

## Environmental Quality Incentives Program

# Dairy Waste Storage



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— **Bruce Gordon**  
District Conservationist

### A Change in Plan

**Resource Concern:** Contaminants-Animal waste and other organics

**Original Plan:** An earthen structure installed and maintained for temporary storage of animal wastes or other organic agricultural wastes as part of a pollution-control system to conserve nutrients and to prevent environmental degradation.

**Revised Plan:** Fabricated concrete storage tank Installed above ground to store liquid and/or solid waste on a temporary basis as part of a pollution-control system to conserve nutrients and to prevent environmental degradation.

### Engineer Helps Dairy Find Affordable Waste Storage Solution

The Radelfinger-Nelson Dairy owned by **Denver Nelson**, milks approximately 200 Jersey cows on 201 acres of perennial grass-clover pasture at their main facility near Ferndale, California. Nelson has expanded and improved the facilities significantly since acquiring the property and recently converted to certified organic production.

In 2006 Nelson was interested in continuing improvements to the dairy including roof runoff, irrigation, nutrient management and an enhanced waste storage facility. He requested assistance from NRCS and received funding through the 2006 Environmental Quality Incentives Program (EQIP) at the Eureka, California NRCS office. Soil Conservationist **Mark Meissner** helped Nelson to develop a comprehensive conservation plan.

Improved waste storage was a priority. The dairy had two ponds and an in-ground pit that provided less than 80 days of liquid waste storage. But the rainy season in Humboldt County typically lasts more than 120 days. To prevent the ponds from overflowing uncontrollably during winter storms, liquid waste had to be pumped and applied to the land at every opportunity. This was usually at a time in the growing cycle when the pasture plants are not capable of fully using the nutrients and when imminent rain threatens to remove the nutrients through deep percolation and surface runoff and possibly contaminate surface waters.

**Ken Householder**, Ag Engineer at the Eureka Service Center, worked out a design that would meet the dairy’s waste storage needs. Householder



Laying the foundation



Pouring the floor slab



Erecting the forms



Finishing the forms



Finished tank ready for plumbing

When a Ferndale dairy needed a longer waste storage period to fully utilize organic nutrients while protecting water quality, the owner applied for EQIP cost-sharing to construct a manure storage facility to meet that need. But a problematic regulatory environment and changed design standards seemed to require a much more expensive facility than originally planned, possibly making the project unaffordable. An innovative solution was found through the tenacity and toil of an engineer from the Eureka office, and the project was completed for under \$131,000. The new tank will increase the storage period to 120 days.

All photos by Ken Householder

said that getting this practice implemented was definitely the first hurdle.

Changes to State waste storage regulations in the Central Valley led NRCS to make a statewide change to the practice standard for waste storage facilities. The result was that the new Nelson facility would have to be above ground due to the shallow water table in the area. “It would be very difficult if not impossible to use what had been used before,” said Householder.

