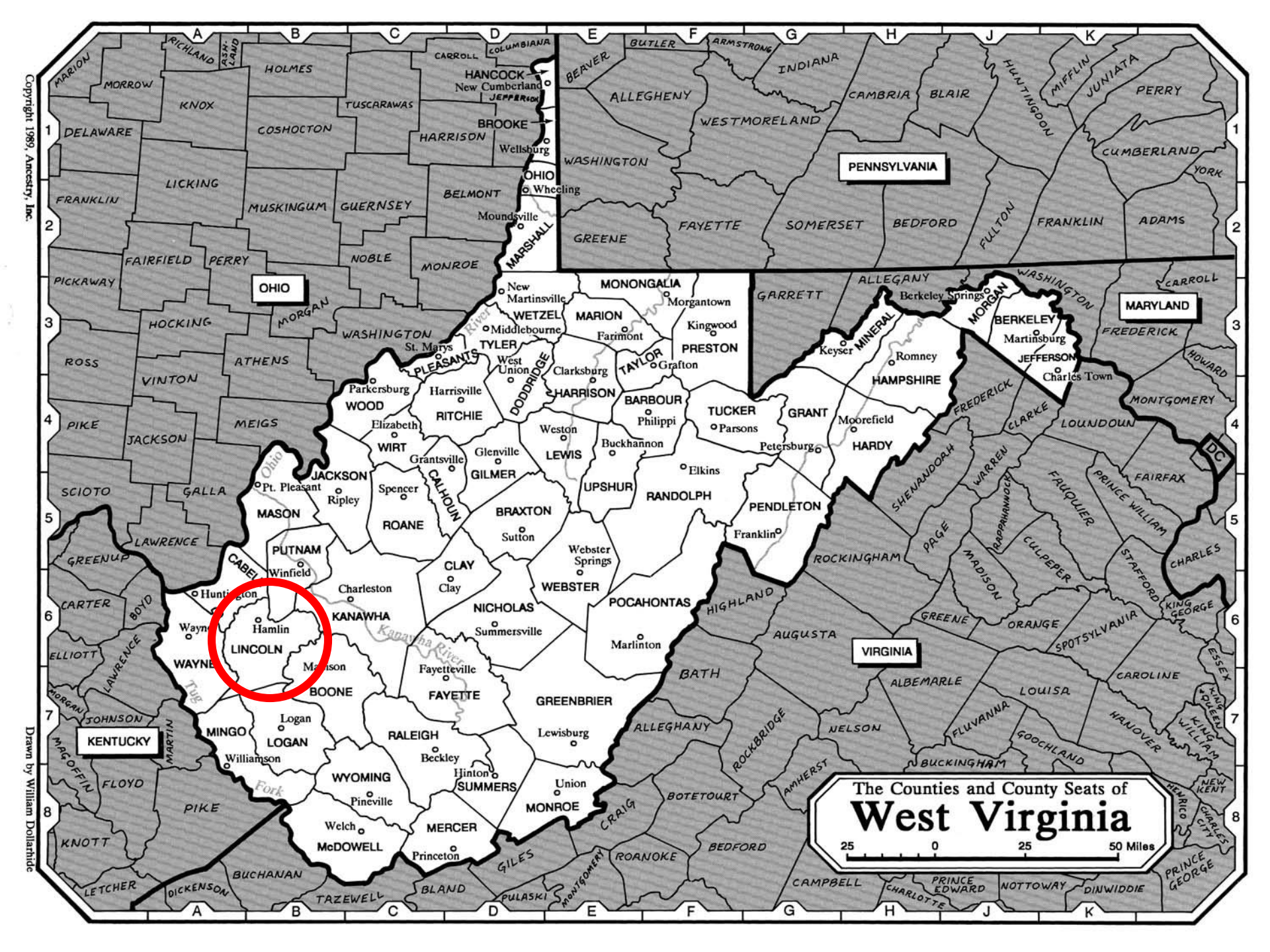
Lincoln County, WV
Onsite Treatment Project Overview

Issues

- Significant bacterial contamination in the tributaries of the Left Fork watershed of the Mud River
- Rural, low income area
  - Area MHI - $19,120
- Property not suitable to traditional systems
  - Lot size too small
  - Unable to perc., etc…

Bigger Picture

- Project Director meant for this project to be a case study into issues involving rural wastewater treatment issues.
- These issues included, but were not limited to:
  - Impacts of pharmaceuticals & mineral content on wastewater.
  - Making systems become more affordable.
  - Improve training of O&M professionals in emerging technologies.
  - Ensure that direct discharge systems met E.coli limits.



