

Protocol
for
Experimental & Alternative Technology Onsite Systems
Indiana State Department of Health

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Protocol for Experimental & Alternative Technology Onsite Systems

I. Experimental Technology

- A. The department may approve the installation or construction of experimental technology to permit development of new or more efficient sewage treatment or soil absorption processes in accordance with the provisions of 410 IAC 6-8.1-31(g).
- B. The owner or agent proposing to install an experimental technology onsite system shall:
 - 1. comply with the applicable requirements contained in 410 IAC 6-8.1; and
 - 2. record a restriction on the deed of the property, when either of the following exist, indicating that:
 - a. an operation and maintenance contract is required by the department pursuant to section IV. A. for the onsite system serving the property;
 - b. a set-aside area for the soil absorption field serving the property is required by the department pursuant to section I. F. stating that the set-aside area be protected from disturbance or alteration.
- C. The following information shall be provided to the department for review of an experimental technology:
 - 1. A description of how the experimental technology operates, including scientific and engineering principles upon which it is based.
 - 2. For an experimental technology soil absorption field:
 - a. a description of the site criteria required for successful operation of the technology, including documentation of research and field performance applicable to soil and climatological conditions found in Indiana; and
 - b. the design criteria for sizing the technology to meet all site and soil conditions required by the department.
 - 3. For secondary treatment units and high strength waste devices:
 - a. the design criteria for sizing the device to meet all waste flow characteristics; and
 - b. procedures used for effluent sampling and analysis.
 - 4. Performance that the experimental technology is expected to meet.
 - 5. Life span of the materials used in the experimental technology.
 - 6. Criteria and requirements used for operation and maintenance of the experimental technology over its life expectancy.
 - 7. A copy of approvals from other states or government units and the statutes, codes, ordinances, and other regulatory documents under which the approval was granted.
 - 8. Research and development data, and data on field performance.
 - 9. Information on certifications (with test results) from independent testing laboratories including the following:

- a. An affidavit certifying that research, certifying organizations, and principal investigators have no conflict of interest.
 - b. A statement of the source(s) of compensation for services.
 - c. A statement that research, certifying organizations, and principal investigators do not stand to gain financially from the sale of the experimental technology.
10. Three (3) copies of the following:
- a. Owner notifications required in section IV. F.
 - b. Documentation required in section VI.
 - c. Product literature and pricing information.
- D. The department may require the effluent from secondary treatment units be sampled and analyzed according to the requirements contained in section VIII.
- E. The department may limit the number of onsite systems incorporating experimental technology while the performance of the experimental technology is being documented in the field.
- F. For residences using an experimental technology soil absorption field, the department may require a set-aside area for an alternate means of soil absorption:
- 1. the set-aside area shall be included in the plan submittal;
 - 2. the set-aside area shall be of sufficient size and suitable soil conditions to allow for the construction of an onsite system that complies with the requirements of 410 IAC 6-8.1; and
 - 3. the set-aside area shall be protected from disturbance or alteration until released, in writing, by the department or local health department, whichever has jurisdiction, or until connection to a wastewater treatment plant or cluster onsite system is secured.
- G. For residences using experimental technology for a replacement soil absorption field, the local health department may waive or modify the requirement for a set-aside area in accordance with 410 IAC 6-8.1-33.
- H. For commercial facilities using an experimental technology soil absorption field, the department may require a set-aside area or contingency plan for an alternate means of soil absorption:
- 1. the set-aside area shall be included in the plan submittal and comply with the requirements of sections I. F. 2. and 3; or
 - 2. a contingency plan for a commercial facility shall be approved by the department prior to design of the experimental technology onsite system.

