
APPENDIX D

Rule 4570: Large Dairy Confined Animal Facility Mitigation Measure Requirements

This page intentionally
left blank.

- 5.5 Phase I Mitigation Measures: Owners/operators of large CAFs shall comply with the following Phase I Mitigation Measures in Section 5.5 until compliance with all applicable Phase II Mitigation Measures in Section 5.6 is demonstrated in accordance with the compliance schedule in Section 8.0.

5.5.1 Dairy CAF: Owners/operators of a large Dairy CAF shall comply with the Phase I requirements in Table 3.1:-

Table 3.1 – Large Dairy CAF Phase I Mitigation Measure Requirements	
A. Owners/operators shall incorporate at least four (4) of the following feed mitigation measures:	
Class One Mitigation Measures	
1.	a. Feed according to National Research Council (NRC) guidelines.
2.	a. Feed animals high moisture corn or steam-flaked corn and not feed animals dry rolled corn.
3.	a. At least once every fourteen (14) days remove feed from the area where animals stand to eat feed.
4.	a. At least once every fourteen (14) days remove spilled feed from the area where equipment travels to place feed in the feed bunk.
5.	a. Remove uneaten wet feed from feed bunks within twenty-four (24) hours of a rain event.
6.	a. Feed or dispose of rations within forty-eight (48) hours of grinding and mixing rations.
7.	a. Store grain in a weatherproof storage structure from October through May.
8.	a. Implement an alternative mitigation measure(s), not listed above.
B. Owners/operators shall incorporate at least one (1) of the following feed mitigation measures:	
Class One Mitigation Measures	
1.	a. Cover the horizontal surface of silage piles, except for the area where feed is being removed from the pile.
2.	a. Collect leachate from the silage piles and send it to a waste treatment system such as a lagoon at least once every twenty-four (24) hours.
3.	a. Implement an alternative mitigation measure(s), not listed above.
Class Two Mitigation Measures	
4.	a. Enclose silage in a bag and vent to a VOC control device with a combined VOC capture and VOC control efficiency of at least 80%, or b. Enclose silage in a weatherproof structure and vent to a VOC control device with a combined VOC capture and VOC control efficiency of at least 80%, or c. Eliminate silage from animal diet.
Continues on the next page	

Table 3.1 – Large Dairy CAF Phase I Mitigation Measure Requirements (continued)	
C. Owners/operators shall incorporate at least one (1) of the following mitigation measures in each milk parlor:	
Class One Mitigation Measures	
1.	a. Flush or hose milk parlor immediately prior to, immediately after, or during each milking.
2.	a. Implement an alternative mitigation measure(s), not listed above.
Class Two Mitigation Measures	
3.	a. Enclose and vent the milk parlor to a VOC control device with an overall VOC capture and VOC control efficiency of at least 80% when animals are in the parlor.
D. Owners/operators housing animals in freestalls shall incorporate at least two (2) of the following mitigation measures in each freestall barn:	
Class One Mitigation Measures	
1.	a. Vacuum or scrape freestall flush lanes immediately prior to, immediately after, or during each milking.
2.	a. Inspect water pipes and troughs and repair leaks at least once every fourteen (14) days.
3.	a. Use non-manure-based bedding and non-separated solids based bedding for at least 90% of the bedding material, by weight, for freestalls (e.g. rubber mats, almond hulls, sand, or waterbeds).
4.	a. Remove manure that is not dry from individual cow freestall beds at least once every fourteen (14) days.
5.	a. Rake, harrow, scrape, or grade bedding in freestalls at least once every fourteen (14) days.
6.	a. Use a dry manure handling system, such as scraping, instead of a liquid manure handling system, such as a flush system.
7.	a. Have no animals in exercise pens, corrals, or drylots at any time.
8.	a. Flush freestalls more frequently than the milking schedule.
9.	a. Implement an alternative mitigation measure(s), not listed above.
Class Two Mitigation Measures	
10.	a. Vacuum manure instead of flushing or scraping and apply manure directly to land either through injection or incorporation within seventy-two hours of removal from animal housing or vacuum truck.
Continues on the next page	

