

**NORTH CAROLINA DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
ENVIRONMENTAL HEALTH SECTION
ON-SITE WATER PROTECTION BRANCH**

**INNOVATIVE WASTEWATER
SYSTEM APPROVAL**

INNOVATIVE WASTEWATER SYSTEM NO: IWWS-99-3

ISSUED TO: Norweco, Inc.
220 Republic Street
Norwalk, Ohio 44870
(419)668-4471; Fax: ((419)663-5440

FOR: Norweco Singulair®ATU/Sand Filter System

APPROVAL DATE: November 1, 1999

In accordance with 15A NCAC 18A.1969, a proposal by Michael Price, for approval of subsurface wastewater systems utilizing Norweco Singulair® Aerobic Treatment Units (ATUs) followed by sand filters has been reviewed and modified and the system has been found to meet the standards of an innovative system when all of the following conditions are met:

A. GENERAL

1. Scope of this .1969 Innovative System Approval

- a. Treatment performance standard, siting and sizing specifications for Norweco Singulair®ATUs with sand filters that meet these performance standard and associated subsurface wastewater systems.
- b. Design, construction and installation requirements Norweco Singulair®ATUs with sand filters that meet these standards, and associated subsurface wastewater systems.
- c. Operation, maintenance and monitoring requirements for Norweco Singulair® ATUs with sand filters and associated subsurface wastewater systems to ensure the treatment performance standard shall continue to be met.

2. This Innovative System Approval is applicable to domestic sewage systems (non-industrial wastewater) utilizing Norweco Singulair® ATUs with sand filters that have a design flow not exceeding 1500 gallons per day, and that treat domestic sewage only (non-industrial wastewater). Influent waste strength to the system shall not exceed that of domestic quality wastewater, with an average carbonaceous biochemical oxygen demand (CBOD₅) less than 300 mg/l, total suspended solids (TSS) less than 350 mg/l, ammonium-nitrogen (NH₃-N) less than 60 mg/l, and grease plus oil less than 30 mg/l.

B. TREATMENT PERFORMANCE STANDARD (TS-II): Tertiary Treatment with nitrogen-reduction

Norweco Singulair® ATUs with sand filters shall be designed, installed and operated to meet the following standards:

1. Carbonaceous Biochemical Oxygen Demand, 5-day (CBOD₅) <10 mg/l.
2. Total suspended solids < 10 mg/l.
3. Ammonium-nitrogen < 10 mg/l.
4. Total nitrogen (organic + ammonium + nitrate forms) concentration < 20 mg/l.
5. Fecal coliform bacteria densities < 10,000 colonies/100ml.

Standards are arithmetic means, except fecal coliform is a geometric mean.

C. APPROVED NORWECO SINGULAIR® AEROBIC TREATMENT UNITS WITH SAND FILTERS

1. Norweco Singulair® Model 960ATUs which have been separately approved by the Division of Environmental Health in accordance with 15A NCAC 18A .1957(c), followed by sand filters designed, constructed and installed as described below.
2. Other types of Norweco ATUs with sand filters that are designed and operated to meet Performance Standard TS-II may be subsequently proposed for approval by the State and as appropriate shall be appended to this approval.

D. SITING CRITERIA

Ground absorption systems receiving effluent from approved Norweco Singulair® ATUs with sand filters may be used on sites classified as Suitable or Provisionally Suitable for conventional, modified, alternative or innovative systems in accordance with 15A NCAC 18A .1900 et seq. The following modifications to siting criteria, vertical or horizontal separation distance requirements shall be acceptable:

1. Minimum initial vertical separation siting criteria and minimum vertical separation distances for trench bottoms specified in Rules .1955 (m), .1956, and .1957 may be reduced as follows:
X by a maximum of 25 percent for gravity dosed drainfields, and
X by a maximum of 50 percent for pressure dosed drainfields (LPP or DRIP distribution),
when all of the following conditions are met:
 - a. the initial vertical separation siting criteria shall **not** be reduced to less than 12 inches from the soil surface to rock or any unsuitable soil horizon,
 - b. the trench bottom vertical separation distance shall **not** be reduced to less than 12 inches to rock or tidal water,
 - c. the site shall be evaluated by a Licensed Soil Scientist (see Section I, below),
 - d. with the exception of horizontal setback reductions from Drainage Systems, **no other reductions in horizontal setbacks or increases in Long Term Acceptance Rates**, as provided for in Sections D.4 and E.2, below, shall be used when any reductions in initial vertical separation siting criteria or

trench bottom vertical separation distances are utilized. Furthermore, no reduction in trench bottom area shall be allowed for chambered or polystyrene aggregate systems when any of these reductions are utilized. These reductions are also not applicable to a PPBPS system sized in accordance with Rule .1956(3)(a)(ii), and

- e. whenever any of the above reductions in initial vertical separation criteria or trench bottom vertical separation distances are utilized, the **property line minimum horizontal setback distance shall be increased to 25 feet.**
2. Drainage Systems: When a Norweco Singulair® ATU with sand filter is to be utilized, drainage may be used on sites with Group III Soil Texture, and soils with Provisionally Suitable (or Suitable) structure are allowed within the vertical separation zone. A groundwater lowering system may also be used to meet the siting criteria or vertical separation requirements for soil wetness conditions for fill systems specified in Rule .1957(b)(1). Site evaluation by a Licensed Soil Scientist shall be required, and the drainage system shall be designed by a person with demonstrated knowledge of drainage systems (see Section I, below).
 3. Saprolite Systems: When a Norweco Singulair® ATU with sand filter is to be utilized, saprolite with sandy clay loam texture may be used. The maximum LTAR for sandy clay loam saprolite texture shall be 0.2 gpd/ft² for conventional trenches and 0.10 gpd/ft² for LPP trenches. Nitrification trenches in saprolite may be installed up to **five** feet deep. Site evaluation by a Licensed Soil Scientist or Professional Geologist shall be required (see Section I, below).
 4. Minimum horizontal setbacks shall be as specified in Rule .1950, except as provided for in Table 1.

Table 1. Minimum horizontal setbacks for ground absorption systems when Norweco Singulair® ATUs with sand filters are used.*

Land feature or component	Existing Rules	Norweco ATUs with Sand Filters
	.1950 (a)	---
		--- minimum horizontal setback, feet ---
(1) Any private water supply source, except any uncased well or spring.	100	50
(2) Any public water supply source	100	100
(3) Streams classified as WS-1	100	50
(4) Waters classified as S.A.	100	50
(5) Other coastal waters	50	25
(6) Any other stream, canal, marsh or other surface waters	50	25
(7) Any Class I or Class II reservoir	100	50
(8) Any permanent storm water retention pond	50	25
(9) Any other lake or pond	50	25
(10) Any building foundation	5	5
(11) Any basement	15	15
(12) Any property line	10	10
(13) Top of slope of embankments or cuts of 2 feet or more vertical height	15	15
(14) Any water line	10	10
(15) Drainage systems*:		
(A) Interceptor drains, etc.		
(i) upslope	10	7
(ii) sideslope	15	10

(iii) downslope	25	15
(B) Groundwater lowering ditches and devices	25	15
(16) Any swimming pool	15	15
(17) Any other nitrification field (except repair area)	20	10

***- Note: With the exception of the Drainage Systems horizontal setback reductions, the reductions in horizontal setbacks in Table 1, above, shall not be allowed when reductions in initial conditions or vertical separation distances are used in accordance with Section D.1, above, or when any increase in Long Term Acceptance Rate (LTAR) is used in accordance with Section E.2, below.**

