Florida Department of Environmental Protection

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

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Noah Valenstein
Secretary

April 15, 2018

Via Electronic Mail to Erkki Lindberg at erkki.lindberg@ekogrid.fi

Erkki Lindberg, CTO, General Partner
Eko Harden Technologies Oy
Huopalahdentie 24
Helsinki, Finland 00350

Re: **EKOGRID ™ (System)**
The FDEP Innovative Technology Application Number: 1651

Dear Erkki Lindberg:

The Florida Department of Environmental Protection's Division of Waste Management (DWM) hereby accepts EKOGRID ™ system for remediation purposes. Per the manufacturer's information, EKOGRID ™ is an electrokinetic system that utilizes optimized pulsed voltage output for in-situ and ex-situ remediation of chlorinated hydrocarbons, petroleum, metals, and other suitable contaminants in groundwater and soil. It enhances bioremediation through electrochemical and electrokinetic processes. Enclosure 1 contains regulatory information. Enclosure 2 contains supplemental information.

The DWM has no objections to the use of the EKOGRID ™ system for the remediation of contaminant impacted sites pursuant to Chapter 62-780, Florida Administrative Code, provided: (a) the considerations of this letter are taken into account; and (b) a site-specific Remedial Action Plan is approved by the Department.

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, upon receipt of an acceptance, must market 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 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.

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.

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

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@dep.state.fl.us.

Sincerely,

Elena C. Compton

Elena Compton, M.S., P.E.
Professional Engineer II
District & Business Support Program
Division of Waste Management, FDEP
850-245-8911

Enclosures: (1) Regulatory Information; (2) Supplemental Information

ec: Nesmar C. Mora R., International Business Development Environmental Engineer - Royal Consulting Services, Inc. – MoraNC@royalconsulting.com

04-15-2018: Burlab # 1651

1. Groundwater cleanup standards: The onus shall be on users of EKOGRID ™ 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 EKOGRID ™ listed in the subject letter. 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 62-780 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. Hazardous Air Pollutant (HAP) emission: Though EKOGRID ™ manufacturer did not elaborate on the HAP emissions topic, a site-specific Remedial Action Plan must provide an evaluation if potentially hazardous emissions might be generated by EKOGRID ™ system. If such emissions are generated, Chapter 62-780, F.A.C., requires air emissions treatment for at least the first 30 days of operation for on-site treatment systems. Treatment may be discontinued after the first 30 days of operation if the total air emissions from all on-site remediation equipment systems do not exceed 5.5 pounds per day for any single HAP or 13.7 pounds per day for total HAPs.

3. Avoidance of contaminant migration: EKOGRID ™ electrodes shall be installed in such manner as not to induce the contaminants of concern and their hazardous break down products' off-site migration.

4. Two 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 set forth in Section 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 pursuant to Section 62-780.750, F.A.C.

1. EKOGRID ™ systems manufacturer's web. site: https://ekogrid.fi

2. Per EKOGRID ™ manufacturer, EKOGRID ™ systems generate enhanced bioremediation and redox reactions triggered by electrochemical and electrokinetic processes. EKOGRID ™ utilizes natural phenomena and reactions:

   - Electro-osmosis, electrophoresis, and electro-migration,
   - Electrochemical redox reactions (e.g., electrolysis),
   - Bioremediation processes and increased microbial activity.

3. The EKOGRID ™ system includes the low voltage power source powered by custom-built EKO control unit that sends optimized pulsed voltage patterns to steel rod electrodes installed around and in the area to be treated. Installed electrodes should reach the depth of polluted soil or groundwater.

4. Per the manufacturer's information, EKOGRID ™ system utilizes optimized pulsed voltage output.

   - Frequently changing polarity of the output, makes the charged contents of the pore water move quickly back and forth (short electro-osmotic pulses) so that freshly formed free radicals and oxygen that promote the oxidization of compounds emerge.

   - The system uses the capacitive nature of the matrix (soil), thus enabling it to work at a very low output voltage.

   - Reactions occur at the surface of each soil particle and eventually spread throughout the whole matrix. The finer the soil grain size, the more effectively the system operates due to faster and more complete remediation.