



Florida Department of Environmental Protection

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

Rick Scott
Governor

Jennifer Carroll
Lt. Governor

Herschel T.
Vinyard Jr.
Secretary

April 19, 2012

Broc Segura
Maxum Resources, LLC
1307 Tool Drive
New Iberia, Louisiana 70560

Re: **NXT™ Technology Using the
Super Collider and Amendments**

Dear Mr. Segura:

The Division of Waste Management (Division) hereby reaffirms and updates its acceptance of the NXT™ Technology, which uses the NXT Super Collider, either alone or in combination with other Division-accepted products for in situ and ex situ remediation of soil and groundwater contaminated by petroleum hydrocarbons, chlorinated hydrocarbons and other suitable contaminants. The technical aspects of NXT™, as discussed in the last acceptance update by the Division on March 4, 2009, have not changed and are reaffirmed, but the contact information is updated to show that Maxum Resources LLC is now the owner of the technology.

The Super Collider (also known as the Ion Collider) is patented. The device has no moving parts, and its materials of construction and shape are such that cavitation chemistry occurs as water is pumped through it, producing an elevated concentration of hydroxyl radicals, which are effective oxidizing agents, and a superoxide [O₂⁻¹]. A voucher for the Division's receipt of a confidential cavitation chemistry report is provided as Enclosure 1; regulatory information is provided as Enclosure 2; supplemental information as Enclosure 3; and Underground Injection Control notification as Enclosure 4.

This updated acceptance consolidates and supersedes all previous acceptances issued by the Division since 1997 for the Ion Collider and Super Collider technology, as either a stand-alone remediation method, or used in combination with other reagents, the most prominent of which are potassium or sodium permanganate, sodium percarbonate, Regenesis brand RegenOx™ and Regenesis brand Oxygen Release Compound ORC™. It also includes one new reagent at your request, sodium persulfate (and its associated activators) for use in combination with the collider. This update also clarifies that each new future combination of the collider

with another Division-accepted remediation product does not necessarily have to seek a separate acceptance, and that it is sufficient to follow the regulatory advice already offered by the Division for the use of that product.

As for future combinations of collider fluid with catalysts, chelators, pH adjusters, flocculants and other additives, which in themselves do not serve as remediation products but are still chemicals subject to Underground Injection Control, it is not necessary to seek a separate acceptance letter. A site-specific Remedial Action Plan, however, must address all regulatory requirements that apply to the additive. Those of Underground Injection Control regarding permission for a temporary injection zone of discharge, and groundwater standards will usually be the most important.

The Division of Waste Management does not provide endorsement of specific or brand name remediation products or processes. It does, however, recognize the need to determine their acceptability in the context of environmental regulations, safety and the protection of public health. For that reason, the Division issues an "acceptance" letter, not an approval. In no way shall an acceptance be construed as certification of performance. Additionally, vendors, upon receipt of an acceptance, must market their product or process on its own merits regarding performance, cost, and safety in comparison to competing alternatives in the marketplace. Site-specific Remedial Action Plans that propose the use of an accepted product or process should include a copy of the acceptance letter in the plan's appendix, and reference it in the text of the document.

It is 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. This also applies to future combinations of the collider with other remediation products and processes, although the Division of Waste Management is willing to issue a separate acceptance if the combination is a significant departure from the current NXT™ Technology strategy or its underlying principles. However, any site-specific Remedial Action Plan for the use of a product or process that does not already have an acceptance must contain sufficient information about the product or process to show that it meets all applicable rules and regulations.

The Division reserves the right to revoke its acceptance of a product or process if it has been falsely represented. Additionally, Division 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-

Broc Segura
April 19, 2012
Page 3


specific design details must be provided in a Remedial Action Plan submitted for Department review and approval.

Questions about hazardous waste cleanup applications of the NXT™ Technology should be directed to Gary Millington, and questions about petroleum cleanup applications should be directed to Rick Ruscito.