Table 3.1 – Large Dairy CAF Phase I Mitigation Measures Requirements (continued)	
E. Owners/operators housing animals in corrals shall incorporate at least six (6) of the following mitigation measures in each corral where animals have been housed in the last thirty (30) days:	
Class One Mitigation Measures	
1.	a. Clean manure from corrals at least four (4) times per year with at least sixty (60) days between cleaning, or b. Clean corrals at least once between April and July and at least once between October and December, or c. Clean concreted areas such that the depth of manure does not exceed twelve (12) inches at any point or time, except for in-corral mounding.
2.	a. Manage corrals such that the manure depth in the corral does not exceed twelve (12) inches at any time or point, except for in-corral mounding.
3.	a. Knockdown fence line manure build-up prior to it exceeding a height of twelve (12) inches at any time or point.
4.	a. Scrape or flush feed aprons in corrals at least once every seven (7) days.
5.	a. Slope the surface of the pens at least 3% where the available space for each animal is 400 square feet or less. Slope the surface of the pens at least 1.5% where the available space for each animal is more than 400 square feet per animal.
6.	a. Maintain corrals to ensure drainage and prevent water from standing more than forty-eight (48) hours after a storm, or b. Maintain corrals and drylots so that there are not indentions in the surface where puddles may form and remain for more than forty-eight (48) hours.
7.	a. Install floats on the troughs or use another method approved by the APCO, ARB, and EPA to ensure that the water in the troughs does not intentionally or unintentionally overflow or spill onto an earthen ground.
8.	a. Inspect water pipes and troughs and repair leaks at least once every fourteen (14) days.
9.	a. Harrow, rake, or scrape pens sufficiently to maintain a dry surface.
10.	a. Install no shade structures in the corrals, or b. Install shade structures such that they are constructed with a light permeable roofing material, or c. Install all shade structures uphill of any slope in the corral.
11.	a. Implement an alternative mitigation measure(s), not listed above.
Class Two Mitigation Measures	
12.	a. Use lime or a similar absorbent material in the pens according to the manufacturer's recommendations to minimize moisture in the pens, or b. Apply thymol to corral soil in accordance with the manufacturer's recommendation.
13.	a. House animals in an enclosure vented to a VOC control device with a combined VOC capture and VOC control efficiency of at least 80%.
Continues on the next page	

Table 3.1 – Large Dairy CAF Phase I Mitigation Measures Requirements (continued)	
F. Owners/operators that handle or store solid manure or separated solids outside the animal housing shall incorporate at least two (2) of the following mitigation measures:	
Class One Mitigation Measures	
1.	a. Cover dry manure piles outside the pens with a weatherproof covering from October through May, except for times, not to exceed twenty-four (24) hours per event, when wind events remove the covering.
2.	a. Cover dry separated solids outside the pens with a weatherproof covering from October through May, except for times, not to exceed twenty-four (24) hours per event, when wind events remove the covering.
3.	a. Remove manure from the facility within seventy-two (72) hours of removal from the pens or corrals.
4.	a. Remove separated solids from the facility within seventy-two (72) hours of separation with a solid separation system, or b. Store no separated solids outside of anaerobic digesters or aerobic digesters.
5.	a. Implement an alternative mitigation measure(s), not listed above.
Class Two Mitigation Measures	
6.	a. Compost manure removed from pens with an aerated static pile vented to a VOC control device with an overall VOC capture and VOC control efficiency of at least 80%.
7.	a. Store all removed manure in an enclosure vented to a VOC control device with an overall VOC capture and VOC control efficiency of at least 80%.
8.	a. Send at least 51% of the manure removed from animal housing to a digester, with a VOC control device with an overall VOC capture and VOC control efficiency of at least 80%.
G. Owners/operators that handle manure in a liquid form shall incorporate at least one (1) of the following mitigation measures:	
Class One Mitigation Measures	
1.	a. Manage the facility such that there are no lagoons, as defined in Section 3.35, at the facility.
2.	a. Use phototropic lagoon, or b. Use an anaerobic treatment lagoon that is not mechanically aerated.
3.	a. Remove solids from the waste system with a solid separator system, prior to the waste entering the lagoon.
4.	a. Maintain lagoon pH between 6.5 and 7.5.
5.	a. Implement an alternative mitigation measure(s), not listed above.

