



Commonwealth of Massachusetts  
Executive Office of Energy & Environmental Affairs

## Department of Environmental Protection

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Commissioner

### **APPROVAL FOR REMEDIAL USE**

Pursuant to Title, 310 CMR 15.000

Name and Address of Applicant:

Knight Treatment Systems  
281 County Route 51A  
Oswego, NY 13126

Trade name of Technology: White Knight Inoculator/Generator Alternative Treatment System (hereinafter called the "System"). A technology inspection checklist is approved and a part of this Approval.

Transmittal Number: X265537

Date of Issuance: June 9, 2015 (previously revised December 22, 2010)

### **Authority for Issuance**

Pursuant to Title 5 of the State Environmental Code, 310 CMR 15.000, the Department of Environmental, Protection hereby issues this Approval for Remedial Use to: Knight Treatment Systems, 281 County Route 51A, Oswego, NY 13126(hereinafter "the Company"), approving the System described herein for Remedial Use in the Commonwealth of Massachusetts. Sale and use of the System are conditioned on compliance by the Company and the System owner with the terms and conditions set forth below. Any noncompliance with the terms or conditions of this Approval constitutes a violation of 310 CMR 15.000.

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David Ferris, Director  
Wastewater Management Program  
Bureau of Water Resources

June 9, 2015  
Date

## I. Purpose

1. The purpose of this approval is to allow use of the System in Massachusetts, on a Remedial Use basis to repair systems failing to protect public health and safety and the environment where failure has occurred as described in 310 CMR 15.303(1)(a), (1) and (2) due to clogging of the soil absorption system (SAS).
2. The System may only be installed on facilities that meet the criteria of 310 CMR 15.284(2).
3. This Approval for Remedial Use authorizes the use of the System where the local approving authority finds that the System is for upgrade of a failed, failing or nonconforming system and the design flow for the facility is less than 10,000 gallons per day (GPD).

## II. Design Standards

1. The System, for design flows less than 2,000 GPD, is typically installed in an existing septic tank (or a new septic tank designed in accordance with 310 CMR 15.223 through 15.228) with an effluent tee filter. The System consists of a White Knight Microbial Inoculator/Generator (MIG) with fine bubble diffuser installed in the first compartment of the septic tank, a bacterial inoculant packet placed into the tank with the MIG, and a linear air pump installed externally to the septic tank and operated on a continuous basis capable of providing 1.5 to 2.5 cfm of air to the MIG diffuser. The System converts the septic tank into a bioreactor (or Treatment Tank) to treat and prepare residential strength wastewater for discharge to a soil absorption system (or leach field). The treated effluent is discharged to the existing soil absorption system.

For all System installations other than single family homes, and for Systems with design flows greater than 2,000 but less than 10,000 GPD, it is required that a conventional septic tank(s) be located up-stream from the Treatment tank containing the MIG unit(s). The septic tank(s) must be provided in accordance with Title 5, 310 CMR 15.223 through 15.228.

A microbial culture is established in the septic tank or Treatment Tank and maintained using the aeration device and the bacterial source. The aerator mixes the contents of the septic tank with the bacteria and aerates the wastewater. The System's biomass reduces both the biochemical oxygen demand (BOD<sub>5</sub>) and the total suspended solids (TSS) concentration in the septic tank effluent. The effluent from the septic tank or Treatment Tank contains dissolved oxygen and System generated bacteria that when discharged to the soil absorption system (SAS) act to reduce the thickness of the biomat improving infiltrative capacity.

2. Prior to installation of the System, the site and existing system shall be evaluated in accordance with 310 CMR 15.100 through 15.107. The existing on-site system components including the septic tank, distribution box, and SAS including the pressure distribution system if present/required, shall be inspected in accordance with 310 CMR 15.302. The evaluation shall include identification of existing components, their

compliance with 310 CMR 15.000, cause(s) of failure, and the location for the upgrade of the septic system if required in the future.

3. A System shall not be proposed for installation where:
  - A. The high groundwater elevation determined in accordance with 310 CMR 15.103 would be less than two feet in soils with recorded percolation rate more than two minutes per inch or less than three feet in soils with a recorded percolation rate of two minutes per inch or less below the bottom of the SAS.
  - B. A facility for which the site investigation indicates that the existing onsite system was designed and installed for a design flow less than required by 310 CMR 15.203. The minimum area for the existing SAS shall not be less than 50 percent of the area required in accordance with 310 CMR 15.242.
  - C. The existing septic tank(s) has not been tested and shown to be watertight.
  - D. The existing system includes a leaching pit or cesspool.
  - E. A site investigation indicates that the existing soil absorption system must be removed and replaced prior to installation of the System.
4. For seasonal use, the System shall be reactivated by the addition of a fresh culture of bacteria at each start up and ensure System is operating properly.
5. System installation shall not include modifications, excavations, or any other changes to the existing SAS, with the exception of the work required in section III (7), and as needed for a complete examination of the existing septic system per section II (2).
6. System installations 2,000 GPD or greater must have a pressure dosed SAS, and if in a nitrogen sensitive area as defined in 310 CMR 15.215 shall have treatment with an RSF or equivalent as required by 310 CMR 15.202(1). Note that some MassDEP approved on-site system technologies under the Alternative SAS- Patented Sand Filter category do not require pressure dosing.

