

FarmWare Version 3.0



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FarmWare

- Computer-based analytical tool
- Evaluates the economic viability of on-farm methane recovery
- Presents potential environmental and energy benefits
- Dairy and Swine farms

FarmWare v.3

- Design based on FarmWare v.2
- Upgraded design for Windows 98 and later
- Demo-stage
 - Currently Undergoing QA for methodology and calculations
 - Will be available for download from a project website

FarmWare v.3: Opening Screen

FarmWare: Welcome

AgSTAR

ENERGY AND POLLUTION PREVENTION

Welcome

Welcome to FarmWare version 3.0!

FarmWare is an analytical tool designed to identify the potential benefits of integrating anaerobic digestion into an existing or planned dairy or swine manure management system. By using FarmWare, you will learn about the costs of these types of systems and the potential environmental and financial benefits.

If you are a new user, you may want to review these brief instructions:

[Getting Started](#)

[Run FarmWare](#)

Step 1: Enter Farm Characteristics

- name, address, county
- farm type
- animals on site and housing
- current and planned waste management

FarmWare v.3: General Site Information: Typical California Drylot Feedlane Flush Manure Handling



FarmWare v.3: General Site Information

FarmWare: General Site Information

AgSTAR ENERGY AND POLLUTION PREVENTION

General Site Information | Setup Analysis | Farm description | Baseline Waste Management System | Biogas Waste Management System | Energy Consumption | Environmental Impact | Reports

New | Open | Background Data

Please press the "Open" to analyse the existing file or to create a new one press "New"

Farm Details

Farm Type:

Name Of Farm:

Address Line 1:

Address Line 2:

City:

State:

County:

Name Of Preparer:

Date Prepared: (mm/dd/yyyy)

Climate Details

	Temp(F)	Rain(in)
January		
February		
March		
April		
May		
June		
July		
August		
September		
October		
November		
December		
Avg/Total		

Save Exit Next >>

Begin New Analysis

OR

Open Existing Analysis

FarmWare v.3: General Site Information

Open Existing Analysis

The screenshot displays the FarmWare v.3 software interface. The main window, titled "FarmWare: General Site Information", features a navigation menu with options: General Site Information, Setup Analysis, Farm description, Baseline Waste Management System, Biogas Waste Management System, Energy Consumption, Environmental Impact, and Reports. Below the menu, there are input fields for "Farm Details" and "Climate Details", including a "Farm Type" dropdown and "Temp(F)" and "Rain(in)" fields. A red instruction reads: "Please press the 'Open' to analyse the existing file or to create a new one press 'New'".

An "OpenFarmWare" dialog box is overlaid on the main window, showing a table of "FarmWare Details". The table lists various farm types and their corresponding details:

Farm Type	Farm Name	Address Line 1	Address Lin	C
Swine: Farrowing plus nursery	Shanelles Dairy	465 Milkroad Lane	Route 655	Ak
Swine: Nursery	Riverroad Dairy Products	3999 River Road	Route 777	Fe
Swine: Farrow-to-finish	Whetstone Farms	123 Main Avenue	Tower Boule	Fe
Swine: Farrow-to-finish	Greenwich Pork	56 Highway 451	P.O. Box 44	Al
Swine: Farrowing plus nursery	Frederick Farms	50443 Frederick Farms	P.O. Box 33	Vt
Swine: Nursery	Kineath Swine	4000 Severn Parkway	Route 449	As
Dairy	Brakel Brown and Reid, Inc.	P.O. Box 4990	Route 490	Ya

At the bottom of the dialog box, there is a blue "Exit" button.

FarmWare v.3: General Site Information

Begin New Analysis

FarmWare: General Site Information

ENERGY AND POLLUTION PREVENTION

General Site Information | Setup Analysis | Farm description | Baseline Waste Management System | Biogas Waste Management System | Energy Consumption | Environmental Impact | Reports

New | Open | Background Data

Farm Details

Farm Type: Dairy

Name Of Farm: Williams Dairy Farm

Address Line 1: 1245 Milkers Lane

Address Line 2: Route 731

City: Milkertown

State: CA - California

County: IMPERIAL

Name Of Preparer: Doug Williams

Date Prepared: 3/24/2004 (mm/dd/yyyy)