Solution

- 117 Individual onsite systems
- Multiple phases from 2004 – 2015
- Total cost $4,116,734
- Average cost per system - $23,445
- Initial phase in 2004 was funded by an EPA Grant
- Remaining phases covered by CWSRF debt forgiveness – Starting with ARRA

Results

Dog Bone Creek that empties into the Left Fork

- Prior to Phase 3 Installation
  - E. coli: > 200,000; 40,000; 7,500; 50,000
- Post Installation
  - E. coli: 450, 250, 360

- Summer recreational project for area children on June 15, 2016 since the area lake from the left fork watershed is clean enough to swim in.

Community Support

- 200 area residents participated in monthly meetings, designed criteria for eligibility and served on bidding committees
- Projects were sponsored by the Lincoln County Commission
- Creation of a Wastewater Management Association for long-term system maintenance

Logistical Considerations

- Site Concerns
  - Can you get to the home (roads, bridges, terrain, ROW)?
  - Is open space available (trash, abandoned items, etc.)?
  - Will it be located to close to well (min. 50’ gap must be maintained)?
  - Close to discharge point?
  - Is the water table high?

Logistical Considerations

- Utilities
  - Electrical – Is it available & up to code?
  - Plumbing – Is it is accessible, up to code, or exist at all?
  - Upgrades were funded for systems to function properly as part of this project.

Phase I Systems/Processes

- 6 types of systems were installed to evaluate their effectiveness to lower E.coli levels
  - Pureflo Peat
  - Sand filtration
  - HAU
  - Eco Peat
  - Geotextile
  - Septic w/low pressure pipe subsurface discharge
- After sampling, the results showed Pureflo's system was the best & would be installed exclusively in the future phases.

NOTE: Orenco system wasn't tested in this Phase & would later be installed in Phase V.

