Practice: 591 - Amend. for Treat. of Ag. Waste

Scenario: #3 - Litter Amendments applied for Air Quality resource concerns

Scenario Description:

This practice scenario includes the application of a litter treatment amendment that is approved by NRCS to the entire poultry house to reduce ammonia emissions from the house and facilitate manure management. The amendment used is proven to reduce ammonia levels in the house by transforming nitrogen into a form of ammonium. The purpose of the practice is to address resource concerns from existing nutrient levels that may contribute to air quality impacts such as objectionable odors and ammonia emissions and impacts on bird health due to excess nutrients and pathogens.
Associated practices: Nutrient Management (590).

Before Situation:

Integrator does not currently apply waste treatment amendments to the litter that reduce ammonia emissions.

After Situation:

This scenario is based on a typical poultry operation with a 2-house facility and each house size is 40' x 400', 16,000 SF. An NRCS approved amendment is applied between flocks, 5 flocks annually, at rate required to meet air quality resource concern, typically 100 pounds per 1000 SF.
Formula to calculate the amount of amendment per year on a 1000 SF basis:
(Square Feet of house) / 1000 SF X (Number of houses) X (Number of Applications per Year)= Number of 1000SF.
16,000 SF / 1000 SF X 2 houses X 5 applications/year= 160 units of 1000SF
An NRCS approved amendment is applied between each flock, 5 applications, at rate required for treatment to address air quality resource concerns. For most products, this is 100 pounds per 1000 SF. The amendment is proven to control the odor, and to reduce ammonia emissions. The selected amendment is applied in conformance with the manufacturer's recommendations and the rates required. The resulting litter contains higher levels of nutrients and nutrient management plans must account for this. Nutrient level testing of the litter and nutrient planning shall be in conformance with CPS Nutrient Management, Code 590. The amendment successfully addresses the air quality impacts of objectionable odors, ammonia emissions, PM and PM precursors and bird health resource concerns.

Scenario Feature Measure: Number of 1000SF applications per year

Scenario Unit: 1,000 Square Foot

Scenario Typical Size: 160

Scenario Cost: $5,473.36 **Scenario Cost/Unit:** $34.21

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Application of ag waste amendment for poultry litter	2020	Litter amendment application performed in house. Includes equipment, power unit and labor costs.	Ton	$56.64	8	$453.12
Materials						
Ag Waste Amendment, sodium bisulfate	1686	Sodium bisulfate poultry litter amendment. NRCS approved for air quality concerns to reduce ammonia emissions from the litter. Includes materials only.	Ton	$627.53	8	$5,020.24

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Scenario: #4 - Litter Amendments applied on a %w/w basis for Water Quality Impacts

Scenario Description:

This practice scenario includes the application of a litter treatment amendment that is approved by NRCS to the entire poultry house to reduce water-soluble phosphorous in the poultry litter by a specified percentage. The amendment used is proven to and transform nitrogen into a form of ammonium and reduce the concentration of water-soluble phosphorous in the litter and reduces ammonia levels in the house. Resource concerns from existing nutrient levels may contribute to water quality degradation from nutrient runoff and leaching from fields fertilized with poultry litter and air quality impacts such as objectionable odors and ammonia emissions.
Associated practices: Nutrient Management (590).

Before Situation:

Integrator does not currently apply waste treatment amendments to the litter that reduce ammonia emissions and soluble phosphorus.

After Situation:

This scenario is based on a typical poultry operation with a desired application rate is 10% by weight of the litter (10%w/w) of a phosphorus binding amendment. Typical operation consists of 2 houses, 40' x 400' house (16,000 SF), 20,000 birds (4 pound finished bird weight), 0.5 lb litter/bird (assume 54 pounds P205/Ton of litter). The operation raises 5 flocks per year.
Formula to calculate required amendment at the prescribed rate in tons per year is:
(Number of birds) X (Finish weight of birds (lbs)) X (Pounds of litter)/bird) X (Number of houses) X (application rate) X (Number of applications per year) / 2000 pounds/ton
20,000 birds X 4 lb bird X 0.50 lb litter/bird X 2 houses X 0.10 lb amendment/lb litter X 5 app/year / 2000 lb/ton = 20 tons/year.
An NRCS approved amendment is applied between each flock at the prescribed rate. The selected amendment is applied in conformance with the manufacturer's recommendations and the rates required. The amendment is proven to reduce soluble phosphorus in the litter, to control the odor, and to reduce ammonia emissions. The resulting litter contains higher levels of nutrients and nutrient management plans must account for this. Nutrient level testing of the litter and nutrient planning shall be in conformance with CPS Nutrient Management, Code 590. The amendment successfully addresses water quality degradation due to nutrients in surface and ground water and air quality impacts from objectionable odors, ammonia emissions, PM and PM precursors and bird health resource concerns.

Scenario Feature Measure: Tons of amendment per year.

Scenario Unit: Ton

Scenario Typical Size: 20

Scenario Cost: $12,988.00 **Scenario Cost/Unit:** $649.40

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Application of ag waste amendment for poultry litter	2020	Litter amendment application performed in house. Includes equipment, power unit and labor costs.	Ton	$56.64	20	$1,132.80
Materials						
Ag Waste Amendment, aluminum sulfate, alum	1684	Aluminum sulfate, alum, poultry Litter amendment. NRCS approved for air and water quality concerns to reduce ammonia emissions and soluble phosphorus in the litter. Materials only.	Ton	$592.76	20	$11,855.20

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Scenario: #5 - Liquid Animal Waste Amendment

Scenario Description:

This practice scenario includes the treatment of liquid animal waste for odor control. The purpose of the practice is to address resource concerns related to air quality impacts from objectionable odors caused by manure storage in a facility close to a small town. Associated practices: Nutrient Management (590), Waste Storage Facility (313).

Before Situation:

Before application of the waste amendment, the liquid manure in the storage facility is creating significant odor problems. The producer is receiving complaints from neighbors.

After Situation:

This practice scenario is applicable for all types of liquid animal waste. A swine operation has been chosen for this scenario example. Typical implementation scenario is a pit under a swine production building for 1180 head of lactating sows, 400 lb each. The pit is 100' x 140' x 8' deep; 1' freeboard and 1' unpumpable sludge reduces working depth to 6'. This scenario is based on the working volume of manure stored and treated per year. The working volume in the manure storage facility is 84,000 cubic feet, and the facility is emptied every 6 months. The resulting total annual working volume of manure to be treated with the amendment is 168,000 cubic feet. An NRCS approved amendment is applied periodically according to manufacturer's instructions, typically on a monthly basis. The manufacturer's recommended dosage is based on the volume of manure added to the waste storage facility between amendment doses. The resulting waste contains higher levels of nutrients, which is accounted for in the nutrient management plan. Nutrient level testing of the liquid manure and nutrient planning is done in conformance with CPS Nutrient Management, Code 590. The amendment is proven to reduce odor by up to 83%, and successfully reduces the objectionable odors on the site. Complaints from neighbors are no longer received.

Scenario Feature Measure: Cubic Feet of required manure storage per year

Scenario Unit: Cubic Foot

Scenario Typical Size: 168,000

Scenario Cost: $31,777.27 **Scenario Cost/Unit:** $0.19

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$20.32	6	$121.92
Materials						
Ag Waste Amendment, digestive enzymes, 10 liter container	1688	10 liter container of an organic manure amendment. Liquefied lignite coal. Materials only.	Each	$89.17	355	$31,655.35