Climate Details

	Temp(F)	Rain(in)
January	48.59	1.36
February	52.14	1.48
March	56.91	1.19
April	63.33	0.33
May	71.4	0.22
June	80.05	0.08
July	85.54	0.29
August	84.75	0.49
September	78.46	0.33
October	61.6	-0.08
November	49.74	0.12
December	42.54	0.45
Avg/Total	64.59	0.52

Save Exit Next >>

FarmWare v.3: Setup Analysis

FarmWare: Set Analysis

ENERGY AND POLLUTION PREVENTION

General Site Information | Setup Analysis | **Farm description** | Baseline Waste Management System | Biogas Waste Management System | Energy Consumption | Environmental Impact | Reports

The FarmWare analysis accounts for dairy cows and associated cattle to be housed in up to two locations on the farm: a Barn and/ or an outdoor confined area. Please select the appropriate for your facility

Do you keep animals in a barn?

Do you keep animals on pasture, outdoor lots or neither?

Yes - Flush Barn
Yes - Scrape Barn
No

For this analysis, you will be asked to specify the manure management system you are currently or are planning on using at your facility. Is this analysis for a new or an existing farm?

Select the primary waste management component for your baseline and biogas option.

Baseline Waste Management system

Liquid Management System:

Solid Management System:

Biogas Waste Management System

Liquid Management System:

Solid Management System:

<< Previous | Save | Exit | Next >>

FarmWare v.3: Setup Analysis

FarmWare: Set Analysis

AgSTAR ENERGY AND POLLUTION PREVENTION

General Site Information | **Setup Analysis** | Farm description | Baseline Waste Management System | Biogas Waste Management System | Energy Consumption | Environmental Impact | Reports

The FarmWare analysis accounts for dairy cows and associated cattle to be housed in up to two locations on the farm: a Barn and/or an outdoor confined area. Please select the appropriate for your facility

Do you keep animals in a barn? Yes - Flush Barn

Do you keep animals on pasture, outdoor lots or neither? Scraped Outdoor Lot

Number of Barns: 4
Number of Flush Tank: 2
Gallons per Flush: 100000
Flushes per Day: 1

Is flushing or scraping used to collect manure from the lot? Scraping

How often is manure collected: 1 per week

What portion of the dry lot is a loafing area? 60 %
What portion of the loafing area is paved? 20 %
What portion of the dry lot is the feeding area? 20 %
What portion of the feed lane is paved? 10 %

For this analysis, you will be asked to specify the manure management system you are currently or are planning on using at your facility. Is this analysis for a new or an existing farm?
Existing Farm

Select the primary waste management component for your baseline and biogas option.

Baseline Waste Management system
Liquid Management System: Single Cell Anaerobic Lagoon
Solid Management System: Solid Storage

Biogas Waste Management System
Liquid Management System: Covered Lagoon Digester
Solid Management System: Solid Storage

<< Previous | Save | Exit | Next >>

FarmWare v.3: Setup Analysis

FarmWare: Set Analysis

ENERGY AND POLLUTION PREVENTION

General Site Information | **Setup Analysis** | Farm description | Baseline Waste Management System | Biogas Waste Management System | Energy Consumption | Environmental Impact | Reports

The FarmWare analysis accounts for Swine to be housed in one type of location on the farm. Please select the appropriate for your facility. (Note: If Swine are housed on pasture, biogas recovery is not viable option.)

What is your manure removal system basis?

Frequency of Draining

Recharge Volume (recycled water)

For this analysis, you will be asked to specify the manure management system you are currently or are planning on using at your facility. Is this analysis for a new or an existing farm?

Select the primary waste management component for your baseline and biogas option.

Baseline Waste Management system

Liquid Management System:

Solid Management System:

Biogas Waste Management System

Liquid Management System:

Solid Management System:

<< Previous | Save | Exit | Next >>

FarmWare v.3: Setup Analysis

FarmWare: Set Analysis



ENERGY AND POLLUTION PREVENTION



General Site Information | Setup Analysis | **Farm description** | Baseline Waste Management System | Biogas Waste Management System | Energy Consumption | Environmental Impact | Reports

The FarmWare analysis accounts for Swine to be housed in one type of location on the farm. Please select the appropriate for your facility. (Note: If Swine are housed on pasture, biogas recovery is not viable option.)

What is your manure removal system basis?