E. SIZING CRITERIA

1. The system sizing criteria shall normally be based upon the Long Term Acceptance Rate (LTAR) specified in the appropriate portion of the Rules for the type of ground absorption system to be used.
2. The LTAR may be increased up to a factor of two when all of the following conditions are met:
 - a. initial vertical separation siting criteria or vertical separation distances for trench bottoms specified in Rules .1955(m), .1956 or .1957 have not been reduced,
 - b. sandy clay loam saprolite is not proposed to be used,
 - c. horizontal separation distances specified in Rule .1950 have not been reduced, and
 - d. for systems to be installed in fill, a pressure dosed drainfield (LPP or DRIP distribution) is to be used.
 - e. for systems to be installed on sites with Group III or IV soils within three feet of the trench bottom or on sites requiring drainage of Group II or III soils, the site has been evaluated by a Licensed Soil Scientist (see Section I, below).
3. For ground absorption systems utilizing modified, graveless or other types of nitrification trenches separately approved in accordance with Rules .1956 or .1969, no reductions in linear footage of nitrification trench or system area shall be applied when the LTAR has been increased in accordance with section E.2, above.

F. DESIGN CRITERIA

1. Pretreatment:

A pre-approved Norweco Singulair® Aerobic Treatment Unit Model 960 sized as required for the proposed facility served shall be provided.
2. Sand Filter:

A pressure dosed sand filter shall be installed after the Norweco Singulair® ATU, with filter surface area selected based upon a maximum design loading rate of 10 gallons per day per square foot. The following parameters shall guide the design and construction of the sand filter (alternate designs may be proposed for approval by the State on a case-by-case basis):

- a. Sand Filter Containment Structure shall be either a prefabricated or built-in-place concrete tank
- (1) The containment structure for systems using preconstructed concrete boxes shall consist of a watertight, precast, top-seam septic tank (without baffle wall) or pump tank constructed without a top, or the bottom half of a watertight, precast mid-seam septic tank (without baffle wall) or pump tank.
 - (2) The containment structure for built-in-place concrete filters shall be a cast-in-place concrete, block or brick masonry tank constructed without a top in accordance with Rule .1954(d).

Precast openings shall be provided for the underdrain exit and supply line entrance points to the box or tank.

b. Sand filter underdrain

- (1) A minimum of six-inches of washed stone (#5) or washed pea gravel (#78M) shall be placed in the bottom of the filter containment structure. If pea gravel is used the underdrain pipe shall be surrounded by washed stone.
- (2) Buried 4-inch diameter perforated or slotted underdrain collection pipes shall be centered on the bottom of the containment structure in the washed stone. The underdrain shall be covered with at least 2-inches of washed stone.
- (3) Systems shall have cleanouts that come above the ground surface at the distal ends of all underdrain collection pipes.
- (4) The underdrain must be vented, which could be accomplished utilizing an underdrain cleanout.

c. Sand filter media

- (1) The sand filter media shall be washed, durable, clean granular material that has the specified characteristics, as described below.
- (2) Acceptable media includes
 - i. filter sand with an effective size (ES or d_{10}) between 0.5-1.5mm and a uniformity coefficient (UC) <2.5 , and dust content <0.5 percent; and
 - ii. other media approved by the State on a case-by-case basis.
- (3) Filter sand thickness shall be at least 24 inches.
- (4) **Media replacement warning:** The following statement should be included on all permits and authorizations to construct: **A Notice: periodic replacement of the sand filter media shall be necessary for some sand filters that become clogged**

d. Sand filter effluent distribution network

- (1) The effluent distribution network shall consist of small diameter LPP laterals on a

maximum of two-foot centers. Pipe perforations shall be spaced no greater than the center-to-center spacing of the laterals.