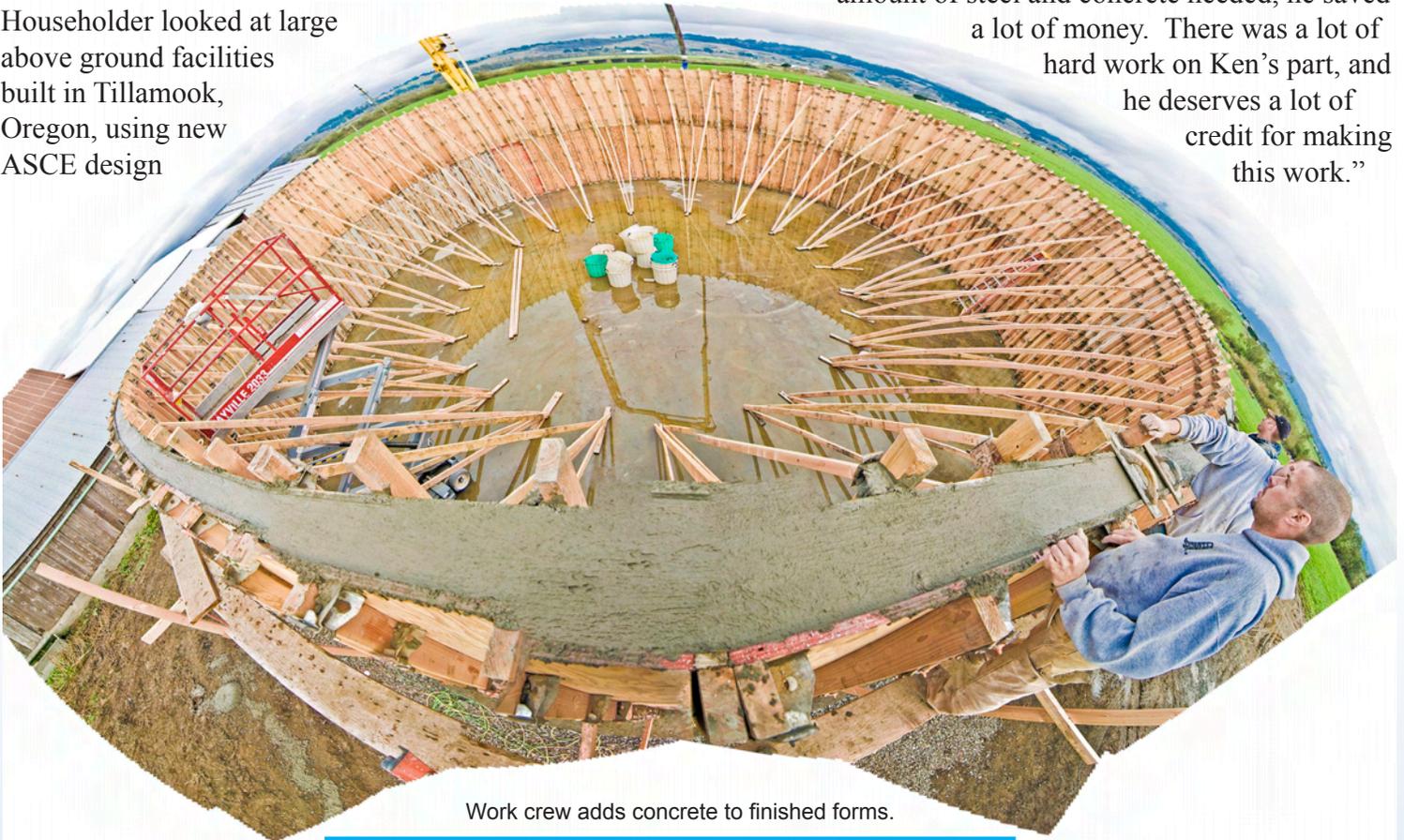
“The change in standard caused delay,” said District Conservationist **Bruce Gordon**. “The contract was written under the old standard. It would be much more expensive under the new standard, and early rough estimates indicated that it might cost as much as \$700,000.”

Householder looked at large above ground facilities built in Tillamook, Oregon, using new ASCE design

standards. He worked with the designer of those tanks and the engineering staff in Davis using these “state of the art” design standards to come up with a workable solution.

Although innovative, the Tillamook tanks have big footprints. One, holding 15.3 million gallons, is known as the largest above ground manure storage tank in North America. Householder designed the Nelson tank to fit local conditions and the dairy’s needs. “This tank is different because it had to be designed for the extreme seismic loads of our region,” Householder said. “The structure was built with big earthquakes in mind.”

“Ken was able to refine the design,” said Gordon. “He reduced the diameter and increased the height, using thinner walls and high grade concrete. By reducing the amount of steel and concrete needed, he saved a lot of money. There was a lot of hard work on Ken’s part, and he deserves a lot of credit for making this work.”



Work crew adds concrete to finished forms.