II. Alternative Technology

- A. The department may approve the installation or construction of alternative technology sewage treatment or soil absorption processes in accordance with the provisions of 410 IAC 6-8.1-31(g) when:
- 1. the manufacturer has demonstrated to the department that the alternative technology will provide a level of public health and environmental protection at least equivalent to that of onsite systems permitted by this rule,
 - 2. the alternative technology is designed and constructed in accordance with manufacturer's instructions while in compliance with 410 IAC 6-8.1, and

3. the department's evaluation has included a review of broad scale field usage in Indiana.
- B. The owner or agent proposing to install an alternative technology onsite system shall:
1. comply with the applicable requirements contained in 410 IAC 6-8.1; and
 2. record a restriction on the deed of the property indicating that an operation and maintenance contract is required by the department pursuant to section IV. A. for the onsite system serving the property.

III. General Requirements

- A. Onsite systems containing experimental or alternative technology shall comply with the requirements of this section.
- B. Bypassing, removing, or excluding any component or components of an experimental or alternative technology after the design has received final approval from the department or local health department, whichever has authority, is prohibited, unless approved in writing by the department.
- C. A high strength waste device shall be included in onsite systems for commercial facilities when:
1. the septic tank effluent concentration is greater than two-hundred and fifty (250) mg/L for CBOD₅ and TSS;
 2. the septic tank effluent concentration is greater than twenty-five (25) mg/L for fats, oils, and greases; or
 3. greater than fifty (50) percent of wastewater generated is from food operations or food production.
- D. The effluent concentration from a high strength waste device shall be reduced to two-hundred and fifty (250) mg/L or less for CBOD₅ and TSS, and twenty-five (25) mg/L or less for fats, oils, and greases, prior to discharge to:
1. a soil absorption field; or
 2. an experimental or alternative technology secondary treatment unit.
- E. Secondary treatment units and high strength waste devices shall comply with the following design requirements:
1. Effluent from a secondary treatment unit shall discharge into a soil absorption field with no outlet, or a dose tank that discharges into a soil absorption field with no outlet.
 2. Effluent from a high strength waste device shall discharge into a secondary treatment unit, a soil absorption field with no outlet, or a dose tank that discharges into a soil absorption field with no outlet.
 3. All secondary treatment units shall be designed to:
 - a. provide a minimum treatment capacity equivalent to the design daily flow ;
 - b. provide flow equalization of effluent through the unit to stabilize microorganism colonies when a residence or commercial facility is generating surge flows of sewage;

- c. prevent the passage to a soil absorption field of effluent not treated to the effluent quality requirements of Figure 1, Effluent Quality for Secondary Treatment Units; and
 - d. have access to each compartment for inspection and maintenance.
4. The department may require that secondary treatment units:
 - a. conform to ANSI/NSF Standard 40, Residential Wastewater Treatment Systems, maintain a current product listing with an ANSI accredited third party certifier, bear a listing mark, and provide a minimum treatment capacity equivalent to the design daily flow ; and
 - b. meet the requirements of section VIII.
 5. All secondary treatment units shall:
 - a. use materials and components that are durable and non-corrosive;
 - b. be watertight; and
 - c. have an audible and visual alarm, not located in crawl spaces, window wells, or other inaccessible places, which is activated upon an electrical or mechanical malfunction.
 6. The minimum size of a soil absorption field shall comply with Figure 1, Effluent Quality for Secondary Treatment Units for soil absorption fields described in 410 IAC 6-8.1.
 7. Aerobic treatment units shall comply with the following requirements:
 - a. Conform to ANSI/NSF Standard 40, Residential Wastewater Treatment Systems, maintain a current product listing with an ANSI accredited third party certifier, and bear a listing mark.
 - b. Have a mechanism that upon malfunction of the air delivery system, chemical delivery system, or an internal electro-mechanical component, activates the audible and visual alarm.
 - c. Be designed to have access and provisions for the removal of solids and sludge in the aeration compartment.

Figure 1				
Effluent Quality¹ for Secondary Treatment Units				
	CBOD₅	TSS	Reduction Factor²	
			SLR < 0.50gpd/ft²	SLR ≥ 0.50gpd/ft²
With secondary treatment unit	≤ 25	≤ 30	1/3	1/2
¹ Effluent quality discharged to the soil absorption field, measured in milligrams per liter (mg/L). ² Proportion a soil absorption field described in 410 IAC 6-8.1 may be reduced in size. Terms: CBOD ₅ – five-day carbonaceous biochemical oxygen demand; TSS – total suspended solids; SLR – soil load rate.				

