



FLORIDA DEPARTMENT OF Environmental Protection

Ron DeSantis
Governor

Alexis A. Lambert
Secretary

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

June 13, 2025

Via Electronic Mail Scott@remediationproducts.com

Scott Noland
President/CEO
Remediation Products, Inc.
6390 Joyce Drive.
Golden, Colorado 80403

Re: **CAT 100**
Innovative Technology Application Acceptance Letter

Dear Mr. Noland:

The Florida Department of Environmental Protection's Division of Waste Management (Division) hereby accepts *CAT 100* (a patented formulation, based on activated carbon-iron biotechnology) for in-situ remediation of groundwater and saturated soil impacted by contaminants of concern, targeting primarily halogenated compounds.

Due to the presence of activated carbon in *CAT 100*, the attached "Sampling Protocol for Petroleum Cleanup Projects Using In-Situ Activated Carbon Injections" is required to be followed when *CAT 100* is implemented on petroleum cleanup and non-petroleum cleanup projects.

Enclosure 1 contains regulatory information. Enclosure 2 includes Sampling Protocol for Petroleum Cleanup Projects Using In-Situ Activated Carbon Injections. Enclosure 3 provides calculation of an Alternative Groundwater Cleanup Target Level (AGCTL) for un-ionized ammonia.

For in-situ injections of *CAT 100* there are underground injection control regulations that must be observed.

For vadose zone remediation, such as soil blending, the underlying groundwater may be affected by the leaching of the *CAT 100* formulation. Although this remediation approach is not subject to the regulatory requirements of Chapters 62-528 and 62-520, Florida Administrative Code (F.A.C.), a regulatory advisory for Remedial Action Plan preparers and reviewers is included in Enclosure 2 for assistance with compliance with Chapters 62-780 and 62-777, F.A.C.

The Florida Department of Environmental Protection (FDEP) does not provide endorsement of specific or brand name remediation products or processes, however, 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. Vendors are responsible for marketing their product or process on its merits regarding performance, cost, and safety in comparison to competing alternatives in the marketplace. This acceptance letter shall not be construed as either an approval of the product or a certification of its performance.

Additionally, Department acceptance of any product or process does not imply it has been deemed applicable for any particular cleanup situation, or that it is preferred over other treatment or cleanup techniques. A site-specific evaluation of applicability should 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.

It is not a requirement that a remediation product or process obtain an acceptance from the Department in order to be proposed for use in a site-specific Remedial Action Plan, but the plan must contain information to show that it meets all applicable and appropriate rules and regulations. For *CAT 100* a copy of this acceptance letter containing regulatory compliance advice should be included in the appendix of each site-specific Remedial Action Plan that proposes its use.

The Department reserves the right to revoke its acceptance of a product or process if any component has been falsely represented.

This acceptance letter is valid for a period of ten (10) years from the issuance date above. At the end of the ten-year period, the acceptance can be renewed subject to an updated review of the product's use and formulation. The purpose of the updated review is to determine if the use conditions and monitoring requirements for this product need to be modified.

If you have any questions, contact Elena Compton at (850) 245-8911, through Mail Station 4535 at the letterhead address, or by e-mail at Elena.Compton@FloridaDEP.gov.

Sincerely,

Elena Compton, M.S., P.E.
Professional Engineer III
District Support Program, FDEP
850-245-8911

Enclosures: (1) Regulatory Information, (2) Sampling Protocol for Petroleum Cleanup Projects Using In-Situ Activated Carbon Injections, (3) Alternative Groundwater Cleanup Target Level (AGCTL) for un-ionized ammonia

ENCLOSURE 1
REGULATORY INFORMATION

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1. Groundwater cleanup standards: The onus shall be on users of *CAT 100* to ensure that all applicable groundwater standards will be met at the time of project completion for the contaminants of concern being remediated, and any byproducts produced as a result of chemical reactions induced or assisted by *Pl*. 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, for groundwater permitting, and for monitoring requirements; Chapter 62-528, F.A.C., for underground injection control, particularly Part V, for Class V, Group 4 aquifer remediation projects; Chapter 62-780, F.A.C., for cleanup criteria, allowance of alternative cleanup target levels and conditional closure requirements; and Chapter 62-777, F.A.C., for cleanup target levels.
2. Injection well permit: Per paragraph 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 (UIC): Remedial Action Plans proposing injection-type aquifer remediation shall include the information required by subparagraphs 62-528.630(2)(c)1 through 6, F.A.C., for the purposes of the UIC program. Reviewers of those plans, upon issuance of a Department-enforceable Remedial Action Plan Approval Order, must transmit this information to the UIC program in Tallahassee by submitting a completed copy of the "UIC Notification". The notification for sites that are impacted with contaminants of concern is in the form of a memorandum currently located on the Internet at <https://floridadep.gov/waste/district-business-support/documents/uic-notice-remediation-products>
4. General information about temporary Zones of Discharge (ZOD): For groundwater remediation, the composition of a fluid to be injected 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. [and Chapter 62-777, F.A.C.], pursuant to UIC paragraph 62-528.600(2)(d), F.A.C. Aquifer remediation products that do not meet these requirements must seek relief from water quality criteria by one of two mechanisms as follows. Permission for a temporary ZOD may be obtained via paragraph 62-520.310(8)(c), F.A.C. If permission for a ZOD cannot be obtained by rule, then it will be necessary to seek a variance from Department rules in accordance with Section 120.542, Florida Statutes.