Sincerely,

4/19/2012

X 

X 

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

Rick Ruscito, P.E.
Ecology and Environment, Inc.
Bureau of Petroleum Storage Systems
Petroleum Cleanup Section 6
rruscito@ene.com
(850) 877-1133, extension 3722

Enclosures: (1) Voucher for receipt of confidential cavitation chemistry report
(2) Regulatory Information
(3) Supplemental Information
(4) Underground Injection Control Notification Memorandum

c: Tom Conrardy - FDEP/Tallahassee
Rob Cowdery - FDEP/Tallahassee

History:

ppl #370
inn #167
3/4/09

ppl #444
inn #167a
ITR #62210

burlab #1152
04/19/12

ENCLOSURE 1
PROPRIETARY INFORMATION VOUCHER



Florida Department of
Environmental Protection

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

Rick Scott
Governor

Jennifer Carroll
Lt. Governor

Herschel T.
Vinyard Jr.
Secretary

April 19, 2012

Broc Segura
Maxum Resources, LLC
1307 Tool Drive
New Iberia, Louisiana 70560

Re: **Voucher for NXT™ Technology
Confidential Cavitation Chemistry Report**

Dear Mr. Segura:

On February 15, 1999 the Division of Waste Management received a confidential 15-page report titled "Cavitation Driven Chemistry in the Ion Collider", dated April 15, 1998, by Allen, Kim & Quigley of The University of Texas at Austin. At that time, the patented ion collider technology had been placed in a subsidiary named Ion Collider Technologies Incorporated, which was owned by a public entity named International Cavitation Technologies Incorporated, both of Bixby, Oklahoma. The technology, now know as NXT™, is now owned by Maxum Resources LLC.

Having reviewed the report, the Division recognizes that cavitation chemistry is based on sound scientific principles. Without divulging any of the report's confidential details, the Division would like to indicate that the experimental results of the investigation support other opinions in the scientific literature that the phenomena occurring in the ion collider is cavitation-driven catalytic chemistry that is capable of forming free radical species such as hydroxyls. Hydrogen peroxide is also produced. Additionally, when the reactive radicals come into contact with a hydrocarbon, some of the products formed resemble and act as surfactants.

Questions about hazardous waste cleanup applications of the NXT™ Technology should be directed to Gary Millington, and questions about petroleum cleanup applications should be directed to Rick Ruscito.

Broc Segura
April 19, 2012
Report
Page 2


NXT™ Technology
Voucher for Confidential Cavitation Chemistry

Sincerely,

4/19/2012

X 

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

X 

Rick Ruscito, P.E.
Ecology and Environment, Inc.
Bureau of Petroleum Storage Systems
Petroleum Cleanup Section 6
rruscito@ene.com
(850) 877-1133, extension 3722

REGULATORY INFORMATION

1. Regulations: Chapters of the Florida Administrative Code (F.A.C.) that may be applicable, either in part or in their entirety, include but are not necessarily limited to Chapter 62-550, F.A.C., for primary and secondary water quality standards; Chapter 62-520, F.A.C., for groundwater classes and standards; 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; Chapters 62-770, 62-780, 62-782, and 62-785 F.A.C., for cleanup criteria; and Chapter 62-777, F.A.C., for cleanup target levels.

The NXT™ Technology shall comply with all applicable regulations. This includes meeting applicable groundwater cleanup target levels for the contaminants of concern at a cleanup site, the residual concentrations of ingredients associated with any reagents and additives used in combination with ion collider fluid, and any byproducts of concern produced by chemical and biological reactions induced by those ingredients during the timeframe of the cleanup project. For any chemical species that are present in excess of their groundwater standards in the treatment fluid to be injected, the timeframe is that which is permitted for a temporary injection zone of discharge.

2. Underground Injection Control permit: Per Rule 62-528.630(2)(c), F.A.C., Class V injection-type aquifer remediation wells are exempt from the permitting requirements of Rule 62-528.635, F.A.C., when authorized by a Department-approved Remedial Action Plan or other enforceable mechanism, provided the requirements of the rules governing the remediation project, as well as the construction, operation, and monitoring requirements of Chapter 62-528, F.A.C., are met. Per Rule 62-528.630(2)(c), F.A.C., the issuance of an enforceable, site-specific Remedial Action Plan Approval Order by the Department for injection-type aquifer remediation constitutes the granting of a Class V injection well construction/clearance permit.
3. Underground Injection Control notification: Remedial Action Plans proposing in situ, injection-type aquifer remediation shall include information pursuant to Rules 62-528.630(2)(c)1 through 6, F.A.C., for the inventory purposes of the Underground Injection Control program. Reviewers of those plans, upon issuance of an enforceable Remedial Action Plan Approval Order by the Department, must submit a completed copy of the Underground Injection Control inventory notification memorandum in Enclosure 4.
4. General information about temporary injection zones of discharge: For in situ aquifer remediation, the composition of an injected fluid must meet the primary and secondary drinking water standards set forth in Chapter 62-550, F.A.C., and the minimum groundwater criteria of Chapter 62-520, F.A.C., pursuant to 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 a temporary injection zone of discharge. Depending on the chemical composition and the physical properties 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 62-520.310(8)(c), F.A.C., or by variance from Rule 62-520.310(9), F.A.C.