- (2) The distribution pipe shall be sleeved in 2-4-inch diameter corrugated polyethylene drainage tubing or standard drainfield pipe to prevent gravel from blocking orifices and to promote more efficient distribution of the effluent over the sand filter surface. Alternately, specially designed orifice plates, half-sections of 6-inch or greater PVC pipe, chambers, or other equivalent protective devices to shield the orifices, may be used.
 - (3) Lateral and perforation sizes shall be designed to deliver a dosing volume determined by the dosing frequency chosen for the specific type of filter (see below). Minimum lateral pipe size may be 3/4-inch in diameter and minimum perforation size may be as small as 1/8-inch diameter. Note: small pipe and perforation sizes are preferred to provide the largest possible scouring velocity in the laterals, minimize hole clogging, and at the same time provide uniform distribution during frequent small doses.
 - (4) Pipe perforations shall point upwards, except 1-2 perforations which shall point downwards to drain the lateral.
 - (5) Requirements for LPP systems in Rule .1957(a)(5), except as provided for herein, shall otherwise be met. This includes requirements for lateral turn-ups, turn-up protective sleeves, and manifold cleanouts.
- e. An observation port (minimum 6-inch diameter) or similar device with a removable cap shall be provided to facilitate easy above-grade observation of a portion of the sand filter surface.
- f. An effluent sampling point must be established, such as follows:
- (1) Locate a sampling access port in the discharge pipe between the underdrain exit point from the sand filter and the drainfield. A 4-way cross or similar device can be used where the underdrain discharge pipe and the vertical sampling port intersect to facilitate collection of effluent samples. The vertical sampling access port/vent pipe must come above the ground surface, be constructed of 4-inch diameter Schedule 40 PVC pipe, be vented to the atmosphere, and contain a removable cap to allow visual observation and sampling of sand filter effluent flowing to the drainfield. The cap shall be removable and constructed to prevent the entrance of rainwater, surface water, rodents and insects. This could also simultaneously meet the filter underdrainage system ventilation requirement.
 - (2) Alternately, if ventilation is otherwise provided for the filter underdrainage system (see above), a distribution box or drop box may be used for the sampling access point, located in the final effluent discharge line prior to the drainfield trenches. The box must be constructed to facilitate at-grade access.
- g. Filter cover: The filter distribution network (except turnups and cleanouts or inspection ports), shall be covered or otherwise protected from damage due to sunlight and/or freezing. The cover shall consist of a thin layer of washed stone or washed pea gravel, a removable water-proof cover, or equivalent.
- (1) If washed stone or pea gravel is used as the filter cover, it shall be of uniform thickness as needed to cover the distribution network.

- (2) If a removable waterproof cover is used it shall be designed to withstand a uniform live loading of 150 pounds per square foot and constructed of materials resistant to decay and degradation such as aluminum or fiberglass and reinforced with treated lumber. If constructed entirely of wood, it shall be made from tongue and groove lumber treated to avoid decay. Gaps between boards shall be filled after shrinkage has occurred. The cover shall fit snugly on top of the filter containment structure to minimize escape of sewage odors while still facilitating air exchange. The cover must be easily removable to facilitate inspection and routine maintenance.

h. Sand Filter Dosing system

- (1) A State-approved pump tank shall be provided with a liquid capacity at least equal to the design daily flow rate for the system.
- (2) Small, frequent doses shall be used to provide maximum treatment of the effluent. Minimum dose volume shall be 5 times the liquid capacity of the distribution laterals, plus the volume of any manifold and supply line sections which drain between doses.
- (3) Timed dosing regimes or on-demand dosing may be utilized. With timed dosing, frequencies shall be set to range from 4 to 24 doses per day.
- (4) The pump shall be controlled using a control panel that includes an elapsed run time meter, and a pump impulse counter.
- (5) The systems shall be designed for a minimum distal pressure head of 4 feet.
- (6) Requirements for pump dosing systems in Rule .1952(c), except as provided for herein, shall otherwise be met.