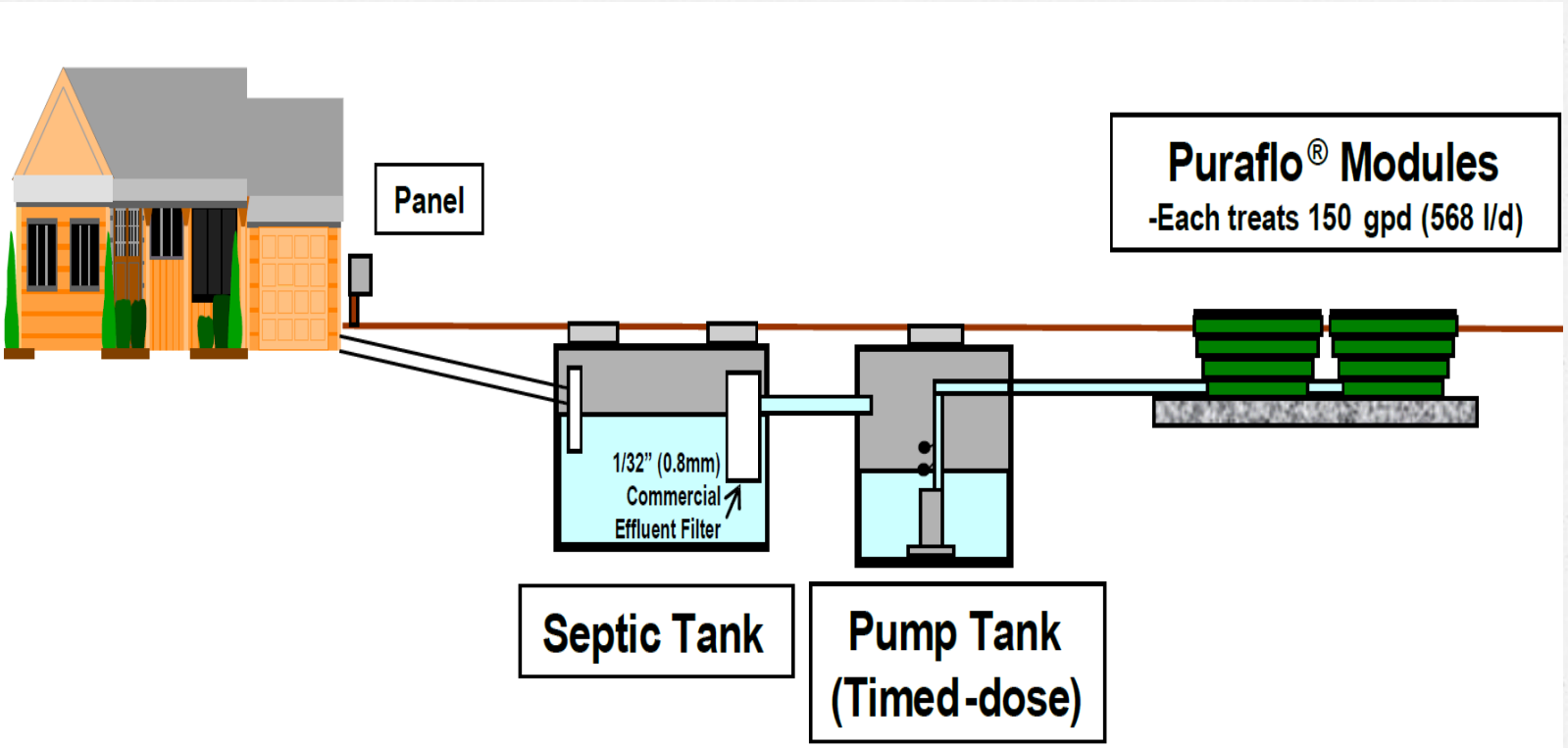
Phase I Systems/Processes

- As time & usage began to mount, problems with most of the systems began to occur.
- Some couldn't meet limits, others had functional problems.
- These issues eventually caused replacement of individual components and/or complete system replacement as part of subsequent phases.

Typical Post-Phase I Installation

- Included the following:
  - Septic Tank (primary treatment).
  - Effluent Tank w/ Pump.
  - Pureflo peat modules (secondary treatment).
  - Trojan UV (disinfection).
  - Direct discharge.

Typical Puraflo schematic



Pureflo Peat Module

Ashco UV Unit

Direct Discharge w/ Permit Sign

Lessons Learned

- Due to I/I, the Commission stopped using concrete tanks.
- Education is required for homeowners. For example, trying to teach homeowners not to dispose of kitchen grease into the onsite system.
- Antibiotics and/or cancer treatments adversely effect the treatment system.
- Additional training is needed for system installers and maintenance providers.
- Construction and engineering oversight is a must.

Concrete Tanks

- Were used in Phase I, but almost immediately had problems.
- Holes developed allowing water both in and out.
- Manufacturer wasn't willing or able to completely satisfy the Commission with his attempts at solving issues.
- Commission had to switch to polyethylene tanks and exclude Manufacturer's products from being used in the project.

Phase V

- By Phase V, the eligibility rules had to be modified to handle issues that arose from other Phases
- These new rules stated home had to:
  - Be occupied before a certain date.
  - Be a permanent, full time residence.
  - Have a failing, existing system.
  - Be habitable.
  - Join the Maintenance Association.
- Orenco Systems were the primary technology installed

Orenco AdvanTex System

Components of a Residential AdvanTex® Treatment System (Mode 1) Listed by Flow Path

1. Two Chamber Processing Tank
2. Biotube® Pump Vault
3. Biotube Filter
4. Effluent Pump
5. Discharge Assembly
6. AdvanTex® AX20 Filter Pod
7. Recirculating Splitter Valve (RSV)
8. Float Switches
9. External Splice Box
10. VeriComm® Control Panel

Installed Orenco System

Long term concerns/issues

- Are rates sufficient enough to maintain required level of service?
- What is the sustainability of the systems?
- Will homeowners continue to support the maintenance association?
- Eventually, plan is that O&M will be taken over by a PSD.

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QUESTIONS?