

Manure Storage Covers That Pay!

Part 2: ECC Lagoon Cover Program



October 2009

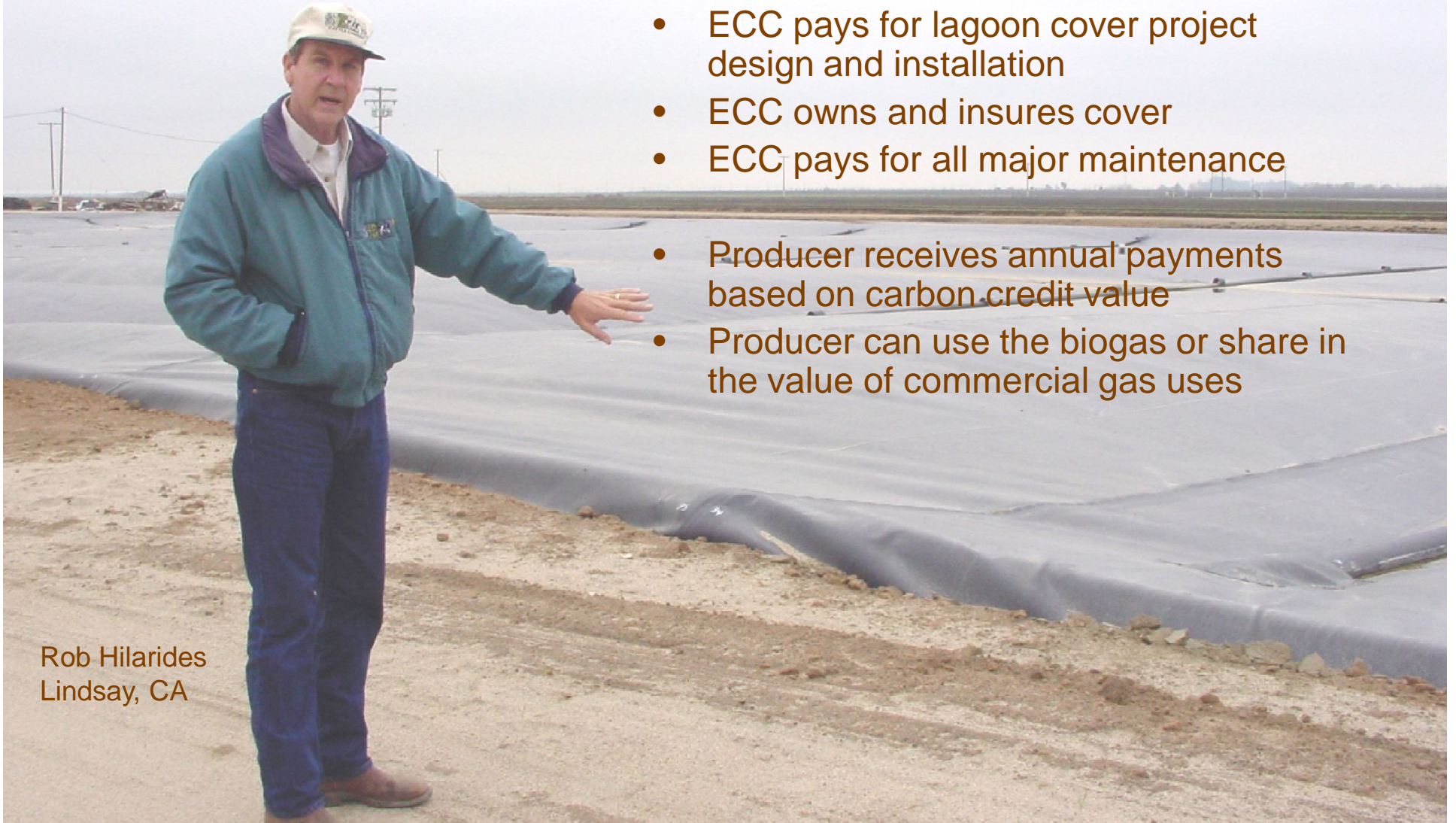
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www.envcc.com

ECC Lagoon Cover Program Creates New Environmental Assets With Carbon Credits

- ECC pays for lagoon cover project design and installation
- ECC owns and insures cover
- ECC pays for all major maintenance
- Producer receives annual payments based on carbon credit value
- Producer can use the biogas or share in the value of commercial gas uses

Rob Hilarides
Lindsay, CA



ECC Lagoon Cover Program Objectives

- The U.S. market for methane capture carbon credits is real; yet few real reduction projects have been realized so far.
- Our goal is to stimulate a mainstream, market supported, program for methane capture that provides both economic and environmental benefits.
- We look for public-private partnership opportunities that leverage private capital made available based on the carbon credits produced.