G. INSTALLATION AND TESTING PROCEDURES

1. A preconstruction conference shall be required to be attended by the sand filter system designer, Norweco Singulair® ATU manufacturer's representative, installer, local health department (LHD), and licensed soil scientist and registered professional engineer, as applicable, prior to beginning construction of the Norweco Singulair® ATU with sand filter and associated ground absorption system.
2. The Norweco Singulair® ATU and sand filter shall be located in compliance with the horizontal setback requirements of Rule .1950(a), and shall be located to prevent surface/subsurface water inflow/infiltration.
3. Watertightness of the preconstructed box or built-in-place concrete containment structure shall be demonstrated by a 24-hour leakage test conducted at the installation site after the underdrain and bedding is in place and prior to placement of sand in the containment structure. Sediment must be excluded from the system while the sand filter is open for this leakage test.
4. Laboratory analysis of the effective diameter, uniformity coefficient and dust content of the proposed sand filter media must be provided to the health department prior to sand media being installed. **This analysis shall be included with the Operation Permit to be issued for the system.**
5. Pressure distribution lateral perforations shall be cleaned of all filings, not have any visible burrs, and be reamed with a hole reamer prior to placement with the protective sleeve.
6. The top of the filter containment structures shall be constructed to extend at least six inches above the

ground surface and the surrounding area graded to shed surface water away from the containment structure.

7. All ATU and filter tankage, including risers, shall be demonstrated to be watertight by a 24-hour leakage test conducted at the installation site prior to system startup. A water level change of 1/2 inch or more over 24 hours, or visual observation of leakage shall be cause for failure of the watertightness test.
8. Pressure head, pump delivery rate, and pump delivery rate efficiency (actual-vs-design pump delivery rate at design pressure head) shall be determined prior to system start-up. The system's Operator in Responsible Charge (ORC) shall be present during these determinations.
9. Specified site preparation steps and construction specifications for the ground absorption system shall be strictly adhered to, including specified depth of trenches in relation to site limiting conditions.

H. OPERATION AND MAINTENANCE

1. System classification, management and inspection shall be in accordance with Rule .1961. Norweco Singulair® ATUs with sand filters shall be classified at a minimum as a Type Vc system according to Table V(a) of Rule .1961(b).
2. System Inspections: Both the LHD and an Operator-in-Responsible Charge (ORC) must conduct monitoring inspections of pressure-dosed sand filters at a minimum frequency as specified in Table V of Rule .1961(b) and the Operation Permit (minimum annual and quarterly for LHD and ORC, respectively).
3. At each Norweco Singulair® ATU/sand filter inspection visit the ORC shall, at a minimum, observe and monitor:
 - a. wastewater level in the tanks,
 - b. operation of aerator pumps, floats, valves, electrical controls and alarms and the Bio-Kinetic® system,
 - c. watertightness of tanks, risers and pipe connections at tanks,
 - d. operation of pumps, floats, valves, electrical controls and alarms,
 - e. filter dosing pumping frequency from pump impulse counters and elapsed run time meters,
 - f. the sand filter surface for wastewater ponding,
 - g. physical integrity of the pipe network,
 - h. vegetative growth over the drainfield,
 - i. the drainfield area for surfacing the effluent, and
 - j. a sample of the Norweco Singulair® ATU and sand filter effluent collected from the filter dosing tank and sampling port, respectively, to check for effluent clarity.
4. At least twice per year the ORC shall, at a minimum, measure and report to the health department:
 - a. sludge and scum levels in the pretreatment chamber of the Norweco Singulair® ATU,
 - b. sludge level in the sand filter pump tank,
 - c. pressure head in the sand filter distribution network,
 - d. sand filter dosing pump delivery rate at the design pressure head and calculate the pump delivery rate efficiency,