IV. Inspection, Operation & Maintenance

- A. Operation and maintenance (O&M) is required for:
 - 1. all secondary treatment units and high strength waste devices;
 - 2. experimental and alternative technology soil absorption fields for which the department requires maintenance; and
 - 3. cluster onsite systems as specified in the approved plans and specifications.
- B. O&M for secondary treatment units, high strength waste devices, and experimental and alternative technology soil absorption fields for which the department requires maintenance shall be performed:
 - 1. only by an authorized service representative as required in section V. B. and E; and
 - 2. as necessary to maintain proper functioning of the onsite system, but not less than once every six (6) months; or
 - 3. at an interval recommended by the manufacturer if the control panel has remote telemetry and the capability of monitoring all components requiring O&M, as demonstrated by the manufacturer to the department, and approved by the department.
- C. The owner shall maintain an O&M contract for the life of a secondary treatment unit, high strength waste device, and experimental or alternative technology soil absorption field for which the department requires O&M, in accordance with:
 - 1. the manufacturer's or designer's requirements, whichever is applicable, for a secondary treatment unit or high strength waste device; and
 - 2. the manufacturer's and designer's requirements for an experimental or alternative technology soil absorption field which requires O&M.
- D. The owner shall provide the department or local health department, whichever has jurisdiction:
 - 1. with evidence of an O&M contract; and
 - 2. that all inspection and maintenance is performed as scheduled in the O&M contract and reported within two months.
- E. The owner or owner's agent shall provide the department or local health department, whichever has jurisdiction, the following information:
 - 1. A complete O&M schedule with frequencies for maintenance.
 - 2. Manufacturer or designer, model number or product identification, and specifications for all equipment, products, and materials used in a secondary treatment unit or high strength waste device.
 - 3. Designer and specifications for all equipment, products, and materials used in an experimental or alternative technology soil absorption field for which the department requires O&M.
- F. The manufacturer distributor or manufacturer representative, or designer, of a secondary treatment unit, high strength waste device, or experimental or alternative technology soil absorption field for which the department requires O&M shall provide the owner, in writing, the following:

1. For onsite systems containing an experimental technology, notification that the onsite system contains an experimental technology. The owner shall sign receipt for this notification and a copy of the signed receipt shall be included in the plan submittal.
 2. Notification of all requirements for O&M of the experimental or alternative technology. The owner shall sign receipt for this notification and a copy of the signed receipt shall be included in the plan submittal. This notification shall include the requirements that the owner:
 - a. maintain an O&M contract for the life of the experimental or alternative technology; and
 - b. provide the department or local health department, whichever has jurisdiction, with information on the O&M contract as required in section IV. D..
- G. The manufacturer distributor or manufacturer representative, or designer, of an experimental technology soil absorption field for which the department does not require O&M, shall provide the owner, in writing, notification that the onsite system contains an experimental technology. The owner shall sign receipt for this notification and a copy of the signed receipt shall be included in the plan submittal.
- H. The owner shall be provided an O&M manual from an authorized representative of the manufacturer distributor or manufacturer representative, or designer, before a secondary treatment unit, high strength waste device, or experimental or alternative technology soil absorption field for which the department requires O&M, commences operation. The following information shall be included in the O&M manual:
1. As-built drawings and specifications of the experimental or alternative onsite system.
 2. A complete O&M schedule with frequencies for maintenance.
 3. Manufacturer or designer, model number or product identification, and specifications for all equipment, products, and materials used in a secondary treatment unit or high strength waste device.
 4. Designer and specifications for all equipment, products, and materials used in an experimental or alternative technology soil absorption field for which the department requires O&M.
 5. A statement of inspection verifying:
 - a. proper construction of the onsite system as required in 410 IAC 6-8.1; and
 - b. proper start-up operation of the secondary treatment unit, high strength waste device, or experimental or alternative technology soil absorption field.