Consider the Asset Value of a Digester?

- In the dairy industry, anaerobic digesters are among the most sought after environmental assets.
- State officials and neighbors support digesters.
- AgSTAR (USDA+EPA) recognizes three digester types: covered lagoon, plug flow, and mixed
- These digesters provide numerous benefits to dairies: odor reduction, solids breakdown, manure conditioning.
- Significant obstacles prevent most dairies from using most types of digesters.
- The covered lagoon digester is a good option for many dairies.

Covered Lagoon Advantages

- Provides same advantages of manure digestion
- Optimum biogas production (cost per cubic foot)
- Well-proven technology (100s of applications)
- Add on to existing manure handling system
- Easy to understand and operate
- Very low maintenance requirements

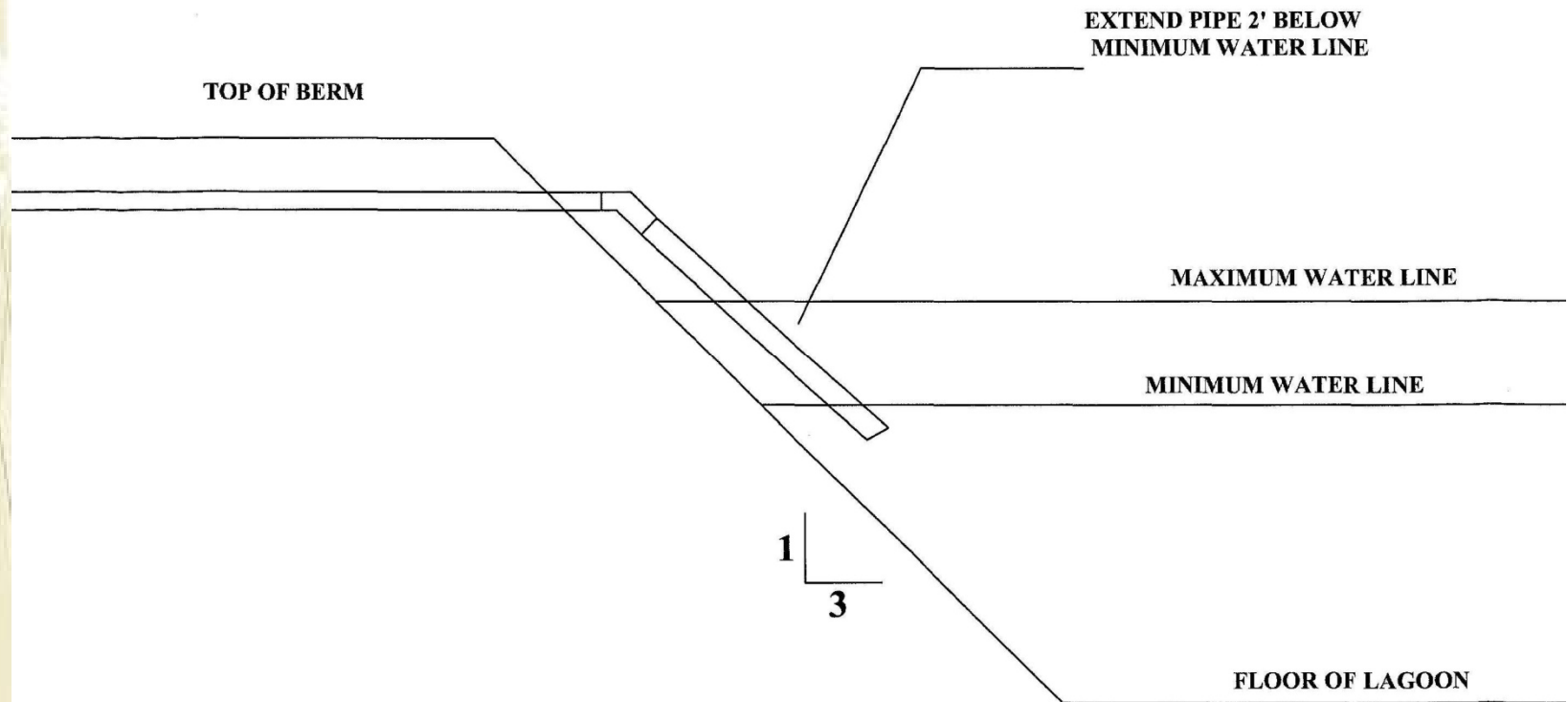
Covered Lagoon Challenges

- Ambient temperature
- Longer retention time
- Potential lagoon management conflicts
- Seasonal biogas production
- Variability limits constant electricity production
- Not as effective with additional waste feedstocks

