

Practice: 366 - Anaerobic Digester

Scenario: #1 - Small Plug Flow <1000 AU

Scenario Description: A plug flow anaerobic digester with less than 1000 animal unit capacity is installed as part of a waste management system to provide biological treatment of waste in absence of oxygen. The process manages odors, reduces the net effect of greenhouse gas emissions, and/or reduces pathogens. The digester type selected is based on effluent consistency. Energy generation is not included. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Waste Separation Facility (632), Waste Treatment Lagoon (359), and Waste Storage Facility (313)

Before Situation: Manure and other agricultural by-products are not being controlled or utilized in an environmentally safe manner. The wastes are accumulating or being transported, but are not properly utilized or disposed of posing an environmental threat of excessive nutrients, organics, and pathogens being transported into surface and ground waters. The treatment of manure and other agricultural by-products is desired in order to manage odors and/or reduce pathogens.

After Situation: A concrete, plug flow anaerobic digester is constructed with vertical side walls and a solid or flexible top. Components to maintain mesophylic or thermophylic temperatures for bacterial activity are included (i.e. piping and boiler or other heat source). Manure or other agricultural by-products are treated to manage odors and/or pathogens. Effluent from the digester is disposed of or utilized in accordance with a nutrient management plan. Typical Design Scenario: 910 animal units (650 - 1,400 lbs dairy cows).

Scenario Feature Measure: Animals Units Contributing to Digester

Scenario Unit: Animal Unit

Scenario Typical Size: 910

Total Scenario Cost: \$650,001.96

Scenario Cost/Unit: \$714.29

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Acquisition of Technical Knowledge

Training, Workshops	294	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	\$45.80	2	\$91.60
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Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$541.06	1	\$541.06
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	1	\$283.39
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$78.25	1	\$78.25

Equipment Installation

Plug Flow, Small (less than 1,000 animal units)	2478	Concrete plug flow anaerobic digester which includes poured walls, floor and top, reception and mixing tanks, piping installed in and/or around the digester for circulating heated liquid to maintain the necessary temperatures for efficient digester operation, piping and collection system for biogas, controls for operating digester and boiler system, boiler needed to maintain digester temperature, and flare excess gas to convert from methane to carbon dioxide. Sized for smaller livestock operations (<1000 AU) includes material, labor, and equipment.	Each	\$649,007.65	1	\$649,007.65
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Practice: 366 - Anaerobic Digester

Scenario: #2 - Medium Plug Flow 1000-2000 AU

Scenario Description: A plug flow anaerobic digester is installed as part of a waste management system to provide biological treatment of waste in absence of oxygen on a livestock operation between 1,000 and 2,000 animal units. The process manages odors, reduces the net effect of greenhouse gas emissions, and/or reduces pathogens. The digester type selected is based on effluent consistency. Energy generation is not included. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Waste Separation Facility (632), Waste Treatment Lagoon (359), and Waste Storage Facility (313).

Before Situation: Manure and other agricultural by-products are not being controlled or utilized in an environmentally safe manner. The wastes are accumulating or being transported, but are not properly utilized or disposed of posing an environmental threat of excessive nutrients, organics, and pathogens being transported into surface and ground waters. The treatment of manure and other agricultural by-products is desired in order to manage odors and/or reduce pathogens.

After Situation: A concrete, plug flow anaerobic digester is constructed with vertical side walls and a solid or flexible top. Components to maintain mesophylic or thermophylic temperatures for bacterial activity are included (i.e. piping and boiler or other heat source). Manure or other agricultural by-products are treated to manage odors and/or pathogens. Effluent from the digester is disposed of or utilized in accordance with a nutrient management plan. Typical design scenario: 1,750 animal units (1,250 - 1,400 lbs dairy cows).

Scenario Feature Measure: Animals Units Contributing to Digester

Scenario Unit: Animal Unit

Scenario Typical Size: 1750

Total Scenario Cost: \$889,786.35

Scenario Cost/Unit: \$508.45

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Acquisition of Technical Knowledge

Training, Workshops	294	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	\$45.80	2	\$91.60
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Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$541.06	1	\$541.06
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	2	\$566.78
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$78.25	1	\$78.25

Equipment Installation

Plug Flow, Medium (between 1,000 and 2,000 animal units)	2479	Concrete plug flow anaerobic digester which includes poured walls, floor and top, reception and mixing tanks, piping installed in and/or around the digester for circulating heated liquid to maintain the necessary temperatures for efficient digester operation, piping and collection system for biogas, controls for operating digester and boiler system, boiler needed to maintain digester temperature, and flare excess gas to convert from methane to carbon dioxide. Sized for medium sized livestock operations (1000-2000 AU) includes material, labor, and equipment.	Each	\$888,508.66	1	\$888,508.66
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Practice: 366 - Anaerobic Digester

Scenario: #3 - Large Plug Flow >2000 AU

Scenario Description: A plug flow anaerobic digester is installed as part of a waste management system to provide biological treatment of waste in absence of oxygen on a livestock operation with more than 2,000 animal units. The process manages odors, reduces the net effect of greenhouse gas emissions, and/or reduces pathogens. The digester type selected is based on effluent consistency. Energy generation is not included. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Waste Separation Facility (632), Waste Treatment Lagoon (359), and Waste Storage Facility (313).

