10 grams per liter
Sodium hydroxide (activator) *	100 milligrams per liter to 20 grams per liter

* Either one or the other of the two activators shown will be used, but not both simultaneously.

- e. Anticipated total injection flow rate: 5 to 50 gallons per minute (Total for all three streams combined: VeruSOL™, oxidant and activator).
- f. System measurements for process control, as indicated by VeruTEK technologies: Injection streams flow rate, temperature and pressure. Also, for process control purposes, the injection streams may be sampled and analyzed for reagent concentration, interfacial tension, dissolved oxygen, oxidation-reduction potential and turbidity.
- g. Subsurface measurements for process monitoring, as indicated by VeruTEK technologies: The effect of the injected reagents on the subsurface may be monitored by probing and sampling the groundwater for temperature, interfacial tension, dissolved oxygen, oxidation-reduction potential, and conductivity. The interfacial tension measurements can be used as indicators of the location and concentration of VeruSOL™ surfactant in the subsurface, and the conductivity measurements can be used as indicators of the persulfate concentration in the subsurface.
- h. Safety. Since safety is always of importance, especially when chemical oxidation is involved, the Bureau of Petroleum Storage Systems provides below the same list of safety items that FMC Corporation identified as important for the use of its Kloxur™ brand sodium persulfate.
 - Use of proper protective clothing.
 - Oxidation is an exothermic reaction.
 - Use storage containers, tanks and piping constructed of 304 or 316 stainless steel, polyvinyl chloride, polyethylene, Plexiglas, Teflon or glass for sodium persulfate. Do not use soft metals such as copper, brass or carbon steel.
 - Disposal of sodium persulfate must be handled as a hazardous waste disposal.

VeruTEK Technologies Incorporated, for its part, provides Material Safety Data Sheets for the reagents used by its S-ISCO™ remediation process. It has also indicated that soil gas probes will be used to monitor for unwanted volatilization of contaminants by the treatment process, which is a safety consideration that the Bureau of Petroleum Storage Systems has also identified as an important safety consideration.

Lastly, for those who prepare Remedial Action Plans proposing the use of S-ISCO™ for the cleanup of petroleum-contaminated sites, the Bureau of Petroleum Storage Systems has incorporated into its Remedial Action Plan Checklist, as Section XXIV, some major design and safety considerations for chemical oxidation. The checklist is currently located at Internet address http://www.dep.state.fl.us/waste/quick_topics/publications/pss/pcp/procedures/RAP_Checklist_02-03-04.pdf. Below is a reproduction of the list of safety reminders provided by the Bureau in Section XXIV of the checklist. They include, but are not necessarily limited to:

- ♦ safe handling of chemicals: avoidance of mixing, premature mixing, or improper storage of incompatible chemicals;
 - ♦ Lower Explosive Level (LEL) considerations;
 - ♦ the potential for vapor migration, either passively or by convection, or driven by air or other gases used, or generated by the heat of exothermic chemical reactions or the vaporization of free product by such heat;
 - ♦ identification of potential pathways such as sewers, storm drains, underground utilities, etc. that could serve as conduits for the unwanted migration of unwanted flammable or toxic vapors, should they be generated, and in the case of flammable vapors, the removal of any potential ignition sources within these pathways or at their termination points;
 - ♦ the minimum tolerable distance between underground storage tanks and product piping and any in situ heat-generating process;
 - ♦ whether it is necessary to replace the flammable contents of petroleum storage tanks and their associated piping with non-flammable inerts such as nitrogen or carbon dioxide, in order to reduce risk of fire and explosion;
 - ♦ observance of National Electrical Code (typically Series 500 articles for Class I, Group D, Division 1 or 2 hazardous area requirements) (for electrical equipment items located in a hazardous area);
 - ♦ appropriate chemical-resistant and/or spark-resistant materials of construction for equipment items;
 - ♦ personal protection of workers; and
 - ♦ safety considerations regarding neighbors and passersby.
- i. Limitations: VeruTEK Technologies Incorporated has indicated that the S-ISCO™ process is not intended for the remediation of heavy metals and radiation.

Memorandum**Florida Department of
Environmental Protection**

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

FROM: _____ [see Note 1.]

DATE: _____

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

Pursuant to paragraph 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 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: _____ [see 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 [see 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 HSA/Mud rotary (*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 land surface

Grouted interval: _____ to _____ feet below land surface

Casing diameter, if applicable (inches): _____

Cased depth, if applicable: _____ to _____ feet below land surface

Casing material, if applicable: _____

The in situ injection-type aquifer remediation plan for this contaminated site is intended to meet the groundwater cleanup criteria set forth in Chapter 62-777, 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 contaminants of concern 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.

Note 1. Local programs are not authorized to approve underground injections into aquifers. Reason: Per agreement with the USEPA, the FDEP cannot delegate this authority. Local programs, after reviewing a Remedial Action Plan or an injection proposal document, should prepare the Approval Order and route it to Tallahassee for Bureau Chief's signature, and then complete this form. This form is primarily for use by state and local program technical reviewers, but remediation contractors may fill in all blanks except those labeled "FROM" and "DATE" on page 1, and the 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, F.A.C. Proprietary formulations shall make confidential disclosure. Injected fluids must meet drinking water standards of Chapter 62-550, F.A.C., unless a zone of discharge is permitted by way of rule 62-522.300(2)(c), F.A.C., or a variance.