Paragraph 62-520.310(8)(c), F.A.C., allows for a temporary ZOD for closed-loop re-injection systems, for the prime constituents of the reagents used to remediate site contaminants, and for groundwater secondary standards. In order to obtain permission for a temporary ZOD by rule, a site-specific Remedial Action Plan must indicate: (a) the chemical ingredients of concern in the fluid to be injected that will be present in excess of groundwater standards; (b) the size of the ZOD that is needed; (c) the amount of time that the ZOD will be needed; and (d) a plan for monitoring the injected chemical ingredients of concern.

The size of the temporary ZOD will usually be the injection well radius of influence when the treatment system is a single injection point. For a multiple point system, the ZOD can usually be expressed and illustrated as the total area covered by all the injection points, located side-by-side with overlapping radii of influence.

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5. Upon expiration of the time-period granted for the ZOD by way of paragraph 62-520.310(8)(c), F.A.C., the concentrations of the above referenced analytes must meet their respective groundwater standards or their site-specific background values, whichever is less stringent.

Conditional closure is also allowable provided the closure criteria of Rule 62-780.680, F.A.C., are met and there are no exceedances of a primary standard due to impurities in the product. Note that such conditional closure may require a modification of the size or duration of the ZOD. This modification must be approved in an enforceable order of the department, such as a conditional Site Rehabilitation Completion Order.

6. Site-specific Remedial Action Plans shall describe the volume and concentration of *CAT 100* that will be injected.
7. Specific ZOD information for *CAT 100*:
- a. For the ZOD parameter: **iron**, **manganese**, and **ammonia** shall be monitored.
 - b. If *CAT 100* is proposed to be delivered into the aquifer via injection wells, reviewers of Remedial Action Plans should check the box as shown below when filling out the UIC Notification memorandum:
“☐ ZOD permission by paragraph 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. ...”.
 - c. If *CAT 100* is proposed to be delivered into the aquifer by means other than injection wells (for example, most excavations [except by large diameter augers], infiltration galleries, trenches, etc.), the UIC Notification memorandum is not required to be filed but monitoring for the UIC parameters is required.
8. The attached “Sampling Protocol for Petroleum Cleanup Projects Using In-Situ Activated Carbon Injections” is required to be followed when *CAT 100* is implemented on petroleum cleanup and non-petroleum cleanup projects.
9. Quarterly monitoring should suffice in most cases. Upon expiration of the time period granted for the ZOD by way of paragraph 62-520.310(8)(c), F.A.C., the concentrations of the above referenced analytes must meet their respective groundwater standards or their site-specific background values, whichever is less stringent, or appropriate controls are put in place to allow conditional closure under Rule 62-780.680, F.A.C.
- i. **Iron** and **manganese** are secondary drinking water pollutants with the following standards: Fe = 300 micrograms per liter (ug/L) and Mn = 50 ug/L.
 - ii. **Ammonia** is currently identified in Chapter 62-777, F.A.C., as a “minimum criteria systemic toxicant” and it has a Groundwater Cleanup Target Level (GCTL) of 2.8 mg/L. However, the oral reference dose upon which this number is based has been withdrawn from the U.S. Environmental Agency’s (EPA) Integrated Risk Information System (IRIS) database. Therefore, the FDEP has calculated an alternative groundwater

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cleanup target level in accordance with Chapter 62-780, F.A.C. This Alternative Groundwater Cleanup Target Level (AGCTL) calculation is attached as Enclosure 3. The Department recommends using the referenced AGCTL for ammonia.