V. Training & Authorization

- A. At the request of a local health department, manufacturer distributors or manufacturer representatives shall train local health department personnel on the design, installation or construction, and service of experimental and alternative technology onsite systems.
- B. Manufacturer distributors or manufacturer representatives shall perform all of the following to train or authorize designers, installers, and service representatives on the experimental and alternative technology onsite systems they offer:

1. Train:
 - a. potential designers on design, installation or construction, and service;
 - b. potential installers on installation or construction; and
 - c. potential service representatives on inspection, operation and maintenance.
 2. Oversee, in the field:
 - a. At least the first three (3) installations by each installer for each type of experimental or alternative technology onsite system; and
 - b. At least the first three (3) maintenance visits by each service representative for each type of experimental or alternative technology onsite system.
 3. After meeting the requirements of sections 1. and 2., maintain ongoing listings of:
 - a. each authorized installer; and
 - b. each authorized service representative.
 4. Provide the department, and keep up-to-date, a list of:
 - a. all designers that have been trained; and
 - b. all installers and service representatives under current agreement.
- C. Designers shall:
1. ensure the design of experimental and alternative technology onsite systems is in accordance with the requirements of the department and manufacturer;
 2. register all components to be specified in their experimental and alternative technology onsite systems designs with the department; and
 3. specify components that are wastewater grade.
- D. Authorized installers shall:
1. be in training or under agreement with a manufacturer distributor or manufacturer representative of an experimental or alternative technology onsite system;
 2. ensure the installation or construction of experimental and alternative technology onsite system is in accordance with the approved plans;
 3. install experimental and alternative technology onsite system components as shown on the approved plans; and
 4. have a supervisor, authorized by a manufacturer distributor or manufacturer representative, on site during the entire installation or construction of an experimental or alternative technology onsite system.
- E. Authorized service representatives shall:
1. be in training or under agreement with a manufacturer distributor or manufacturer representative of an experimental or alternative technology onsite system;
 2. verify all experimental and alternative technology onsite system components are in place in accordance with the approved plans;
 3. ensure all maintenance work on experimental and alternative technology onsite systems are in accordance with the O&M manual of the manufacturer and designer; and
 4. when replacing experimental and alternative technology onsite system components, replace with components as specified on the approved plans.

VI. Documentation for Inspection, Operation & Maintenance

- A. An owner manual, prepared by a manufacturer of an experimental or alternative technology, shall accompany each onsite system containing experimental or alternative technology requiring operation and maintenance in section IV. A.
- B. A manufacturer distributor or manufacturer representative, authorized designer, or authorized installer, shall provide the following information to the owner prior to installation or construction of the experimental or alternative technology:
 - 1. Manufacturer, model number or product identification, and power requirements of the experimental or alternative technology.
 - 2. Description of the functional operation of the experimental or alternative technology with diagrams illustrating basic system design and the flow of effluent.
 - 3. Comprehensive operating instructions, including:
 - a. operating responsibilities of the owner and proper function of the experimental or alternative technology;
 - b. requirements for stable operation, including a list of household substances that, if discharged to the experimental or alternative technology, may adversely affect the experimental or alternative technology, its process(es), or the soil absorption field;
 - c. procedures to identify malfunction or operating problems with the experimental or alternative technology; and
 - d. actions necessary if the experimental or alternative technology is used intermittently or is not used for extended periods.
 - 4. Description of the requirements for an O&M contract, including:
 - a. inspection and maintenance by an authorized service representative;
 - b. schedule of required inspection and maintenance;
 - c. a written report of the results of the required inspection and maintenance; and
 - d. names, addresses and telephone numbers of authorized service representatives.
- C. A manufacturer distributor or manufacturer representative, authorized designer, or authorized installer, shall provide the following information to the owner after installation or construction of the experimental or alternative technology for inclusion in the owner manual:
 - 1. If required by the department or local health department, whichever has authority, as-built drawings and specifications for:
 - a. individually designed secondary treatment units; and
 - b. experimental and alternative technology soil absorption fields.
 - 2. A statement of inspection of the experimental or alternative technology verifying proper construction and operation according to the approved plan submittal, including flow measurements and pressure readings at the start-up of the experimental or alternative technology.
- D. A manufacturer of an experimental or alternative technology shall provide comprehensive and detailed design and installation manuals to designers, authorized installers, and authorized service representatives. The design and installation manual shall contain, as applicable, the following:

1. Manufacturer, model number or product identification.
2. Experimental or alternative technology information, including:
 - a. a numbered list of experimental or alternative technology components and an illustration in which all components are identified;
 - b. specifications for all equipment and materials used in the construction of the experimental or alternative technology; and
 - c. wiring schematics for electrical components of the experimental or alternative technology.
3. Installation instructions, including:
 - a. a process overview of the function of each component and the proper function of the experimental or alternative technology when assembled and operating;
 - b. off-loading and unpacking instructions, including:
 - 1) safety considerations;
 - 2) identification of fragile components; and
 - 3) measures to be taken to avoid damage to the experimental or alternative technology;
 - c. sequential installation procedure from the residence or commercial facility to the soil absorption field;
 - d. requirements for installation, including:
 - 1) plumbing and electrical power requirements;
 - 2) ventilation and air intake protection;
 - 3) miscellaneous fittings and appurtenances;
 - 4) maximum slope in which experimental or alternative technology can be installed;
 - 5) bedding, water tightness, and hydrostatic displacement protection; and
 - 6) final grading to direct surface water away from the experimental or alternative technology.
4. Requirements for experimental technology start-up, including:
 - a. the estimated length of time required for start-up and for achieving stable operation; and
 - b. the initial operating and environmental conditions required for start-up, and the range for any conditions that may require modification during the start-up period, including:
 - 1) flow rates;
 - 2) chemical additives; and
 - 3) component calibration and settings.
- E. A manufacturer of an experimental or alternative technology requiring operation and maintenance in section IV. A. shall provide comprehensive and detailed O&M manuals to authorized service representatives. The O&M manual shall contain, as applicable, the following:
 1. Manufacturer, model number or product identification, power requirements, and specifications for all equipment, devices, products, and materials used in the experimental or alternative technology.
 2. Requirements for O&M, including:

- a. schedule of required inspection and maintenance for the experimental or alternative technology and components;
 - b. requirements for the periodic removal of residuals from the experimental or alternative technology;
 - c. a detailed procedure for visual evaluation of the function of the experimental or alternative technology and components;
 - d. a detailed procedure for the evaluation of the function of the experimental or alternative technology and components using instruments and measuring devices; and
 - e. a detailed procedure for the maintenance of the experimental or alternative technology and components.
- 3. Requirements for troubleshooting and repair, including:
 - a. guidelines for visually evaluating the experimental or alternative technology and narrowing the scope of problems based on effluent characteristics, experimental or alternative technology operation, and history.
 - b. a sequential method, including the use of instruments and measuring devices, for isolating specific component malfunction; and
 - c. procedures for repairing or replacing all experimental or alternative technology components.
 - 4. Names, addresses and telephone numbers of licensed septic cleaners.

VII. Additional Requirements for Individually Designed Secondary Treatment Units, and Experimental & Alternative Soil Absorption Fields

- A. Individually designed secondary treatment units shall comply with the requirements of section III.
- B. Designers of individually designed secondary treatment units shall provide:
 - 1. two copies of drawings to scale with each plan submittal for a property or project to the department or local health department, whichever has authority for plan review; and
 - 2. field supervision for all phases of construction.
- C. Manuals for owners, designers and installers, and service representatives for an individually designed secondary treatment unit, and experimental and alternative technology soil absorption fields, shall contain:
 - 1. information addressing all of the applicable requirements of sections IV, V, and VI; and
 - 2. requirements for protecting the site from erosion until such time that vegetation has been established.
- D. Manufacturers of experimental and alternative technology soil absorption fields shall provide complete instructions for sizing, design, and installation or construction.
- E. Designers of experimental or alternative technology soil absorption fields that are dosed shall provide, in the design, provisions for the metering of dose volumes and frequencies to the experimental or alternative technology soil absorption field.
- F. Owners of individually designed secondary treatment units shall meet the O&M requirements of section IV or provide ongoing monthly sampling and analysis.