Table 3.1 – Large Dairy CAF Phase I Mitigation Measures Requirements (continued)	
Class Two Mitigation Measures	
6.	a. Use an aerobic lagoon, or b. Use an anaerobic treatment lagoon that is mechanically aerated.
7.	a. Maintain organic loading in the lagoon such that the total solids is less than 3.5 mg (dry weight)/mL, or total volatile solids is less than 3.5 mg/mL.
8.	a. Use additional non-standard equipment or chemicals on the solid separator system, such as roller or screw presses or chemical coagulants and flocculants, that increase the percent of solid separation achieved by the separator and that is approved by the APCO, ARB, and EPA.
9.	a. Cover the lagoon or storage pond and vent to a VOC control device with an overall VOC capture and VOC control efficiency of at least 80%.
H. Owners/operators who land apply dry or liquid manure to crop land on the facility shall incorporate at least two (2) of the following mitigation measures:	
Class One Mitigation Measures	
1.	a. Land incorporate all solid manure within seventy-two (72) hours of removal from animal housing.
2.	a. Only apply solid or liquid manure that has been treated with an anaerobic or aerobic lagoon or digester system.
3.	a. Allow liquid manure to stand in the fields no more than twenty-four (24) hours after irrigation, or b. Apply no liquid manure.
4.	a. Apply no solid manure with a moisture content of more than 50%, or b. Apply no solid manure.
5.	a. Implement an alternative mitigation measure(s), not listed above.

5.6 Phase II Mitigation Measures: Owners/operators of CAFs subject to the regulatory threshold in Table 2 shall comply with all applicable Phase II Mitigation Measures in accordance with the compliance schedule in Section 8.0.

5.6.1 Dairy CAF: An owner/operator of a medium or large Dairy CAF shall comply with the Phase II mitigation measures in Table 4.1.

Table 4.1 – Dairy CAF Phase II Mitigation Measure Requirements	
A. Feed: An owner/operator of a dairy CAF shall implement mitigation measures 1, 2, 3, and 4 and at least one (1) additional mitigation measure:	
1.	Feed according to National Research Council (NRC) guidelines.
2.	Push feed so that it is within three (3) feet of feedlane fence within two hours of putting out the feed or use a feed trough or other feeding structure designed to maintain feed within reach of the cows.
3.	Begin feeding total mixed rations within two (2) hours of grinding and mixing rations.
4.	Store grain in a weatherproof storage structure or under a weatherproof covering from October through May.
5.	Feed steam-flaked, dry rolled, cracked or ground corn or other steam-flaked, dry rolled, cracked or ground cereal grains.
6.	Remove uneaten wet feed from feed bunks within twenty-four (24) hours after the end of a rain event.
7.	For total mixed rations that contain at least 30% by weight of silage, feed animals total mixed rations that contain at least 45% moisture.
8.	Implement an alternative mitigation measure(s), not listed above.
B. Silage: An owner/operator of a dairy CAF that feeds silage shall implement at least one (1) of the following silage mitigation measures:	
1.	Operators selecting this option must choose mitigation measure 1a plus one (1) from mitigation measures 1b, 1c, 1d plus two (2) from mitigation measures 1e, 1f, 1g: a. Cover the surface of silage piles, except for the area where feed is being removed from the pile, with a plastic tarp that is at least five (5) mils thick (0.005 inches), multiple plastic tarps with a cumulative thickness of at least 5 mils (0.005 inches), or an oxygen barrier film covered with a UV resistant material, within seventy-two (72) hours of last delivery of material to the pile.
Continues on the next page	

Table 4.1 – Dairy CAF Phase II Mitigation Measure Requirements (continued)

Choose one of the following:

- b. Build silage piles such that the average bulk density of silage piles is at least 44 lb/cu ft for corn silage and 40 lb/cu ft for other silage types, as measured in accordance with Section 7.11; or
- c. When creating a silage pile, adjust filling parameters to assure a calculated average bulk density of at least 44 lb/cu ft for corn silage and at least 40 lb/cu ft for other silage types, using a spreadsheet approved by the District; or
- d. Incorporate all of the following practices when creating silage piles:
 - i. Harvest silage crop at $\geq 65\%$ moisture for corn; and $\geq 60\%$ moisture for alfalfa/grass and other silage crops; and
 - ii. Incorporate the following parameters for Theoretical Length of Chop (TLC) and roller opening, as applicable, for the crop being harvested.

Crop Harvested	TLC (inches)	Roller Opening (mm)
Corn with no processing	$\leq 1/2$ in	N/A
Processed Corn <35% dry matter	$\leq 3/4$ in	1 - 4 mm
Alfalfa/Grass	≤ 1.0 in	N/A
Wheat/Cereal Grains/Other	$\leq 1/2$ in	N/A

- iii. Manage silage material delivery such that no more than six (6) inches of material are un-compacted on top of the pile.