Permission by way of rule. Rule 62-520.310(8)(c), F.A.C., allows a temporary injection zone of discharge for closed-loop re-injection systems, the prime constituents of the reagents used to remediate site contaminants, and the secondary standards for groundwater, provided a Department-approved remedial action plan addresses the duration and size of the zone of discharge, and groundwater monitoring of the injected chemical species of concern. The issuance of a site-specific Remedial Action Plan Approval Order for a Remedial Action Plan that meets the requirements of Rule 62-520.310(8)(c), F.A.C., constitutes the granting of permission for the temporary injection zone of discharge.

In order to obtain permission for a temporary injection zone of discharge by way of Rule 62-520.310(8)(c), F.A.C., a site-specific Remedial Action Plan must indicate: (a) the chemical species of concern in the fluid to be injected that will be present in excess of their allowable concentrations; (b) the size of the zone that is needed; (c) the amount of time that the zone will be needed; and (d) a groundwater monitoring plan for the injected chemical species of concern. In most cases, monitoring on a quarterly basis should be sufficient. The size of the temporary injection zone of discharge in item (b) above will usually be the radius of influence when the Technology is a single injection point. For a multiple point system, the zone of discharge can usually be expressed and illustrated as the total area of the cluster formed by all the injection points, located side-by-side with overlapping radii of influence.

Permission by way of variance: A remediation fluid that does not meet the requirements of Rule 62-520.310(8)(c), F.A.C., for a temporary injection zone of discharge must seek permission by way of variance from Rule 62-520.310(9), F.A.C. Such a fluid would be one that contains primary drinking water contaminants that are not prime constituents of the reagents needed to remediate the contaminants at a cleanup site; for example: one that contains heavy metal impurities in concentrations greater than their primary drinking water standards. In order to obtain permission to inject this type of a fluid, a petition for variance must be submitted to the Florida Department of Environmental Protection's Office of General Counsel, for a joint review by appropriate Divisions within the Department, and ultimate approval by the Underground Injection Control Section.

5. Pilot study: In the case of petroleum cleanup, per Rule 62-770.700(2), F.A.C., it is required that a pilot study proposal be submitted for review, and that a pilot test be performed prior to the design of a full-scale Technology. If conditions at a site do

not warrant a pilot study, then a proposal explaining the rationale to forego it must be submitted for review. For hazardous waste cleanups, the decision to conduct a pilot study should be made in accordance with applicable rules and regulations.

6. Utilization of wells: If a remediation site happens to have an abundance of monitoring wells, then the Division has no objection to the use of some wells for the application of NXT™ Technology remediation fluids. However, no “designated” monitoring well, dedicated to the tracking of remediation progress (by sampling) shall be used as a treatment point. 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.
7. Avoidance of migration: For injection-type, in situ aquifer remediation projects, pursuant to Rule 62-528.630(3), F.A.C., injection of NXT™ Technology fluids shall be performed in such a way, and at such a rate and volume, that no undesirable migration of either the treatment fluids or the contaminants of concern occurs in the aquifer.
8. Abandonment of wells: Upon issuance of a Site Rehabilitation Completion Order, injection wells shall be abandoned pursuant to Section 62-528.645, F.A.C., and the Underground Injection Control Section of the Department shall be notified so that they can be removed from the injection well inventory-tracking list.
9. Open-pit applications: While the open-pit application of a NXT™ Technology fluid is not an injection-type application, and notification of the Underground Injection Control Section therefore not required, the user must still be mindful of groundwater quality. For open-pit applications, the Division of Waste Management suggests that groundwater in the application area be sampled for the same parameters that would have been monitored had the application been an injection.

