

# Appendix

# G

## Winter Spreading Technical Guidance

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# Interim Final

## Technical Guidance for the Application of CAFO Manure on Land in the Winter

Water Division  
Region 5  
United States Environmental Protection Agency

### Introduction<sup>1</sup>

Many owners or operators of concentrated animal feeding operations (CAFOs) use their manure, litter, and process wastewater (hereinafter *manure*) as a source of nutrients for the growth of crops or forage or to improve the tilth of soil. Others dispose of manure on land. The longer manure remains in the soil before plants take the nutrients up, the more likely those nutrients will be lost through volatilization, denitrification, leaching to subsurface drainage tile lines or ground water, and runoff to surface water. To use the greatest fraction of the nutrients in manure, late spring and early summer are the best times for land application. Some CAFO owners or operators apply manure on land in the late fall or winter because crops are not growing, labor is available, and, when it is frozen, the soil is able to handle the weight of manure hauling equipment without excessive compaction. Application in the late fall or winter also enables the owner or operator to avoid the cost of the structures that would be needed to store manure through the winter months. From the dual perspectives of nutrient utilization and pollution prevention, however, winter is the least desirable time for land application. Appendix G-1 contains an excerpt from the U.S. Environmental Protection Agency (EPA) (2002 p. 177-78) summarizing the literature on the risk that land application in the winter poses to water quality.

Under regulations that EPA promulgated in 2003, agencies that are authorized to issue National Pollutant Discharge Elimination System permits (hereinafter *states*) need to have technical standards for nutrient management that address, among other factors, the times at which CAFOs may apply manure on land (see Title 40 of the *Code of Federal Regulations* [CFR] part 123.36). Technical standards are to achieve realistic crop or forage production goals while minimizing movement of nitrogen and phosphorus to waters of the United States. They will form the basis for the nutrient management plans that CAFO owners and operators will implement under 40 CFR parts 122.42, 412.4.

EPA recognizes certain times during which there could be an increased likelihood that runoff from CAFO land application areas could reach waters of the United States. The times include, among others, when the soil is frozen or covered with ice or snow. Frozen soil will occur in areas where snow or other ground cover is shallow and where prolonged periods of subfreezing air temperatures prevail (U.S. Army Corps of Engineers 1998). The January normal daily minimum air temperature in EPA Region 5 ranges from minus 8 degrees Fahrenheit (°F) in the northwest

to 22 °F in the south. Thus, all areas in the region are subject to air temperatures that can cause soil to freeze. For December through March, the mean precipitation in the region ranges from 3 inches of water in the northwest to 14.6 inches of water in the south. The mean snowfall in those months ranges from 13 inches in the south to 108 inches in the coastal north. The above normals notwithstanding, the only reliable way to predict temperature and precipitation before any winter is through statistical analysis of historical data for the location of interest.

To ensure effective implementation of the regulations, EPA (2003) has expressed its strong preference that states prohibit the discharge of manure from land application. That is applicable unless the discharge is an agricultural stormwater discharge (i.e., a precipitation-related discharge from land where manure was applied in accordance with a nutrient management plan). EPA has also expressed its strong preference for the way in which states in their technical standards should address the timing of land application. With regard to the winter months, EPA strongly prefers that technical standards either prohibit surface application on snow, ice, and frozen soil or include specific protocols that CAFO owners or operators, nutrient management planners, and inspectors will use to conclude whether application to a frozen or snow- or ice-covered field, or a portion thereof, poses a reasonable risk of runoff. Where there is a reasonable risk, EPA strongly prefers that technical standards prohibit application on the field or the pertinent portion thereof during times when the risk exists or could arise.

## Technical Guidance

This paper presents technical guidance to which EPA Region 5 will refer as we work together with those states that plan to allow CAFO owners or operators to apply manure on land in the winter where a crop will not be grown in that season or nutrients need not be applied in the winter to grow the crop. For that purpose, Region 5 assumes that the risk of runoff will be minimized if a state requires injection or timely incorporation of manure in the winter, provided that the CAFO owner or operator adheres to the setback requirements in 40 CFR part 412.4(c)(5). Further, we assume that the risk of runoff will be minimized if waters of the United States, sinkholes, open tile line intake structures, and other conduits to waters of the United States are upslope from the land on which manure would be surface applied. Thus, the balance of this technical guidance is intended to provide a basis for the region to evaluate the adequacy of preliminary technical standards that would allow surface application without timely incorporation where waters of the United States, sinkholes, open tile line intake structures, or other conduits to waters of the United States are downslope from the land on which the manure would be applied.<sup>2</sup>

### ***Potential Discharges That Are Not Precipitation Related***

When liquid manure is applied on frozen soil in the absence of snow cover, Region 5 has concluded that the manure will run off and potentially discharge if it is applied in excess of the pertinent rate specified in Table G-1a or G-1b.<sup>3</sup> For an example that shows how the region came to this conclusion, see Appendix G-2. In as much as the discharge of manure is not an agricultural stormwater discharge when it is not related to precipitation, technical standards need to prohibit the application of liquid manure on frozen soil, in excess of the rates provided in the following tables, when the soil is not covered with snow.

## Liquid Manure Maximum Rates of Application onto Frozen Soil

**Table G-1a.** Harvested Crops were row crops planted in straight rows with land in good hydrologic condition

Hydrologic Soil Group*	Maximum rate of application (gallons per acre)
A	3,000
B	1,600
C	1,100
D	1,100

**Table G-1b.** Harvested crops were close-seeded legumes planted in straight rows with land in good hydrologic condition

Hydrologic Soil Group	Maximum rate of application (gallons per acre)
A	4,100
B	2,200
C	1,100
D	1,100

\*See Appendix A of U.S. Department of Agriculture, Soil Conservation Service (1986) for information on the Hydrologic Soil Group within which a given soil is classified. The appendix is at <ftp://ftp.wcc.nrcs.usda.gov/wntsc/H&H/other/TR55documentation.pdf>.

### Discharges That Are Precipitation Related

When manure is applied on land in the winter, Region 5 assumes that nutrients and manure pollutants will dissolve or become suspended in any precipitation that comes into contact with the manure. That assumption is consistent with the findings reported in Appendix G-1 and Table G-2. The technical guidance that follows is intended to provide a basis for the region to evaluate the adequacy of preliminary technical standards as such standards affect the movement of nutrients and manure pollutants in precipitation runoff during the winter or early spring. Six substantive steps are presented below. The first three involve the formulation of state policy for nutrient management. As contemplated in **Step 1**, the policy should include a standard for the concentration or mass of biochemical oxygen demand (BOD) in precipitation-related discharges. Nutrients, including ammonia and nitrite, contribute to that demand. The final three involve engineering analysis to determine whether the BOD standard will be met.

**Step 1:** In collaboration with Region 5, the state establishes a standard for the concentration or mass of BOD that will be permitted in precipitation-related discharges from land on which manure has been surface applied in the winter.

**Table G-2.** Assumed initial concentration of bod in runoff from land on which manure or process wastewater has been surface applied

Type of material	Initial total BOD in runoff (mg/L)
Broiler manure <sup>a</sup>	708
Cattle (other than manure dairy cow) manure	Reserved
Cattle open lot process wastewater	Reserved
Egg wash process wastewater	Reserved
Feed storage process wastewater	Reserved
Layer manure <sup>b</sup>	809
Mature dairy cow manure <sup>c</sup>	924
Swine manure <sup>d</sup>	204
Turkey manure	Reserved

<sup>a</sup> Daniel et al. 1995

<sup>b</sup> Ibid.

<sup>c</sup> Thompson et al. 1979

<sup>d</sup> Daniel et al. 1995

**Step 2: A.** The state establishes preliminary technical standards for the setback<sup>4</sup> and the type, form, and maximum quantity of manure that could be surface applied on land in the winter. Standards for the setback should be expressed in terms of distance and slope. The minimum distance is that required under 40 CFR part 412.4(c)(5). As required to use equations 2 or 3, below, standards for the setback should also be expressed in terms of the land cover and treatment practice and the crop residue rate (in the case of equation 2) or the Hydrologic Soil Group (in the case of equation 3). For information on various residue rates and land cover and treatment practices, see Tables G-3 and G-4.

**B.** If the standard established in **Step 1** is expressed as a mass, the state establishes additional preliminary technical standards for the land cover and treatment practice and Hydrologic Soil Group applicable to land that is upslope from the setback.

**Step 3:** So that Region 5 can perform the engineering analysis, the state establishes appropriate design conditions for the land use, form of precipitation (rain or ripe snow), depth of precipitation, and the temperature and moisture content of soil. At a minimum, the design condition for the moisture content of soil should be antecedent moisture condition III (i.e., saturated soil) (Wright 2004; Linsley et al. 1982). States should carefully review climate data to determine whether the design temperature of soil should be 0 degrees Celsius (°C) or less. In no case should the design temperature of soil exceed 3 °C.

**Table G-3. Recommended Manning's roughness coefficients for overland flow**

Cover or treatment	Residue rate (ton/acre)*	Recommended coefficient	Range
Bare clay-loam (eroded)		0.02	0.012 to 0.033
Fallow - no residue		0.05	0.006 to 0.16
Chisel plow	< 0.25	0.07	0.006 to 0.17
	0.25 to 1	0.18	0.07 to 0.34
	1 to 3	0.3	0.19 to 0.47
	> 3	0.4	0.34 to 0.46
Disk/harrow	< 0.25	0.08	0.008 to 0.41
	0.25 to 1	0.16	0.1 to 0.25
	1 to 3	0.25	0.14 to 0.53
	> 3	0.3	--
No till	< 0.25	0.04	0.03 to 0.07
	0.25 to 1	0.07	0.01 to 0.13
	1 to 3	0.3	0.16 to 0.47
Moldboard plow (fall)		0.06	0.02 to 0.1
Coulter		0.1	0.05 to 0.13
Range (natural)		0.13	0.02 to 0.32
Range (clipped)		0.1	0.02 to 0.24
Short grass prairie		0.15	0.1 to 0.2
Dense grass		0.24	0.17 to 0.3

Source: Engman 1986

\* See Figure G-2 to convert residue cover from a percent to a mass.

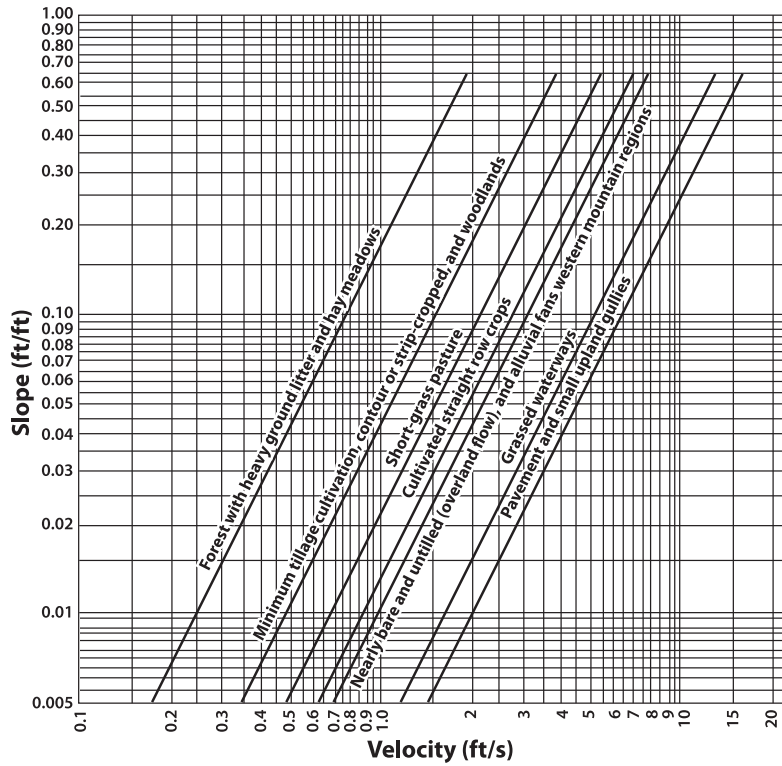


Figure G-1. Average velocity of shallow concentrated flow. (Source: USDA NRCS 1993)

