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

PROVISIONAL WASTEWATER SYSTEM APPROVAL

PROVISIONAL WASTEWATER SYSTEM NO: PWWS-2019-01

Issued To: Eljen Corporation
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For: Eljen Geotextile Sand Filter (GSF) System Model A42

Approval Date: September 6, 2019

In accordance with G.S. 130A-343, 15A NCAC 18A .1969 and .1970, a proposal by Eljen Corporation for approval of their wastewater system utilizing the Eljen GSF A42 system has been reviewed, and found to meet the standards of a Provisional System when all of the following conditions are met:

I. General

A. Scope of this Provisional Approval includes all of the following:
   1. Siting, design, installation, and operation and maintenance guidelines for Eljen GSF A42 systems to meet NSF-40 and TS-I effluent quality standards in accordance with Rule .1970(a) Table VII – Effluent Quality Standards for Advanced Pretreatment Systems, and effective hydraulic performance.
   2. Collection of field effluent quality data from Eljen GSF A42 systems designed to meet NSF-40 and TS-I effluent quality standards in accordance with Rule .1970(a) Table VII.
   3. Monitoring activities for Eljen GSF A42 systems to verify compliance with effluent quality standards and hydraulic performance.
   4. Proposal for evaluation of this Provisional System.

B. This Provisional Approval applies to sewage systems with a design daily flow not exceeding 1,500 gallons per day and treating domestic strength wastewater (not high strength or industrial process wastewater) utilizing Eljen GSF A42 systems.

   Use of Eljen GSF A42 systems for facilities with an influent waste strength that exceeds domestic septic tank quality effluent standards pursuant to Rule .1970(b) may be proposed by Eljen Corporation and a NC Professional Engineer (PE) to the State for review. The submittal must include the projected raw wastewater strength (BOD_5, COD, TN, TSS, fats, oils and grease, etc.), the expected organic loading rate (in pounds of BOD), hydraulic loading rate on the pretreatment system, and the calculations and references to support the proposed design. State approval shall be received prior to permitting by the local health department (LHD).

C. Any site utilizing an Eljen GSF A42 system required to meet TS-I effluent quality standard shall have wastewater with sufficient alkalinity to facilitate biological treatment processes. The influent shall not have a pH or toxins that significantly inhibit microbial growth.

D. Use of Eljen GSF A42 systems that have a design flow exceeding 1,500 gallons per day may be permitted after review and approval by the State on a case-by-case basis in accordance with the State Review/Approval Process (Rule 15A NCAC 18A .1938).

E. This Provisional Approval is limited to 200 systems. The intent of this Provisional Approval is to gain sufficient field experience to qualify this system for Innovative Approval as both NSF-40 and TS-I systems pursuant to Rule .1969(g).

II. System Description

The Eljen GSF A42 system consists of the following components: a State approved septic tank, and final subsurface treatment and dispersal either in a trench or bed configuration drainfield utilizing one or more rows of Eljen GSF A42 units. The Eljen GSF A42 unit consists of anti-siltation fabric, 4-inch diameter smooth wall performance distribution pipe, Bio-Matt™, and a cuspated plastic core 24 inches wide by 48 inches long and seven inches high. The Eljen FSF A42 system includes the GSF A42 unit and surrounding imported system sand meeting ASTM C-33, and further modified to meet manufacturer specifications (system sand). (See Attachment A.)

A State approved dosing tank may be used between the septic tank and the Eljen GSF A42 unit if required to meet site conditions and/or system design.

III. Siting Criteria

A. The Eljen GSF A42 system shall be sited and sized in accordance with Rule .1970 for NSF-40 or TS-I systems, as applicable.
   1. Eljen GSF A42 systems designed to meet NSF-40 effluent standards shall meet the siting requirements in Rule .1970(d)(1) and (3) and the following criteria:
      a. Trench configurations shall not have a design flow exceeding 1,500 gallons per day.
      b. Bed configurations in soil classified based on texture as Soil Group I, II, or III shall not have a design daily flow exceeding 600 gallons per day. Bed configurations shall not be used in Group IV soils.
   2. Eljen GSF A42 systems designed to meet TS-I standards shall have a design flow not exceeding 1,500 gallons per day or 480 gallons per day for an existing fill site and shall meet the following requirements:
      a. Trench configurations shall meet the siting requirements in Rule .1970(e)(1) and (3).
      b. Bed configurations where the soil is classified based on texture as Soil Group I or II, shall not have a design flow exceeding 1,000 gallons per day, and shall meet the siting requirements in Rule .1970(i)(1) and (2).
      c. Bed configurations where the soil is classified based on texture as Soil group III shall not have a design daily flow exceeding 600 gpd and shall not receive any further siting concessions than those granted to NSF 40 systems.
      d. Bed configurations where the soil is classified based on texture as Soil Group I with a design flow greater than 1,000 gallons per day and not exceeding 1,500 gallons per day, shall meet the siting requirements in Rule .1970(j)(1) and (2).