- e. dosing volume and measure or calculate average pump run time, and
 - f. number of turns the gate valves were opened when pressure head was set.
5. The ORC shall also conduct other additional observations, measurements, monitoring, and maintenance activities as specified in the Operation Permit and as recommended by the manufacturer.
6. Effluent Sampling and Analysis:
- a. Norweco Singulair® ATU/sand filter effluent samples shall be collected at least annually by the ORC.
 - (1) Samples shall be collected from the sampling port/vent pipe located between the sand filter underdrain exit point and the drainfield.
 - (3) The 4-way cross, P-trap, distribution box or similar device provided for effluent sampling shall be purged of accumulated effluent and allowed to refill prior to collecting a sample.
 - b. Sample collection frequency shall be specified by the local health department in the Operation Permit and can be modified, as needed, by the local health department.
 - c. All samples shall be obtained, preserved, and analyzed in accordance with 40 CFR 136. Samples shall be analyzed by a state certified wastewater laboratory for the treatment performance standards specified in Section B.
 - d. When samples do not meet treatment standards specified in Section B, the system shall be re-sampled two more times within the next 60 days with samples collected no less than 48 hours apart. The average system performance shall then be calculated as the arithmetic mean (geometric mean for fecal coliforms) of results from the three samples. System maintenance or repair shall be required whenever the average system performance as calculated above does not meet the applicable treatment standards specified in Section B.
7. Notification and Performance of Maintenance and Repairs
- a. The ORC shall alert the system owner in a timely fashion of needed maintenance or repair activities including, but not limited to, landscaping, tank sealing, tank pumping, lateral pipe desludging, pipe or control system repairs, sand media replacement, and adjustments to any other system component. The ORC shall notify the system owner and local health department whenever the pump delivery rate efficiency or average pump run time are not within 25% of initial measurements conducted prior to system startup.
 - b. The ORC shall keep the Norweco Singulair® ATU and Bio-Kinetic® outlet filter cleaned and in proper operating condition.
 - c. System troubleshooting and needed maintenance (flushing lines etc.) must be provided to maintain the filter pump delivery rate efficiency and average pump run time within 25% of initial measurements conducted prior to system startup.
 - d. The pretreatment chamber of the Norweco Singulair® ATU will be evaluated as outlined in the Distributor Manual and pumped as needed upon recommendation of the ORC.
 - e. The ORC shall notify the local Health Department and system owner in writing whenever repairs are required. All maintenance activities shall also be logged and recorded in the ORC reports

provided to the local health department.

8. Reporting

- a. After each required ORC system inspection, the ORC shall provide a completed written report to the system owner and the local health department within 30 days. At a minimum this report must specify:
 - (1) the date and time of inspection.
 - (2) system operating conditions observed according to H.3, above,
 - (3) system operating conditions measured according to H.4, and H.5, above,
 - (4) results from any laboratory analyses of any effluent samples,
 - (5) maintenance activities performed since the last inspection report,
 - (6) an assessment of overall system performance, and
 - (7) a determination of whether the system is malfunctioning, and the specific nature of the malfunction

- b. After each required health department system inspection, the local health department shall provide a completed inspection report to the system owner and the State within 30 days. The local health department shall also provide an annual summary each January to the State including:
 - (1) the name of the environmental health specialist in the health department with primary responsibility for the Norweco Singulair® ATU/sand filter program in the county/district,
 - (2) the number of improvement permits, construction authorizations, and operation permits issued for Norweco Singulair® ATU/sand filter systems the prior year in the county/district,
 - (3) the total cumulative number of Norweco Singulair® ATU/sand filter systems installed under this Approval in the County/District,
 - (4) the percentage of ORC reports due to the health department that have been received from the ORC=s ,
 - (5) an assessment of overall performance of Norweco Singulair® ATU/sand filter systems in the County/District, and
 - (6) the percentage of Norweco Singulair® ATU/sand filter systems which malfunctioned during the prior year, the nature of the malfunctions, and any remedies implemented or needed.

I. RESPONSIBILITIES AND PERMITTING PROCEDURES

- 1. Prior to the installation of a Norweco Singulair® ATU with Sand Filter at a site, the owner or owner=s

legal representative shall notify the local health department of their proposed use of such a system. The local health department shall issue an Improvement Permit or Authorization to Construct or amend a previously issued Improvement Permit or Authorization to Construct allowing for the use of the proposed Innovative System upon a finding that all provisions of this approval and all other applicable rules shall be met. Use of the proposed Innovative System and any conditions shall be described in the Improvement Permit and Authorization to Construct or amended Improvement Permit and Authorization to Construct, as well as described on the Operation Permit to be issued upon the acceptable completion of the system installation.