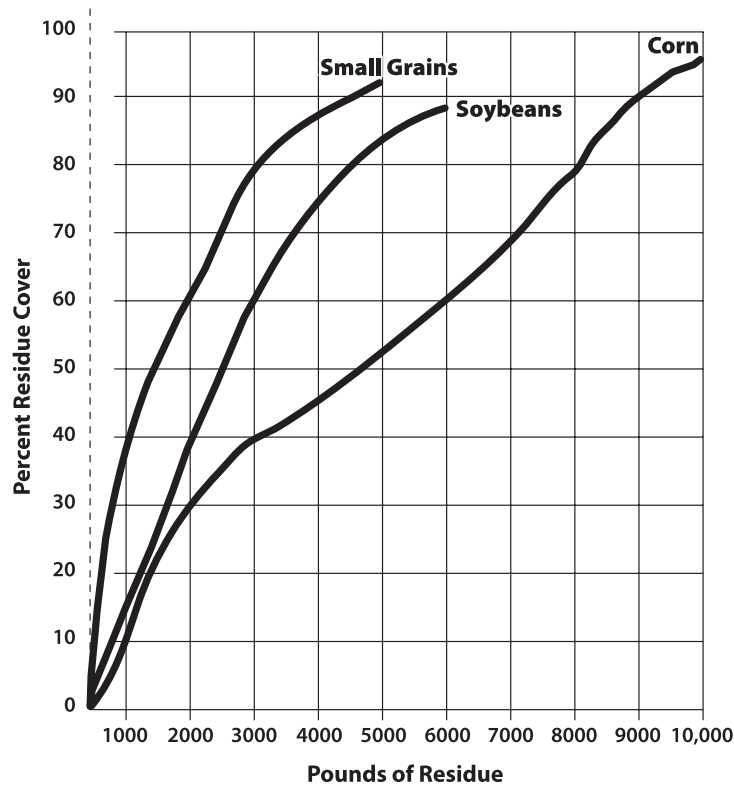


Figure G-2. Pounds of residue vs. percent ground cover. (Source: USDA NRCS 2002b)



**Table G-4. Runoff curve numbers for hydrologic soil-cover complexes<sup>a</sup>**

Land use	Treatment or practice	Hydrologic condition <sup>b</sup>	Hydrologic soil group			
			A	B	C	D
Fallow	Bare soil		89	94	97	98
	Crop residue cover	Poor	89	94	96	98
	"	Good	88	93	95	96
Row crops	Straight row	Poor	86	92	95	97
	"	Good	83	90	94	96
	Straight row and crop residue cover	Poor	86	91	95	96
	"	Good	81	88	92	94
	Contoured	Poor	85	91	93	95
	"	Good	82	88	92	94
	Contoured and crop residue	Poor	84	90	93	95
	"	Good	81	88	92	94
	Contoured and terraced	Poor	82	88	91	92
	"	Good	79	86	90	92
	Contoured, terraced, and crop residue	Poor	82	87	91	92
	"	Good	78	85	89	91
Small grain	Straight row	Poor	82	89	93	95
	Contoured	Poor	80	88	92	94
	"	Good	78	87	92	93
	Contoured and crop residue	Poor	79	87	92	93
	"	Good	78	86	91	93
	Contoured and terraced	Poor	78	86	91	92
	"	Good	77	85	90	92
	Contoured, terraced, and crop residue	Poor	78	86	90	92
	"	Good	76	84	89	91
Close-seeded legumes <sup>c</sup> or rotation meadow	Straight row	Poor	82	89	94	96
	"	Good	76	86	92	94

**Table G-4.** Runoff curve numbers for hydrologic soil-cover complexes<sup>a</sup> (continued)

Land use	Treatment or practice	Hydrologic condition <sup>b</sup>	Hydrologic soil group			
			A	B	C	D
	Contoured	Poor	81	88	93	94
	"	Good	74	84	90	93
Close-seeded legumes <sup>d</sup> or rotation meadow	Contoured and terraced	Poor	80	87	91	93
	"	Good	70	83	89	91
Pasture or range		Poor	84	91	94	96
		Fair	69	84	91	93
		Good	59	78	88	91
	Contoured	Poor	67	83	92	95
	"	Fair	43	77	88	93
	"	Good	13	55	85	91
Meadow		Good	50	76	86	90

Source: USDA NRCS 1993; USDA SCS 1986

<sup>a</sup> The runoff curve numbers in this table apply to saturated soil conditions (i.e., antecedent moisture condition III). For runoff curve numbers applicable to average soil moisture conditions, see Appendix G-3.

<sup>b</sup> According to USDA SCS (1986), hydrologic condition is based on a combination of factors, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes in rotation, (d) percent of residue cover on the land surface (good  $\geq$  percent), and (e) degree of surface roughness.

<sup>c</sup> Close-drilled or broadcast

<sup>d</sup> Close-drilled or broadcast

**Step 4:** The region calculates the percent removal of BOD that will occur in the setback, given the design conditions and preliminary technical standards. Calculating the percent removal is a two-step process, as shown in **A** and **B** below.

**A.** Calculate the amount of time it takes water to travel or *concentrate* ( $T_c$ ) across the setback distance. Two equations are provided below as options for calculating  $T_c$ . In general, use equation 1 (USDA NRCS 2002a) when the design condition consists of rain on frozen soil or rain on ripe snow or when the preliminary technical standards specify a residue rate equal to or greater than 20 percent. Use equation 3 (USDA NRCS 1993) when the design condition consists of ripe snow, the preliminary technical standards do not specify a residue rate, or the rate is less than 20 percent.

$$\text{Eq. 1} \quad T_c (\text{hr}) = T_{t(\text{overland})} + T_{t(\text{shallow concentrated})}$$

where

$$\text{Eq. 2} \quad T_{t(\text{overland})} = \frac{0.007 \times (N \times L)^{0.8}}{(P^{0.5}) \times (s^{0.4})}$$

$N$  = Manning's roughness coefficient for overland flow. To select a coefficient that is appropriate in light of the preliminary technical standards, see Table G-3.

$L$  = overland flow portion of the setback distance (maximum of 100 feet) (ft).

$P$  = precipitation design depth (in).

$s$  = preliminary technical standard for the slope over the distance  $L$  (ft/ft).

$T_{t(\text{shallow concentrated})}$  applies to the shallow concentrated flow portion of the setback distance. In other words, it applies to the portion that is between points (a) and (b) as described below.

Point (a): 100 feet downslope from the furthest downslope point at which manure would be applied under the preliminary technical standards.

Point (b): the nearest waters of the United States, sinkhole, open tile line intake structure, or other conduit to waters of the United States.  $T_{t(\text{shallow concentrated})}$  is determined by multiplying the above distance times a velocity of runoff that is appropriate in light of the preliminary technical standards. See Figure G-1.

$$\text{Eq. 3} \quad T_c (\text{hr}) = \frac{5}{3} \times \frac{(L^{0.8}) \times (S + 1)^{0.7}}{1900 \times (s^{0.5})}$$

where

$L$  = preliminary technical standard for the setback distance (ft).

$S$  = potential maximum retention after runoff begins

$$= (1,000 / \text{CN}) - 10$$

$\text{CN}$  = runoff curve number. To select a number that is appropriate in light of the design condition for the land use and the preliminary technical standards, see Table G-3.

$s$  = preliminary technical standard for the slope over the distance  $L$  (percent).

**B.** Calculate the percent removal of BOD in the setback. The equation for percent removal is as follows (modified from Martel et al. 1980):

$$\text{Eq. 4} \quad E = (1 - A \times e^{-(k_T \times t)}) \times 100$$

where

$E$  = percent removal of BOD

$A$  = nonsettleable fraction of BOD in manure

= 0.5 to 0.6 for animals other than mature dairy cows (Zhu 2003)

= 0.9 for mature dairy cows (Wright 2004)

$k_T$  = first-order reaction rate constant at the design temperature of soil (T) (°C)

=  $k \times (\Theta)^{T-20}$

$\Theta$  = 1.135 (Schroepfer et al. 1964)

$k$  = 0.03/min<sup>5</sup>

$t$  = detention time

=  $T_c \times 60$

**Step 5:** Region 5 multiplies the percent removal calculated in **Step 4. B.** times the initial concentration of BOD in runoff from land where manure has been surface applied (i.e., the concentration before treatment of the runoff by land in the setback). If state-specific data are not available, use the values from Table G-2 as the basis for assumptions about the initial concentration. Subtract from the initial concentration the product of the percent removal times the initial concentration. If the standard established in **Step 1** is expressed as a mass, proceed to **Step 6.** If it is expressed as a concentration, compare the final concentration to the standard. If the final concentration is less than or equal to the standard, the region will conclude that there is no reasonable risk of runoff. The region will neither object to nor disapprove the state's preliminary technical standards. However, for the analysis to hold, the technical standards need to require the CAFO owner or operator to verify that conditions in the setback at the beginning of any application are consistent with the values assigned to  $N$  or  $S$ . In other words, the standards need to prohibit surface application when ice reduces the surface roughness or occupies the surface storage in the setback. If the concentration is greater than the standard established in **Step 1**, the region will conclude that there is a reasonable risk of runoff. Therefore, the final technical standards need to prohibit surface application of manure in the winter (or on frozen or snow-covered soil) or the state needs to otherwise strengthen the preliminary technical standards so there is no reasonable risk of runoff.

**Step 6:** If the standard is expressed as a mass, Region 5 calculates the mass of BOD that will run off the land given the design conditions for the land use, depth of precipitation, soil temperature, and soil moisture content and the preliminary technical standards for the Hydrologic Soil Group, land cover and treatment practice, and the type and maximum quantity of liquid manure. Calculating the mass is a three-step process as shown below.

**A.** Use the following equation (USDA NRCS 1993) to calculate the inches of runoff.

$$\text{Eq. 5} \quad Q = \frac{(P - 0.2 \times S)^2}{(P + 0.8 \times S)}$$

where

$Q$  = runoff (in)

$P$  = precipitation design depth plus the depth of water that could be applied in the winter as liquid manure given the preliminary technical standards (in).

$S$  = the same as defined for equation 3 except that, if the design temperature of soil is 0 °C or less, substitute  $S_f$  for  $S$  where  $S_f = (0.1 \times S)$  (Mitchell et al. 1997).

**B.** Use the following equation to convert the runoff from inches to a volume per acre.

$$\text{Eq. 6} \quad Q \text{ (gal/ac)} = Q \text{ (in)} \times \text{ft}/12 \text{ in} \times 43,560 \text{ ft}^2/\text{ac} \times 7.48 \text{ gal/ft}^3$$

**C.** Calculate the mass of BOD in runoff by multiplying the volume of runoff times the final concentration of BOD calculated in **Step 5**. The equation is as follows:

$$\text{Eq. 7} \quad \text{BOD (lb/ac)} = \text{BOD (mg/l)} \times Q \text{ (gal/ac)} \times 3.7854 \text{ L/gal} \times \text{g}/1000 \text{ mg} \times 0.0022 \text{ lb/g}$$

Compare the mass with the standard established in **Step 1**. If the mass is less than or equal to the standard, Region 5 will conclude that there is no reasonable risk of runoff. The region will neither object to nor disapprove the preliminary technical standards. However, for the analysis to hold, the technical standards need to require the CAFO owner or operator to verify that conditions in the setback at the beginning of any application are consistent with the values assigned to  $N$  or  $S$ . In other words, the standards need to prohibit surface application when ice reduces the surface roughness or occupies the surface storage in the setback. If the mass is greater than the standard established in **Step 1**, Region 5 will conclude that there is a reasonable risk of runoff. Therefore, the final technical standards need to prohibit surface application of manure in the winter (or on frozen or snow-covered soil) or the state needs to otherwise strengthen the preliminary technical standards so there is no reasonable risk of runoff.

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## Endnotes

- <sup>1</sup> In accordance with the U.S. Environmental Protection Agency (2000), Region 5 asked three professional engineers to review a February 2004 draft of this document. The peer review record includes responses to the comments that those individuals provided pursuant to the request.
- <sup>2</sup> For the purpose of this technical guidance, "other conduits to waters of the United States" means any area wherein water is or could be conveyed to waters of the United States via channelized flow.
- <sup>3</sup> Region 5 developed the tables for the corn and soybean crops commonly grown in the region. On request, the region can supply tables for other land uses and land cover and treatment practices.
- <sup>4</sup> The term *setback* is defined in 40 CFR part 412.4 to mean a specified distance from surface waters (i.e., waters of the United States) or potential conduits to surface waters where manure may not be land applied.
- <sup>5</sup> The k value of 0.03 per minute is as reported by Martel et al. (1980) for treatment of municipal wastewater by the overland flow process. The region assumes that Martel et al., reported the constant at 20 °C consistent with standard engineering practice.

## Appendix G-1

The following is an excerpt from EPA (2002 p. 177–78):

[C]onsiderable research has demonstrated that runoff from manure application on frozen or snow-covered ground has a high risk of water quality impact. Extremely high concentrations of nitrogen and phosphorus in runoff have been reported from plot studies of winter-applied manure: 23.5 to 1,086 milligrams (mg) of total Kjeldahl nitrogen (TKN) per liter (L) and 1.6 to 15.4 mg/L of phosphorus (P) (Thompson, et al. 1979; Melvin and Lorimor 1996). In two Vermont field studies, Clausen (1990, 1991) reported 165 to 224 percent increases in total P concentrations, 246 to 1,480 percent increases in soluble P concentrations, 114 percent increases in TKN concentrations, and up to 576 percent increases in ammonia-nitrogen (NH<sub>3</sub>-N) following winter application of dairy manure. Mass losses of up to 22 percent of applied nitrogen and up to 27 percent of applied P from winter-applied manure have been reported (Midgeley and Dunklee 1945; Hensler et al. 1970; Phillips et al. 1975; Converse et al. 1976; Klausner et al. 1976; Young and Mutchler 1976; Clausen 1990, 1991; Melvin and Lorimor 1996). Much of this loss can occur in a single storm event (Klausner et al. 1976). Such losses could represent a significant portion of annual crop needs.