e. Vertical separation requirements to a limiting condition are measured from the bottom of the imported Eljen-specified system sand.

B. For bed configurations, the slope shall not exceed 15 percent for an Eljen GSF A42 system designed to meet NSF-40 standards. For an Eljen GSF A42 system designed to meet TS-I standards that utilize TS-I siting or sizing allowances, the slope shall not exceed 10 percent. A hydraulic assessment completed pursuant to Rules .1970(i)(1)(B) and .1970(p) is required for TS-I systems using a bed configuration on sites with slopes greater than two percent.

C. The system shall be considered a fill system if any part of the Eljen GSF A42 unit, excluding the 4-inch distribution pipe, is located above the naturally occurring soil surface. Fill systems shall be installed only on sites with uniform slopes less than 15 percent.

IV. System Sizing

A. The Eljen GSF A42 system shall be sized in accordance with Rule .1970 for NSF-40 and TS-I systems, as applicable.
   1. Eljen GSF A42 systems designed to meet NSF-40 standards shall meet the following:
      a. The allowance in Rule .1970(d)(2) for a 25 percent trench or bed size reduction for an Eljen GSF A42 system is applicable in Group I or II soils with suitable structure and clay mineralogy. For a bed, the net result is a bed bottom area that is 12.5% greater than the bottom area required for a conventional trench system receiving septic tank effluent with no additional pretreatment, per Rule .1955(b) and (c).
      b. In Group III Soils, there is no trench or bed size reduction. The bed bottom area for the GSF system shall be 50% greater than the bottom area required for a trench system.
   2. Eljen GSF A42 systems designed to meet TS-I standards shall meet the following:
      a. The trench length may be reduced in accordance with Rule .1970(e)(2) up to a maximum of 50 percent when compared to the trench length required for a conventional system receiving septic tank effluent with no additional pretreatment.
      b. The bed system shall be sized pursuant to Rule .1970(i)(3)(A), with up to a maximum reduction of 50 percent in Group I or II soils when compared to the area required for a bed system receiving septic tank effluent with no additional pretreatment. The net result is a bed bottom area that is 75% of the bottom area required for a conventional trench system receiving septic tank effluent with no additional pretreatment.
B. Example calculations for sizing are provided in Attachment B.

V. Special Site Evaluation

A special site evaluation may be required based on the requirements of Rule .1970 for the proposed dispersal field.

VI. Design Criteria

A. The Eljen GSF A42 System shall be designed in accordance with the following criteria.
   1. A State approved septic tank sized as required in Rule .1952 shall be provided. An access riser with lid extending at least to finished grade shall be provided over the outlet tank compartment (and effluent filter) and be designed and maintained to prevent surface/water inflow.
   2. A pump tank shall be provided if needed to overcome site and design constraints or for pressure distribution. A State approved pump tank shall be sized as required in Rule .1952. If a pump

tank is provided, dosing may be demand dosing or timer-dosing for a system designed for up to 1,000 gallons per day. Timer-dosing is required for a system designed for over 1,000 gallons per day. Dosing shall be a maximum of three gallons per Eljen GSF A42 unit per dose. A low-pressure distribution network (pressure dispersal) may be constructed as well in accordance with manufacturer's specifications.