Frequency of Draining

Recharge Volume (recycled water) gallons per day per animal

For this analysis, you will be asked to specify the manure management system you are currently or are planning on using at your facility. Is this analysis for a new or an existing farm?

Select the primary waste management component for your baseline and biogas option.

Baseline Waste Management system

Liquid Management System:

Solid Management System:

Biogas Waste Management System

Liquid Management System:

Solid Management System:

<< Previous | Save | Exit | Next >>

FarmWare v.3: Farm Description

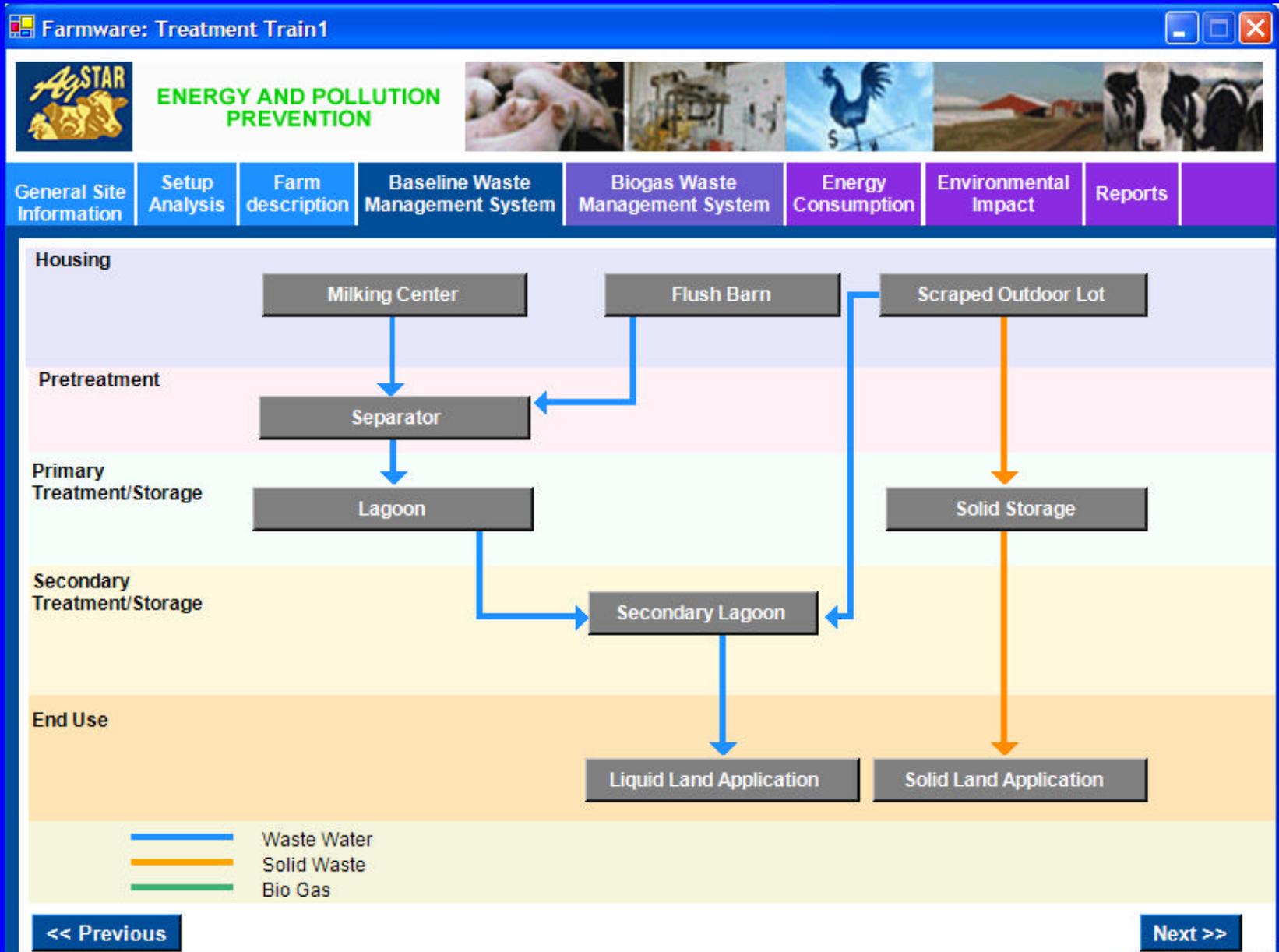
Drylot + Flush Lanes



Step 2: Review Waste Management System Flow Charts

- Based on previously input data
- Baseline = traditional system
- Biogas = methane recovery system