On a watershed basis, runoff from winter-applied manure can be an important source of annual nutrient loadings to waterbodies. In a Wisconsin lake, 25 percent of annual P load from animal waste sources was estimated to arise from winter spreading (Moore and Madison 1985). In New York, snowmelt runoff from winter-manured cropland contributed more P to Cannonsville Reservoir than did runoff from poorly managed barnyards (Brown et al. 1989). Clausen and Meals (1989) estimated that 40 percent of Vermont streams and lakes would experience significant water quality impairments from the addition of just two winter-spread fields in their watersheds.

Winter application of manure can increase microorganism losses in runoff from agricultural land compared to applications in other seasons (Reddy et al. 1981). Cool temperatures enhance survival of fecal bacteria (Reddy et al., 1981; Kibby et al. 1978). Although some researchers have reported that freezing conditions are lethal to fecal bacteria (Kibby et al. 1978; Stoddard et al. 1998), research results are conflicting. Kudva et al. (1998) found that *Escherichia coli* can survive more than 100 days in manure frozen at minus 20 degrees Celsius. Vansteelant (2000) observed that freeze/thaw of soil/slurry mix only reduced *E. coli* levels by about 90 percent. Studies have found that winter spreading of manure does not guarantee die-off of *Cryptosporidium* oocysts (Carrington and Ransome 1994; Fayer and Nerad 1996). Although several studies have reported little water quality impact from winter-spread manure (Klausner 1976; Young and Mutchler 1976; Young and Holt 1977), such findings typically result from fortuitous circumstances of weather, soil properties, and timing/position of manure in the snowpack. The spatial and temporal variability and unpredictability of such factors makes the possibility of ideal conditions both unlikely and impossible to predict.



## Appendix G-2. Example Derivation of the Maximum Rates for Liquid Manure Application on Frozen Soil

### Givens

According to USDA NRCS (1993), the following are givens:

$$\text{Potential maximum retention after runoff begins (S)} = \frac{1,000 - 10}{CN}$$

$$\text{Runoff curve number (CN)} = \frac{1,000}{S + 10}$$

According to Mitchell et al. (1997), the following is a given for frozen soil:

$$S_f = 0.1 \times S$$

For  $CN$  in the range from zero to 100, Table 10.1 in USDA NRCS (1993), identifies the minimum depth of precipitation ( $P$ ) at which the runoff curve begins under dry, average, and saturated antecedent soil moisture conditions. For example, for a  $CN$  of 91 and average antecedent soil moisture, the runoff curve begins when  $P$  equals 0.2 inch.

### Example

Hydrologic Soil Group A.

Harvested crop was corn planted in straight rows.

The land is in good hydrologic condition.

The antecedent soil moisture is average.

$$S_f = (1,000 / 64 - 10) \times 0.1 = 0.56$$

$$CN_f = (1,000 / (0.56 + 10)) = 94.7 \cong 95$$

According to Table 10.1 in USDA NRCS (1993), for a  $CN$  of 95, 0.11 inch is the minimum depth of precipitation (or other liquid) at which the runoff curve begins. Converting that depth to a volume per acre,

$$Q (\text{gal/ac}) = 0.11 \text{ in} \times \text{ft}/12 \text{ in} \times 43,560 \text{ ft}^2/\text{ac} \times 7.48 \text{ gal}/\text{ft}^3$$

results in 2,987 gallons per acre as the maximum quantity of liquid that can be applied on frozen soils in Hydrologic Soil Group A while precluding runoff.

### Appendix G-3. Runoff Curve Numbers for Antecedent Moisture Condition II

If the curve number for AMC III is ...	then the curve number for AMC II is ...
100	99
99	96
98	93
97	91
96	89
95	87
94	85
93	83
92	81
91	79
90	78
89	76
88	74
87	73
86	71
85	70
84	68
83	67
82	65
81	64
80	63
79	62
78	60
77	59
76	58
75	57
74	55
73	54
72	53
71	52
70	50
69	49
68	48
67	47
66	46
65	45
64	44
63	43
62	42
61	41

# Appendix



# H

# NPDES CAFO Nutrient Management Plan Review Checklist

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## Introduction

This checklist is a tool to guide the review of a nutrient management plan (NMP) submitted with a National Pollutant Discharge Elimination System (NPDES) permit application or notice of intent (NOI). The checklist supports the permit writer's determination of whether the NMP adequately addresses each of the nine minimum practices required in the regulations. That determination should be based on an assessment of the following for each minimum practice:

1. Are the practices and procedures identified in the NMP sufficient to prevent discharges to surface water?
2. Are the practices and procedures adequate to support identification of NMP terms for the permit?

The checklist is focused on the fundamental concepts necessary to evaluate whether an NMP addresses the regulatory requirements (e.g., NPDES minimum standards and effluent limitations guideline (ELG) requirements). The checklist is organized into three parts: (1) Part A – Basic Facility Information, (2) Part B – Nine Minimum Practices and Associated Information, and (3) Part C – Plan Adequacy. Associated information in Part B includes information associated with each minimum practice and is used to help to determine if the plan meets the requirements of the minimum practices. For example, crop information is necessary to review the protocols for land application of manure and wastewater minimum practice.

## Using the Checklist

The checklist has been designed to serve as a tool for use in determining whether an NMP addresses the ELG requirements (where applicable) and NPDES NMP minimum practices. It also addresses the information needed to identify the terms of an NMP as defined by EPA. The checklist was designed to cover a variety of NMPs and operations; as such, it should cover most common situations a permit writer will encounter. However, specific operational characteristics can vary widely depending on animal sector, climate, state requirements, and other factors. Permit writers should be aware of the characteristics of a typical CAFO in their area and, if needed, revise the checklist to improve its utility in evaluating NMPs for a specific state or region.

Although the checklist is intended for use by permit writers in evaluating NMPs, the completed checklist for a facility should be saved in the permit file and be made available as a reference for the CAFO inspector to review before conducting a compliance inspection. The checklist information would enable the inspector to document changes that have occurred at the operation since the permit was issued and verify that they are reflected in the current NMP.

The determination of whether an NMP addresses the nine minimum practices often will be based on best professional judgment. Even where a plan appears to address each of the nine minimum practices, a poorly developed plan could be an indicator of a potential future permit violation. Further, as described in Chapter 4 of this Manual, broadly applicable permit could be captured as terms and conditions of the permit and therefore might not necessarily be addressed in the operation's NMP.

<b>NPDES CAFO NMP Nine Minimum Practices Review Checklist</b>	
<b>Part A</b>	<b>Basic Facility Information</b> Documents location information and basic information about the type and size of the operation.
<b>Part B</b>	<b>Nine Minimum Practices</b> Documents critical information and terms specific to each of the NMP nine minimum practices, including information associated with or necessary to review how the plan addresses each practice.
<b>Part C</b>	<b>Plan Adequacy</b> For use by the plan reviewer to document an overall determination of plan adequacy.
<i>Note: Some of the information in the checklist might apply to Large CAFOs only. For additional details, consult the regulations.</i>	
<b>Part A – Basic Facility Information</b>	
<b>1. Facility Identification</b>	
<ul style="list-style-type: none"> <li>• Operation Name: _____</li> <li>• NPDES permit number: _____</li> </ul>	
<b>2. Plan Preparer Certification</b>	
<ul style="list-style-type: none"> <li>• Did the plan preparation involve certified technical specialists? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• Are the name and certification credentials of the plan preparer identified in the plan?..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> </ul>	
<b>3. Type of Operation</b>	
<ul style="list-style-type: none"> <li>• Is the operation <input type="checkbox"/> Large CAFO <input type="checkbox"/> Medium or Small CAFO <input type="checkbox"/> Other (non-CAFO)</li> <li>• Is the operation <input type="checkbox"/> Open lot <input type="checkbox"/> Partially enclosed <input type="checkbox"/> Fully enclosed</li> </ul>	
Notes: _____ _____ _____	
<ul style="list-style-type: none"> <li>• Does the description of the facility in the plan reflect the description of the facility in the application/NOI/fact sheet/permit? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> </ul>	
<b>4. Facility Location</b>	
<ul style="list-style-type: none"> <li>• Street Address (mailing): _____</li> <li>• City, State, ZIP: _____</li> <li>• Does the plan include maps that identify                             <ul style="list-style-type: none"> <li>(1) The location of the production area, including confinement areas, manure and wastewater handling and storage areas, and raw material handling and storage areas)? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>(2) All land application areas owned or under the ownership, rental, lease, other legal arrangement of the CAFO operator, including topography and soil types? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>(3) Environmentally sensitive areas (sinkholes, wells, drinking water sources, tile drain outlets, etc.) for the production and land application areas? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> </ul> </li> <li>• Does the plan identify the latitude and longitude to the entrance of the production area? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• Does the plan identify the watershed(s) in which the operation is located? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> </ul>	

- Is the watershed listed on the state's list of impaired watersheds? .....  Yes  No

*If yes, what impairments are identified?* \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

- Is this facility within a state-designated source water protection area? .....  Yes  No
- Are there any other water quality concerns in this watershed? .....  Yes  No

*Explain:* \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**5. Animals**

- What type(s) of animals are confined at the facility?
 

<input type="checkbox"/> Beef (slaughter/feeder)	<input type="checkbox"/> Chicken – Layer
<input type="checkbox"/> Dairy	<input type="checkbox"/> Chicken – Broiler
<input type="checkbox"/> Swine	<input type="checkbox"/> Sheep/Lambs
<input type="checkbox"/> Turkey	<input type="checkbox"/> Horse
<input type="checkbox"/> Duck	<input type="checkbox"/> Other _____

- What is the maximum number of animals confined, by animal type?
 

<input type="checkbox"/> Beef (slaughter/feeder) _____	<input type="checkbox"/> Chicken – Layer _____
<input type="checkbox"/> Dairy _____	<input type="checkbox"/> Chicken – Broiler _____
<input type="checkbox"/> Swine _____	<input type="checkbox"/> Sheep/Lambs _____
<input type="checkbox"/> Turkey _____	<input type="checkbox"/> Horse _____
<input type="checkbox"/> Duck _____	<input type="checkbox"/> Other _____

- Is the plan based on the animal numbers listed above? .....  Yes  No

*If no, on what capacity is the plan based?* \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

<b>Part B – Nine Minimum Practices</b>
<b><i>Minimum Practice: Ensure Adequate Storage Capacity</i></b>
<p><b>Manure/Litter/Process Wastewater Generation</b></p> <ul style="list-style-type: none"> <li>• What are the manure generation rates identified in the plan?               <ul style="list-style-type: none"> <li>Animal Type 1: _____ lbs/year</li> <li>Animal Type 2: _____ lbs/year</li> <li>Animal Type 3: _____ lbs/year</li> </ul> </li> <li>• Are the manure generation rates generally consistent with the USDA's <i>Agricultural Waste Management Field Handbook</i>? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No               <p style="margin-left: 20px;">If no, are other practices in place that account for the rates included in the plan? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p style="margin-left: 20px;">If yes, what are the practices identified in the plan?..... <input type="checkbox"/> Feed Management <input type="checkbox"/> Other</p> <p style="margin-left: 20px;"><i>Explain:</i> _____</p> <p style="margin-left: 20px;">_____</p> </li> <li>• Does the plan identify all sources of process wastewater and appropriate generation rates? .. <input type="checkbox"/> Yes <input type="checkbox"/> No</li> </ul> <p><b>Storage Capacity</b></p> <ul style="list-style-type: none"> <li>• Does the plan identify the volume and number of days of storage required for the facility? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• Does the plan identify the size (in acres) of the production area? ..... <input type="checkbox"/> Yes _____ acres <input type="checkbox"/> No</li> <li>• Does the plan identify the number and type of storage structures?..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• Does the plan document the source of the information to calculate available storage volume? <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• Does the storage volume in the plan account for manure and process wastewater generation (including silage leachate and other wastes) during the storage period in addition to the collection of runoff and direct precipitation on the surface of the storage structure from normal precipitation and the design storm event (25-year, 24-hour storm or other as required/appropriate for new source swine, poultry, and veal calf operations) for the CAFO location, a minimum treatment volume for anaerobic lagoons, and volume for solids accumulation?..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• Does the plan use the correct 25-year, 24-hour rainfall amount for the location of this operation to determine storage requirements (or other storm event as required/appropriate for new source swine, poultry, and veal calf operations)? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No               <p style="margin-left: 20px;"><i>Note source of information:</i> _____</p> </li> <li>• Are the evaporation rates used in the plan consistent with local data/guidance and appropriately applied? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• Does the plan include a schedule for cleaning out the storage structures or solids removal for liquid storage structures? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• Does the plan document that available storage volume is consistent with the plan's specified land application schedule? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• Does the plan require maintenance for all storage structures? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• Does the plan identify the specific maintenance actions and a frequency/schedule for those actions? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> </ul> <p><i>Terms for Minimum Practice: Ensure Adequate Storage Capacity (identify below or reference NMP section(s)):</i></p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>