Open- air manure lagoon



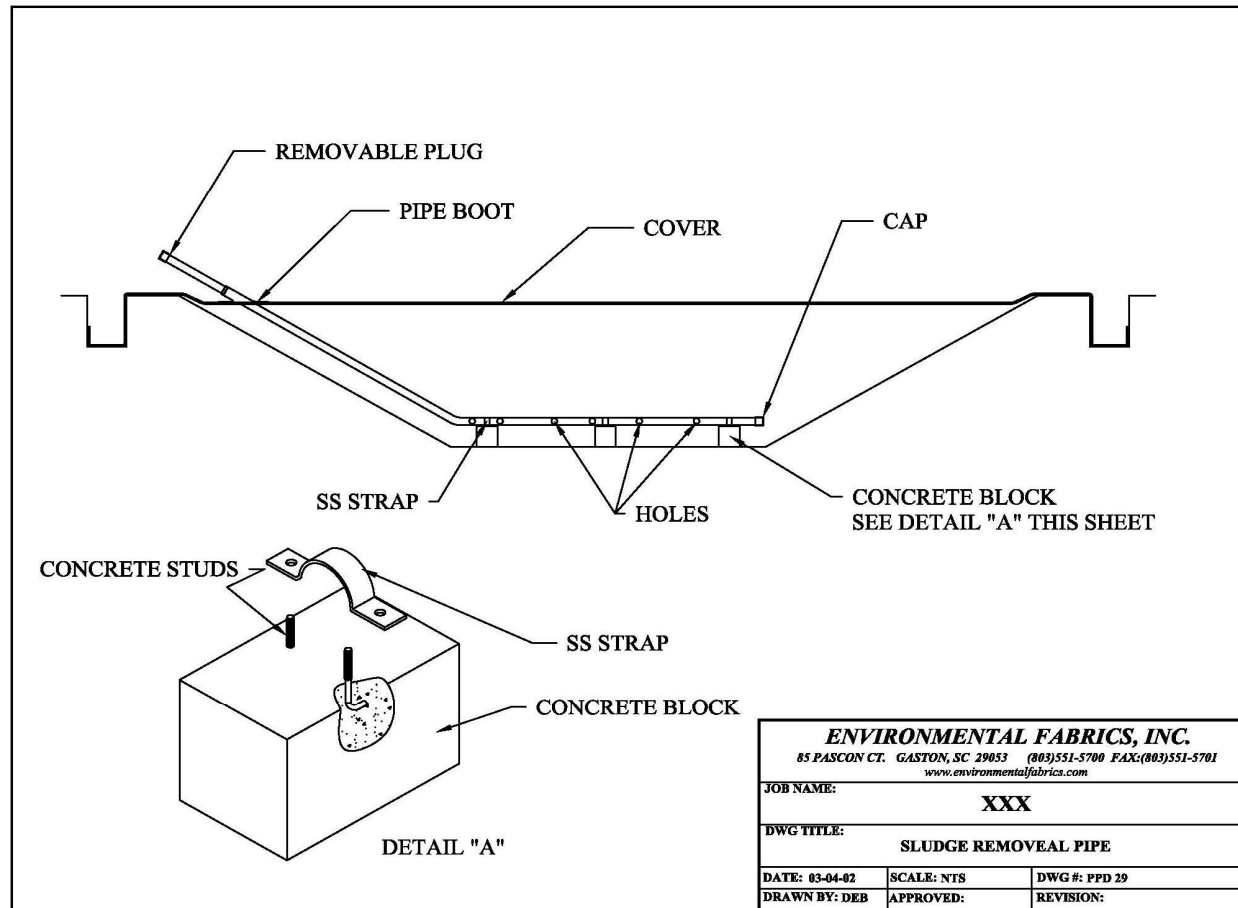
Piping Modifications



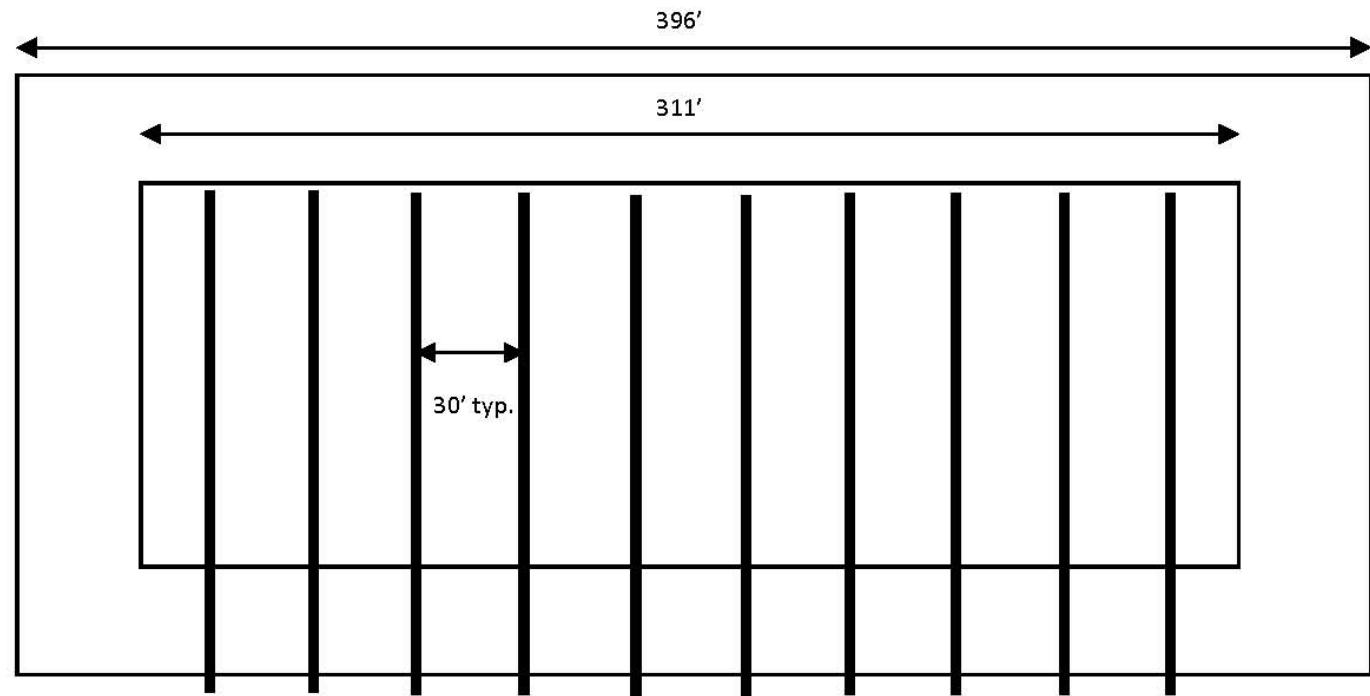
Sludge Piping



Covered Lagoon Solids/Surry Management



Covered Lagoon Solids/Surry Management



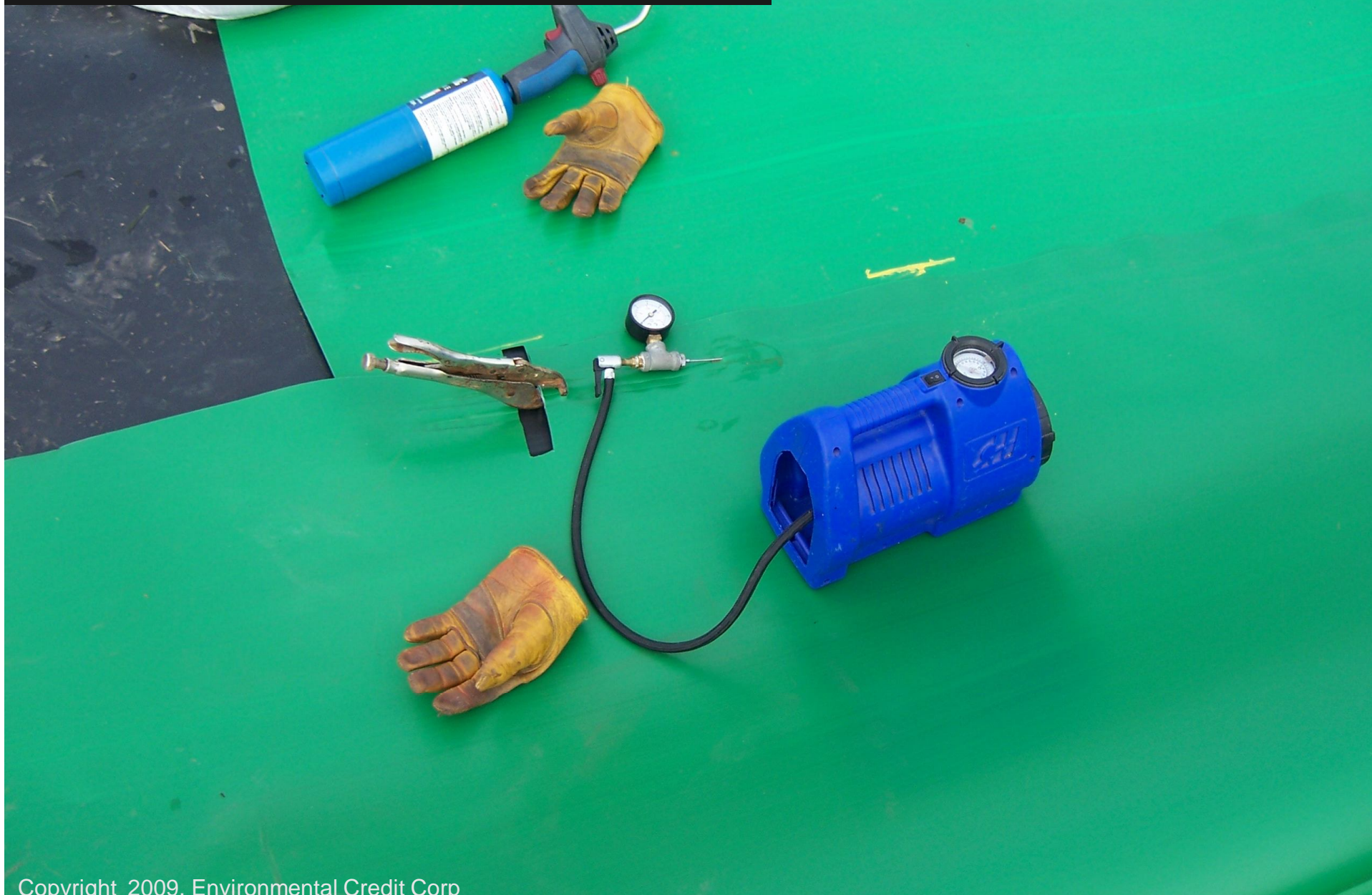
Gas collection piping



Construction of cover (1 of 3)



Construction of cover (2 of 3)



Construction of cover (3 of 3)

- Simple, low-cost technology
- U.S. supplier, local jobs
- Rapid installation
- Reliable operation
- Farmer friendly



Permanent installation



Finishing touches



Monitoring, Measurement & Verification



Completed Lagoon Cover



Benefits:

- Reduced GHG emissions
- Reduced odor
- Improved storm water management
- Potential for biogas use

Hilarides Dairy Lagoon Cover



- 6,000+ heifer ranch
- Lindsey, CA, (Central Valley)
- Self-financed lagoon cover with some grant support
- Installed by Environmental Fabrics Inc. (EFI)
- ECC Project Partner for carbon credits (~18,500 per year)
- Four 125 kW gensets provide maximum flexibility
- Expanding project to include 9,000 cow dairy