Choose two of the following:

- e. Manage exposed silage (select one of the following):
 - i. Manage silage piles such that only one silage pile has an uncovered face and the uncovered face has a total exposed surface area of less than 2,150 square feet; or
 - ii. Manage multiple uncovered silage piles such that the total exposed surface area of all uncovered silage piles is less than 4,300 square feet.

Continues on the next page

Table 4.1 – Dairy CAF Phase II Mitigation Measure Requirements (continued)	
	f. Maintain silage working face (select one of the following): i. Use a shaver/facer to remove silage from the silage pile; or ii. Maintain a smooth vertical surface on the working face of the silage pile. g. Silage Additives (select one of the following): i. Inoculate silage with homolactic lactic acid bacteria in accordance with manufacturer recommendations to achieve a concentration of at least 100,000 colony forming units per gram of wet forage; or ii. Apply propionic acid, benzoic acid, sorbic acid, sodium benzoate, or potassium sorbate at a rate specified by the manufacturer to reduce yeast counts when forming silage pile; or iii. Apply other additives at specified rates that have been demonstrated to reduce alcohol concentrations in silage and/or VOC emissions from silage and have been approved by the District and EPA.
2.	Utilize a sealed feed storage system (e.g., Ag-Bag) for silage.
3.	Implement an alternative mitigation measure(s), not listed above.
C. Milking Parlor: An owner/operator of a dairy CAF shall implement at least one (1) of the following mitigation measures in each milking parlor:	
1.	Flush or hose milking parlor immediately prior to, immediately after, or during each milking.
2.	Implement an alternative mitigation measure(s), not listed above.
D. Freestall Barn: An owner/operator of a dairy CAF that houses animals in freestalls shall implement mitigation measures 1 and 2 and at least one (1) additional mitigation measure in each freestall barn:	
1.	Pave feedlanes, where present, for a width of at least eight (8) feet along the corral side of the feedlane fence for milk and dry cows and at least six (6) feet along the corral side of the feedlane for heifers.
2.	Choose one of the following: a. Flush, scrape, or vacuum freestall flush lanes immediately prior to, immediately after, or during each milking; or b. Flush or scrape freestall flush lanes at least three (3) times per day.
3.	Use non-manure-based bedding and non-separated solids based bedding for at least 90% of the bedding material, by weight, for freestalls (e.g. rubber mats, almond shells, sand, or waterbeds).
Continues on the next page	

Table 4.1 – Dairy CAF Phase II Mitigation Measure Requirements (continued)	
4.	For a large dairy CAF, remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every seven (7) days. For a medium dairy CAF, remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every fourteen (14) days.
5.	Have no animals in exercise pens or corrals at any time.
6.	Implement an alternative mitigation measure(s), not listed above.
E. Corrals: An owner/operator of a dairy CAF that houses animals in corrals shall implement mitigation measures 1, 2, 3, 4, 5, and 6 and at least one (1) additional mitigation measure in each corral where animals have been housed in the last thirty (30) days:	
1.	Pave feedlanes, where present, for a width of at least 8 feet along the corral side of the feedlane fence for milk and dry cows and at least 6 feet along the corral side of the feedlane for heifers.–
2.	Choose one of the following: a. Clean manure from corrals at least four (4) times per year with at least sixty (60) days between cleaning; or b. Clean corrals at least once between April and July and at least once between September and December.–
3.	Choose one of the following: a. Scrape, vacuum, or flush concrete lanes in corrals at least once every day for mature cows and every seven (7) days for support stock; or b. Clean concrete lanes such that the depth of manure does not exceed twelve (12) inches at any point or time.
4.	Inspect water pipes and troughs and repair leaks at least once every seven (7) days.
5.	Choose one of the following: a. Slope the surface of the corrals at least 3% where the available space for each animal is 400 square feet or less. Slope the surface of the corrals at least 1.5% where the available space for each animal is more than 400 square feet per animal; or b. Maintain corrals to ensure proper drainage preventing water from standing more than forty-eight (48) hours; or c. Harrow, rake, or scrape corrals sufficiently to maintain a dry surface.
6.	If the CAF has shade structures, they must choose one of the following: a. Install shade structures such that they are constructed with a light permeable roofing material; or b. Install all shade structures uphill of any slope in the corral; or c. Clean manure from under corral shades at least once every fourteen (14) days, when weather permits access into the corral; or d. Install shade structure so that the structure has a North/South orientation.
Continues on the next page	