<p><b>Minimum Practice: Ensure Proper Management of Mortalities</b></p> <ul style="list-style-type: none"> <li>• Is the animal mortality addressed in the plan? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No                      If yes, what methods are identified in the plan to address animal mortality?  <input type="checkbox"/> Rendering    <input type="checkbox"/> Incineration    <input type="checkbox"/> Composting    <input type="checkbox"/> Disposal pits  <input type="checkbox"/> Landfill    <input type="checkbox"/> Other _____</li> <li>• Does the plan include a schedule for collecting, storing, and disposing of animal carcasses? . <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• Does the plan address mortality storage before final disposition? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• Is the mortality rate used in the plan consistent with USDA expected values for the animals confined at the operation? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• Does the plan include contingency plans for unexpected but possible occurrences such as mass mortality or the loss of a rendering contractor? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• Does the animal mortality plan meet state and local requirements? ..... <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No</li> </ul> <p><i>Terms for Minimum Practice: Ensure Proper Management of Mortalities (identify below or reference NMP section(s)):</i></p> <p>_____</p> <p>_____</p> <p>_____</p>
<p><b>Minimum Practice: Divert Clean Water from Production Area</b></p> <ul style="list-style-type: none"> <li>• Does the plan address the diversion of clean water from the production areas?..... <input type="checkbox"/> Yes <input type="checkbox"/> No                      If no, why? _____                      _____</li> <li>    If no, is the runoff being collected and is storage of runoff adequate?                      (See the Minimum Practice: Ensure Adequate Storage Capacity section)..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• Does the plan require periodic visual inspection to verify proper and functional diversion? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• Does the plan address the maintenance of diversion structures? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> </ul> <p><i>Terms for Minimum Practice: Divert Clean Water from Production Area (identify below or reference NMP section(s)):</i></p> <p>_____</p> <p>_____</p> <p>_____</p>
<p><b>Minimum Practice: Prevent Direct Contact</b></p> <ul style="list-style-type: none"> <li>• Does the facility or topographic map identify any surface water in the production area? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• If yes, are measures in the plan to prevent direct contact? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• What are the measures identified in the plan?..... <input type="checkbox"/> Fences <input type="checkbox"/> Other</li> <li>• Does the plan address maintenance of the identified practices?..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> </ul> <p><i>Terms for Minimum Practice: Prevent Direct Contact (identify below or reference NMP section(s)):</i></p> <p>_____</p> <p>_____</p> <p>_____</p>

<b>Minimum Practice: Chemical Disposal</b>										
<ul style="list-style-type: none"> <li>• Does the plan include practices that ensure chemicals (including pesticides, hazardous and toxic chemicals, and petroleum products/by-products) are not disposed of in any storage or treatment system that is not specifically designed to treat those chemicals? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• Has the facility incorporated measures (in accordance with applicable laws and regulations) to prevent mishandling of pesticides, hazardous and toxic chemicals, and petroleum products/by-products? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> </ul> <p><i>If no, explain:</i> _____ _____</p>										
<p><i>Terms for Minimum Practice: Chemical Disposal (identify below or reference NMP section(s)):</i></p> <p>_____</p> <p>_____</p> <p>_____</p>										
<b>Minimum Practice: Conservation Practices to Reduce Nutrient Loss</b>										
<ul style="list-style-type: none"> <li>• Does the plan specify a 100-foot setback or a 35-foot vegetated buffer or alternative setback for land application from downgradient surface waters and conduits in accordance with the Effluent Limitations Guideline? ..... <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No</li> </ul> <p>If an alternative setback has been specified, what is the basis for the use of an alternative setback? _____ _____ _____</p> <ul style="list-style-type: none"> <li>• Does the plan include the use of best management practices (BMPs) to control nutrient loss from the:             <table style="width: 100%; border: none;"> <tr> <td style="padding-left: 20px;">Production area .....</td> <td><input type="checkbox"/> N/A</td> <td><input type="checkbox"/> Yes</td> <td><input type="checkbox"/> No</td> </tr> <tr> <td style="padding-left: 20px;">Land application area(s) .....</td> <td><input type="checkbox"/> N/A</td> <td><input type="checkbox"/> Yes</td> <td><input type="checkbox"/> No</td> </tr> </table> </li> </ul> <p>If yes, identify:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <p><b>Land Application Areas</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Vegetated Buffers (Type of vegetation _____)</li> <li><input type="checkbox"/> Diversion</li> <li><input type="checkbox"/> Grassed Waterway (Type of vegetation _____)</li> <li><input type="checkbox"/> Strip Cropping</li> <li><input type="checkbox"/> Residue Management</li> <li><input type="checkbox"/> Terracing</li> <li><input type="checkbox"/> Conservation Tillage</li> </ul> </td> <td style="width: 50%; vertical-align: top;"> <p><b>Production Area</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Vegetated Buffers (Type of vegetation _____)</li> <li><input type="checkbox"/> Other _____</li> </ul> </td> </tr> </table> <ul style="list-style-type: none"> <li>• If BMPs are being used to control nutrient loss, does the plan specify how they are to be implemented? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> </ul> <p>If yes, what does the plan require? _____ _____</p> <ul style="list-style-type: none"> <li>• What references are cited for the practices? <input type="checkbox"/> USDA Practice Standards <input type="checkbox"/> State Standards <input type="checkbox"/> Other _____ (Note: To be used to verify proper implementation)</li> <li>• Does the plan include Operation &amp; Maintenance requirements for practices used to reduce nutrient loss? ..... <input type="checkbox"/> Yes <input type="checkbox"/> No</li> <li>• Do the plan and facility maps identify the specific locations where the BMPs and setbacks are to be used? ..... <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No</li> </ul>	Production area .....	<input type="checkbox"/> N/A	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Land application area(s) .....	<input type="checkbox"/> N/A	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<p><b>Land Application Areas</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Vegetated Buffers (Type of vegetation _____)</li> <li><input type="checkbox"/> Diversion</li> <li><input type="checkbox"/> Grassed Waterway (Type of vegetation _____)</li> <li><input type="checkbox"/> Strip Cropping</li> <li><input type="checkbox"/> Residue Management</li> <li><input type="checkbox"/> Terracing</li> <li><input type="checkbox"/> Conservation Tillage</li> </ul>	<p><b>Production Area</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Vegetated Buffers (Type of vegetation _____)</li> <li><input type="checkbox"/> Other _____</li> </ul>
Production area .....	<input type="checkbox"/> N/A	<input type="checkbox"/> Yes	<input type="checkbox"/> No							
Land application area(s) .....	<input type="checkbox"/> N/A	<input type="checkbox"/> Yes	<input type="checkbox"/> No							
<p><b>Land Application Areas</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Vegetated Buffers (Type of vegetation _____)</li> <li><input type="checkbox"/> Diversion</li> <li><input type="checkbox"/> Grassed Waterway (Type of vegetation _____)</li> <li><input type="checkbox"/> Strip Cropping</li> <li><input type="checkbox"/> Residue Management</li> <li><input type="checkbox"/> Terracing</li> <li><input type="checkbox"/> Conservation Tillage</li> </ul>	<p><b>Production Area</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Vegetated Buffers (Type of vegetation _____)</li> <li><input type="checkbox"/> Other _____</li> </ul>									

*Terms for Minimum Practice: Conservation Practices to Reduce Nutrient Loss (identify below or reference NMP section(s)):*

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**Minimum Practice: Protocols for Manure and Soil Testing**

- Does the plan include specific protocols for the representative *sampling* of manure, wastewater, and soil for determining nutrient content?.....  Yes  No
- Does the plan include appropriate frequencies for the *sampling* of manure, wastewater, and soil for determining nutrient content? .....  Yes  No
- Does the plan include specific protocols for the *analysis* of manure, wastewater, and soil for determining nutrient content? .....  Yes  No
- Are the soil test results used to develop the plan less than 5 years old?.....  Yes  No
- Are the manure nutrient analysis results used to develop the plan less than 12 months old?...  Yes  No  
*[Note: book values may be used for the first year of operation.]*

*Terms for Minimum Practice: Protocols for Manure and Soil Testing (identify below or reference NMP section(s)):*

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**Minimum Practice: Protocols for Land Application of Manure and Wastewater**

**Manure, Litter, and Process Wastewater Use and Disposal**

- What manure utilization options are identified in the plan? (If more than one option is identified in the plan, indicate the relative amount of the manure used or disposed of under this option.)
  - Land Application..... \_\_\_\_\_%
  - Composting ..... \_\_\_\_\_%
  - Incineration ..... \_\_\_\_\_%  
 Does the plan address what is done with the remaining ash? \_\_\_\_\_  
 \_\_\_\_\_
  - Other ..... \_\_\_\_\_%  
 Describe: \_\_\_\_\_  
 \_\_\_\_\_
- Is manure, litter, or wastewater to be transferred off-site?  Yes  No  
 If yes:  
 How much will be transferred annually? \_\_\_\_\_ tons \_\_\_\_\_ gallons  
 Does the plan include the necessary arrangements for that transfer? .....  Yes  No  
 Does the plan identify the recipients? .....  Yes  No

- If the plan includes land application of manure, litter, or process wastewater:
  - Do the facility maps identify the fields or conservation management units (CMU) used to develop the plan? (Field boundaries, field number, acreage).....  Yes  No
  - Does the plan address rates of application using the  linear approach or the  narrative rate approach?
 

*[Note: The linear and narrative rate approaches primarily influence identification of terms based on the NMP and generally do not dictate the content of the NMP, with a few specific exceptions. The questions in the sections below identify specific information that is required to support development of terms under a particular approach.]*
- How many acres under control of the CAFO (e.g., owned, leased, subject to an access agreement) are identified in the plan for land application use?
 

\_\_\_\_\_ acres owned \_\_\_\_\_ acres leased \_\_\_\_\_ total acres applied
- Does the CAFO own or control sufficient land to properly use all manure and wastewater generated by the operation?.....  Yes  No
 

If no:

  - Does the plan identify the quantity of excess manure being generated? \_\_\_\_\_ tons/year or gallons/year
  - Does the plan identify how the excess manure is to be used? .....  Yes  No
  - If yes, how? \_\_\_\_\_

*Terms for Minimum Practice: Protocols for Land Application of Manure and Wastewater, Manure, Litter, and Process Wastewater Use and Disposal (identify below or reference NMP section(s)):*

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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**Crop Production Information**  
 For use where the NMP includes land application of manure, litter, or process wastewater

- Does the plan identify what crops are produced for each field? .....  Yes  No
 

What are they? \_\_\_\_\_

\_\_\_\_\_
- Does the plan identify the crop rotations? .....  Yes  No
 

What is the crop rotation? \_\_\_\_\_

\_\_\_\_\_
- Does the plan identify cropping practices? .....  Yes  No
 

If yes, what are they?  Ridge Till  Conservation Tillage  Contour Farming

Other \_\_\_\_\_
- Does the cropping system use irrigation? .....  Yes  No
 

If yes, what type:  Traveling Gun  Center Pivot

Flood  Other Sprinkler

Ridge and furrow  Other \_\_\_\_\_
- For plans using the narrative rate approach, does the plan identify alternative crops for specific fields? .....  Yes  No
 

*[Note: Inclusion of alternative crops is optional.]*

- Are realistic crop yield goals identified in the plan (including for alternative crops, if included in plans using the narrative rate approach)? .....  Yes  No
- What source of information was used to determine the realistic yield goals for this operation?
  - Farm records (*Circle one:* last year's crop production, 3-year average, 5- year average, Other: \_\_\_\_\_)
  - USDA  State databases (VALUES, MASCAP)
  - County averages  Previous crop insurance records
- Is adequate justification provided to support the yield goal? .....  Yes  No

*Terms for Minimum Practice: Protocols for Land Application of Manure and Wastewater, Crop Production Information (identify below or reference NMP section(s)):*

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**Rate Determination/Nutrient Application Information**  
 For use where the NMP includes land application of manure, litter, or process wastewater