### **III. General Conditions**

1. All provisions of 310 CMR 15.000 are applicable to the use of this System, the System owner and the Company, except those that specifically have been varied by the terms of this Approval.
2. Any required sample analysis shall be conducted by an independent U.S. EPA or DEP approved testing laboratory, or a DEP approved independent university laboratory. It shall be a violation of this Approval to falsify any data collected pursuant to an approved testing plan, to omit any required data or to fail to submit any report required by such plan.
3. The facility served by the System and the System itself shall be open to inspection and sampling by the Department and the local approving authority at all reasonable times.

4. In accordance with applicable law, the Department and the local approving authority may require the owner of the System to cease operation of the system and/or to take any other action as it deems necessary to protect public health, safety, welfare and the environment.
5. The Department has not determined that the performance of the System will provide a level of protection to public health and safety and the environment that is at least equivalent to that of a sewer system. No System shall be installed, upgraded or expanded, if it is feasible to connect the facility to a sanitary sewer, unless as allowed by 310 CMR 15.004. When a sanitary sewer connection becomes feasible, the facility served by the System shall be connected to the sewer, within 60 days of such feasibility, and the System shall be abandoned in compliance with 310 CMR 15.354, unless a later time is allowed, in writing, by the approving authority.
6. Design, installation and operation shall be in strict conformance with the Company's DEP approved plans and specifications, 310 CMR 15.000 and this Approval.
7. A minimum of one (1) inspection port shall be provided within the SAS down to the lower stone/in-situ soil interface to enable monitoring for subsurface wastewater elevation. Existing inspection ports may be acceptable for use if found to be at appropriate depth and in good condition.

#### **IV. Conditions Applicable to the System Owner**

1. The System is approved for use with sanitary sewage only. Any wastes that are non-sanitary sewage generated or used at the facility served by the System shall not be introduced into the System and shall be lawfully disposed.
2. Operation and Maintenance Agreement:
  - A. Throughout its life, the System owner shall operate and maintain the System in accordance with the Company and designer's operation and maintenance requirements and this Approval. To ensure proper operation and maintenance (O&M), the System owner shall enter into an O&M agreement. No O&M agreement shall be for less than one year.
  - B. No System shall be used until an O&M agreement is submitted to the approving authority which:
    - i. Provides for the contracting with the Company or its approved management company, trained by the Company as provided in Section V (7), to operate the System consistent with the System's specifications and the operation and maintenance requirements specified by the designer and any specified by the Department;
    - ii. Contains procedures for notification to the Department and the local board of health within five days of a System failure or alarm event and for corrective measures to be taken immediately;

- iii. Provides the name of an O&M provider, which must be an approved Title 5 System Inspector trained by the Company that will operate and monitor the System. The O&M provider must inspect and maintain installed Systems according to the below Monitoring Requirements.
3. The System owner shall at all times have the System properly operated and maintained in accordance with this Approval, the designer's operation and maintenance requirements and the Company's approved operating procedures. The System owner shall notify the Department and the local approving authority in writing within seven days of any cancellation, expiration or other change in the terms and/or conditions of their O&M agreement.
4. Prior to transferring any or all interest in the property served by the System, or any portion of the property, including any possessory interest, the System owner shall provide written notice of all conditions contained in this Approval to the transferee(s). Any and all instruments of transfer and any leases or rental agreements shall include as an exhibit attached thereto and made a part thereof a copy of this Approval for the System. The System owner shall send a copy of such written notification(s) to the local approving authority within 10 days of such notice being given.
5. Monitoring Requirements:

A functional existing or new observation port or monitoring well located within the SAS is required for all System installations, and shall be monitored according to the following requirements.