3. Components common to all Eljen GSF A42 Systems:
   a. Septic tank for primary treatment
   b. Distribution box or pressure manifold (when the design calls for more than one row of Eljen GSF A42 units in a trench or bed configuration)
   c. Effluent filter on the outlet of the septic tank
   d. Eljen GSF A42 Units (each unit measures 24-inches wide, 48-inches long and 7-inches high)
   e. Geo-textile anti-siltation cover fabric supplied by manufacturer
   f. Sampling devices and inspections ports
   g. Vent (when cover over cuspated plastic core is greater than 18-inches deep; otherwise optional)
   h. Four-inch diameter perforated (holes aligned at 4 and 8 o'clock position), smooth wall distribution pipe
   i. System sand meeting ASTM C-33 and further modified to meet manufacturer specifications (See Attachment A.)
4. The minimum number of Eljen GSF A42 units per bedroom is six or 25 units per 100 foot of trench, whichever is greater.
5. In a trench configuration, each Eljen GSF A42 unit shall be aligned in the center of the trench and be butted together end-to-end with no voids or spaces between units. In a bed configuration, Eljen GSF A42 units shall be evenly spaced across the system sand in the bed and each Eljen GSF A42 unit shall be butted together end-to-end with no voids or spaces between units, except for the Eljen specified system sand between each lateral row (i.e. relative to the distribution device) of units.
6. Minimum system sand depths and minimum and maximum spacing requirements are as follows:
   a. Minimum sand below each Eljen GSF A42 cuspated unit: NSF-40: 6 inches; TS-I: 12 inches
   b. Minimum center to center spacing of Eljen GSF A42 units: Trench: 108 inches; Bed: 36inches
   c. Maximum center to center spacing of Eljen GSF A42 units: Bed: 48 inches with Eljen-specified system sand between units
   d. For bed configuration, horizontal distance from the center of the outer row of units to the side of the bed: NSF-40: 18 - 48 inches; TS-I: 18 – 48 inches
   e. Horizontal distance containing system sand from end of a row of units to the ends of the trench or bed: 6 – 12 inches
   f. Minimum cover over unit – 12 inches (8 inches over pipe)
7. Minimum and maximum Eljen GSF A42 unit row lengths:
   a. Minimum length – 20 feet
   b. Maximum length – 60 feet gravity dispersal (longer row allowable with pressure dispersal in accordance with manufacturer's specifications for pressure dispersal)
8. To meet the spacing requirements in A.5 and 6, it may be necessary to provide more Eljen GSF A42 units than the minimum required by A.4. Units shall be spread uniformly within the dispersal field.
9. The system design shall incorporate provisions for complying with the flow monitoring

requirements of Rule .1970:

a. If a pump is involved, a cycle counter will be incorporated into the pump's control circuit. This cycle counter will be used to estimate daily flow.
b. If the system is gravity fed, the system design will either incorporate a siphon system with a dosing cycle counter, or a tipping D-box with a cycle counter, where the counter display would be used as a mechanical logger.
c. A data logging system will be incorporated with the cycle counter in order to allow review of flows over time.
d. In the rare instance where none of the above options are feasible, a water meter can be placed on the incoming line to the house connected to a data logging system, with the understanding that not all the water entering the house will enter the septic system due to personal consumption, landscaping purposes, etc.

10. For bed systems designed for over 1,000 gallons per day and to not exceed 1,500 gallons per day, two or more beds shall be used, and effluent shall be distributed to each bed and separate rows of Eljen GSF A42 units uniformly and evenly over a 24-hour period using a pump, pump control, and effluent dispersal system, in accordance with manufacturer requirements for pump systems.

B. Eljen GSF A42 systems shall be designed by an Eljen-certified designer or a NC PE. Systems over 1,000 gallons per day shall be designed by a NC PE.

VII. Installation and Testing

A. An on-site preconstruction conference shall be required to be attended by the GSF system designer, NC PE (if required), certified installer, LHD, licensed soil scientist (as applicable), property owner or owner's representative, and Operator in Responsible Charge (ORC), if known, prior to beginning construction of the Eljen GSF A42 system.

B. The Eljen GSF A42 system shall be located in compliance with the horizontal setback requirements of Rule .1950(a) and Rule .1970, as applicable, and shall be located to prevent surface/subsurface water inflow/infiltration. The horizontal setback requirements in Rule .1970 for NSF-40 or TS-I systems shall be used, as applicable.