SUPPLEMENTAL INFORMATION

1. The Division of Waste Management would like to avoid a situation in which there could be numerous but somewhat similar NXT™ Technology acceptance letters for the combination of ion collider fluid with other remediation products and chemical additives. For that reason, the following are consolidated into this single, superseding acceptance: (1) combinations that were recognized in several earlier ion collider acceptances; (2) sodium persulfate and its associated activators, as discussed in the Division's February 25, 2005 acceptance issued to FMC Corporation for its Klozur™ Activated Persulfate; and (3) additives such as the catalysts, chelators, pH adjusters and flocculants that were discussed in a submittal to the Division on January 30, 2009, and supplemental information received February 18, 2009 regarding the use of ion collider fluid in combination with other reagents and additives.
2. Permanganates: In regard to the use of permanganates in combination with ion collider fluid, the Division reaffirms its acceptance for the use of potassium permanganate, which was the subject of an earlier ion collider acceptance. There is also no objection to the use of sodium permanganate, which has come into use for remediation purposes since the original acceptance of potassium permanganate in combination with ion collider fluid. For that reason, sodium permanganate has been added to Table 1 below. Either type of permanganate may be used in combination with ion collider fluid, provided the requirements of a variance granting permission for a temporary injection zone of discharge are met for the appropriate chemical species of concern.
3. Dosage and zone of discharge advice for major amendments: Table 1 is a list of the remediation products and reagents that may be used as major amendments in combination with ion collider fluid. The concentration of each amendment that will be present in the treatment fluid to be injected shall be indicated in a site-specific Remedial Action Plan. Follow the advice offered in Table 1 in regard to the groundwater parameters that must be monitored in the temporary injection zone of discharge for each amendment.
4. Dosage and zone of discharge advice for minor additives: Table 2 is a list of the chemicals that may be used as minor additives in combination with ion collider fluid when site conditions are such that the use of an additive will facilitate the cleanup. Each site-specific Remedial Action Plan submitted shall indicate which, if any, of the additives will be used. These additives will be used in relatively low concentrations, usually not more than 1.6 pounds of additive per ton of water, which the Division, for convenience, has mathematically converted to an equivalent 800 milligrams per liter (mg/L). Additionally, Maxum Resources, LLC might, if necessary, use more than one minor additive at a time, but in most cases the use of

only a single additive will be necessary to achieve a desired result. Follow the advice offered in Table 2 in regard to the groundwater parameters that must be monitored in the temporary injection zone of discharge for each additive.

5. Future combinations: In the future, when another “already-accepted” remediation product not listed in Table 1 below will be injected or used in combination with ion collider fluid, it may not be a necessity to seek a separate acceptance for the combination, but rather suffice for a site-specific Remedial Action Plan to follow the regulatory advice offered in the existing acceptance letter for that product.

Also in the future, when a just a different type of minor additive (not covered by an existing acceptance) will be injected in combination with ion collider fluid, it may not be a necessity to seek a separate acceptance for the combination, but rather suffice for a site-specific Remedial Action Plan to address all applicable rules and requirements. The site-specific remediation plan should provide the complete chemical composition of the fluid to be injected, including the composition of the additive, and seek permission for a temporary injection zone of discharge if the fluid does not meet injection requirements. Such permission will be obtained either by way of Rule 62-520.310(8)(c), Florida Administrative Code (F.A.C.), or by way of variance if the composition is such that permission cannot be obtained by rule.

Table 1. Temporary Injection Zone of Discharge Parameters for Amendment of Ion Collider Fluid With Other Reagents

