



Douglas A. Ducey
Governor

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY



Misael Cabrera
Director

November 4, 2022

Tim Mooney
AZ Greenhouse Project, LLC
40345 North 51st Street, Cave Creek, AZ 85331
CAVE CREEK, AZ 85331

Re: Approval authorized under 49-241(B) and (C) for operation of NextGen Septic, LLC Zero Liquid Discharge system.

Mr. Mooney:

The Arizona Department of Environmental Quality (ADEQ or Department) Groundwater Protection Value Stream (GWPVS) received a request from AZ Greenhouse Project, LLC for a permitting exemption under 49-241(B) for the operation of NextGen Septic, LLC Zero Liquid Discharge system based on the determination that it is designed, constructed and operated so that there will be no migration of pollutants directly to the aquifer or to the vadose zone. This approval is applicable only to the system being installed and operated at 40345 North 51st Street, Cave Creek, AZ 85331 with a design flow of 500 gallons per day.

I. Background

The NextGen Septic, LLC Zero Liquid Discharge (ZLD) system is designed to treat wastewater from a single-family house (maximum flowrate of 1,000 gallons per day) using a three-step treatment system. The first step consists of a 1,500-gallon, standard, plastic septic tank, installed below ground, which has a single baffle. Wastewater with solids from the house flows by gravity into this tank, wherein the solids are allowed to settle down and the clear liquid, overflowing the baffle, flows into the second compartment. The second compartment consists of a self-cleaning filter (50 microns) and is equipped with a submersible pump. This pump flows some of the filtered water to the rotating nozzles, located inside the screen, which continuously cleans the screen, while the remaining filtered water flows into a second, 500-gallon septic tank, also installed below ground.

This second Bioreactor tank represents the second treatment step, in which the water is aerated using a blower and porous tubes, installed at the bottom of the tank. There is moving biomedica, consisting of a spherical plastic mesh (2 inches in diameter) in which a 2-inch cube of open cell foam is enclosed inside the mesh. These balls of Biomesh Biomedica move around the tank, while it is being aerated. The plastic mesh protects the open cell foam from being clogged by the suspended particles, while the open cell foam inside the mesh provides a very high surface area for the active biofilms. The outside surface of the open cell foam immobilizes aerobic biofilms, while the inside surface area

of the foam, which has limited penetration of dissolved oxygen, supports anoxic biofilms facilitating conversion to nitrogen gas.

Water from the Bioreactor compartment flows into the smaller second compartment, which has a self-cleaning filter (50 microns screen size) and a submersible pump. This self-cleaning and pump is identical to the self-cleaning filter in the first septic tank. Filtered water from the self-cleaning filter in the second septic tank is pumped to a 5-micron screen size, stainless steel membrane, which is located inside a Technology Box. Water which passes through the 5-micron membrane flows into a separate 100-gallon tank, while the unfiltered water, which does not cross the stainless-steel membrane is recycled back to the first septic tank.

The technology box also houses an air blower and a stand-by blower. In addition, the Programmable Logic Controller (PLC) and an air compressor are also installed inside this box. Filtered water from the stainless-steel membrane flows into a 100-gallon tank, which houses a submerged Ultrafiltration Membrane, with an average membrane pore size of 0.03 microns. There is a submerged pump in this 100-gallon tank, which pumps the water back into the stainless-steel membrane to periodically back flush the solids off the stainless-steel membrane into the first septic tank. Filtered water from the Ultrafiltration Membrane flows into the ZLD system, which is installed above ground on a concrete platform.

A reversible pump pulls water from the Ultrafiltration Membrane in the 100-gallon tank and stores it in a 20-gallon tank. Periodically, this pump reverses to push water from this 20-gallon tank to back flush the Ultrafiltration membrane. Water from the 20-gallon tank is pumped through a venturi in which ozone, generated onsite is used for disinfection. Disinfected water is then pumped using a high-pressure pump through multiple nozzles, which create small water droplets in an air flow, 4,200 cubic feet per minute, from a blower. The resulting small water droplets (typically ranges in less than 50 microns in size) are released into the ambient air and are not expected to settle.

II. Basis for Approval

- A.** Under Arizona Revised Statute (A.R.S.) § 49-241(B), the Director may allow the use of an on-site wastewater treatment facility (i.e., NextGen Septic, LLC Zero Liquid Discharge (ZLD) system) that is designed, constructed and operated so that there will be no migration of pollutants directly to the aquifer or to the vadose zone without a permit.

III. NextGen Septic, LLC Zero Liquid Discharge (ZLD) system Requirements

A. ZLD System Specific Conditions

1. ZLD will be operated within the design flow listed in this document.
2. Following 6 months of operations of the ZLD system a written summary of

- any O&M performed on the system shall be submitted ADEQ.
3. Any system failures resulting in spills, sewage backups, or any non-aerosolized discharges from the stack must be reported to ADEQ within 24 hours of discovery.
 4. ADEQ reserves the right to inspection.

IV. Approval

A. The Director finds that the ZLD system is designed, constructed and operated so that there will be no migration of pollutants directly to the aquifer or to the vadose zone and is exempt from aquifer protection permitting in accordance with A.R.S. § 49-241(B).

B. Effective Date

*This approval is effective as of **DATE** as long as these conditions are met).* The Department reserves the right to revoke or revise this waiver as necessary to ensure protection of the public and the environment. Further, the Department reserves the right to take additional actions as appropriate and as allowed by law.

C. The Department grants the approval subject to the conditions outlined in this document.

AUTHORIZING SIGNATURE

Date: _____

Trevor Baggione, Director
Water Quality Division
Arizona Department of Environmental Quality