Fessenden Family Dairy Farm



- 800 dairy cows
- King Ferry, NY
- Manure management
 - Liquid
 - Scrape system
- Manure solids separation
- Open-air anaerobic manure lagoon
- Flare lit on July 2, 2008

Coyne Farms



- 1,400 cow dairy
- 7 million gallon lagoon
- Avon, NY, 20 miles south of Rochester
- Guaranteed income
- Buy-out provision
- Odor control & rainwater diversion
- *“Here’s a company that does all the work, and you still get something out of it. This is right up our alley.” Malachy Coyne*

Black Farms



6,000 finishing hogs

7 million gallon lagoon

Lillington, NC

Odor control & rainwater diversion

"I am very excited and proud to be one of the first farmers in North Carolina to be involved in this program, and to help pave new roads with technology in the hog industry." LD Black

Linde Dairy



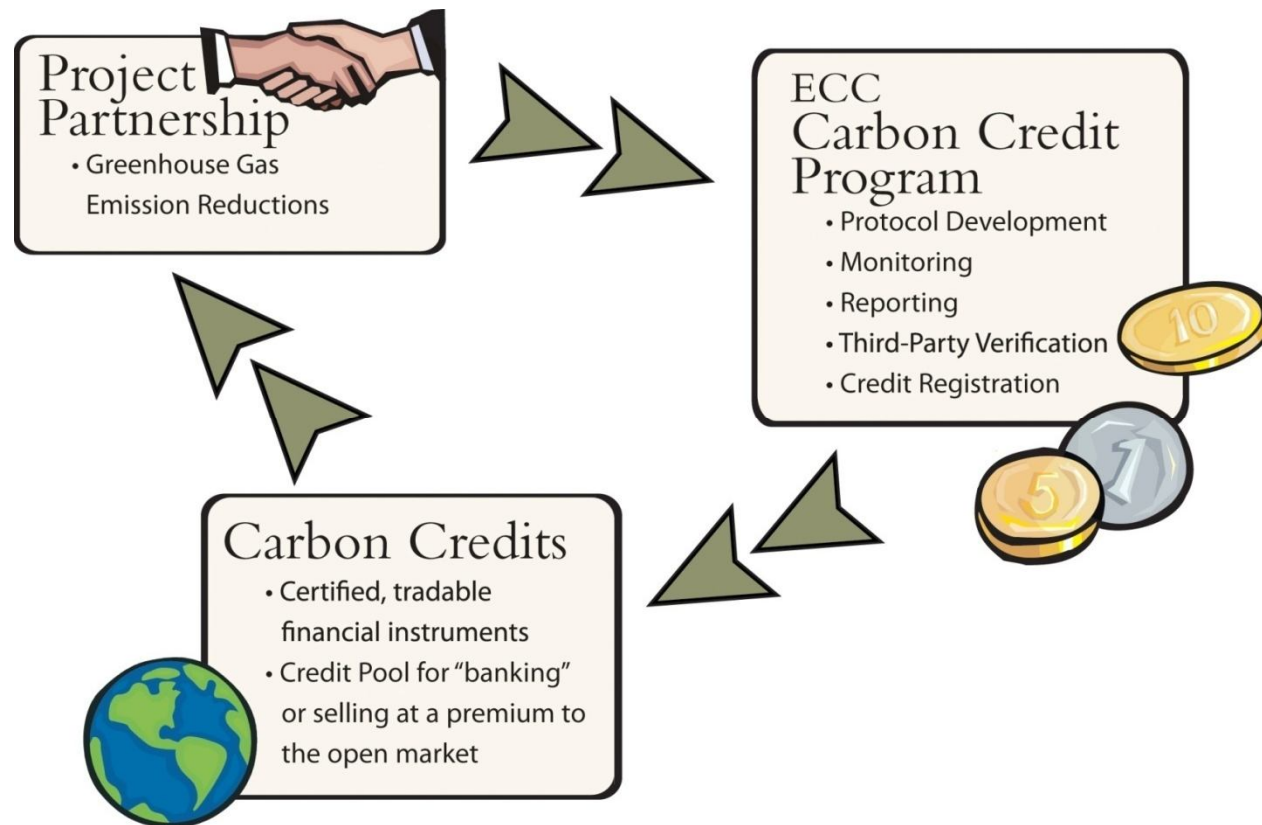
- 1,150 milking cows
- 35,000 sq ft lagoon
- White, SD
- Odor control & rainwater diversion
- 1st such project in South Dakota
- *“This project is something for the future and for taking care of the environment.” Rein Landman*