C. For Eljen GSF A42 systems, the trench or bed shall be constructed as a rectangle, with the long axis parallel to the ground elevation contours of the slope, unless it is determined the site's usable soil depth will allow the system design to be off contour. The bottom of the trench or bed shall be excavated level, with a plus or minus tolerance of ½-inch from side-to-side and a maximum fall along the trench of one inch in 100 feet. When sited in accordance with the appropriate sections of this approval, the bottom of the system sand bed for Eljen GSF A42 systems may be installed up to but no deeper than five feet below finished grade, provided that the vertical separation requirements in Section III of this approval are met. The system sand bed shall be immediately installed without allowing machinery to traverse the excavated/exposed bed bottom. Eljen-approved small track vehicles may be used to traverse across the sand bed during installation only after at least a six-inch layer of sand shall be under the vehicle at all times.

D. The Eljen GSF A42 units shall be installed level in a trench or bed lined with Eljen-specified system sand. The surface of the system sand shall be level with a plus or minus tolerance of ½-inch from side-to-side and a maximum fall along the trench of one inch in 100 feet. The unit, including the distribution pipe, is covered by the Eljen-approved geotextile fabric that extends

along the full length of the top and sidewalls of the units, per manufacturer specifications. Eljen-specified imported system sand shall be level with the Eljen GSF A42 cuspated units and extend laterally at this same minimum elevation over the entire perimeter of the trench or sand bed.

E. Backfill shall be installed over the finished sand trench or bed and between the GSF A42 units and the perimeter of the system. Backfill shall be free of trash or debris. Minimum backfill depth shall be 12 inches above the top of the Eljen GSF A42 cuspated units. Native soil (Group I, II, III or IV) may be used for the up to eight inches above the top of the Eljen GSF A42 cuspated units. At a minimum, the final four inches of backfill, after settling, shall have a finer texture (such as Group II or III) for the establishment of a vegetative cover.

F. For a fill system, backfill shall be installed with a side slope not to exceed a rise to run ratio of 1:3, unless a dry stacked interlocking block retaining wall is constructed adjacent to the Eljen GSF A42 unit and surrounding sand. Any other type of retaining wall shall be designed by and its construction certified in writing by a NC PE. Use of a retaining wall for supporting backfill does not supersede side slope requirements for fill systems and setbacks shall be measured from the toe of the projected side slope.

G. Water tightness of the tanks and any dosing tanks shall be demonstrated by either a 24-hour water leakage test or a vacuum test conducted at the installation site. A water level change of ½-inch or more within a 24-inch riser over 24 hours, or visual observation of leakage shall be cause for failure of the water tightness test. Initial water level shall be to two inches above the riser/adapter seam.

H. Pump (if needed) delivery rate shall be measured and determined to be in accordance with design parameters. The initial settings shall be made to pump floats and/or timer controls in the pump tank based upon the field measurements prior to system start-up.

I. Specified site preparation steps and construction specifications for the dispersal field shall be strictly adhered to, including specified depth of the trench or bed in relation to site limiting conditions. All Eljen GSF A42 systems shall be installed according to the provisions of this approval and directions provided by Eljen Corporation. Additionally, all Eljen GSF A42 system components not manufactured by Eljen Corporation (distribution pipe, d-box, pumping components, etc.) shall be installed in accordance with all applicable regulations and applicable specifications of Eljen Corporation.

J. All individuals/companies installing Eljen GSF A42 systems shall be in possession of all necessary permits and licenses before attempting any portion of a new or repair installation. The company/individual shall be a Level IV installer and an Eljen Corporation certified system installer.

K. Prior to Operation Permit issuance, the Eljen Corporation certified system installer and the NC PE or manufacturer trained and certified designer of record, as applicable, shall conduct an inspection/start-up of the Eljen GSF A42 system and all associated system components. The LHD and the ORC shall attend and observe the inspection/start-up. An acceptance letter from the installer and NC PE/designer shall be provided to the LHD prior to issuance of the Operation Permit.

VIII. Operation, Maintenance, Monitoring, and Reporting

A. The Eljen GSF A42 system shall be classified as a Type Va system in accordance with Table V(a) of Rule .1961(b). Management and inspection shall be in accordance with Rules .1961 and .1970.

B. All Eljen GSF A42 systems require an operation and maintenance agreement between the system owner and a certified subsurface system operator designated as the ORC to inspect and maintain the system. The ORC shall meet one of the following criteria: an Eljen Corporation, Inc. employee, an Eljen authorized representative, or a certified subsurface operator authorized in writing by Eljen in accordance with Rule .1970. The ORC must have proper equipment and training to inspect, operate and maintain the system, as applicable.