Before Situation: Manure and other agricultural by-products are not being controlled or utilized in an environmentally safe manner. The wastes are accumulating or being transported, but are not properly utilized or disposed of posing an environmental threat of excessive nutrients, organics, and pathogens being transported into surface and ground waters. The treatment of manure and other agricultural by-products is desired in order to manage odors and/or reduce pathogens.

After Situation: A concrete, plug flow anaerobic digester is constructed with vertical side walls and a solid or flexible top. Components to maintain mesophylic or thermophylic temperatures for bacterial activity are included (i.e. piping and boiler or other heat source). Manure or other agricultural by-products are treated to manage odors and/or pathogens. Effluent from the digester is disposed of or utilized in accordance with a nutrient management plan. Typical Design Scenario: 3,920 animal units (2,800 - 1,400 lbs dairy cows).

Scenario Feature Measure: Animals Units Contributing to Digester

Scenario Unit: Animal Unit

Scenario Typical Size: 3920

Total Scenario Cost: \$1,331,344.11

Scenario Cost/Unit: \$339.63

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Acquisition of Technical Knowledge

Training, Workshops	294	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	\$45.80	2	\$91.60
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Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$541.06	1	\$541.06
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	3	\$850.16
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$78.25	1	\$78.25

Equipment Installation

Plug Flow, Large (more than 2,000 animal units)	2480	Concrete plug flow anaerobic digester which includes poured walls, floor and top, reception and mixing tanks, piping installed in and/or around the digester for circulating heated liquid to maintain the necessary temperatures for efficient digester operation, piping and collection system for biogas, controls for operating digester and boiler system, boiler needed to maintain digester temperature, and flare excess gas to convert from methane to carbon dioxide. Sized for large livestock operations (>2000 AU) includes material, labor, and equipment.	Each	\$1,329,783.03	1	\$1,329,783.03
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Practice: 366 - Anaerobic Digester

Scenario: #4 - Small Complete Mix <1000 AU

Scenario Description: A complete mix anaerobic digester is installed as part of a waste management system to provide biological treatment of waste in the absence of oxygen on a livestock operation with less than 1000 animal units. The process manages odors, reduces the net effect of greenhouse gas emissions, and/or reduces pathogens. The digester type selected is based on effluent consistency. Energy generation is not included. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Waste Separation Facility (632), Waste Treatment Lagoon (359), and Waste Storage Facility (313).

Before Situation: Manure and other agricultural by-products are not being controlled or utilized in an environmentally safe manner. The wastes are accumulating or being transported, but are not properly utilized or disposed of posing an environmental threat of excessive nutrients, organics, and pathogens being transported into surface and ground waters. The treatment of manure and other agricultural by-products is desired in order to manage odors and/or reduce pathogens.

After Situation: A round, concrete or steel complete mix digester is constructed above ground. Components to maintain mesophilic or thermophilic temperatures for bacterial activity are included (i.e. piping and boiler or other heat source). Manure or other agricultural by-products are treated to manage odors and/or pathogens. Effluent from the digester is disposed of or utilized in accordance with a nutrient management plan. Typical Design Scenario: 1,039 animal units (742 - 1,400 lbs dairy cows).

Scenario Feature Measure: Animals Units Contributing to Digester

Scenario Unit: Animal Unit

Scenario Typical Size: 1039

Total Scenario Cost: \$745,655.33

Scenario Cost/Unit: \$717.67

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Acquisition of Technical Knowledge

Training, Workshops	294	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	\$45.80	2	\$91.60
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Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$541.06	1	\$541.06
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	1	\$283.39
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$78.25	1	\$78.25

Equipment Installation

Complete Mix, Small (less than 1,000 animal units)	2481	A complete mix flow anaerobic digester includes the containment facility, agitation or stirring equipment, and any necessary reception and mixing tanks. Piping installed in and/or around the digester for circulating heated liquid to maintain the necessary temperatures for efficient digester operation, Piping and collection system for biogas, Controls for operating digester and boiler system, boiler needed to maintain digester temperature, and flare excess gas to convert from methane to carbon dioxide. Sized for smaller livestock operations (<1000 AU) includes material, labor, and equipment.	Each	\$744,661.03	1	\$744,661.03
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Practice: 366 - Anaerobic Digester

