Green SRF Wastewater Project ~ Phase 3

Left Fork Watershed of the Mud River

Lincoln County Commission ~ WV DEP ~ WV DHHR Cooperative Project

FINAL REPORT PHASE 3

Project Dates: **April 2011 through May 2012**

Total Budget: **$726, 170**

Individual decentralized wastewater systems installed:

25

Total Homes with New Systems Phases 1 to 3:

84

BACKGROUND & INTRODUCTION

The ***Phase 3 Green SRF Wastewater Project*** built on the success of two earlier projects. All project phases have been located in the Left Fork Watershed of the Mud River, a low income, rural area in Lincoln County.

The original project was a cooperative agreement between the Lincoln County Commission and the US Environmental Protection Agency. It ran from 2005 to 2010. The project was one of several national decentralized wastewater demonstration projects. 40 homes received new, alternative wastewater systems, replacing old, failing ones. ***One of the project's primary goals was, and continues to be, protecting public health and improving water quality.***

The Second Phase ran from 2010 to 2011. It was part of the federal American Recovery and Reinvestment Act (ARRA) and was funded through the WV DEP. Another 21 home systems in the same watershed were installed, again replacing old, failing systems.

Phase 3 continued the work in the Left Fork Watershed as well as continuing the collaboration with the WV DEP. Phase 3 funded another ***25 home installations*** during 2011 and 2012. All systems had Anua (Bord na Mona) peat technology as secondary treatment, followed by Salcor UV final disinfection before discharging into tributaries.

Phase 3 project sign on Bulger Road in the Left Fork Watershed

SIGNIFICANT OUTCOMES

Tributary Sampling. From the start of the first phase, the project has sampled tributaries of the watershed. Over time, the sampling has focused on ten points. One of the sampling points serves as a control point above which there are no homes and no farming. Points are sampled monthly during times when there is adequate flow in the tributaries and when there have not been heavy rains. The project has a certified lab analyze for E. coli colonies. The Project's acceptable level for samples is 200 colonies or less per 100 milliliters.

From the beginning of sampling in 2005 through 2012, there has been a continuing trend in reduction of E. coli in tributaries. ***The project believes this tributary bacterial reduction is directly related to installation of new, more effective wastewater systems.*** Here is an example:

After Dog Bone Creek empties into the Left Fork, Phase 3 installed new systems for a small cluster of three homes. Prior to installations, the E. coli readings were >200,000, 40,000, 7,500, and 50,000. Post installation samplings were 450, 250, and 360. ***Clearly the new systems are positively impacting tributary health.***

Direct discharge sampling

Direct Discharge Sampling. All of the systems installed in Phase 3 are direct discharge systems (the final treated effluent discharges into the creek). Since the beginning, the Project has periodically sampled the final discharge from direct discharge systems where they empty into the Left Fork's tributaries. During Phase 3, from August 2011 through March 2012, 72 direct discharge samples were taken. Only 4 were over the acceptable limit of 200 E. coli colonies. Of these, 2 samples were taken where problems were discovered in the UV light preventing adequate final decontamination. The other 2 were taken at a home where a child was using strong antibiotics that often kill the good bacteria needed in the septic tank. Of the 68 samples under 200 colonies, 58 or 85% had <10 colonies per 100 mL. All of the homes in Phase 3 had failing septic systems prior to new installations. ***Because all of these new systems are direct discharge they immediately have had positive impact on human and ecological health.***

One of the more extreme situations showing raw sewage flowing from under a mobile home. This family received a new system under Phase 3.