C. All Eljen GSF A42 systems shall be operated and maintained according to the latest version of Eljen Corporation's Operation and Maintenance (O&M) manual.

D. The LHD and the ORC must conduct monitoring inspections of Eljen GSF A42 systems at the frequency specified in Table V(b) of Rule .1961 and per the Operation Permit.

E. At each Eljen GSF A42 system inspection the ORC shall, at a minimum, observe, inspect, monitor, and record the following:
   1. Wastewater level in the tanks;
   2. Sludge and scum levels in all the tanks, measure and record;
   3. Clogging of effluent filter;
   4. Water tightness of tanks, risers and pipe connections at tanks;
   5. Operation of pumps, floats, valves, electrical controls and alarms, where applicable;
   6. Drainfield pump delivery rate (drawdown test), determination of the average pump run time, and drainfield dosing volume;
   7. Any structural damage, malfunctions, accessibility issues, adequate ventilation, positive drainage, odor issues, insect/wildlife infestations, approved vegetative cover over the drainfield, saturation, ponding or surfacing of effluent on the drainfield area, and the designated repair area remains intact/undisturbed;
   8. A sample of effluent collected from the sampling port as indicated in the approved sampling protocol to check for effluent clarity and odor;
   9. Samples of Eljen GSFA42 influent and effluent as required, as indicated in the approved sampling protocol;
   10. Readings from pump cycle counters and run time meters and any water meter readings, as applicable; and
   11. System operating conditions from the review of stored data for indication of 7-day and 30-day flows and flow variances or other abnormal conditions.

F. Sampling
   1. All sampling shall be done in accordance with Rule .1970(n)(3) and (5).
   2. All systems shall be tested for effluent $CBOD_5$ and TSS. Influent shall be tested for BOD_5. All TS-I systems shall additionally have influent tested for TKN and effluent tested for NH_4-N and fecal coliforms.
   3. Additional sampling of effluent or influent may be determined to be necessary by the ORC during a system inspection to assist with troubleshooting or to verify system performance.

4. Influent samples shall be taken from a sampling port located between the septic tank and the drainfield or from the dosing tank (where applicable).
5. Effluent samples shall be collected from the sampling device.
6. Adjustments in the monitoring schedule and number of parameters sampled may be proposed by the manufacturer and approved by the State as a modification to this Provisional Approval.

G. Notification and Performance of Maintenance and Repairs
1. The ORC shall notify Eljen Corporation, the LHD, and the system owner within 48 hours of needed maintenance or repair activities including, but not limited to, landscaping, tank sealing, tank pumping, pipe or control system repairs, Eljen GSF A42 unit replacement, and/or adjustments to any other system component. Repair activities will require a repair permit to be issued by the LHD prior to construction.
2. The ORC shall keep the septic tank outlet effluent filter or screened pump vault cleaned and in proper operating condition, as per manufacturer's recommendations.
3. The ORC shall notify the system owner, Eljen Corporation, and the LHD whenever the pump delivery rate efficiency and/or average pump run times are not within 25% of initial measurements conducted prior to system start-up.
4. The septic tank will be pumped as needed upon recommendation of the ORC and in accordance with the Eljen GSF A42 System Operation and Maintenance instructions. However, at a minimum, the septic tank will be pumped whenever the solids level exceeds 25% of the tank's total liquid working capacity or the scum layer is more than four inches thick.
5. The tanks shall be pumped by a properly permitted septage management firm, and the septage handled in accordance with 15A NCAC 13B .0800.
6. All maintenance activities shall be logged and recorded in the ORC reports provided to the LHD.

H. The ORC shall also conduct other additional observations, measurements, monitoring, and maintenance activities for any system component (septic tank, pump tank, controls, drainfield, etc.), as specified in the Operation Permit and as recommended by the manufacturer.