Miedema Dairy



- Andy and Itske Miedema family
- Expanding to 1,500 cows
- New second lagoon
- Circleville, OH
- 1st such project in Ohio
- Innovative partial cover design
- Cooperative research with OSU

How ECC Programs Work



ECC Lagoon Cover Program Advantages

Keep it Simple Principle

- Our expert design and construction staff do the work.
- Quick installation by a well-qualified vendor.
- Very low operation & maintenance requirements.
- On-farm renewable energy source.
- Additional farm benefits at no added cost.
- Get our support and connections for the highest and best use of the biogas.
- Positive publicity for your environmental partnership.
- ECC's success based model limits farm risk.

Major Lagoon Cover Products

Carbon Credits

- From methane destruction
- Certified annually
- Limited by the baseline
- Baselines vary by geography
- Additional credits from energy use
- Available right away after first year

Biogas (60% Methane)

- Digester experience: 50-90 cfd per milk cow equiv.
- Energy value = 600 BTU
- Expect seasonal variation
- Renewable energy credits
- Requires additional investments

Typical Biogas Use Priorities

- On-farm thermal energy (e.g., boiler)
- Supplemental fuel for diesel engines
- Sales to neighboring farms or businesses
- Electricity - combined heat and power (CHP)
- Pipeline quality gas
- Sales to utilities or gas company



Lagoon Cover Program Details

- ECC installs cover, meter and flare on existing lagoon system
- ECC takes care of any major maintenance
- Project partner does some routine maintenance
- Project partner assists with data collection
- ECC does all the carbon credit work and pays expenses
- ECC pays for all debts on its work
- Project partner receives 15% of credit value (\$3000 min.) to start. When debt is paid, partner receives 25% (\$3000 min.)
- ECC owns gas, which partner can use at 10% of market value
- Possible energy development projects to mutual benefit
- Project partner gets an option to purchase
- Ten year agreement with possible extensions
- No cost for odor control and rainwater exclusion

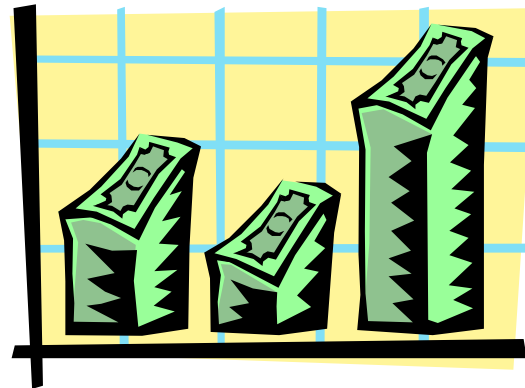
What Makes a Good FREE Project?

- Herd size: roughly 1,500 or more
- Flush vs scrape or vacuum
- Successful sand and solids removal
- Use mostly the liquid fraction of dairy manure
- Manage flows consistently (e.g., recycle flush or sand flume liquid before lagoon)
- Well designed and constructed lagoons
- Right size for bank-to-bank cover (60 days of HRT)
- Optimum square footage (deeper is better)
- COST SHARE available for less optimal projects

2009 Economics Example

POTENTIAL REVENUE:

- Facility size = 1500 cows
- Est credit potential = 4 credits/cow
- Est credit value = \$4-\$7/credit
- Est gas = 90,000 cu ft/day of biogas
- Guaranteed income & buy out provision



POTENTIAL CAPITAL:

- Lagoon cover alone = \$150,000 - \$250,000
- Gas use-generators = \$150,000 - \$250,000
- Digester & generators = \$1.5 - \$2.0 million

OPERATION & MAINTENANCE:

- Lagoon cover = simple
- Digester = complex and expensive

It's Time to Act THANK YOU



"I think there is something, more important than believing: Action! The world is full of dreamers, there aren't enough who will move ahead and begin to take concrete steps to actualize their vision." — W. Clement Stone