  - A. The System O&M provider shall monitor and record the depth of the subsurface wastewater elevation below the SAS monthly. After three months of System operation the dose storage shall be determined. Dose storage is the system designed void space within the stone layer between the invert of the distribution pipe and the naturally occurring or in-situ soils elevation.
    - i. If the depth of the subsurface wastewater elevation indicates at least 50% of dose storage is available, then monitoring may be reduced from quarterly to every six months for single family homes, and from monthly to quarterly for all other Systems. Further reduction in monitoring is not allowed;
    - ii. If the depth of the subsurface wastewater elevation indicates less than 50% of dose storage available, then repeat the monitoring 30 days later. If the second reading is at least 50% of dose storage then the previous observation port measurement reduced frequency may be continued. However if the second reading does not show at least 50% of dose storage available then the system must then be monitored monthly, and a report with evaluation of the System provided to the local approving authority/BOH. The report shall include water use data and all recorded subsurface wastewater elevation data; and
    - iii. If the System continues to indicate excessive subsurface wastewater elevation greater than the 50% dose storage elevation for 6 consecutive months (3 month initial operation period plus 3 additional months) as defined above, the System is in failure and shall be removed in accordance with Section V(8).

Example for monitoring of the Subsurface Wastewater Elevation: For a SAS with 12 inches of depth from the distribution pipe invert to the bottom of stone/ naturally occurring soil interface - if monitoring port reading shows subsurface wastewater elevation level is greater than 6 inches then the 50% of dose storage requirement is not met. If the monitoring shows the subsurface wastewater elevation level is 6 inches or less, then 50% of dose storage is met.

6. By February 15<sup>th</sup> of each year for the previous year, the System owner shall submit to the appropriate local approving authority/BOH all data collected in accordance with item 5, above, and the technology inspection checklist completed by the System O&M provider for each inspection performed during the previous calendar year.
7. Prior to the issuance of a Certificate of Compliance for the System installation, the System owner shall record and/or register in the appropriate Registry of Deeds and/or Land Registration Office, a Notice disclosing the existence of the alternative system subject to this Approval on the property. If the property subject to the Notice is unregistered land, the Notice shall be marginally referenced on the owner's deed to the property. Within 30 days of recording and/or registering the Notice, the System owner shall submit the following to the local approving authority: (i) a certified Registry copy of the Notice bearing the book and page/instrument number and/or document number; and (ii) if the property is unregistered land, a Registry copy of the owner's deed to the property, bearing the marginal reference.

#### **V. Conditions Applicable to the Company**

1. The Company shall develop and submit to the Department within 60 days of the revised date of this Approval: minimum site evaluation criteria and installation requirements; an operating manual, including information on substances that should not be discharged to the System; a technology inspection checklist; and a recommended schedule for maintenance and replacement of components essential to consistent successful performance of the installed Systems. The Company shall develop and submit to the Department within 60 days of the revised date of this Approval a standard protocol for determining subsurface wastewater elevation within the SAS. The Company shall also submit to the local approving authority within 60 days of the revised date of this Approval a protocol for completing inspections and monitoring of the System and any procedures that will be implemented should the System fail. The Company shall make available, in print and electronic format, the above referenced procedures and protocols to owners, O&M providers, designers and installers of the System.
2. The Company shall develop and submit within 30 days of the revised date of this approval to the Department a plan for ensuring the submission of inspection reports by the O&M provider to the Company and local approving authority.
3. The Company shall maintain the following additional information for the Systems installed in Massachusetts and make it available to the Department within 30 days

of a request by the Department:

- A. The total number of units of the System sold for use in Massachusetts during the previous year; the address of each installed System, the owner's name and address, the type of use (e.g. residential, commercial, institutional) and the design flow;
  - B. Date when system was installed and started up;
  - C. Tabulation of monitoring port readings and any other recorded parameters with backup inspection and laboratory sheets;
  - D. Tabulation of systems that are in failure as described in 310 CMR 15.303 (1)(a)(1) or (2) due to excessive ponding of effluent on the SAS, reasons for non-compliance and any corrective action taken including but not limited to design, installation and/or operation or maintenance changes required to reach compliance;
  - E. Completed technology inspection checklists shall be maintained by the Company or Company's representative on file for possible Department auditing;
  - F. A general summary of the results for the year, any recommended changes to the design, installation and/or operation and maintenance procedures and a schedule for implementing those changes; and
  - G. Warranty issues both resolved and unresolved or an explanation of any warranty claims that have been received and their resolution.
4. The Company or its designee shall review the plans and site evaluation conducted for the System prior to the sale of any unit to ensure that the proposed installation of the System is at a site consistent with this Approval and the System's capabilities. The Company shall certify in writing that the System plan and existing site conditions conform to the requirements of this Approval and any requirements of the Company and shall submit a copy of that certification to the local approving authority and the System owner.
  5. Prior to the issuance of a Certificate of Compliance for the System's installation, the Company or its designee shall submit to the local approving authority and the System owner a signed certification that the System has been installed in accordance with the Company's requirements, the approved plan and this Approval. This certification in no way changes the requirements of 310 CMR 15.021(3).
  6. The Company or the Company's approved operation and maintenance contractor shall maintain a contract with the System owner that:
    - A. Provides for operating and maintaining the System with an O&M provider that has been trained by the Company to operate the System consistent with the System's specifications and any additional operation and maintenance requirements specified by the designer or by the Department;