Scenario: #5 - Medium Complete Mix 1000-2500 AU

Scenario Description: A complete mix anaerobic digester is installed as part of a waste management system to provide biological treatment of waste in the absence of oxygen on a livestock operation with 1,000 to 2,500 animal units. The process manages odors, reduces the net effect of greenhouse gas emissions, and/or reduces pathogens. The digester type selected is based on effluent consistency. Energy generation is not included. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Waste Separation Facility (632), Waste Treatment Lagoon (359), and Waste Storage Facility (313).

Before Situation: Manure and other agricultural by-products are not being controlled or utilized in an environmentally safe manner. The wastes are accumulating or being transported, but are not properly utilized or disposed of posing an environmental threat of excessive nutrients, organics, and pathogens being transported into surface and ground waters. The treatment of manure and other agricultural by-products is desired in order to manage odors and/or reduce pathogens.

After Situation: A round, concrete or steel complete mix digester is constructed above ground. Components to maintain mesophilic or thermophilic temperatures for bacterial activity are included (i.e. piping and boiler or other heat source). Manure or other agricultural by-products are treated to manage odors and/or pathogens. Effluent from the digester is disposed of or utilized in accordance with a nutrient management plan. Typical Design Scenario: 1,890 animal units (1,350 - 1,400 lbs dairy cows).

Scenario Feature Measure: Animals Units Contributing to Digester

Scenario Unit: Animal Unit

Scenario Typical Size: 1890

Total Scenario Cost: \$1,300,986.72

Scenario Cost/Unit: \$688.35

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Acquisition of Technical Knowledge

Training, Workshops	294	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	\$45.80	2	\$91.60
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Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$541.06	1	\$541.06
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	2	\$566.78
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$78.25	1	\$78.25

Equipment Installation

Complete Mix, Medium (between 1,000 and 2,500 animal units)	2482	A complete mix flow anaerobic digester includes the containment facility, agitation or stirring equipment, and any necessary reception and mixing tanks. Piping installed in and/or around the digester for circulating heated liquid to maintain the necessary temperatures for efficient digester operation, Piping and collection system for biogas, Controls for operating digester and boiler system, boiler needed to maintain digester temperature, and Flare excess gas to convert from methane to carbon dioxide. Sized for medium sized livestock operations (1000-2500 AU) includes material, labor, and equipment.	Each	\$1,299,709.03	1	\$1,299,709.03
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Practice: 366 - Anaerobic Digester

Scenario: #6 - Large Complete Mix >2,500 AU

Scenario Description: A complete mix anaerobic digester is installed as part of a waste management system to provide biological treatment of waste in the absence of oxygen on a livestock operation with more than 2,500 animal units. The process manages odors, reduces the net effect of greenhouse gas emissions, and/or reduces pathogens. The digester type selected is based on effluent consistency. Energy generation is not included. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Waste Separation Facility (632), Waste Treatment Lagoon (359), and Waste Storage Facility (313).

Before Situation: Manure and other agricultural by-products are not being controlled or utilized in an environmentally safe manner. The wastes are accumulating or being transported, but are not properly utilized or disposed of posing an environmental threat of excessive nutrients, organics, and pathogens being transported into surface and ground waters. The treatment of manure and other agricultural by-products is desired in order to manage odors and/or reduce pathogens.

After Situation: A round, concrete or steel complete mix digester is constructed above ground. Components to maintain mesophilic or thermophilic temperatures for bacterial activity are included (i.e. piping and boiler or other heat source). Manure or other agricultural by-products are treated to manage odors and/or pathogens. Effluent from the digester is disposed of or utilized in accordance with a nutrient management plan. Typical Design Scenario: 3,220 animal units (2,300 - 1,400 lbs dairy cows).

Scenario Feature Measure: Animals Units Contributing to Digester

Scenario Unit: Animal Unit

Scenario Typical Size: 3220

Total Scenario Cost: \$1,561.08

Scenario Cost/Unit: \$0.48

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Acquisition of Technical Knowledge

Training, Workshops	294	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	\$45.80	2	\$91.60
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Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$541.06	1	\$541.06
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	3	\$850.16
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$78.25	1	\$78.25

Practice: 366 - Anaerobic Digester

Scenario: #7 - Covered Lagoon/Holding Pond

Scenario Description: A covered lagoon is installed as part of a waste management system to provide biological treatment of waste in the absence of oxygen. The process manages odors, reduces the net effect of greenhouse gas emissions, and/or reduces pathogens. The waste holding/treatment area is covered by waste treatment lagoon (359) or waste storage facility (313) and the cover is addressed under roofs and covers (367). Costs for this scenario are only for system controls, gas collection, and flaring system. The digester type selected is based on effluent consistency. Energy generation is not included. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Waste Separation Facility (632), Waste Treatment Lagoon (359), and Waste Storage Facility (313).

