

Commonwealth of Pennsylvania
Department of Environmental Protection (DEP)
Bureau of Point and Non-Point Source Management
Harrisburg, PA

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Technology: Sundrive Biovaporator Solar Greenhouse Evapotranspiration Wastewater Disposal System (Sundrive)

Classification Type: Alternate technology (A2014-0024-0002)

Classification Date: February 6, 2004 (ASG)
February 24, 2014
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In accordance with Title 25, Chapter 73, Section 73.72, DEP classifies the Sundrive Biovaporator Solar Greenhouse Evapotranspiration Wastewater Disposal System (Sundrive) for use as an alternate onlot sewage treatment system.

I. Technology Description

This technology eliminates sewage flow through evapotranspiration using direct evaporation and plant transpiration. This process consists of the utilization of low flow plumbing fixtures inside the home, a septic tank or an aerobic treatment tank, and specially modified passive solar greenhouse beds to eliminate wastewater through the process of evapotranspiration. These systems are often used where site limitations, such as shallow depth to seasonal high water table or excessive slope exist, or where the use of other soil-based absorption systems is difficult. Plants grown in the greenhouse may not be used for human consumption unless the requirements of Section II.C.4 in the *Reuse of Treated Wastewater Guidance Manual* (Document # 385-2188-002) have been met.

II. Design Requirements

- A. Location: Sundrive may be installed for the treatment of domestic strength wastewater (as defined by Table 1 of Miscellaneous Data to be used in Conjunction with PA DEP listings) serving a new construction or as a repair.
- B. Construction:
 - (1) Design and installation must follow the manufacturer's specifications.
 - (2) An onsite preconstruction conference attended by the sewage enforcement officer, designer, installer, and the property owner prior to construction is recommended.
 - (3) Tank installations must consist of either a two-compartment rectangular tank, two rectangular tanks in series, and otherwise conform to meet the requirements of

- Section 73.31. Vertically aligned circular (round) tanks are not permitted. Aerobic treatment tanks must be in compliance with Section 73.32.
- (4) Utilizing of an aerobic treatment tank(s) is recommended.
 - (5) Typical installations require a minimum of approximately 1 acre lot size to house both the greenhouse and the building being served.
 - (6) To reduce the size of the greenhouse, the use of water conservation devices, such as US EPA Watersense listed fixtures are required to reduce the volume of wastewater produced.
 - (7) The bed must be contained in an enclosed, walled structure (usually concrete masonry unit blocks) and insulated on the interior or exterior to minimize heat loss to the frozen ground. The bed must be lined to retain all effluent and avoid infiltration with the underlying soil.
 - (8) The bed may be sectionalized with a series of valves that control effluent flow to facilitate maintenance.
 - (9) Temperature and humidity controls and suitable ventilation means must be used to maintain the proper internal environment necessary to reach optimal evapotranspiration potential.

III. Minimum Maintenance Standards

- A. The manufacturer's representative must meet with the property owner within one (1) month of system start-up and/or occupancy of the dwelling and with the local agency's SEO upon request, to explain the operation and maintenance of the system and provide written instructions to the property owner that includes:
 - (1) An Operation and Maintenance Manual;
 - (2) The locations of all parts of the system;
 - (3) A commitment that the manufacturer's service provider will investigate and troubleshoot system problems;
 - (4) Contact information for the manufacturer, the manufacturers' representatives, and manufacturer's service provider;
- B. The service provider shall inspect at least the following items at an interval frequency recommended by the manufacturer's requirements:
 - (1) Inspect septic tanks, dosing tanks, and lift pump tanks for structural integrity of the tank, inlet and outlet baffles, solids retainer, pumps, siphons, and electrical connections;
 - (2) Inspect aerobic tanks for structural integrity of the tank, inlets, and outlet baffles, buoyed solids retainer, pumps, siphons, and electrical connections.
 - (3) Ensure that the pumping system is operational.
 - (4) The effluent filter shall be inspected and maintained per the manufacturer's requirements at a minimum annually.
- C. The service provider shall inspect and pump excess solids in accordance with the manufacturer's requirements.
- D. Sundrive requires regularly scheduled maintenance and monitoring to insure the long-term reliability of performance. Maintenance activities include the following:

- (1) Monthly inspections and water meter readings to check that all components (fans, pumps, etc) are operating.
- (2) Mowing of cover crops and replanting of cover crops once or twice per year.
- (3) Replacement of greenhouse poly film glazing every 4 to 5 years. The use of “rigid” polycarbonate or acrylic glazing can increase this interval to 20+ years.

IV. Permitting Requirements

- A. DEP’s regional office must review the proposal prior to permitting by the SEO. If requested by the regional office, central office will also provide comments.
- B. A letter from the manufacturer or designer certifying that the design is acceptable must be included in the application (Section 73.72(d)(3)).
- C. The SEO should include all operation and maintenance requirements in the permit application.
- D. An operation and maintenance manual shall be provided to the homeowner.
- E. Each application shall be accompanied by a statement acknowledging the requirement that the sewage enforcement officer be notified of any malfunction or modification of the original system design (Section 73.72(e)).
- F. The SEO is responsible to ensure that all components of the systems have been installed in compliance with the contents of the listing.
- G. The sewage enforcement officer shall include on both the *Application for An Onlot Sewage Disposal* permit (Part III, Section 1) and the permit, the classification number itemized in the Classification Type of this listing.

V. Planning Requirements

Not applicable.