- B. Contains procedures for notification to the System owner, the Department and the local approving authority within five days of knowledge of a System failure and for corrective measures to be taken immediately;
  - C. Contains procedures for inspecting the bacterial source at each quarterly visit and if necessary replacing the media. The microbial inoculants shall be replaced annually if considered necessary by the Company and or O&M provider; and
  - D. Contains a plan to determine if required after the first three months of operation why the effluent water surface elevations in the SAS are as high or higher than the water surface elevation when the System was installed.
7. The Company shall institute and maintain a program of O&M provider training and continuing education. The Company shall maintain and annually update, and make the list of qualified O&M providers available by February 15<sup>th</sup> of each year. The company shall update the list of qualified O&M providers and make the list known to users of the technology.
8. The Company shall provide to each System owner a written warranty transferable to a new owner that includes the following:
- A. Refund of the cost of equipment and installation should the System continue in failure as described in 310 CMR 15.303(1)(a)(1) and (2) after 120 days of operation that is conducted in accordance with the Company's specifications and oversight; or
  - B. Refund of the cost of equipment and installation should the System fail as described in section IV(5) within two years of installation provided that the System owner has entered into and maintained an operation and maintenance contract with the Company and has operated the System in accordance with the Company's specifications.
9. The Company shall conduct a performance evaluation starting after the first 100 systems have been installed and operating for at least one year. A report shall be submitted to the Department no more than 180 days beyond this milestone evaluating whether at least 90 percent of these Systems have demonstrated successful reduction in the subsurface wastewater elevation. Successful performance of these Systems for this report is defined as maintaining the subsurface wastewater elevation within the SAS consistently at or below the naturally occurring in-situ soils elevation (or stone bottom elevation). Should the System not demonstrate this success, the report shall detail the changes that must be made in site evaluation, design, installation and/or operation or maintenance to meet this goal, and shall include a schedule containing a deadline for implementing those changes. No more than 100 systems shall be installed until the performance report has been completed and the results indicate that over 90 percent of the Systems are no longer in failure.



10. The Company shall include copies of this Approval and the procedures and protocol described in Section V (1) with each System that is sold. In any contract executed by the Company for distribution or re-sale of the System, the Company shall require the distributor or re-seller to provide each purchaser of the System with copies of this Approval and the procedures and protocol described in Section V (1).
11. The Company shall notify the Director of the Wastewater Management Program, Bureau of Water Resources, MassDEP- Boston, at least 30 days in advance of the proposed transfer of ownership of the technology for which this Approval issued. Said notification shall include the name and address of the proposed new owner and a written agreement between the existing and proposed new owner containing a specific date for transfer of ownership, responsibility, coverage and liability between them. All provisions of this Approval applicable to the Company shall be applicable to successors and assigns of the Company, unless the Department determines otherwise.
12. The Company shall furnish the Department any information that the Department requests regarding the System within 21 days of the receipt of that request.
13. Systems approved and installed after the date of this Approval and thirty (30) days prior to submitting an application for a Disposal System Construction Permit (DSCP), the Company or its representative shall provide to the Local Approving Authority a certification, signed by the owner of record for the property to be served by the unit, stating that the property owner:
  - A. has been provided a copy of the Remedial Use Approval and all attachments and agrees to comply with all terms and conditions;
  - B. has been informed of all the owner's costs associated with the operation including power consumption, maintenance, sampling, recordkeeping, reporting, and equipment replacement;
  - C. understands the requirement for a contract with a company approved O&M provider and has been provided a current list of all approved O&M providers;
  - D. agrees to fulfill his responsibilities to provide a Deed Notice as required by 310 CMR 15.287(10) and the Approval; and
  - E. agrees to fulfill his responsibilities to provide written notification of the Approval conditions to any new owner, as required by 310 CMR 15.287(5).

## VI. Reporting

1. All notices and documents required to be submitted to the Department by this Approval shall be submitted to:

Director  
Wastewater Management Program

Department of Environmental Protection  
One Winter Street - 5th floor  
Boston, Massachusetts 02108

**VII. Rights of the Department**

1. The Department may suspend, modify or revoke this Approval for cause, including, but not limited to, non-compliance with the terms of this Approval, inadequate system performance demonstrated by the annual report required in Section VI (2) or other relevant information, non-payment of the annual compliance assurance fee, for obtaining the Approval by misrepresentation or failure to disclose fully all relevant facts or any change in or discovery of conditions that would constitute grounds for discontinuance of the Approval, or as necessary for the protection of public health, safety, welfare or the environment, and as authorized by applicable law. The Department reserves its rights to take any enforcement action authorized by law with respect to this Approval and/or the System against the owner, or O&M provider of the System and/or the Company.