Maintenance Association. There is no Public Service District currently providing septic maintenance in the Left Fork Watershed. When new wastewater systems are installed, the Project requires 2 years of maintenance by the installer. In 2010, the Left Fork Community established a Wastewater Maintenance Association and received tax-exempt status from the IRS. In 2011 and 2012, the Association elected a Board of Directors, hired a maintenance provider, and enrolled into the Association community members who'd received new systems. Currently there are over 50 members. Members pay a monthly fee of $8 and then 30% of maintenance costs. ***Because these systems require continual maintenance and oversight, the establishment of a functioning Association helps guarantee that systems will be well taken care of and that positive environmental and public health impacts will be sustained.***

Leaking Concrete Tanks. When Phase 1 began in 2005, concrete septic and pump tanks were used. By the end of 2009, the Commission had decided to stop using concrete tanks. Too many of them leaked, jeopardizing the positive impacts of the new systems. Tanks were being checked for water-tightness both on the fabricators' lots and after arriving in the watershed. Any leaking tanks were either disallowed for installation or repaired on site. However, as direct discharge sampling continued in 2011 and 2012, there were unacceptably high E. coli levels in some discharge where there were concrete tanks which originally seemed to be working. This led to more intensive examinations of these concrete tanks using inground dye testing and photography inside tanks.

Interior of concrete pump tank showing infiltration of roots and ground water

Research showed that ground water was infiltrating some of the original concrete tanks. This led to over saturation of the system and inadequate bacterial decontamination. The Commission worked with the tank manufacturer and came to an agreement on a protocol for repairing the tanks. Though manufacturing standards have improved, ***the Commission believes concrete tanks are not effective enough in preventing contamination of tributaries and ground water. Only heavy-duty plastic tanks are currently allowed in the Project.***

PROJECT CHALLENGES

One underlying reason for challenges to the Project is the reality of low income, rural life. The new, high tech wastewater systems installed by the Project are sensitive. Often homeowners need to change the way they use water and deal with waste. In the past, peoples' systems were inadequate, but they could deal more easily with kitchen wastes, oil and grease, sanitary products, and surges in water use. New systems often are threatened by surges in water use which come when many loads of wash are done on the same day, or when reunions or family situations increase the number of people staying at the house. One of the challenges of the Project has been to get people to change their life-long habits and lifestyles. In a few instances improper disposal of kitchen grease has threatened long term viability of systems. In these cases, the Project has worked closely with homeowners to insure grease is disposed of properly.

Septic tank with too much grease

Other challenges include that fact that rural low income areas like the Left Fork suffer from power surges and outages. At times, the circuitry and complicated settings of the new wastewater systems have been negatively impacted by the surges and outages. There is very little research about dealing with or preventing these electrical related problems.

More and more technology manufacturers have reduced their staff in response to the continuing depressed economy. As a result the Project has had less technical help than in earlier stages. Manufacturers' experts have not been available as often for onsite project trouble shooting and advice.

The number of "bureaucratic" requirements for the Project and for installers keeps growing. The Project has always been challenged to find enough potential installers willing to bid on contracts. As requirements increase, and more and more "legalese" enters the procedures, potential bidders often feel the effort is not worth it. Fewer bidders usually mean higher bids and increased costs.

Typical new system installation in Phase 3

IMPORTANT LESSONS

The Project is very involved in ongoing maintenance and troubleshooting. The sampling and testing components sometimes uncover problems which would probably go undetected until there were significant negative consequences. This close monitoring and oversight also helps frame discussions about critical installation and maintenance procedures. The knowledge the Project generates impacts how manufacturers consider adapting technologies to make them more effective in rural, low income areas. ***Changes in installation procedures, UV system design, maintenance and inspection protocols, and tank lid construction have all been impacted by the Project's findings.***

RECOMMENDATIONS

Consensus grows about the importance of protecting ground water and surface water. Rural watersheds are critical environmental areas needing ongoing protection. The following recommendations all focus on this. None of these are new. Most were originally made during Phase 1.

➔ Increase technology-specific standards for maintenance inspections, especially for direct discharge systems.

➔ Require ongoing training for maintenance providers and system installers.

➔ Support research into less high tech and lower cost systems which would have final discharge in the ground rather than into tributaries.

➔ Investigate ways to require inspections of all onsite wastewater systems, both inground and direct discharge. Such inspections, however, cannot add undue financial burdens on low income homeowners.

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