10. Utilization of wells: If a remediation site has sufficient monitoring wells, then the Division of Waste Management has no objection to the use of some existing monitoring wells for the injection of *CAT 100*. However, no “designated” monitoring well, dedicated to the tracking of remediation progress (by sampling) shall be used to apply *CAT 100*. Nor shall wells be used for the injection of *CAT 100* as dedicated wells for tracking remediation progress. This will avoid a premature conclusion that the site meets cleanup goals. By making sure that designated tracking wells are not used for treatment, there will be more assurance that the treatment process has permeated the entire site and that it did not remain localized to the area immediately surrounding each injection well.
11. Baseline Sampling: Baseline sampling (prior to any injection) for the ZOD monitoring parameters (and the impurities) is not required but is strongly recommended. The baseline sampling data is very useful for evaluating when the aquifer has returned to the pre-injection conditions. Analyses for iron, manganese, and ammonia must be included in the baseline sampling.
12. Three categories of groundwater monitoring:
 - a. Active remediation monitoring for a cleanup site’s contaminants of concern: During the period of active remediation, groundwater shall be monitored in accordance with the requirements of the approved RAP as set forth in Rule 62-780.700, F.A.C.
 - b. Post Active Remediation Monitoring for a cleanup site’s contaminants of concern: 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 highest contamination, the other at the downgradient edge of the contamination plume, pursuant to Rule 62-780.750, F.A.C.
 - c. Quarterly monitoring of the UIC zone of discharge: When *CAT 100* is utilized, in order to comply with paragraph 62-520.310(8)(c), F.A.C., the ZOD shall be *CAT 100* monitored for **iron, manganese, and ammonia**, as discussed in paragraph 7a above.
 - d. Annual monitoring for **iron, manganese, and ammonia** to demonstrate and verify compliance with Chapter 62-528, F.A.C., as discussed in paragraph 7a above.
13. Injection operations:
 - a. Avoidance of migration: For injection-type in-situ aquifer remediation projects, injection of *CAT 100* shall be performed in such a way and at such a rate and volume that no migration of *CAT 100* (beyond the ZOD) or the contaminants of concern in the aquifer, or surface water, results, pursuant to subsection 62-528.630(3), F.A.C.
 - b. Underground Injection Control operating permit: Although an operating permit is not required for aquifer remediation wells pursuant to paragraphs 62-528.640(1)(b) and (c), F.A.C., since no movement of the contamination plume is expected to accompany the treatment process, the

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Department requests that the information items listed in paragraph 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 the quality of water in the aquifer, quality of the injected fluid, existing and potential uses of the affected aquifer, and well construction details.

14. Abandonment of wells: Upon issuance of a Site Rehabilitation Completion Order or a declaration of "No Further Action", injection wells shall be abandoned pursuant to Rule 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.

Sampling Protocol for Petroleum Cleanup Projects Using In-Situ Activated Carbon Injections

During the course of evaluating petroleum contaminated sites for closure, there is some question as to how we can ensure that any injected product has completed the remediation of the groundwater contamination and that there is no residual contamination that could result in a rebound in groundwater concentrations after the site is closed. A key component of this assurance is a demonstration that the product has reacted completely or that insufficient contaminant mass remains to cause a rebound. For reactive products, this can be a straightforward demonstration that the reactants are no longer present. For products that work by adsorbing contaminants, whether to permanently immobilize or to provide a substrate for breakdown, it is more difficult to evaluate.

To help ensure that remediation is complete, the following sampling and monitoring protocol should be used on all petroleum/hydrocarbon contaminated sites where when using products that employ adsorption to injected activated carbon as part of the treatment process at a site. This protocol eliminates concerns that residual contamination could cause rebound after the site is closed. This protocol is in addition to the product-specific use and monitoring requirements in the Innovative Technology (IT) acceptance letter. The current list of IT products known to be subject to this protocol follows below.

Cleanup Stage	Comments	Sampling
Prior to Injection for Pilot Test and Active Remediation (Baseline)	This should be the level of contamination in both matrices in equilibrium at that time. Include total organic carbon (TOC) in soil and CO ₂ and methane in groundwater for baseline sampling.	3-5 saturated soil and groundwater samples*
When Groundwater reaches Cleanup Target Levels and PARM begins	Not verifying that soils have reached any target but at this new equilibrium, it should show that whatever contamination remains on soil is not contributing to groundwater contamination because the groundwater concentrations are remaining steady or decreasing.	3-5 saturated soil and groundwater samples. Include TOC in soil and CO ₂ and methane in groundwater.
When Groundwater Maintains Cleanup Target Levels for 1 Year	Monitor GW for a year, and if it stays at or below cleanup target levels, the site can move forward with Risk Management Option I under 62-780, F.A.C., unless Soil levels exceed those at the beginning of PARM.	3-5 saturated soil and groundwater samples. Include TOC in soil and CO ₂ and methane in groundwater

* Saturated soil and groundwater samples should be collected in area of highest contamination based on pre-injection concentrations. This table only lists the additional sampling, contaminants of concern, Underground Injection Control parameters, and secondary drinking standards are still evaluated as with all other petroleum sites. Sample collection and analysis should follow standard protocols.