Before Situation: Manure and other agricultural by-products are not being controlled or utilized in an environmentally safe manner. The wastes are accumulating or being transported, but are not properly utilized or disposed of posing an environmental threat of excessive nutrients, organics, and pathogens being transported into surface and ground waters. The treatment of manure and other agricultural by-products is desired in order to manage odors and/or reduce pathogens.

After Situation: A covered lagoon/holding pond with a flexible top is installed over an earthen storage/treatment facility for the purposes of capturing biogas. Manure or other agricultural by-products are treated to manage odors and/or pathogens. Effluent from the digester is disposed of or utilized in accordance with a nutrient management plan. Typical Design Scenario: 1,000 animal units (715 - 1,400 lbs dairy cows).

Scenario Feature Measure: Animals Units Contributing to Digester

Scenario Unit: Animal Unit

Scenario Typical Size: 1000

Total Scenario Cost: \$108,407.44

Scenario Cost/Unit: \$108.41

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Acquisition of Technical Knowledge

Training, Workshops	294	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	\$45.80	1	\$45.80
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	1	\$283.39
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$78.25	1	\$78.25

Equipment Installation

Covered Lagoon (not including the lagoon or the associated cover)	2484	Piping and collection system for biogas, controls for operating the digester system, flare excess gas to convert from methane to carbon dioxide Includes material, labor, and equipment.	Each	\$108,000.00	1	\$108,000.00
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Practice: 366 - Anaerobic Digester

Scenario: #16 - Small Plug Flow less than 1000 AU

Scenario Description: A plug flow anaerobic digester can be part of a waste management system. It provides biological treatment of the waste in the absence of oxygen. This process for manure and other by-products of animal agricultural operations will manage odors, reduce the net effect of greenhouse gas emissions, and/or reduce pathogens. This scenario is for a plug flow digester with less than 1,000 animal units. Selection of digester type will be based on effluent consistency. Energy generation is not included with this scenario. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Waste Separation Facility (632), Waste Treatment Lagoon (359), and Waste Storage Facility (313).

Before Situation: Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed. This situation poses an environmental threat of excessive nutrients, organics, and pathogens being transported into surface and ground waters, in addition to the use of excessive amounts of fertilizers. The treatment of manure and other agricultural by-products is desired in order to manage odors, and/or reduce pathogens.

After Situation: Manure and other agricultural by-products are being treated such that odors are managed and/or pathogens are reduced. Effluent from the digester is disposed of or utilized in a proper manner in accordance with a nutrient management plan. A plug flow digester is typically constructed of concrete with vertical side walls and solid or flexible top. The typical scenario also includes items necessary to maintain mesophilic or thermophilic temperatures for bacterial activity (i.e. piping and boiler or other heat source). Typical Design Scenario: 910 animal units (650 - 1,400 lbs dairy cows).

Scenario Feature Measure: Animals Units Contributing to Digester

Scenario Unit: Animal Unit

Scenario Typical Size: 910

Total Scenario Cost: \$650,001.96

Scenario Cost/Unit: \$714.29

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Acquisition of Technical Knowledge

Training, Workshops	294	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	\$45.80	2	\$91.60
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Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$541.06	1	\$541.06
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	1	\$283.39
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$78.25	1	\$78.25

Equipment Installation

Plug Flow, Small (less than 1,000 animal units)	2478	Concrete plug flow anaerobic digester which includes poured walls, floor and top, reception and mixing tanks, piping installed in and/or around the digester for circulating heated liquid to maintain the necessary temperatures for efficient digester operation, piping and collection system for biogas, controls for operating digester and boiler system, boiler needed to maintain digester temperature, and flare excess gas to convert from methane to carbon dioxide. Sized for smaller livestock operations (<1000 AU) includes material, labor, and equipment.	Each	\$649,007.65	1	\$649,007.65
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Practice: 366 - Anaerobic Digester

Scenario: #17 - Medium Plug Flow 1000-2000 AU

Scenario Description: A plug flow anaerobic digester can be part of a waste management system. It provides biological treatment of the waste in the absence of oxygen. This process for manure and other by-products of animal agricultural operations will manage odors, reduce the net effect of greenhouse gas emissions, and/or reduce pathogens. This scenario is for plug flow digesters with livestock operations between 1,000 and 2,000 animal units. Selection of digester type will be based on effluent consistency. Energy generation is not included with this scenario. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Waste Separation Facility (632), Waste Treatment Lagoon (359), and Waste Storage Facility (313).