Table 4.1 – Dairy CAF Phase II Mitigation Measure Requirements (continued)	
7.	Manage corrals such that the manure depth in the corral does not exceed twelve (12) inches at any time or point, except for in-corral mounding. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. The facility must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible.
8.	Knockdown fence line manure build-up prior to it exceeding a height of twelve (12) inches at any time or point. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. The facility must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible.
9.	Choose one of the following: a. Use lime or a similar absorbent material in the corrals according to the manufacturer's recommendation; or b. Apply thymol to the feedlot soil in accordance with the manufacturer's recommendation.
10.	Implement an alternative mitigation measure(s), not listed above.
F. Solid Manure/Separated Solids: Owners/operators of a large dairy CAF that handle or store solid manure or separated solids outside the animal housing shall implement at least one (1) of the following mitigation measures:	
1.	Within seventy-two (72) hours of removal from housing, either: a. Remove dry manure from the facility; or b. Cover dry manure outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed twenty-four (24) hours per event.
2.	Within seventy-two (72) hours of removal from the drying process, either: a. Remove separated solids from the facility; or b. Cover separated solids outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed twenty-four (24) hours per event.
3.	Implement an alternative mitigation measure(s), not listed above.
G. Liquid Manure: An owner/operator of a dairy CAF that handles manure in a liquid form shall implement at least one (1) of the following mitigation measures:	
1.	Use a phototropic lagoon.
2.	Use an anaerobic treatment lagoon designed in accordance with NRCS Guideline No. 359.
3.	Remove solids from the waste system with a solid separator system, prior to the waste entering the lagoon.
4.	Maintain lagoon pH between 6.5 and 7.5.
5.	Implement an alternative mitigation measure(s), not listed above.
Continues on the next page	

Table 4.1 – Dairy CAF Phase II Mitigation Measure Requirements (continued)	
H.	Land Application: An owner/operator of a dairy CAF who land applies manure to crop land on the facility shall implement the following applicable mitigation measures:
1.	If the CAF applies solid manure, choose one of the following: a. Incorporate all solid manure within seventy-two (72) hours of land application; or b. Only apply solid manure that has been treated with an anaerobic treatment lagoon, aerobic lagoon, or digester system; or c. Apply no solid manure with a moisture content of more than 50%; or d. Implement an alternative mitigation measure(s), not listed above.
2.	If the CAF applies liquid manure, choose one of the following: a. Only apply liquid manure that has been treated with an anaerobic treatment lagoon, aerobic lagoon, or digester system; or b. Allow liquid manure to stand in the fields for no more than twenty-four (24) hours after irrigation; or c. Apply liquid/slurry manure via injection with drag hose or similar apparatus; or d. Implement an alternative mitigation measure(s), not listed above.

- 7.11.10 Organic Loading - Standard Methods of the Examination of Water and Wastewater Method 2540 G – Solids.
- 7.11.11 pH – EPA Method 150.2 (pH, Electrometric) or TMECC Method 04.11-A (1:5 Slurry pH)
- 7.11.12 Temperature – EPA Method 170.1 (Temperature – Thermometric)
- 7.11.13 Alternative Test Methods – An operator may use an alternative test method to those listed in Sections 7.11.1 through 7.11.13 for which written approval of the APCO and EPA has been obtained.

8.0 Compliance Schedule

- 8.1 Owners/operators of facilities subject to the Regulatory Threshold requirements of this rule under Table 2 shall submit a complete Permit-to-Operate or Authority-to-Construct application for the Phase II requirements in Section 5.6 by April 21, 2011 that complies with all applicable provisions of this rule.
 - 8.1.1 Owners/operators shall comply with all provisions of Phase II requirements on and after 365 days from the Authority-to-Construct or Permit-to-Operate issuance date, whichever is earlier.
 - 8.1.2 Owners/operators of Large CAFs shall comply with the Phase I requirements in Section 5.5 until demonstrating full compliance with Phase II requirements in Section 5.6.
- 8.2 Owners/operators of new or modified facilities that become subject to the Regulatory Threshold requirements of this rule under Table 2 shall comply with the Phase II requirements of Section 5.6.