Additional comments

1. The 3-5 soil samples from each campaign are intended to be replicates of the previous sampling events. Each of the 3-5 samples should be collected at roughly the same location and discrete depth within the targeted carbon-treatment saturated zone.
2. Collected samples should also be analyzed for the petroleum contaminants of concern that were present prior to the initial treatment.

Sampling Protocol for Petroleum Cleanup Projects Using In-Situ Activated Carbon Injections

3. Variability in the soil sample results is expected. An estimate of that variability can be derived from the baseline sampling and that estimate can be used to calculate the expected error range for subsequent sample events.
4. Pilot Test Plans and Remedial Action Plans for petroleum sites that include in-situ injection of activated carbon injections should incorporate this sampling protocol.
5. For sites where in-situ injection of activated carbon has occurred but the PARM Plan has not yet been approved, then the additional soil sampling outlined in rows 2 and 3 of the table will be incorporated into the PARM plan.
6. For sites where post in-situ injection of activated carbon PARM has already begun via an approved PARM Plan or an Approved Purchase Order with PARM Sampling scoped, then the additional soil sampling will not be performed.
7. For any questions about this protocol please e-mail ODBS_Review@FloridaDEP.gov.

List of Accepted Innovative Technologies Subject to the Sampling Protocol for Petroleum Projects Utilizing In-Situ Activated Carbon Injections (as of July 19, 2022). This list may be amended or expanded as information on these or other technologies becomes available.

#	Technology Name	IT Acceptance # (linked to letter)	IT Acceptance Date
1.	Bioavailable Absorbent Media (BAM-C formulation)	1661	09/13/2019
2.	CarbonOx	1530	04/18/2016
3.	GR-320-IRC	1450	02/24/2014
4.	MetaFix (formulations I-3 and I-7A)	1487	10/20/2020
5.	Nutribind	1534	04/22/2016
6.	PetroFix with Electron Acceptor Blend – Regular and Nitrate Free	1833	05/14/2019
7.	PlumeStop Colloidal Biomatrix	1476	08/31/2015
8.	Trap & Treat BOS 100	1365	04/19/2007
9.	Trap & Treat BOS 200	1366	04/17/2007

ENCLOSURE 3
Alternative Groundwater Cleanup Target Levels (AGCTL) for un-ionized ammonia

Table 1 – AGCTLs in µg/L total ammonia based on a range of common temperature and pH values for Florida groundwater

pH	20°C	21°C	22°C	23°C	24°C	25°C	26°C	27°C	28°C	29°C	30°C
5.5	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000
5.6	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000
5.7	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000
5.8	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	340,000
5.9	360,000	360,000	360,000	360,000	360,000	360,000	360,000	330,000	310,000	290,000	270,000
6.0	360,000	360,000	360,000	350,000	330,000	300,000	280,000	260,000	250,000	230,000	210,000
6.1	350,000	320,000	300,000	280,000	260,000	240,000	230,000	210,000	200,000	180,000	170,000
6.2	270,000	260,000	240,000	220,000	210,000	190,000	180,000	170,000	160,000	150,000	130,000
6.3	220,000	200,000	190,000	180,000	160,000	150,000	140,000	130,000	120,000	120,000	110,000
6.4	170,000	160,000	150,000	140,000	130,000	120,000	110,000	110,000	98,000	92,000	86,000
6.5	140,000	130,000	120,000	110,000	100,000	96,000	90,000	84,000	78,000	73,000	68,000
6.6	110,000	100,000	95,000	88,000	82,000	77,000	71,000	67,000	62,000	58,000	54,000
6.7	87,000	81,000	75,000	70,000	65,000	61,000	57,000	53,000	49,000	46,000	43,000
6.8	69,000	64,000	60,000	56,000	52,000	48,000	45,000	42,000	39,000	37,000	34,000
6.9	55,000	51,000	48,000	44,000	41,000	38,000	36,000	33,000	31,000	29,000	27,000
7.0	44,000	41,000	38,000	35,000	33,000	31,000	28,000	27,000	25,000	23,000	22,000
7.1	35,000	32,000	30,000	28,000	26,000	24,000	23,000	21,000	20,000	18,000	17,000
7.2	28,000	26,000	24,000	22,000	21,000	19,000	18,000	17,000	16,000	15,000	14,000
7.3	22,000	20,000	19,000	18,000	17,000	15,000	14,000	13,000	13,000	12,000	11,000
7.4	18,000	16,000	15,000	14,000	13,000	12,000	11,000	11,000	10,000	9,300	8,700
7.5	14,000	13,000	12,000	11,000	10,000	9,800	9,200	8,500	8,000	7,500	7,000

Shaded values are based on the acute exposure AGCTL

AGCTLs were calculated using an f value rounded to 5 significant digits and an un-ionized ammonia concentration of 210 µg/L

AGCTLs were rounded to two significant figures