- Does the plan clearly identify field-specific maximum application rates, as follows:
  - For plans using the linear approach, the maximum pounds of N and P from manure, litter, and process wastewater per crop, per year?.....  Yes  No
  - For plans using the narrative rate approach, the maximum pounds of N and P from all nutrient sources per crop, per year?.....  Yes  No
- Does the plan include the outcome of a field-specific N and P transport risk assessment?.....  Yes  No
- Does the plan identify the basis/rationale for determining an N-based or P-based application rate for each field?.....  Yes  No
  - What is the basis?
    - Soil test method  Soil phosphorus threshold
    - Phosphorus Index  Other \_\_\_\_\_
- Does the plan identify fields where land application is N-based and where it is P-based?.....  Yes  No
- For P-based fields, does the plan include the use of multi-year P application?.....  Yes  No
  - If yes,
    - Is multi-year P application limited to fields that do not have a high potential for P runoff to surface water? .....  Yes  No
    - Is the application rate limited to the annual crop N requirement? .....  Yes  No
    - Is additional P application planned only after the amount applied in the multi-year application has been removed through crop uptake and harvest? .....  Yes  No
- Does the plan identify the appropriate crop N and P removal rates or nutrient recommendations (including for alternative crops, if included in plans using the narrative rate approach)?.....  Yes  No
- Does the plan take into account other sources of nutrients used at the operation .....  Yes  No
  - If yes, what other sources of nutrients have been accounted for?
    - Commercial fertilizer  Biosolids
    - Bedding  Legume credits
    - Wastewater  Previous manure application
    - Compost  Irrigation water
    - Other \_\_\_\_\_

- For plans using the linear approach, does the plan clearly articulate the methodology used to account for the amount of N and P in the manure to be applied?.....  Yes  No
- For plans using the narrative rate approach, does the plan clearly articulate the methodology used to account for the following? .....  Yes  No  
(check each that is addressed in the NMP methodology)
  - Soil test results  The form and source of manure
  - Credits for all plant available N in the field  The timing and method of land application
  - The amount of N and P in the manure to be applied  Volatilization of N
  - Consideration of multi-year P application  Mineralization of organic N
  - Accounting for all other additions of plant available N and P to the field
- Does the plan identify the application method? .....  Yes  No  
If yes, what method is used:  Surface applied  Injected  Incorporated
- Does the plan identify appropriate volatilization rates based on the method of application? ....  Yes  No
- Does the plan include the application of wastewater to fields via an irrigation system? .....  Yes  No  
If yes:
  - Does the plan identify the type of irrigation system? .....  Yes  No
  - Does the plan include provisions to minimize ponding or puddling of wastewater on land application fields? .....  Yes  No
  - Does the plan address the management of drainage water to prevent surface or groundwater contamination? .....  Yes  No
- Does the plan include specific restrictions or adequate management practices to prevent water pollution from the application of manure/wastewater to flooded, saturated, frozen, or snow-covered ground? .....  Yes  No
- Does the plan address inspection and maintenance of land application equipment?.....  Yes  No
- Does the plan require periodic calibration of manure application equipment?.....  Yes  No
- Are the application rates identified in the plan appropriate? .....  Yes  No

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

*Terms for Minimum Practice: Protocols for Land Application of Manure and Wastewater, Rate Determination/Nutrient Application Information (identify below or reference NMP section(s)):*

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Minimum Practice: Record Keeping**

- Identify the records that the plan indicates will be maintained at the facility.
  - Production Area Records
    - ✓ Weekly inspections of stormwater and runoff diversion devices and devices for channeling contaminated stormwater to wastewater containment structures.....  Yes  No
    - ✓ Weekly inspections of manure, litter, and process wastewater impoundments.....  Yes  No
    - ✓ Weekly storage facility wastewater level, as indicated on a depth marker .....  Yes  No
    - ✓ Daily water line inspections .....  Yes  No
    - ✓ Actions taken to correct deficiencies identified as a result of daily and weekly inspections .....  Yes  No
    - ✓ Manure/wastewater storage—date of emptying, level before emptying, and level after emptying, or quantity removed (dry manure) .....  Yes  No
    - ✓ The date, time, and volume of any overflow.....  Yes  No
    - ✓ Records documenting that mortalities were not disposed of in any liquid manure or process wastewater system and that mortalities were handled to prevent the discharge of pollutants to surface water .....  Yes  No
    - ✓ On-site precipitation .....  Yes  No
    - ✓ Animal Inventory .....  Yes  No
  - Land Application Records
    - ✓ Manure and wastewater sample nutrient analysis test methods and results that will be used to calculate land application rates.....  Yes  No
    - ✓ Soil sample analysis test methods and results that will be used to calculate land application rates .....  Yes  No
    - ✓ Manure and wastewater application equipment inspection log .....  Yes  No
    - ✓ Maintenance log of all equipment necessary to control discharge and meet permit requirements (e.g., maintenance of land application equipment) .....  Yes  No
    - ✓ Annual calculation of the maximum amount of manure or wastewater to be land applied, before application .....  Yes  No
    - ✓ Crop planting/harvest dates by field or CMU .....  Yes  No
    - ✓ Crop type and yield by field or CMU – bushels/acre (seasonally) .....  Yes  No
    - ✓ For each land application event, the date, rate (tons of manure or gallons of wastewater/acre or pounds of N and P per acre), weather conditions during and for 24 hours before and after application, application method, and equipment used by field or CMU (daily during application).....  Yes  No
    - ✓ The total amount of N and P applied to each field, including calculations .....  Yes  No
    - ✓ Lease/Rental/Access Agreements for all land not owned by the operator .....  Yes  No
  - Off-site Transfer of Manure and Wastewater Records
    - ✓ Date of each transfer.....  Yes  No
    - ✓ The name and address of the recipient (for each transfer).....  Yes  No
    - ✓ Quantity transferred (for each transfer) .....  Yes  No
    - ✓ Documentation that the most current nutrient analysis was provided to the recipient .....  Yes  No
- Does the plan require that any additional records be maintained at the facility? .....  Yes  No  
 If yes, what are those records? \_\_\_\_\_  
 \_\_\_\_\_
- Does the plan include an emergency action plan to address spills and catastrophic events? ..  Yes  No

*Terms for Minimum Practice: Record Keeping (identify below or reference NMP section(s)):*

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**Part C – Determination of Plan Adequacy**

*[Note: This section is to be used by the NMP reviewer to evaluate the overall adequacy of the plan based on the information in Parts A and B and does not necessarily reflect information expected to be contained in the NMP.]*

- Does the plan adequately address the storage, handling, and application of manure and wastewater to prevent the discharge of pollutants to waters of the United States? .....  Yes  No
- Is the plan consistent with the technical standards for nutrient management established by the Director with regard to protocols for manure and soil testing and land application protocols including nutrient transport risk assessment methods and methods and data used to determine application rates? .....  Yes  No
- Have there been past discharges to waters of the United States from the facility? .....  Yes  No  
 If yes, does the plan include sufficient measures to address the cause of the past discharge and prevent future discharges? .....  Yes  No
- Does the plan require revision? .....  Yes  No  
 If yes, what specific components of the plan require revision?

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**Additional Review Comments:**

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# Appendix

# I

## NPDES CAFO Technical Standard Review Checklist

Under the Clean Water Act, all authorized states were required to adopt technical standards by February 12, 2005, pursuant to Title 40 of the *Code of Federal Regulations* (CFR) part 123.36. Part 123.36 requires that technical standards meet the requirements of 40 CFR part 412.4(c)(2) to minimize phosphorus (P) and nitrogen (N) transport to surface waters. Additionally, the 2008 confined animal feeding operation (CAFO) rule requires site-specific *terms of a nutrient management plan* (NMP) to be included in a CAFO's National Pollutant Discharge Elimination System (NPDES) permit. Technical standards provide the basis for critical elements of the site-specific terms of the NMP required by 40 CFR parts 122.42(e)(5)(i) and (ii). The criteria outlined in the attached checklist identifies the information needed in a technical standard to meet the requirements of part 412.4(c)(2) to develop an NMP that contains all the required *terms of the NMP*.

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ESTABLISHMENT AND APPLICABILITY OF TECHNICAL STANDARDS (TS)			
1	Has the Director verified or provided (or both) the state's TS?		
2	What mechanism did the state Director use to establish the TS? <i>(check item(s) to right)</i>	Standalone document	
		Permit attachment	
		Permit referenced documents	
		Written into the regulations	
		Regulation reference documents	
Other			
3	How is the specific standard included as a requirement of the CAFO program?	Describe how it is made known that the CAFO NMP must be developed in accordance with the document(s) identified above. For example, does the permit or regulation provide a reference to the listed document(s)? Or does the document itself identify that it is the TS for CAFO operations that meets the requirement of part 412.4(c)(2)?	
APPLICATION RATES			
Field-specific risk assessment			
Criteria	Specify	Reference	
4	Does the TS contain a clearly outlined, field-specific assessment tool for N or P or both transport from the field to surface waters?	Answer Y or N; Describe what the assessment tool is	Provide a reference to where in the TS this is stated
5	Does the assessment tool (above) provide quantitative or qualitative (or both) criteria for determining whether manure application rates can be N-based, P-based, or prohibited?	Answer Y or N; Provide the quantitative criteria and corresponding rate (e.g., 1.5xP removal, 2xP removal, 3xP removal)	Provide a reference to where in the TS this is stated
6	Where the assessment tool requires a P-based application rate, is it constrained to a 1-year P removal rate?	Answer Y or N; If no, provide under what criteria this is allowed and what rate is allowed	Provide a reference to where in the TS this is stated
Amount			
Criteria	Specify	Reference	
7	Does the TS provide the basis for determining expected crop yields?	Answer Y or N; Explain how realistic yield goals are to be calculated or determined and provide any necessary sources of information that are to be used.	Provide a reference to where in the TS this is stated
8	Does the TS provide crop recommendations that are to be used on which to base applications rates?	Answer Y or N; Provide the recommendations that are to be used for different crops and their source	Provide a reference to where in the TS this is stated
9	Does the TS define what a P-based application rate is? (e.g., crop removal rate, soil test, or the choice of either)?	Answer Y or N; Provide what it is	Provide a reference to where in the TS this is stated
10	Does the TS provide the actual removal rates, soil test recommendations or both for crops, depending on the answer to item 9?	Answer Y or N; Provide what the removal rate is or the soil test recommendation	Provide a reference to where in the TS this is stated

<b>Amount (continued)</b>			
<b>Criteria</b>		<b>Specify</b>	<b>Reference</b>
11	Does the TS provide a value for N credits to be given when legume crops are planted?	Answer Y or N; Provide what N credits are applied for different legumes	Provide a reference to where in the TS this is stated
12	Are N mineralization rates provided for different type (dairy, beef, poultry, swine, etc.) of manure?	Answer Y or N; Provide rates with corresponding manure types	Provide a reference to where in the TS this is stated
13	Does the TS address the requirement for a manure <sup>†</sup> analysis?	Answer Y or N	Provide a reference to where in the TS this is stated
14	Does the TS address the frequency of a manure <sup>†</sup> analysis	Answer Y or N; Provide frequency for analysis to be performed	Provide a reference to where in the TS this is stated
15	Does the TS address methods for collecting manure <sup>†</sup> samples?	Answer Y or N; Provide methods to be used	Provide a reference to where in the TS this is stated
16	Does the TS address the components for which the manure <sup>†</sup> is to be analyzed?	Answer Y or N; List components to be analyzed	Provide a reference to where in the TS this is stated
17	Does the TS address acceptable method(s) or laboratories or both for conducting the manure <sup>†</sup> analysis?	Answer Y or N; Provide methods or appropriate laboratories to be used	Provide a reference to where in the TS this is stated
18	Does the TS address the requirement for a soil test?	Answer Y or N	Provide a reference to where in the TS this is stated
19	Do the TS address the frequency of the soil test?	Answer Y or N; Provide frequency for analysis to be performed	Provide a reference to where in the TS this is stated
20	Does the TS address the methods for collecting soil samples?	Answer Y or N; Provide methods to be used	Provide a reference to where in the TS this is stated
21	Does the TS address which components to include in the soil analysis?	Answer Y or N; List components to be analyzed	Provide a reference to where in the TS this is stated
22	Does the TS address acceptable method(s) or laboratories or both for conducting the soil analysis?	Answer Y or N; Provide methods or laboratories to be used	Provide a reference to where in the TS this is stated
<b>Form and Source</b>			
<b>Criteria</b>		<b>Specify</b>	<b>Reference</b>
23	Does the amount, timing, and method address how it is to be applied to each form (solid, semisolid, or liquid) and source of manure?	The <i>form and source</i> of manure can be addressed separately under the amount, timing, or method of land application as it applies.	
<b>Timing—The criteria below are not required to adequately address the timing of manure application. The criteria identified below may be addressed in a TS, although alternative criteria that address the timing of manure application would also be appropriate.</b>			
<b>Criteria</b>		<b>Specify</b>	<b>Reference</b>
24	Does the TS address when manure application should be prohibited or delayed? If yes, do these limitations apply only to certain forms (solid, semisolid, or liquid) of manure?	Answer Y or N; If yes, provide when it is to be delayed	Provide a reference to where in the TS this is stated
25	Does the TS adjust mineralization rates for applications made at different times during the year?	Answer Y or N; Provide rate to be used for different times of land application	Provide a reference to where in the TS this is stated

Method of Application—The criteria below are not required to adequately address the method of manure application. The criteria identified below may be addressed in a TS, although alternative criteria that address the method of manure application would also be appropriate.			
Criteria	Specify	Reference	
26	Does the TS provide volatilization rates to apply to different types of land application methods? (e.g., if manure is incorporated after X number of days, a different volatilization rate is applied)?	Answer Y or N; Provide rate and corresponding land-application method	Provide a reference to where in the TS this is stated
27	Are there any specifications provided for applying different forms (solid, semisolid, or liquid) of manure?	Answer Y or N; Provide any specifications that must be met when land applying different forms of manure (e.g., application of liquid waste through surface or sprinkler irrigation will be timed to prevent deep percolation or runoff. The application rate must not exceed the soil intake/ infiltration rate.)	Provide a reference to where in the TS this is stated
Appropriate Flexibilities			
Criteria	Specify	Reference	
28	Does the TS allow multi-year P application?	Answer Y or N; If yes, define what multi-year application means for this standard	Provide a reference to where in the TS this is stated. This flexibility does not have to be provided for by the state Director. If it is not provided for, the remaining criteria (29 – 31) are not applicable.
29	If yes, does it provide restrictions on when or where (or both) this can occur?	Answer Y or N; provide restrictions that apply	Provide a reference to where in the TS this is stated
30	If yes, is there a restriction that additional P to these fields may not be applied until the amount applied in the single year has been removed through plant uptake and harvest?	Answer Y or N	Provide a reference to where in the TS this is stated
31	If yes, does the standard set N limits that must be met?	Answer Y or N; Provide N limits that must be met	Provide a reference to where in the TS this is stated

<sup>1</sup> Manure in this checklist means manure, litter, or process wastewater.