2. Prior to the issuance of the Improvement Permit, the site shall be evaluated by a Licensed Soil Scientist, whenever the following conditions are applicable:
 - a. initial vertical separation siting criteria or vertical separation distances for trench bottoms are proposed to be reduced in accordance with Section D.1, above,
 - b. drainage is proposed for Group III soils or a groundwater lowering system is proposed to be used in conjunction with a fill system (the drainage system shall be designed by someone with demonstrated knowledge of drainage systems),
 - c. sandy clay loam texture saprolite is proposed to be used (this evaluation could be performed by a Professional Geologist instead of a Licensed Soil Scientist), or
 - d. the LTAR is proposed to be increased on sites with Group III or IV soils within 3 feet of the trench bottoms or on sites where drainage of Group II or III soils is proposed, in accordance with Section E.2, above.
3. Where required, the Licensed Soil Scientist (or Professional Geologist where appropriate), shall conduct a detailed assessment of the site conditions and provide to the local health department a written, sealed report that includes:
 - a. detailed descriptions of landscape position and soil morphological conditions to a depth of at least three feet below the trench bottom in the drainfield and repair area,
 - b. field estimates of the depth and thickness of the least permeable horizons,
 - c. recommended depth for placement of the trench bottoms and the recommended LTAR,
 - d. an hydraulic assessment, based on site-specific information, substantiating the projected effectiveness of system performance. This shall include documentation that indicates the treated sewage effluent at the proposed LTAR will not discharge to the surface of the ground within or adjacent to the drainfield when the system is installed and operated within design parameters, and justification for any proposed drainage systems, and
 - e. other site-specific requirements for system design, installation, site preparation, modifications a and final landscaping.

The local health department may request the assistance of the State in evaluating this report prior to Improvement Permit issuance.

4. Design responsibility: Prior to the issuance of an Authorization to Construct for a Norweco Singulair® ATU with Sand Filter, site-specific plans and specifications prepared by a person with a demonstrated

knowledge of such systems shall be submitted for review and approval by the local health department. Approval shall be contingent upon the following:

- a. general plans and specifications for the proposed sand filter component have been submitted for review and pre-approved by the State and appended to this Innovative System Approval, or
 - b. specific plans and specifications for the sand filter component have been prepared by a professional engineer when the sand filter design proposed to be used has not received prior State approval and been appended to this Innovative System Approval, and
 - c. the specific sand filter design proposed is in accordance with all provisions of this approval as applicable to the proposed facility and site.
5. The system shall be installed by a person with a demonstrated knowledge of installation of Norweco Singulair® ATUs with sand filters. Prior to Operation Permit issuance, the manufacturer or his licensed representative shall certify in writing to the local health department that the Norweco Singulair® ATU with sand filter has been properly installed.
 6. For systems that have not received prior State approval and are required to be designed by a professional engineer, a professional engineer must certify in writing that the system was installed in accordance with the approved plans and specifications prior to Operation Permit issuance. For sites required to be evaluated by a Licensed Soil Scientist or Professional Geologist (see Section I.2, above), the health department may specify as a condition on the Improvement Permit and Authorization to Construct that a Licensed Soil Scientist or Professional Geologist oversee critical phases of the ground absorption system installation and certify in writing that the installation was in accordance with their specified site/installation requirements prior to the Operation Permit issuance.
 7. The operator requirements of Rule .1961(b) shall be met and the ORC shall be present during initial system setup in accordance with Section G.8, above, prior to issuance of the Operation Permit. The ORC must be certified both as a subsurface operator and a wastewater treatment facility operator (minimum of Grade 2).

J. REPAIR OF SYSTEMS

The provisions of 15A NCAC 18A .1961(l) shall govern the use of Pressure-Dosed Sand Filter Pretreatment Systems for repairs to existing malfunctioning wastewater systems.

K. APPENDICES

Plans and specifications for specific sand filter designs which have been approved by the State shall be appended to this Innovative System Approval.

Approved by: _____

Date: _____

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