

O R E N C O
C A S E S T U D Y

Starbuck, Washington:

Community Builds Own Effluent Sewer System, Cuts Cost in Half



The small Eastern Washington town of Starbuck (pop. 165) installed a low-cost, reliable effluent sewer system to serve the community, followed by an AdvanTex® Treatment System.



"I've been in construction all my life and didn't know wastewater, but this is the simplest system to run. So user-friendly — better than Windows 98! And the people at Orenco couldn't have been more helpful. You guys do a great job."

Floyd Wildman
Operator
Starbuck, Washington



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World Does Wastewater®*

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When the failing septic systems in Starbuck, Washington (pop. 165) threatened to pollute the groundwater and nearby Tucannon River, residents discovered they wouldn't be allowed to rehabilitate or replace them. Their lots didn't meet the state's current minimum size for onsite wastewater systems. But residents figured they couldn't afford a community wastewater system, especially when initial estimates came in at \$1.8 million to construct and a monthly fee of \$55-\$65 per household.

Enter the Washington Department of Ecology's "self-help" program. If Starbuck could eliminate debt from the equation by supplementing grant money with citizen contributions of labor, the town could cut the monthly fee to less than \$20. Residents embraced the concept, as well as one of its chief proponents, an engineering firm experienced in self-help projects for small communities. Loomis Austin Inc. had specified Orenco Systems equipment in Texas and knew that effluent sewers were relatively easy to install. Armed with plans for an affordable system from Loomis Austin and grant funding from the State and the US Forest Service, the townspeople took on the challenge of doing the installation themselves.

Loomis Austin recommended an Orenco Effluent Sewer and Orenco AdvanTex® Treatment System. On each property, a 1,500-gallon watertight tank with Biotube® effluent filter was installed, where solids are retained and treated. The filtered effluent from the tanks flows by gravity through small diameter collection lines (mostly 2" and 3") to an 8,000-gallon STEP pumping station, equipped with telemetry controls. The pumping station pumps to a 20,000 gpd AdvanTex® Treatment System (sixteen RX40 textile filters). After treatment, the effluent is so clean it's used to irrigate grazing lands via a drip irrigation system.

Carol Wildman, Starbuck's former clerk/treasurer, oversaw the self-help project. "People here can be stubborn," she said, "so we made hook-ups voluntary." Each household wanting a

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connection to the effluent sewer was expected to donate 80 hours of labor.

Some people laid pipe; others fed the work crews or babysat for crew members. Still others ran errands or did paperwork. Retirees found a new reason to get up in the morning. In the end, virtually everyone in town opted to hook up. After nine months, installation was complete and Starbuck had accomplished what amounted to a modern-day barn-raising on an amazing scale.

The collection system — 2.5 miles of pipe and 90 hook-ups, including a school and a restaurant — cost \$325,000. Treatment facilities added \$414,000 and professional fees another \$124,000. Grant funds covered that \$863,000 total. But grant administration, housing and meals for engineers, meals for volunteers, and approximately 7,500 hours of volunteer labor were contributed by the community! Residents pay a base monthly fee of \$16, plus one dollar per thousand



Aerial view of Starbuck, Washington and its AdvanTex® Treatment System.

gallons of water used (averaged from winter monthly consumption).

The system has been performing beautifully since the January 2000 start-up: lab sampling shows average BOD and TSS under 2 mg/L and total nitrogen of 13.3 mg/L. The system operator — Wildman's husband Floyd — spends about ten hours a month on O&M, excluding the drip irrigation equipment.

“When you design a self-help project, the goal is constructability,” says engineer Andy Hollon of Loomis Austin. So forget the big pipes, deep trenches, mammoth construction equipment, and special expertise! For the town of Starbuck, Orenco's effluent sewer and AdvanTex® Treatment System fit the bill.

“A self-help project is no picnic,” says Carol Wildman. “It requires hard work and sacrifice. But look at what we accomplished. Our wastewater system is completely debt-free. It was definitely worth it!”

S U M M A R Y O F S P E C I F I C A T I O N S

Starbuck, Washington Effluent Sewer and AdvanTex® Treatment System with Denitrifying Upflow Filters Using Orenco Systems Equipment, plus Dispersal by Drip Irrigation

INSTALLATION DATE

1999. Completed in 9 months

START-UP DATE

January 2000

SYSTEM ENGINEER

Loomis Austin, Inc.; Austin, Texas

PROJECT COST EXCLUDING DONATED LABOR

\$863,000

DONATED LABOR

7,500 hours

FEES

\$16 per month base charge plus \$1 per 1,000-gal winter avg. water use

ONSITE FACILITIES

90 connections, all STEG
Residential tanks by Willamette Graystone, Portland, OR: 1,500-gal* one-piece concrete construction, single compartment, fitted with Orenco Biotube® Effluent Filters

COLLECTION SYSTEM

2.5 miles of PVC pipe, mostly 2" and 3", some 4".

One 8,000 gal STEP pumping station with two 3/4 hp pumps and VeriComm® telemetry controls

TREATMENT SYSTEM

16 AdvanTex®-RX40 Textile Filters
2 denitrifying upflow filters—1 day HRT (peak flow)
2 flow-splitter basins set for 50/50 filtrate split

Design flow = 20,000 gpd
Average actual flow = 7,330 gpd

Recirculation rate: start-up—5:1, after one year—4:1

* Although 1,000-gal tanks would have been adequate, 1,500-gal tanks were selected for reduced septage pumping frequency, from every 8 - 12 years (for a 1,000-gal tank) to every 12 - 20 years.

TANKS

20,000-gal-blend tank; (2) 10,000-gal recirculation tanks

PUMPS

Four 3/4 hp pumps in each recirc tank

DISPERSAL

20,000 gal surge/dose tank
50,000 lineal feet of drip irrigation line (4 acres)

OPERATION / MAINTENANCE

Maintenance of tanks, collection system, AdvanTex® Treatment System, and upflow filters — Avg. 10 hrs/mo

PERFORMANCE

TEST	INFLUENT (mg/L)	EFFLUENT (mg/L)
BOD ₅	130	<1
TSS	34	1.8
TN	46	13.3

COST COMPARISON

	Gravity Sewer
	Effluent Sewer
	“Self-Help” Effluent Sewer



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