# Appendix

# J

## NPDES General Permit Template for CAFOs

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**NOTE:** This NPDES General Permit template for CAFOs has been developed to address existing large CAFOs subject to the effluent limitation guidelines subparts C (dairy cows and cattle other than veal calves) and D (swine, poultry, and veal calves). This example permit has not been developed for new sources or for CAFOs subject to subparts A (horses and sheep) and B (ducks).

Example NPDES CAFO Permit Text Key:

**[BOLD/SMALL CAPITALS]** defines areas where the permitting authority needs to insert specific text.

***[Bold/Italic]*** provides notes to the permitting authority designed to help it develop an NPDES CAFO permit and should be deleted when using this template.

**TEMPLATE  
NPDES GENERAL PERMIT  
FOR  
CONCENTRATED ANIMAL FEEDING OPERATIONS (CAFOs)**

**[AUTHORIZED NPDES PERMITTING AUTHORITY]**

**AUTHORIZATION TO DISCHARGE UNDER THE  
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)**

*[The intent of this NPDES General Permit template for CAFOs is to provide an outline for specific permit requirements that are consistent with the NPDES CAFO regulations, CAFO ELG, and the NPDES CAFO Permit Writers' Guidance (to be updated in accordance with the 2008 final rule). EPA encourages permitting authorities to use the recommendations of the guidance manual and this template as appropriate. Minimum NPDES permitting requirements for CAFOs are defined at 40 CFR parts 122, 123, and 412 and all other applicable CWA regulations.]*

In compliance with provisions of the Clean Water Act, 33 United States Code (U.S.C.) 1251 *et seq.* (the Act), **[INSERT STATE REGULATORY CITATION AS APPROPRIATE]**, owners and operators of concentrated animal feeding operations (CAFOs), except those CAFOs excluded from coverage in Part I of this permit, are authorized to discharge and must operate their facility in accordance with effluent limitations, monitoring requirements, and other provisions set forth herein.

A copy of this permit must be kept by the permittee at the site of the permitted activity.

This permit will become effective **[DATE 30 DAYS AFTER: DATE OF PUBLICATION (GENERAL PERMIT) OR SIGNATURE (INDIVIDUAL PERMIT)]**

This permit and the authorization to discharge under the NPDES shall expire at midnight **[DATE 5 YEARS AFTER THE DATE ABOVE]**.

Signed this **[DAY]** of **[MONTH]** and **[YEAR]**.

\_\_\_\_\_  
**[PERMITTING AUTHORITY—OFFICIAL]**

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## Part I. Permit Area and Coverage

### A. Permit Area

*[The permitting authority should insert language that identifies the scope of the permit. In the case of a general permit, the permit should identify the type of facilities and/or the geographic area covered (e.g., watershed, statewide) by the permit. If the general permit is restricted to specific animal types and/or to certain size facilities, those limitations should be identified here. When issuing individual permits, this section of the permit should identify the specific facility covered by the permit. Only facilities that discharge or propose to discharge are required to apply for an NPDES permit. Other CAFOs may seek permit coverage if desired.]*

### B. Permit Coverage

This permit covers any operation that meets the following criteria:

1. Is located in the permit area as defined by Part I.A. of this permit.
2. That meets the definition of a CAFO at 40 CFR part 122.23(b)(4) (see Part VIII, Definitions, *large CAFO* of this permit) **[INSERT STATE REGULATORY CITATION AS APPROPRIATE]**.
3. Discharges pollutants to waters of the United States. Once an operation is defined as a CAFO, the NPDES requirements for CAFOs apply with respect to all animals in confinement at the operation and all manure, litter and process wastewater generated by those animals or the production of those animals, regardless of the type of animal.
4. Is eligible for permit coverage as defined in Part I.C. of this permit.
5. Is authorized for permit coverage by the permitting authority as specified in Part I.F. of this permit.

### C. Eligibility for Coverage

Unless excluded from coverage in accordance with Paragraph D or F below, owners/operators of existing, operating animal feeding operations that are defined as CAFOs or designated as CAFOs by the permitting authority (see Part VIII Definitions, *CAFOs* of this permit) and that are subject to 40 CFR Part 412, subparts C (Dairy Cows and Cattle Other than Veal Calves) and D (Swine, Poultry, and Veal Calves) are eligible for coverage under this permit. Eligible CAFOs may apply for authorization, under the terms and conditions of this permit, by submitting a Notice of Intent (NOI) to be covered by this permit (see Appendix A of this permit). ***[The permitting authority should provide a copy of the NOI as an appendix to this permit.]***

CAFO owners/operators may also seek to be excluded from coverage under this permit by (1) submitting to the permitting authority a Notice of Termination form (see Appendix D of this

permit). *[The permitting authority should specify the information to be included in such a request or, if available, the form to be used and include a copy of the form as an appendix to the permit.]* or (2) by applying for an individual NPDES Permit in accordance with Part I.F of this permit.

*[The permitting authority should specify an overall approach that defines how CAFOs are to be permitted. That requires determining those types of CAFOs that will be addressed under either general (statewide or watershed) or individual permits. The approach should be modified, as necessary, to reflect specific permitting authority programmatic priorities and constraints.]*

## D. Limitations on Coverage

The following CAFOs are not eligible for coverage under this NPDES general permit and must apply for an individual permit: *[Specific eligibility limitations for the general permit should be determined by the NPDES permitting authority.]*

## E. Application for Coverage

*[The permitting authority should insert the appropriate text in this section. Two alternatives are provided for E.1 providing different levels of detail.]*

1. Owners/operators of CAFOs seeking to be covered by this permit must perform the following:
  - a. For facilities covered by an expiring or expired permit that wish to have continuous permit coverage, submit an NOI to the permitting authority within *[The permitting authority may establish a time frame for submitting the NOI, which may extend to the expiration date of the permit or some time before the expiration date.]* days of the effective date of this permit.
  - b. Submit a Nutrient Management Plan (NMP) with the NOI that meets the requirements of 40 CFR Parts 122 and 412, where applicable.
  - c. Submit an NOI after the applicable date in Part I. E.1.a. above. Regardless of when the NOI is submitted, the CAFO's authorization under this permit is only for discharges that occur after permit coverage is granted. The permitting authority reserves the right to take appropriate enforcement actions for any unpermitted discharges.

*[Where a CAFO has submitted an application for coverage under an individual permit before issuance of the general permit, the CAFO must (1) submit an NOI for coverage under the general permit, or (2) submit an updated application for coverage under an individual permit if the application requirements have been revised or if the information in the existing application is not current.]*

2. Contents of the NOI: The NOI submitted for coverage under this permit must include the following information:
  - a. Name of the owner or operator.
  - b. Facility location and mailing addresses.
  - c. Latitude and longitude of the production area (entrance to production area).
  - d. Topographic map of the geographic area in which the CAFO is located showing the specific locations of the production area, land application area, and the name and location of the nearest surface waters.
  - e. A diagram of the production area.
  - f. Number and type of animals, whether in open confinement or housed under roof (beef cattle, broilers, layers, swine weighing 55 pounds or more, swine weighing less than 55 pounds, mature dairy cows, dairy heifers, veal calves, sheep and lambs, horses, ducks, turkeys, other).
  - g. Type of containment and storage (anaerobic lagoon, roofed storage shed, storage ponds, underfloor pits, aboveground storage tanks, belowground storage tanks, concrete pad, impervious soil pad, other) and total capacity for manure, litter, and process wastewater storage (tons/gallons). *[Note: Total design storage volume includes all wastes accumulated during the storage period, and as applicable; normal precipitation less evaporation on the surface of the structure during the storage period; normal runoff from the production area for the storage period; the direct precipitation from a 25-year, 24-hour storm on the surface of the structure; the runoff from the 25-year, 24-hour storm from the production area; residual solids; and necessary freeboard to maintain structural integrity.]*
  - h. Total number of acres under control of the applicant available for land application of manure, litter, or process wastewater.
  - i. Estimated amounts of manure, litter, and process wastewater generated per year (tons/gallons).
  - j. Estimated amounts of manure, litter and process wastewater transferred to other persons per year (tons/gallons).
  - k. An NMP that meets the requirements of the provisions of 40 CFR part 122.42(e) (including, for all CAFOs subject to 40 CFR part 412, subpart C or subpart D, the requirements of 40 CFR part 412.4(c), as applicable) and Part III of this permit.
3. Signature Requirements: The NOI must be signed by the owner/operator or other authorized person in accordance with Part VII.E of this permit.
4. Where to Submit: Signed copies of the NOI or individual permit application must be sent to: **[PERMITTING AUTHORITY MAILING ADDRESS]**.

5. Upon receipt, the permitting authority will review the NOI and NMP to ensure that the NOI and NMP are complete. The permitting authority may request additional information from the CAFO owner or operator if additional information is necessary to complete the NOI and NMP or to clarify, modify, or supplement previously submitted material. If the permitting authority makes a preliminary determination that the NOI is complete, the NOI, NMP and draft terms for the NMP to be incorporated into the permit will be made available for a thirty (30) day public review and comment period. The process for submitting public comments and requests of hearing will follow the procedures applicable to draft permits as specified by 40 CFR parts 124.11 through 124.13. The permitting authority will respond to comments received during the comment period as specified in 40 CFR part 124.17 and, if necessary, require the CAFO owner or operator to revise the NMP in order to granted permit coverage. If determined appropriate by the permitting authority, CAFOs will be granted coverage under this general permit upon written notification by EPA. The permitting authority will identify the terms of the NMP to be incorporated into the permit in the written notification.

## F. Requiring an Individual Permit

1. **The [PERMITTING AUTHORITY], may at any time require any facility authorized by this permit to apply for and obtain an individual NPDES permit. [PERMITTING AUTHORITY] will notify the operator, in writing, that an application for an individual permit is required within [TIME FRAME FOR APPLICATION SUBMISSION]. Coverage of the facility under this general NPDES permit is automatically terminated when (1) the operator fails to submit the required individual NPDES permit application within the defined time frame or (2) the individual NPDES permit is issued by [PERMITTING AUTHORITY].**
2. Any owner/operator covered under this permit may request to be excluded from the coverage of this permit by applying for an individual permit. The owner/operator shall submit an application for an individual permit (Form 1 and Form 2B) with the reasons supporting the application to the [PERMITTING AUTHORITY]. If a final, individual NPDES permit is issued to an owner/operator otherwise subject to this general permit, the applicability of this NPDES CAFO general permit to the facility is automatically terminated on the effective date of the individual NPDES permit. Otherwise, the applicability of this general permit to the facility remains in full force and effect (for example, if an individual NPDES permit is denied to an owner/operator otherwise subject to this general permit).

## G. Permit Expiration

This permit will expire 5 years from the effective date. The permittee must reapply for permit coverage 180 days before the expiration of this permit unless the permit has been terminated consistent with 40 CFR part 122.64(b) or the CAFO will not discharge or propose to discharge upon expiration of the permit. If this permit is not reissued or replaced before the expiration date, it will

be administratively continued in accordance with the Administrative Procedures Act and remain in force and effect. Any permittee who is granted permit coverage before the expiration date will automatically remain covered by the continued permit until the earlier of any of the following:

1. Reissuance or replacement of this permit, at which time the permittee must comply with the NOI conditions of the new permit to maintain authorization to discharge.
2. Issuance of an individual permit for the permittee's discharges.
3. A formal decision by the permitting authority not to reissue this general permit, at which time the permittee must seek coverage under an individual permit.
4. The permitting authority grants the permittee's request for termination of permit coverage.