FarmWare v.3: Baseline WMS



FarmWare v.3: Baseline WMS

Flushwater solids settling and screen separator

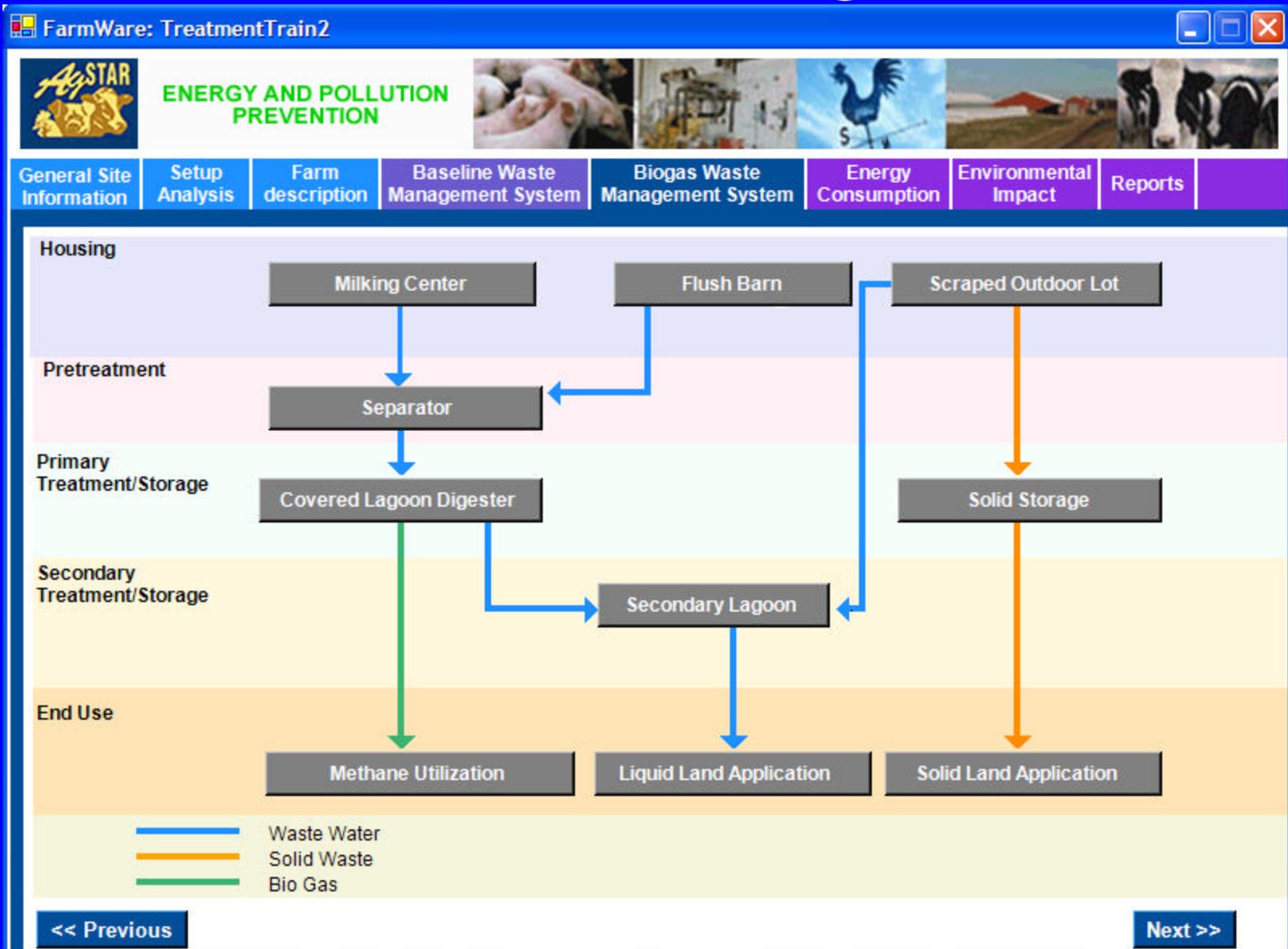


FarmWare v.3: Baseline WMS

Existing Storage Lagoon



FarmWare v.3: Biogas WMS



FarmWare v.3: Biogas WMS

New Covered Lagoon



FarmWare v.3: Biogas WMS

New Covered Lagoon



FarmWare v.3: Biogas WMS

Biogas Handling System



FarmWare v.3: Biogas WMS

Biogas Handling System



FarmWare v.3: Biogas WMS Engine-Generator



FarmWare v.3: Biogas WMS Engine-Generator and Heat Recovery



Step 3: Enter Energy Use Information

- Historical Use (past 12 months)
- Energy Program Participation

FarmWare v.3: Energy Consumption

FarmWare - Energy



ENERGY AND POLLUTION
PREVENTION







General Site Information
Setup Analysis
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Historical Energy

What sources of energy do you use or plan to use at your facility?

	<input checked="" type="checkbox"/> Electricity		<input type="checkbox"/> Fuel Oil		<input checked="" type="checkbox"/> Propane	
	kwh	\$/month	gallons	\$/month	gallons	\$/month
January	40,530	5,320			320	1,200
February	38,439	4,590			410	1,400
March	38,439	4,590			380	1,300
April	34,500	4,000			350	1,325
May	30,000	4,004			330	1,450
June	30,400	4,200			420	1,305
July	30,500	4,300			400	1,603
August	28,020	3,800			405	1,710
September	32,300	4,100			410	1,821
October	33,401	4,200			390	1,400
November	38,300	4,400			380	1,300
December	40,530	5,320			375	1,200

Replace w/biogas? Yes No No

Percent of recovered biogas energy consumed on the farm?

Future Energy Program

If you are choosing a methane recovery option, will you participate in any of the following programs?

Net Metering [Info](#)

Electricity Rate \$/kWh

BUYBACK PROGRAMS [Info](#)

Sell All

Electricity Purchase Rate \$/kWh