Before Situation: Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed. This situation poses an environmental threat of excessive nutrients, organics, and pathogens being transported into surface and ground waters, in addition to the use of excessive amounts of fertilizers. The treatment of manure and other agricultural by-products is desired in order to manage odors, and/or reduce pathogens.

After Situation: Manure and other agricultural by-products are being treated such that odors are managed and/or pathogens are reduced. Effluent from the digester is disposed of or utilized in a proper manner in accordance with a nutrient management plan. A plug flow digester is typically constructed of concrete with vertical side walls and solid or flexible top. The typical scenario also includes items necessary to maintain mesophilic or thermophilic temperatures for bacterial activity (i.e. piping and boiler or other heat source). Typical design scenario: 1,750 animal units (1,250 - 1,400 lbs dairy cows).

Scenario Feature Measure: Animals Units Contributing to Digester

Scenario Unit: Animal Unit

Scenario Typical Size: 1750

Total Scenario Cost: \$889,786.35

Scenario Cost/Unit: \$508.45

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Acquisition of Technical Knowledge

Training, Workshops	294	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	\$45.80	2	\$91.60
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Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$541.06	1	\$541.06
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	2	\$566.78
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$78.25	1	\$78.25

Equipment Installation

Plug Flow, Medium (between 1,000 and 2,000 animal units)	2479	Concrete plug flow anaerobic digester which includes poured walls, floor and top, reception and mixing tanks, piping installed in and/or around the digester for circulating heated liquid to maintain the necessary temperatures for efficient digester operation, piping and collection system for biogas, controls for operating digester and boiler system, boiler needed to maintain digester temperature, and flare excess gas to convert from methane to carbon dioxide. Sized for medium sized livestock operations (1000-2000 AU) includes material, labor, and equipment.	Each	\$888,508.66	1	\$888,508.66
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Practice: 366 - Anaerobic Digester

Scenario: #18 - Large Plug Flow greater than 2000 AU

Scenario Description: A plug flow anaerobic digester can be part of a waste management system. It provides biological treatment of the waste in the absence of oxygen. This process for manure and other by-products of animal agricultural operations will manage odors, reduce the net effect of greenhouse gas emissions, and/or reduce pathogens. This scenario is for plug flow digesters with more than 2,000 animal units. Selection of digester type will be based on effluent consistency. Energy generation is not included with this scenario. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Waste Separation Facility (632), Waste Treatment Lagoon (359), and Waste Storage Facility (313).

Before Situation: Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed. This situation poses an environmental threat of excessive nutrients, organics, and pathogens being transported into surface and ground waters, in addition to the use of excessive amounts of fertilizers. The treatment of manure and other agricultural by-products is desired in order to manage odors, and/or reduce pathogens.

After Situation: Manure and other agricultural by-products are being treated such that odors are managed and/or pathogens are reduced. Effluent from the digester is disposed of or utilized in a proper manner in accordance with a nutrient management plan. A plug flow digester is typically constructed of concrete with vertical side walls and solid or flexible top. The typical scenario also includes items necessary to maintain mesophylic or thermophylic temperatures for bacterial activity (i.e. piping and boiler or other heat source). Typical Design Scenario: 3,920 animal units (2,800 - 1,400 lbs dairy cows).

Scenario Feature Measure: Animals Units Contributing to Digester

Scenario Unit: Animal Unit

Scenario Typical Size: 3920

Total Scenario Cost: \$1,331,344.11

Scenario Cost/Unit: \$339.63

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Acquisition of Technical Knowledge

Training, Workshops	294	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	\$45.80	2	\$91.60
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Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$541.06	1	\$541.06
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$283.39	3	\$850.16
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$78.25	1	\$78.25

Equipment Installation

Plug Flow, Large (more than 2,000 animal units)	2480	Concrete plug flow anaerobic digester which includes poured walls, floor and top, reception and mixing tanks, piping installed in and/or around the digester for circulating heated liquid to maintain the necessary temperatures for efficient digester operation, piping and collection system for biogas, controls for operating digester and boiler system, boiler needed to maintain digester temperature, and flare excess gas to convert from methane to carbon dioxide. Sized for large livestock operations (>2000 AU) includes material, labor, and equipment.	Each	\$1,329,783.03	1	\$1,329,783.03
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