If the injected Ion Collider fluid is amended with ...	Then obtain permission for temporary injection zone of discharge (ZOD) by way of ...	And the groundwater monitoring parameters associated with the zone of discharge for this amendment will be...	Selected acceptance letters and variances cited for additional information	Notes
Nothing else	Not Applicable. No ZOD needed.	Not Applicable		The pH of Ion Collider fluid alone is approx. 8 and already in the acceptable 6.5 to 8.5 range.
Calcium Peroxide	Rule 62-520.310(8)(c)	pH & Total Dissolved Solids		Calcium is not a regulated groundwater contaminant.
Hydrogen Peroxide	Rule 62-520.310(8)(c)	pH		Monitor groundwater pH regardless of concentration of hydrogen peroxide applied.
Magnesium Peroxide	Rule 62-520.310(8)(c)	pH & Total Dissolved Solids		Magnesium is not a regulated groundwater contaminant.
Potassium Permanganate	Variance	Link to several ZOD variances for potassium permanganate is currently available at web page www.dep.state.fl.us/waste/categories/pcp/pages/innovative.htm . Select appropriate variance and follow its advice regarding zone size, time limit, and groundwater parameters to be monitored.		
Regenesis brand RegenOx™ (sodium percarbonate with a ferrous sulfate activator)	Rule 62-520.310(8)(c)	Iron, pH, Sodium, Sulfate & Total Dissolved Solids	Regenesis, RegenOx™, August 17, 2005	
Regenesis brand ORC™ Oxygen Release Compound	Rule 62-520.310(8)(c)	pH & Total Dissolved Solids	Regenesis, Oxygen Release Compound™, April 2, 2004	ORC™ is mainly magnesium peroxide.
Sodium Percarbonate	Rule 62-520.310(8)(c)	Sodium & Total Dissolved Solids		
Sodium Permanganate	Variance	Link to several ZOD variances for sodium permanganate is currently available at web page www.dep.state.fl.us/waste/categories/pcp/pages/innovative.htm . Select appropriate variance and follow its advice regarding zone size, time limit, and groundwater parameters to be monitored.		
Sodium Persulfate	Rule 62-520.310(8)(c)	Iron, Manganese, pH, Sodium, Sulfate & Total Dissolved Solids	FMC Corp., Klozur™ Activated Persulfate, February 25, 2005	If concentration is greater than 20% by weight, then permission must be obtained by way of variance for a zone of discharge for chromium.

Table 2. Temporary Injection Zone of Discharge Parameters for Ion Collider Additives at 800 Milligrams Per Liter (mg/L)

If the injected Ion Collider fluid contains 800 milligrams per liter of this additive ...	Chemical Abstracts Service (CAS) Number	Then obtain permission for temporary injection zone of discharge by way of ...	And the groundwater monitoring parameters associated with the zone of discharge for this additive will be...	Notes
Aluminum Oxide	1344-28-1	Rule 62-520.310(8)(c)	Aluminum	
Aluminum Ferric Chloride Sulfate (polymeric)		Rule 62-520.310(8)(c)	Aluminum, Chloride, Iron & Total Dissolved Solids	Use of this additive at 2,667 mg/L or greater will also require monitoring of sulfate.
Aluminum Sulfate	10043-01-3	Rule 62-520.310(8)(c)	Aluminum, Sulfate & Total Dissolved Solids	
Ammonium Ferric Chloride	16774-56-4	Rule 62-520.310(8)(c)	Ammonia, Chloride, Iron & Total Dissolved Solids	
Citric Acid	77-92-9	Rule 62-520.310(8)(c)	pH	
Citric Acid (as a sodium citrate, e.g., trisodium citrate)	6132-04-3	Rule 62-520.310(8)(c)	pH	Use of this additive at greater than 800 mg/L may trigger need to monitor sodium as well (e.g., the trigger point for trisodium citrate is 1,803 mg/L)
Ethylene Diamine Tetra Acetic Acid (EDTA)	60-00-4	Rule 62-520.310(8)(c)	Ammonia & pH	
Ferric Chloride	7705-08-0	Rule 62-520.310(8)(c)	Chloride, Iron & Total Dissolved Solids	
Ferric Oxide	1309-37-1	Rule 62-520.310(8)(c)	Iron & Total Dissolved Solids	
Ferrous Sulfate	7720-78-7	Rule 62-520.310(8)(c)	Iron, Sulfate & Total Dissolved Solids	
Humate	Not applicable	Not applicable	Not Applicable	Humate is not a regulated groundwater contaminant.
Limonene	138-86-3	Rule 62-520.310(8)(c)	Limonene	
Potassium Hydroxide	1310-58-3	Rule 62-520.310(8)(c)	pH	Potassium is not regulated as a groundwater contaminant.
Sodium Hydroxide	1310-73-2	Rule 62-520.310(8)(c)	pH & Sodium	
Sulfuric Acid	7664-93-9	Rule 62-520.310(8)(c)	pH, Sulfate & Total Dissolved Solids	
Titanium Dioxide	13463-67-7	Rule 62-520.310(8)(c)	Titanium Dioxide & Total Dissolved Solids	
Zeolites	Not applicable	Not applicable	Not Applicable	Zeolites are not regulated as a groundwater contaminant.