VIII. Sampling & Analysis

- A. The department may require:
 - 1. each manufacturer of a manufactured secondary treatment unit to sample and analyze effluent quality of up to ten (10) units of each model; and
 - 2. each designer of an individually designed secondary treatment unit to sample and analyze effluent quality.
- B. For secondary treatment units that the department requires sampling and analysis of effluent quality, the manufacturer, designer, or its contractor, shall:
 - 1. monitor the secondary treatment unit for three years from the date of initial operation with:
 - a. monthly sampling and analysis for the first year of operation; and
 - b. quarterly sampling and analysis for the second and third year of operation;
 - 2. provide the department and local health department with the name, address and telephone number of:
 - a. the entity contracted to perform sampling; and
 - b. the laboratory contracted to perform analysis;
 - 3. provide measurements of daily:
 - a. inflow to the septic tank; and
 - b. outflow from the secondary treatment unit;
 - 4. upon request, notify the department and local health department of the days and times that samples will be taken at least two (2) working days prior to sampling.
- C. Sampling and laboratory analysis shall be performed for carbonaceous biochemical oxygen demand—five day average (CBOD₅) and total suspended solids (TSS) for:
 - 1. the septic tank effluent (baseline effluent quality), where applicable; and
 - 2. the secondary treatment unit effluent.
- D. Sampling, laboratory analysis, and reporting shall meet the following requirements:
 - 1. The point of sampling shall be:
 - a. a location that is representative of final discharge from:
 - 1) the septic tank, where applicable; and
 - 2) the secondary treatment unit;
 - b. detailed on the plan submittal.
 - 2. Samples shall be collected:
 - a. on weekdays between 7:30 a.m. and 9:30 a.m. on days a residence is occupied; or
 - b. when a commercial facility is in operation.
 - 3. Samples shall be collected and analyzed according to the methods prescribed in the Standard Methods for the Examination of Water and Wastewater, 20th Edition (1998) (American Public Health Association) or equivalent.
 - 4. The laboratory performing the analysis shall report the specific laboratory procedures used in the analysis, and, if the procedures used are not from the Standard Methods for the Examination of Water and Wastewater, 20th Edition (1998), certify that the sampling and analysis methods used are equivalent to

- those contained in the Standard Methods for the Examination of Water and Wastewater, 20th Edition (1998).
5. The laboratory results of all sampling and analysis shall be submitted to the department and the local health department within one (1) month of the date of sampling.
- E. If the sample results from a secondary treatment unit for either CBOD₅ or TSS exceed the effluent quality requirements of Figure 1, Effluent Quality for Secondary Treatment Units, the secondary treatment unit manufacturer or designer shall:
1. provide all alterations or maintenance necessary to bring the effluent quality of the secondary treatment unit below these effluent quality requirements. If alterations to any experimental technology onsite system component are necessary, the manufacturer or designer shall obtain necessary approvals from the department and permits from the local health department; and
 2. provide documentation, in writing, to the department, and local health department, within thirty (30) days of the alterations made or maintenance performed.
- F. The department may:
1. extend the monitoring period, or the scope of monitoring, for the secondary treatment unit until such time that it meets the effluent quality requirements of Figure 1, Effluent Quality for Secondary Treatment Units; or
 2. shorten the monitoring period for the secondary treatment unit if it meets the effluent quality requirements of Figure 1, Effluent Quality for Secondary Treatment Units.