I. Reporting

1. The ORC shall provide a completed written report to the system owner, Eljen Corporation, and the LHD within 30 days of each inspection. At a minimum this report shall specify:
   a. Location of property (physical address);
   b. Name of property owner(s);
   c. Type of facility (primary residence, vacation residence/rental, business, or public assembly);
   d. The date and time of inspection;
   e. System operating conditions measured and observed according to VIII.E, F, G and H;
   f. Results from any laboratory analysis of any influent and effluent samples;
   g. Maintenance activities performed since the last inspection report;
   h. An assessment of overall system performance;
   i. A list of any improvements or maintenance needed;
   j. A determination of whether the system is malfunctioning, and the specific nature of the malfunction;
   k. Any weather conditions that may have influenced system performance; and
   l. Any changes made in system settings based on recommendations of the manufacturer.

2. Proposal for Evaluation and Reporting
    a. The manufacturer shall maintain a contract for evaluation of the performance of the Provisional wastewater system with an independent third-party laboratory, consultant, or other entity that has expertise in the evaluation of wastewater system and that is approved by the State.
    b. Semi-annual reports are due to the State by January 31 and July 31 of each year from the third-party. The reports shall include the following information at a minimum:
        (1) list of all systems currently installed under the Provisional Approval;
        (2) results of all effluent quality samples collected, including a table summarizing all the effluent quality results;
        (3) results of all ponding measurements;
        (4) flow monitoring, type of facility, and occupancy information;
        (5) copies of all ORC inspection reports;
        (6) assessment of system performance in relation to effluent quality standards and showing compliance with Rule .1970(o);
        (7) assessment of system performance in relation to flow monitoring and showing compliance with Rule .1970(o);
        (8) assessment of physical and chemical properties of the materials used to construct the system in terms of strength, durability, and chemical resistance to loads and conditions experienced and showing compliance with Rule .1969(g)(2)(B);
        (9) recommended areas of applicability for the system; and
        (10) conditions and limitations related to the use of the system.
    c. Upon completion of the research and testing protocol, the third-party shall submit a final report to the State. This report shall be submitted in conjunction with Eljen Corporation completing an application for Innovative Approval and within five years of the effective date of the first OP issued pursuant to this approval.
    d. The final report shall contain the following information at a minimum:
        (1) list of all systems currently installed during the Provisional Approval period;
        (2) results of all effluent quality sampling and ponding measurements, including tables summarizing all the effluent quality and ponding results;
        (3) flow monitoring information;
        (4) copies of all ORC inspection reports;
        (5) assessment of system performance in relation to effluent quality standards and showing compliance with Rule .1970(o);
        (6) assessment of system performance in relation to flow monitoring and showing compliance with Rule .1970(o);
        (7) assessment of physical and chemical properties of the materials used to construct the system in terms of strength, durability, and chemical resistance to loads and conditions experienced and showing compliance with Rule .1969(g)(2)(B), and hydraulic performance;
        (8) recommended areas of applicability for the system; and
        (9) conditions and limitations related to the use of the system.
    e. The Final Report shall be in electronic format and may be published on the On-Site Water Protection Branch's website without confidentiality. The contents of the semi-annual and final reports shall not be altered from the original document without approval from Eljen Corporation.

f. The research and testing protocol shall be managed by 3-Engineering, LLC or other approved third-party evaluator and includes the following minimum activities outlined in a detailed protocol that is appended to this Provisional Approval:
   (1) A minimum of 50 complete data sets shall be collected from a minimum of 15 sites each, for NSF-40 and TS-I systems.
   (2) A complete data set includes the following information: influent BOD (NSF-40 and TS-I systems) and TKN (TS-I systems); and effluent CBOD and TSS (NSF-40 and TS-I systems), and fecal coliforms and NH_4-N (TS-I systems). There must be at least 30 days between samples collected from any one site.
   (3) Samples shall be collected from all sites. A site may be excluded if adequate justification is provided that the site is unsuitable as a test site. The samples from that site must be provided but will not be used as part of the data evaluation.
   (4) Each site shall produce a minimum of two complete data sets collected over at least a 12-month period.
   (5) For coastal resort communities, two samples shall take place between June 1 and September 8 of each year. The samples must be taken at least six weeks apart.
   (6) Other seasonal homes shall be inspected by the ORC and sampled during the projected times of peak use and/or occupancy. Samples shall not be collected during periods with limited or no occupancy.
   (7) The samples will be collected during a scheduled visit by the ORC.
   (8) A copy of the sample results will be provided to the On-Site Wastewater Branch after the analyses.
   (9) Data from Eljen GSF A42 systems installed on NSF-40 sites and designed to meet NSF-40 effluent quality standards, may be sampled for TS-I parameters, and may be used in support of attaining TS-I Innovative Approval status. If analyzed, data for all TS-I parameters shall be reported, even if not ultimately utilized as a compliant site for TS-I approval.
   (10) Hydraulic performance shall be assessed based upon ponding conditions measured in 3-inch wide observation ports extending to finished grade shall be installed for each system at the Eljen-specified artificial system sand-soil interface on the trench/bed bottom and on the top of the cuspated units. Observation ports to the sand-soil interface shall be installed a minimum of 2-inches away from the cuspated units, in order to avoid short-circuiting from the unit to the sand-soil interface
      (a) For trench configurations, two observation ports located adjacent to the cuspated unit that terminate at the sand-soil interface shall be installed for each trench: one at proximal end. and one at the distal end of the trench. For a bed configuration, hydraulic performance observation ports located adjacent to the cuspated units that terminate at the sand-soil interface shall be installed, as follows:
         i) For beds up to nine feet wide, a minimum of three ports shall be installed: one located at the beginning, middle, and the end of the bed and staggered within the bed.
         ii) For beds wider than nine feet, a minimum of five ports shall be installed.
      (b) For a trench or bed configuration each row of Eljen GSF A42 product shall include three observation ports that terminate at the top of the cuspated

