



Florida Department of Environmental Protection

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

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Jonathan P. Steverson
Secretary

October 09, 2016

Via Electronic Mail to Josh Seidner at:

BMoody@groundws.com JSeidner@GroundWS.com

Mr. Robert Moody
Mr. Josh Seidner
Ground Works Solutions, Inc.
4759 Drane Field Road
Lakeland, Florida 33811

Re: **URETEK 486STAR**

Dear Mr. Moody and Mr. Seidner:

The Florida Department of Environmental Protection's Division of Waste Management (Division) hereby accepts URETEK 486STAR geopolymer for the construction of inert, non-permeable, subsurface barrier walls to restrict groundwater movement in order to hydraulically contain petroleum, hazardous wastes, and other suitable contaminants. The Injectable BarrierSM wall is installed in-situ by a no-excavation injection technique developed by URETEK Holdings.

URETEK 486STAR is a two-part polyurethane with additives that are mixed and applied with an injection gun, and it is formulated to expand and create a rigid foam with good dimensional stability (resistance to shrinkage and collapse) even when it is water-blown (formed underwater). Although it has also been used for in-situ stabilization of poorly compacted soils and the leveling of structures, including pavement, the focus of this acceptance is on the injection of it as a subsurface barrier. Supplemental information is provided in Enclosure 1. Regulatory information is provided in Enclosure 2.

While the Florida Department of Environmental Protection (FDEP) 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, upon receipt of an acceptance, must market their product or process on its own merits regarding performance, cost, and safety in

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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.

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 URETEK 486STAR, a copy of this acceptance letter 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 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. If you have any questions, contact Elena Compton at (850) 245-8911, through Mail Station 4580 at the letterhead address, or by e-mail at Elena.Compton@dep.state.fl.us.

Sincerely,



Elena Compton, M.S., P.E.
Professional Engineer II
PRP Team 2, FDEP
850-245-8911

Enclosures: (1) Supplemental Information

ec: Kenneth Busen, P.G. - FDEP/Tallahassee – Kenneth.Busen@dep.state.fl.us
John Wright, P.E. - FDEP/Tallahassee - John.Wright@dep.state.fl.us

SUPPLEMENTAL INFORMATION

1. Manufacturer/ Distributer: Accella Polyurethane Systems, LLC
<http://accellapolyurethane.com>
2. Description: The injected material is URETEK 486STAR, a two-component, high-density structural polymer that is mixed at the surface in an injection gun and, as a result of carbon dioxide production, expands rapidly (within 1 minute) from 15 to 25 times its original volume when unconfined. The majority of the polymer's strength is attained within approximately 20 minutes, and it reaches full strength in several hours. The polymer is hydrophobic, and is capable of forcing water out of voids and soil pore spaces. It can be injected below the water table with minimal reduction in strength. URETEK 486STAR uses a blowing agent that is non-CFC, non-HFC, zero ozone depleting.

URETEK 486STAR polymer is NSF61 Drinking Water Components certified for a maximum surface area to volume ratio of 0.375 square inches per liter. Mix ratio is 1:1 (A:B) by volume or 8.1:6.9 (A:B) by weight. URETEK 486STAR certified for various densities and reaction speeds. More information about certification(s) of Accella Polyurethane Systems can be found at www.nsf.org

3. Chemical Composition (per the manufacture's provided MSDS):

A-Component:

9016-87-9	diphenylmethanediisocyanate, isomers and homologues:	30-60 %
101-68-8	4,4'-methylenediphenyl diisocyanate):	15-40 %
5873-54-1	o-(p-isocyanatobenzyl)phenyl isocyanate:	1-5 %

B-Component (aka Uretek™ 4R Resin):

25791-96-2	polyol(s)	7-13 %
25265-71-8	oxydipropanol	≤ 1.0 %
	polyol(s)	15-40 %
6846-50-0	2,2,4-trimethyl-1,3-pentanediol diisobutyrate	15-40 %

4. A more detailed technical discussion of URETEK 486STAR polymer production and the delivery options of the polymer is available in US Patent No. 6,521,673 of February 18, 2003, and US Patent No. 6,634,831 B2 of October 21, 2003.

REGULATORY INFORMATION

1. Groundwater cleanup standards: The onus shall be on users of URETEK 486STAR (when they are used to inject a fluid for an in-situ, injection type cleanup) 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 by-products produced as a result of chemical or biochemical reactions induced or assisted by the injected fluid. 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; 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 62-780, 62-782, and 62-785 F.A.C., for cleanup criteria; and Chapter 62-777, F.A.C., for cleanup target levels.
2. Injection well permit: 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 (UIC): Remedial Action Plans proposing injection-type aquifer remediation shall include the information required by Rules 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 is in the form of a memorandum currently located on the Internet at www.dep.state.fl.us/waste/categories/pcp/pages/innovative.htm.
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], pursuant to UIC Rule 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 Rule 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.

Rule 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.
5. Site-specific Remedial Action Plans shall indicate the volume and the complete chemical composition (i.e., the identity and concentration of each ingredient) of the fluid to be injected. If

the fluid to be injected is a proprietary product for which the Department has already issued an acceptance letter that contains a voucher for the confidential disclosure of ingredients and their proportions, then it will suffice in the Remedial Action Plan to indicate just the volume and overall concentration of the fluid to be injected, and that a confidential disclosure regarding the composition of the fluid to be injected has already been provided to the Department. Place a copy of the letter in the appendix of the plan.

Additionally, for URETEK 486STAR, calculations of the solidified polymer's surface area ratio to volume of groundwater shall be provided in the Remedial Action Plan.

6. Specific ZOD information for URETEK 486STAR:

Due to URETEK 486STAR polymer's certification by NSF61 Drinking Water Components, there is no need to establish a ZOD, assuming a ratio of the solidified polymer's surface area to volume of groundwater does not exceed 0.375 square inches per liter (see Enclosure 1, paragraph 2).

7. Injection operations:

- a. Avoidance of migration: For injection-type, in-situ aquifer remediation projects, injection of URETEK 486STAR shall be performed in such a way, and at such a rate and volume that no undesirable migration of either URETEK 486STAR or the contaminants of concern in the aquifer results, pursuant to Rule 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 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.