Farm Generated Sell Rate \$/kWh

Surplus Sales

Standard (off peak) Electricity Purchase Rate \$/kWh

Peak Electricity Purchase Rate \$/kWh

Utility incentive \$/kWh saved

Standby Charge \$/kWh

Information on your state's rules

<< Previous
Save
Exit
Next >>

Step 3: Review Reports

- Quick Financial Report
- Summary Report (in development)
- Cost Flow Report (in development)
- Environmental Report

FarmWare v.3:

Quick Financial Report

FarmWare Quick Report
Case Study 1
Milkerstown, California
3/25/2004

Parameter	Baseline System	Biogas Recovery System
Capital Cost	\$140,450	\$340,038
Annual Operating Cost	\$ 7,022	\$ 21,045
Annual Energy Savings	\$ 0	\$ 19,035
Net Present Value	-	\$ 4,353
Simple Payback	-	8 years

FarmWare v.3:

Environmental Comparison

Parameter	Reduction, %					
	Uncovered Anaerobic Lagoon	Storage Tanks and Ponds	Covered Lagoons, Dairy and Swine	Complete Mix, Swine	Complete Mix, Dairy	Plug Flow, Dairy
Water Quality Impacts Related To:						
Total Solids	> 95%	< 5%	> 95%	up to 55%	up to 25%	up to 25%
Total Volatile Solids	> 98%	< 10%	> 98%	up to 65%	up to 30%	up to 30%
Total Nitrogen	> 90%	< 10%	> 90%	0%	0%	0%
Total Phosphorus	> 95%	< 1%	> 98%	0%	0%	0%
Pathogens	> 95% indicator organisms	0%	> 95% indicator organisms	up to 99% indicator organisms	> 99% indicator organisms	> 99% indicator organisms
Air Quality Impacts Related To:						
Methane	0%	0%	> 75%	up to 80%	up to 25%	up to 25%
Odors (volatile organic acids)	Some reduction	No reduction	Notable reduction	Notable reduction	Notable reduction	Notable reduction
Amm onia	0%	0%	0%	0%	0%	0%
Hydrogen Sulfide	unknown	0%	unknown	0%	+/- 50%	+/- 50%

FarmWare v.3 Next Steps

- Complete functionality
- Methodology quality assurance checks
- Final revision from QA and comments
- Expected completion Spring 2004