units: one at the proximal end, one at the distal end, and one in the center of each row.

(c) One of each type of observation port shall be installed within 10-ft of any sampling port installed for effluent monitoring.

The hydraulic performance shall be assessed in accordance with the following:

(a) A minimum of 15 NSF-40 and 30 TS-I sites shall be evaluated for hydraulic performance.

(b) A minimum of 5 NSF-40 and 10 TS-I sites shall be evaluated for hydraulic performance in each of the three geographic regions of the state (Coastal, Piedmont, Mountain) prior to granting innovative approval for use in that portion of the state.

(c) At least 95 percent of all observations, and 95 percent of all sites shall pass the hydraulic standard during each site assessment. A minimum of 90 percent of all approval criteria must be met for all sites within a single geographic region of the state.

(d) Pass criteria for hydraulic performance is effluent ponding no higher than 3-inches above the sand-soil interface and no higher than 2-inches above the top of the cuspated unit observation ports; and for the "site" average ponding levels of 3-inches or less in all sand-soil interface observation ports and 2-inches or less in the top of the cuspated unit observation ports. Observation data can be discarded if a one inch or greater rainfall occurred in the last 24 hours. Failed observation data can also be discarded if the port is re-inspected from no more than three days afterwards and found to pass upon re-inspection.

(e) At least one measurement for each site used for the hydraulic performance assessment shall be taken during a typical wet-weather period (January through March) and after the system has been in use for at least six months, and no more than two measurements taken at a single site shall be used for the overall hydraulic performance assessment. Observation port readings shall be taken from all observation ports during each effluent sampling collection day, and all data collected shall be reported.

(11) In order to meet the effluent monitoring and hydraulic performance criteria in this Paragraph, data may be presented that has been collected as part of a comparable third-party evaluation in another State or Canada.

IX. Responsibilities and Permitting Procedures

A. Prior to the installation of an Eljen GSF A42 system at a site, the owner or owner's agent shall fill out an application at the LHD for the proposed use of this system. The LHD shall issue an Improvement Permit or Authorization to Construct or amend a previously issued Authorization to Construct allowing for the use of an Eljen GSF A42 system.

B. The Improvement Permit and Authorization to Construct shall contain all conditions the site approval is based upon, including the proposed used of the Provisional System. The Operation Permit will include all conditions specified in the Improvement Permit and the Authorization to Construct.

C. When a special site evaluation is required pursuant to Rule .1970(p)(1), an evaluation and written, sealed report from a Licensed Soil Scientist regarding the site shall be provided to the LHD. The

report shall contain the information as specified in Rule .1970(p)(2) and "Requirements for Submittals of Soil Reports and Pretreatment and/or Dispersal System Designs". The LHD may request the assistance of their Regional Soil Scientist in evaluating this report prior to permit issuance.

D. The Eljen GSF A42 system shall be designed by an Eljen Corporation-certified designer or a NC Professional Engineer. Systems over 1,000 gallons per day shall be designed by a NC Professional Engineer.