## H. Change in Ownership

If a change in the ownership of a facility whose discharge is authorized under this permit occurs, coverage under the permit will automatically transfer if (1) the current permittee notifies the permitting authority at least 30 days prior to the proposed transfer date; (2) the notice includes a written agreement between the existing and new permittees containing a specific transfer date for permit responsibility, coverage, and liability; and (3) the permitting authority does not notify the existing permittee and the proposed new permittee of its intent to modify or revoke and reissue the permit. If the new CAFO owner or operator modifies any part of the NMP, the NMP shall be submitted to the permitting authority in accordance with Part III.A of this permit and 40 CFR part 122.42(e)(6).

## I. Termination of Permit Coverage

1. Coverage under this permit may be terminated in accordance with 40 CFR part 122.64 and if EPA determines in writing that one of the following three conditions are met:
  - a. The facility has ceased all operations and all wastewater or manure storage structures have been properly closed in accordance with *[The appropriate standard for closure for example, Natural Resource Conservation Service (NRCS) Conservation Practice Standard No. 360, Closure of Waste Impoundments, as contained in the Natural Resources Conservation Service Field Office Technical Guide]* and all other remaining stockpiles of manure, litter, or process wastewater not contained in a wastewater or manure storage structure are properly disposed.
  - b. The facility is no longer a CAFO that discharges manure, litter, or process wastewater to waters of the United States.
  - c. In accordance with 40 CFR part 122.64, the entire discharge is permanently terminated by elimination of the flow or by connection to a publicly owned treatment works (POTW).

## Part II. Effluent Limitations and Standards and Other Legal Requirements

### A. Effluent Limitations and Standards

*[The permit writer will include (1) technology-based effluent limitations, and (2) any more stringent water quality-based effluent limitations where necessary to prevent discharges from the production area that would cause or contribute to an exceedance of water quality standards.]*

The following effluent limitations apply to facilities covered under this permit:

*[These provisions apply to all existing facilities that are subject to the CAFO ELG specified in 40 CFR part 412 parts C and D. In other cases, the permit writer establishes technology-based limitations on the basis of the specific requirements defined in the CAFO ELG or through the application of best professional judgment (BPJ), whichever is determined to be applicable.]*

#### 1. Technology-based Effluent Limitations and Standards—Production Area.

The CAFO must implement the terms of an NMP, as specified below and in Part III.B of this permit.

- a. There may be no discharge of manure, litter, or process wastewater pollutants into waters of the United States from the production area except as provided below:

Whenever precipitation causes an overflow of manure, litter, or process wastewater, pollutants in the overflow may be discharged into waters of the United States provided:

- i. The production area is properly designed, constructed, operated and maintained to contain all manure, litter, process wastewater and the runoff and direct precipitation from the 25-year, 24-hour storm event for the location of the CAFO.
- ii. The design storage volume is adequate to contain all manure, litter, and process wastewater accumulated during the storage period including, at a minimum, the following:
  - a) The volume of manure, litter, process wastewater, and other wastes accumulated during the storage period.
  - b) Normal precipitation less evaporation during the storage period.
  - c) Normal runoff during the storage period.
  - d) The direct precipitation from the 25-year, 24-hour storm.
  - e) The runoff from the 25-year, 24-hour storm event from the production area.
  - f) Residuals solids after liquid has been removed.
  - g) Necessary freeboard to maintain structural integrity.
  - h) A minimum treatment volume, in the case of treatment lagoons.



- b. Installation of a depth marker in all open surface liquid impoundments. The depth marker must clearly indicate the minimum capacity necessary to contain the runoff and direct precipitation of the 25-year, 24-hour rainfall event. The marker shall be visible from the top of the levee.
- c. Weekly visual inspections of all stormwater diversion devices, runoff diversion structures, and devices channeling contaminated stormwater to the wastewater and manure storage and containment structures.
- d. Weekly inspections of the manure, litter, and process wastewater impoundments noting the level as indicated by the depth marker installed in accordance with Part II.A.1.b of this permit.
- e. Daily visual inspections of all water lines, including drinking water and cooling water lines.
- f. Timely correction of any deficiencies that are identified in daily and weekly inspections.
- g. Proper disposal of dead animals [*may specify a timeframe for example, within 3 days*] unless otherwise provided for by the permitting authority. Mortalities must not be disposed of in any liquid manure or process wastewater system that is not specifically designed to treat animal mortalities. Animals shall be disposed of in a manner to prevent contamination of waters of the United States or creation of a public health hazard.
- h. The maintenance of complete, on-site records documenting implementation of all required additional measures for a period of 5 years, including the records specified for Operation and Maintenance in Part V.C, Table V-A of this permit.
- i. The production area must be operated in accordance with the additional measures and records specific in Part II.A.2 of this permit.

**2. Additional Measures–Applicable to the Production Area.**

In addition to meeting the requirements in Part II.B of this permit, the permittee must implement the following additional measures:

- a. Ensure adequate storage of manure, litter, and process wastewater, including procedures to ensure proper operation and maintenance of the storage facilities.
- b. Mortality handling practices shall be in accordance with all applicable state and local regulatory requirements. Any such state/local requirements should be consistent with NRCS Practice Standard 316 as applicable.
- c. Ensure that clean water is diverted, as appropriate, from the production area in accordance with Part III.A.3.c of this permit.
- d. Prevent direct contact of confined animals with waters of the United States.

- e. Ensure that chemicals and other contaminants handled on-site are not disposed of in any manure, litter, process wastewater, or storm water storage or treatment system unless specifically designed to treat such chemicals and other contaminants.
- f. Identify specific records that will be maintained to document the implementation and management of Part II.A.2. a through c of this permit.
- g. In cases where CAFO-generated manure, litter, or process wastewater is sold or given away, the permittee must comply with the following conditions:
  - i. Maintain records showing the date and amount of manure, litter, and/or process wastewater that leaves the permitted operation.
  - ii. Record the name and address of the recipient.
  - iii. Provide the recipient(s) with representative information on the nutrient content of the manure, litter, and/or process wastewater.
  - iv. The records must be retained on-site, for a period of 5 years, and be submitted to the permitting authority on request.

### 3. Water Quality-based Effluent Limitations and Standards—Production Area.

**[PERMITTING AUTHORITY TO SPECIFY APPLICABLE WATER QUALITY-BASED EFFLUENT LIMITATIONS.]** *[The permit writer must ensure that the permit includes effluent limitations developed from applicable technology-based requirements and any more stringent effluent limitations necessary to meet water quality standards. A water quality-based effluent limitation is designed to protect the quality of the receiving water by ensuring state or tribal water quality standards are met. Federal regulations, 40 CFR part 122.44(d), require permit limitations to control all pollutants that may be discharged at a level that will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard. Where water-quality based effluent limitations apply (i.e., are more stringent), technology-based effluent limitations do not apply.]*

*The permit writer determines the need to establish more restrictive requirements for the production area, particularly for instances where the discharge is to 303(d) waterbodies listed for nutrients, dissolved oxygen, or bacteria, or where an analysis of frequency, duration and magnitude of the anticipated discharge (consisting of potential overflows of manure, litter, or process wastewater) indicates the reasonable potential to violate applicable water quality standards. With respect to the production area, the imposition of a more restrictive water quality-based effluent limitation can include the establishment of more restrictive requirements, such as the imposition of a higher design standard (e.g., 100 year, 24-hour storm in the case of existing sources under subpart C and D of the CAFO ELG) or the inclusion of additional management practices.]*

#### 4. Technology-based Effluent Limitations and Standard—Land Application Areas under the Control of the CAFO Owner/Operator.

Permittees that apply manure, litter, or process wastewater to land under the permitted CAFO's ownership or operational control must implement the terms of an NMP, as specified below and in Part III.B of this permit. The NMP must be developed in accordance with the requirements of this section and Part III.A of this permit.

- a. Determination of application rates. Application rates for manure, litter, or process wastewater must minimize phosphorus and nitrogen transport from the field to surface waters in compliance with the technical standards for nutrient management established by the permitting authority. **[INSERT OR REFERENCE TECHNICAL STANDARDS FOR NUTRIENT MANAGEMENT ESTABLISHED BY THE PERMITTING AUTHORITY IN ACCORDANCE WITH 40 CFR 123.36. THE TECHNICAL STANDARD MUST (1) SPECIFY THE FIELD-SPECIFIC ASSESSMENT OF THE POTENTIAL FOR NITROGEN AND PHOSPHORUS TRANSPORT FROM THE FIELD TO SURFACE WATERS, (2) ADDRESS THE FORM, SOURCE, AMOUNT, TIMING, AND METHOD OF APPLICATION OF NUTRIENTS ON EACH FIELD TO ACHIEVE REALISTIC PRODUCTION GOALS, AND (3) INCLUDE APPROPRIATE FLEXIBILITIES FOR THE IMPLEMENTATION OF SPECIFIC NUTRIENT MANAGEMENT PRACTICES TO COMPLY WITH THE STANDARD.]** *[It is recommended that a complete copy of the standard established by the permitting authority be included as an appendix to the permit.]*
- b. Manure and soil sampling. Manure must be analyzed at least once annually for nitrogen and phosphorus content. Soil must be analyzed at least once every 5 years **[or replace with more stringent state-specific soil sampling frequencies for phosphorus and nitrogen]**. The results of the analyses must be used in determining application rates for manure, litter, and process wastewater.
- c. Inspection of land application equipment for leaks. Equipment used for land application of manure, litter, or process wastewater must be inspected periodically for leaks.
- d. Land application setback requirements. Manure, litter, or process wastewater must not be applied closer than 100 feet to any downgradient waters of the United States, open tile line intake structures, sinkholes, agricultural well heads, or other conduits to waters of the United States. The permittee may elect to use a 35-foot vegetated buffer where applications of manure, litter, or process wastewater are prohibited as an alternative to the 100-foot setback to meet the requirement.
- e. Record Keeping requirements. Complete, on-site records including the site-specific NMP must be maintained to document implementation of all required land application practices. Such documentation must include the records specified for Soil and Manure/Wastewater Nutrient Analyses and Land Application in Part V.C, Table V-A of this permit.

**[Site-specific conservation practices (other than the setback requirements in 40 CFR part 412.4(c)(5) which apply to all Large CAFOs) and protocols to land**

**apply manure, litter and process wastewater are site-specific and must be included in Part IV of this permit.]**

**5. Additional Measures–Applicable to the Land Application under the Control of the CAFO Owner/Operator.**

*[Permitting authorities should consider the applicability of the following types of additional limitations for land application under the control of the CAFO. Options are not limited to the examples presented below.]*

a. Additional BMPs to control discharges from land application areas. *[Insert BMPs to control discharges from land application areas, such as limiting discharges from tile drains, areas where there is significant soil erosion, and/or runoff associated with irrigation.]*

b. Prohibitions.

i. There shall be no discharge of manure, litter, or process wastewater to waters of the United States from a CAFO as a result of the application of manure, litter or process wastewater to land areas under the control of the CAFO, except where it is an agricultural stormwater discharge. Where manure, litter, or process wastewater has been applied in accordance with the terms of the NMP as set forth in Part II.A and III.B of this permit, a precipitation related discharge of manure, litter, or process wastewater from land areas under the control of the CAFO is considered to be an agricultural stormwater discharge.

ii. *[Any state-specific prohibition or other limitations such as timing of land application, (e.g., no application on frozen or snow-covered land), minimum storage capacity, or specific BMPs required (e.g., stockpiles, prevention of the direct contact of animals with waters of the United States).]*

**6. Water Quality-based Effluent Limitations and Standards–Applicable to the Land Application under the Control of the CAFO Owner/Operator.**

**[PERMITTING AUTHORITY TO SPECIFY OTHER/ALTERNATE APPLICABLE WATER QUALITY-BASED EFFLUENT LIMITATIONS.]** *[Discharges from CAFOs that are not exempt from CWA permitting requirements (i.e., agricultural stormwater discharges) are subject to NPDES requirements, including water quality-based effluent limitations. The permit writer may determine the need to establish effluent limitations necessary to meet water quality standards. A water quality-based effluent limitation is designed to protect the quality of the receiving water by ensuring state or tribal water quality standards are met. Federal regulations, 40 CFR part 122.44(d) require permit limitations to control all pollutants that may be discharged at a level that will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard. Water quality-based effluent limitations might be needed when there is a dry-weather discharge (e.g., from tile drain systems or clean water irrigation on fields where manure was previously applied) from the land application area that causes or contributes to an excursion above any state water quality standard.]*

## 7. Effluent Limitations—Other Discharges.

*[All discharges other than agricultural stormwater should be addressed under a CAFO permit. Therefore, if there are situations or conditions that result in a discharge during the term of the permit and that are not addressed under the effluent limitations above, such discharges should be addressed either here or in part IV.B of this permit (Special Conditions, Additional Special Conditions) through the application of BPJ and, to the extent necessary, the use of water quality-based effluent limitations. The language provided below includes examples. Such conditions should be developed using state-specific requirements and CAFO-specific conditions.]*