Table 3. Groundwater Standards for Parameters Listed in Tables 1 & 2

Parameter	Groundwater Standard in milligrams per liter (mg/L)	Chapter 62-550, F.A.C.		Chapter 62-777, F.A.C.
		Primary Standard	Secondary Standard	Minimum Groundwater Criteria
Aluminum	0.2		X	
Ammonia	2.8			X
Chloride	250		X	
Chromium	0.1	X		
Limonene	0.7			X
Iron	0.3		X	
Manganese	0.05		X	
pH	6.5-8.5		X	
Sodium	160	X		
Sulfate	250		X	
Titanium Dioxide	28			X
Total Dissolved Solids	500		X	

Memorandum

**Florida Department of
Environmental Protection**

TO: Cathy McCarty, P.G.
Florida Department of Environmental Protection
Bureau of Water Facilities Regulation
Underground Injection Control Section - MS 3530
2600 Blair Stone Road, Tallahassee, FL 32399-2400

FROM: _____

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.

Facility name: _____
Facility address: _____
City/County: _____
Latitude/Longitude: _____
FDEP Facility Number: _____

Facility owner's name: _____
Facility owner's address: _____

Well contractor's name: _____
Well contractor's address: _____

AFFECTED AQUIFER

Name of aquifer: _____
Depth to groundwater (feet): _____
Aquifer thickness (feet): _____
Areal extent of contamination (square feet): _____

INJECTION WELLS

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

PROJECT DESCRIPTION

The in situ, injection-type aquifer remediation product/process remediates contaminants by:
(check those that apply)

- bioremediation,
- chemical oxidation, or
- other (describe) _____

Brief description of the project:

Summary of major design considerations and features of the project:

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

FLUID TO BE INJECTED

Composition of injected fluid:

(ingredient, wt. %): _____

TEMPORARY INJECTION ZONE OF DISCHARGE (ZOD)

(check those that apply)

- No ZOD needed. The fluid to be injected meets the primary and secondary groundwater standards of Chapter 62-550, F.A.C., and the minimum groundwater criteria of Chapters 62-520 and 62-777, F.A.C.
- ZOD permission by rule 62-520.310(8)(c), F.A.C., for reagent chemical species and/or parameter(s) in the fluid to be injected (or re-injected) that exceed secondary groundwater standards. ZOD permission by this rule also applies to chemical species in the fluid to be injected that exceed primary groundwater standards or minimum groundwater criteria, provided those species are prime constituents of the reagents used to remediate site contaminants. The list of chemical species and parameters for which the approved Remedial Action Plan identifies zone size, duration and groundwater monitoring are as follows:

- ZOD permission by rule 62-520.310(8)(c), F.A.C., for the following contaminants of concern that exceed their groundwater standards in the fluid to be re-injected as part of a closed-loop re-injection system for which the approved Remedial Action Plan identifies zone size, duration and groundwater monitoring:

- ZOD permission by variance because fluid to be injected contains the following impurities that are not prime constituents of the reagents used to remediate the site's contaminants, and the concentration of those impurities in the fluid to be injected are in excess of their primary groundwater standards:

- A variance needs to be granted before the remediation can be conducted.
- A variance has already been granted for the impurities listed above:

Date variance granted: _____ Zone size (feet): _____ Duration (time): _____

..... ◆◆◆

- If ZOD permission by rule 62-520.310(8)(c), F.A.C., or by variance is checked above, then a figure that delineates the ZOD is attached, or the ZOD is described as follows:

Cathy McCarty, P.G.
Page 4 of 4
Date: _____

Facility name: _____
FDEP facility no.: _____

CLEANUP CRITERIA AND ENFORCEABLE APPROVAL ORDER

In situ injection-type aquifer remediation of the contaminants of concern at this site is intended to meet the groundwater cleanup target levels established for them in accordance with applicable and appropriate chapters of the Florida Administrative Code and cited in the approved Remedial Action Plan. 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 Chapters 62-520 and 62-777, 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.