E. Prior to issuance of an Authorization to Construct for an Eljen GSF A42 system, a design submittal prepared by an authorized designer or a NC Professional Engineer shall be submitted for review and approval by the LHD. The design submittal shall include the information required in "Requirements for Submittals of Soil Reports and Pretreatment and/or Dispersal System Designs".

F. It is recommended that local authorized environmental health practitioners attend a design training session offered by the manufacturer/authorized representative prior to permitting the system. Also, at the request of the LHD, a Regional Engineer will review the design.

G. An Eljen Corporation certified installer and company-certified designer or NC PE, as applicable, shall certify in writing that the Eljen GSF A42 System was installed in accordance with the approved design prior to Operation Permit issuance.

H. For sites required to be evaluated by a Licensed Soil Scientist or Professional Geologist (see Sections V and IX.C), the LHD 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 drainfield installation and certify in writing that the installation was in accordance with their specified site/installation requirements prior to the Operation Permit issuance.

X. Repair of Systems

The provisions of 15A NCAC 18A .1961(l) shall govern the use of the Eljen GSF A42 System for repairs to existing malfunctioning wastewater systems.

Approved By: _____ Date: _____

Attachment A: **SYSTEM SAND SPECIFICATIONS**

To ensure proper system operation, the system must be installed using ASTM C33 sand with the additional requirement for the sand to have less than 10% passing a #100 sieve and less than 5% passing a #200 sieve. Listed below is a chart outlining the sieve requirements for the Eljen-Specified System Sand. Ask your material supplier for a sieve analysis to verify that your material meets the required specifications.

Eljen System Sand Specification (modified from ASTM C33)		
Sieve Size	Sieve Square Opening Size	Specification Percent Passing (Wet Sieve)
3/8 inch	9.52 mm	100
No. 4	4.76 mm	95 - 100
No. 8	2.38 mm	80 - 100
No. 30	590 µm	25 - 60
No. 50	297 µm	5 - 30
No. 100	149 µm	< 10[1]
No. 200	75 µm	< 5[2]

1: ASTM C33 Specification for percent passing No. 100 Sieve is 0 to 10%

2: ASTM C33 Specification for percent passing No. 200 Sieve is 0 to 5%

Attachment B: Sizing Calculation Examples:

Example Premise:

Three bedroom residence, six occupants, design daily sewage flow 360 gpd, on a loamy sand (Group I)

Total computed **trench bottom area** is: 360 gpd/1.0-gpd/ft.^{2} LTAR = 360 ft^2

1. Eljen GSF A42 NSF-40 Trench System:

   360 ft^2 x (0.75) 25% Trench Bottom Area Reduction[1] = 270 ft^2

   270 ft^2/3 foot wide trench = 90 linear ft

   OR

   The required linear footage for Eljen GSF A42 NSF-40 system is:

   360 ft^2/4.0 ft = 90 linear ft

   Where 4.0 ft. is the equivalency factor for the Eljen GSF A42 NSF-40 trench system[1]

2. Eljen GSF A42 NSF-40 Bed System:

   Total computed **bed bottom area** is:

   360 ft^2 x 1.50% Bed Bottom Area Increase = 540 ft^2

   540 ft^2 x (0.75) 25% Bed Bottom Area Reduction[1] = 405 ft^2

   OR

   360 ft^2 x 1.125% Bed Bottom Area Increase = 405 ft^2

3. Eljen GSF A42 TS-I Trench System:

   360 ft^2 x (0.50) 50% Trench Bottom Area Reduction = 180 ft^2

   180 ft^2/3 foot wide trench = 60 linear ft

   OR

   The required linear footage for Eljen GSF A42 TS-I system is:

   360 ft^2/6.0 ft = 60 linear ft

   Where 6.0 ft. is the equivalency factor for the Eljen GSF A42 TS-I Trench system

4. Eljen GSF A42 TS-I Bed System:

   Total computed **bed bottom area** is:

   360 ft^2 x 1.50% Bed Bottom Area Increase = 540 ft^2

   540 ft^2 x (0.50) 50% Bed Bottom Area Reduction[1] = 270 ft^2

   OR

   360 ft^2 x 0.75% Bed Bottom Area Reduction[1] = 270 ft^2

Note 1: Reductions applicable in Group I or II Soils only.