- a. Process wastewater discharges from outside the production area, including: washdown of equipment that has been in contact with manure, raw materials, products or by-products that occurs outside the production area; runoff of pollutants from raw materials, products or by-products (such as manure, litter, bedding and feed) from the CAFO that have been spilled or otherwise deposited outside the production area which are discharged to waters of the United States; and **[INSERT ANY OTHER DISCHARGES MEETING THIS DESCRIPTION]** shall be identified in the NMP. The NMP shall identify measures necessary to meet applicable water quality standards. **[SPECIFY ADDITIONAL REQUIREMENTS HERE OR CROSS-REFERENCE REQUIREMENTS ELSEWHERE IN THIS PERMIT]**
- b. Wastewater discharges that do not meet the definition of process wastewater, including: (1) discharges associated with feed, fuel, chemical, or oil spills, equipment repair, and equipment cleaning, where the equipment has not been in contact with manure, raw materials, products or by-products; (2) domestic wastewater discharges; and **[INSERT ANY OTHER DISCHARGES MEETING THIS DESCRIPTION]** shall be identified in the NMP. The NMP shall identify measures necessary to meet applicable water quality standards. **[SPECIFY ADDITIONAL REQUIREMENTS HERE OR CROSS-REFERENCE REQUIREMENTS ELSEWHERE IN THIS PERMIT].**
- c. Stormwater discharges that are not addressed under the effluent limitations in Section II above remain subject to applicable industrial or construction stormwater discharge requirements. *[Permit writers might want to clarify that such stormwater excludes process wastewater, discharges that qualify as agricultural stormwater, and discharges from construction activities that disturb less than one acre. Permit writers also may want to discuss the applicability of the no exposure provisions specified in 40 CFR part 122.26(g), as well as either specify or reference the applicable stormwater requirements or reference an applicable stormwater permit.]* **[WHERE APPROPRIATE, REFERENCE GENERAL PERMIT OR OTHER APPLICABLE STORMWATER REQUIREMENTS.]**

In addition to meeting the above effluent limitations in Part II.A of this permit, the permittee must comply with the special conditions established in Part IV of this permit.

## B. Other Legal Requirements

No condition of this permit shall release the permittee from any responsibility or requirements under other statutes or regulations, federal, state/Indian tribe or local.

# Part III. Effluent Limitations and Standards of the Nutrient Management Plan

## A. Procedural Requirements for Implementing the Terms of the Nutrient Management Plan

CAFO owners or operators seeking coverage under this general permit must submit a Nutrient Management Plan (NMP) with the NOI, as required by Part I.E.1 of this permit. The NMP shall specifically identify and describe practices that will be implemented to assure compliance with the effluent limitations and other conditions of this permit set forth in this part and Part II.A of this permit (Effluent Limitations and Standards). The NMP must be developed in accordance with the technical standards identified in Appendix B of this permit. *[Alternatively, technical standards may be identified in this section.]*

1. **Schedule.** The completed NMP must be submitted to the permitting authority with the NOI for CAFOs seeking coverage under this permit. The CAFO shall implement its NMP upon authorization under this permit, in accordance with the terms of the NMP set forth in Part III.B of this permit.
2. **NMP Review and Terms**
  - a. Upon receipt of the NMP, the permitting authority will review the NMP. The permitting authority may request additional information from the CAFO owner or operator if additional information is necessary to complete the NMP, or to clarify, modify, or supplement previously submitted material.
  - b. The permitting authority will use the NMP to identify site-specific permit terms, to be incorporated into this permit. The permitting authority will identify site-specific permit terms with respect to protocols for the land application of manure, litter, and process wastewater. The permitting authority will also identify site-specific permit terms with respect to manure, litter, and process wastewater storage capacities and site-specific conservation practices on the basis of the CAFO's NMP to the extent that such terms are necessary to support the application rates expressed in the NMP. The permitting authority will also identify site-specific permit terms with respect to mortality management, clean water diversions, preventing direct contact of animals with waters of the United States, chemical handling, protocols for manure and soil testing, and record keeping as appropriate.

- c. When the permitting authority determines that the NMP and NOI are complete, the permitting authority will notify the public of the permitting authority's proposal to grant coverage under the permit and make available for public review and comment the NOI submitted by the CAFO, including the CAFO's NMP, and the permitting authority will identify the terms of the NMP to be incorporated into the permit. ***[The permit should state where and how notice to the public will be provided.]***
  - d. The period for the public to comment and request a hearing on the proposed terms of the NMP to be incorporated into the permit shall be ***[The permitting authority can specify in the permit; cite a state regulation; or use a time period specified in 40 CFR part 124.10 (i.e., 30 days)]***.
  - e. The permitting authority will respond to comments received during the comment period, as provided in 40 CFR part 124.17, and, if necessary, require the CAFO owner or operator to revise the NMP to be granted permit coverage.
  - f. When the permitting authority authorizes the CAFO owner or operator to discharge under the general permit, the terms of the NMP shall be incorporated as terms and conditions of the permit for the CAFO. The permitting authority will notify the CAFO owner or operator that coverage has been authorized and of the applicable terms and conditions of the permit. Those site-specific permit terms will be provided to the permittee in a ***[permitting authority specify procedure/mechanism (e.g., permit authorization notice/letter, certificate of coverage, permit modification)]***.
  - g. Each CAFO covered by this permit must comply with the site-specific permit terms established by the permitting authority on the basis of the CAFO's site-specific NMP.
- 3. NMP Content.** The site-specific NMP at a minimum must include practices and procedures necessary to implement the applicable effluent limitations and standards in Part II.A of this permit. In addition, the NMP and each CAFO covered by this permit must, as applicable do the following:
- a. Ensure adequate storage of manure, litter, and process wastewater, including procedures to ensure proper operation and maintenance of the storage facilities. All wastewater and manure containment structures shall at a minimum be designed, constructed, operated, and maintained in accordance with the standards of the *Natural Resources Conservation Service, Field Office Technical Guide* ***[or other standards identified by the permitting authority]***. Storage capacity must be sufficient to meet the minimum applicable state requirements, including ***[permitting authority specify or reference state storage requirements]***, and it must be sufficient to allow the CAFO to comply with the land application schedule specified in the NMP. The NMP must describe the extent that the NMP

depends on off-site transport or other means of handling to ensure adequate storage capacity, if applicable.

***[If the CAFO needs to maintain storage capacity that exceeds the minimum state capacity requirements to comply with the land application provisions in the NMP, the storage capacity shall become a term of this permit and site-specific terms are to be developed by the permitting authority on the basis of the submitted NMP.]***

- b. Ensure proper management of mortalities (i.e., dead animals) to ensure that they are not disposed of in a liquid manure, stormwater, or process wastewater storage or treatment system that is not specifically designed to treat animal mortalities. Mortalities shall be handled in such a way as to prevent the discharge of pollutants to waters of the United States. Mortality handling practices shall be in accordance with all applicable state and local regulatory requirements, including ***[Insert state/local regulatory requirements as appropriate. Any such state/local requirements should be consistent with NRCS Practice Standard 316 as applicable.]***
- c. Ensure that clean water is diverted, as appropriate, from the production area. Any clean water that is not diverted and comes into contact with raw materials, products, or by-products including manure, litter, process wastewater, feed, milk, eggs, or bedding is subject to the effluent limitations specified in Part II.A of this permit. Where clean water is not diverted, the CAFO owner or operator must document that it has been accounted for in meeting the requirement to ensure adequate storage capacity as a condition of this permit. Clean water includes, but is not limited to, rain falling on the roofs of facilities and runoff from adjacent land.
- d. Prevent the direct contact of animals confined or stabled at the facility with waters of the United States.
- e. Ensure that chemicals and other contaminants handled on-site are not disposed of in any manure, litter, process wastewater, or stormwater storage or treatment system unless specifically designed to treat such chemicals or contaminants. All wastes from dipping vats, pest and parasite control units, and other facilities used for the management of potentially hazardous or toxic chemicals shall be handled and disposed of in a manner sufficient to prevent pollutants from entering the manure, litter, or process wastewater retention structures or waters of the United States. Include references to any applicable chemical handling protocols and indicate that other protocols included in the NMP will be reviewed.
- f. Identify appropriate site-specific conservation practices to be implemented, including as appropriate buffers or equivalent practices, to control runoff of pollutants to waters of the United States and specifically to minimize the runoff of nitrogen and phosphorus. Each CAFO covered by this permit must implement the site-specific conservation practices determined by the permitting authority



to be a term of this permit, as specified in *[Identify mechanism (e.g., permit authorization notice/letter, certificate of coverage, permit modification) that the permitting authority will use to specify terms.]*, including residue management, conservation crop rotation, grassed waterways, strip cropping, vegetated buffers, riparian buffers, setbacks, terracing, and diversions. At a minimum, such practices must be adequate to keep erosion levels in each field at or less than the soil loss tolerance (T) value specified in the *Natural Resources Conservation Service, Field Office Technical Guide [or other standards identified by the Permitting Authority]*. *[Comment: Note that conservation practices become terms of the NMP in two ways:*

- i. *Conservation practices are terms based on the information, protocols, BMPs and activities deemed necessary to meet part 122.42(e)(1).*
  - ii. *Conservation practices become permit terms to the extent that they influence the risk of runoff rating and consequently the application rate. Site-specific terms are to be developed by the permitting authority based on the submitted NMP.]*
- g. Identify protocols for appropriate testing of manure, litter, process wastewater, and soil. Manure, wastewater and soil sampling must be conducted in accordance with the requirements of Part III.A.2.b of this permit and the following protocols: *[Insert specific references for the protocols that are to be used]*.
- h. Establish protocols to land apply manure, litter, or process wastewater in accordance with site-specific nutrient management practices that ensure appropriate agricultural utilization of the nutrients in the manure, litter, or process wastewater.

The CAFO's site-specific NMP shall document the calculation of land application rates of manure, litter, or process wastewater. The following technical standard for nutrient management established by the permitting authority shall be used for calculating these rates. *[Insert reference to state technical standards]* The rate calculation shall address the form, source, amount, timing, and method of application on each field to achieve realistic production goals while minimizing nitrogen and phosphorus movement to surface water. The rate calculation shall be based on the results of a field specific assessment of the potential for nitrogen and phosphorus transport from the field to surface waters using the following assessment protocol *[Insert phosphorus risk assessment tool established by the permitting authority]*.

Application rates may be expressed in NMPs consistent with one of the two approaches described in Parts III.A.3.h.i and ii of this permit. *[The permitting authority may limit CAFOs to one approach for specifying application rates or allow both approaches.]*

Development of site-specific terms will be based on the permitting authority's review of the NMP submitted in accordance with the requirements of Part III.B of this permit. To support the development of site-specific terms the submitted NMP must include at a minimum:

- Names of fields available for land application.
- Field-specific rates of application properly developed as specified in paragraph i or ii below in the following chemical forms in this part and **[specify forms of nitrogen and phosphorus to be used for expressing application rates]**.
- *[Placeholder for EPA-or state-specified timing restrictions such as no saturated, frozen, or snow covered ground or during periods of crop dormancy]*.
- The information specified in paragraph i and ii below for the selected approach.
- Any additional information necessary to assess the adequacy of the application rates included in the NMP.
  - i. Linear Approach. Expresses rates of application as pounds of nitrogen and phosphorus. CAFOs selecting the linear approach to address rates of application must include in the NMP submitted to the permitting authority the following information for each crop, field, and year covered by the NMP, which will be used by the permitting authority to establish site-specific permit terms:
    - The maximum application rate (pounds/acre/year of nitrogen and phosphorus) from manure, litter, and process wastewater.
    - The outcome of the field-specific assessment of the potential for nitrogen and phosphorus transport from each field. [If a state does not have an N transport risk assessment, the NMP must document any basis for assuming that nitrogen will be fully used by crops.] The CAFO must specify any conservation practices used in calculating the risk rating.
    - The crops to be planted or any other uses of a field such as pasture or fallow fields.
    - The realistic annual yield goal for each crop or use identified for each field.
    - The nitrogen and phosphorus recommendations from **[permitting authority to specify acceptable sources]** for each crop or use identified for each field.
    - Credits for all residual nitrogen in each field that will be plant-available.
    - Consideration of multi-year phosphorus application. For any field where nutrients are applied at a rate based on the crop phosphorus requirement, the NMP must account for single-year nutrient applications that supply more than the crop's annual phosphorus requirement.

- All other additions of plant available nitrogen and phosphorus (i.e., from sources other than manure, litter, or process wastewater or credits for residual nitrogen).
  - The form and source of manure, litter, and process wastewater to be land-applied.
  - The timing and method of land application. The NMP also must include storage capacities needed to ensure adequate storage that accommodates the timing indicated.
  - The methodology that will be used to account for the amount of nitrogen and phosphorus in the manure, litter, and wastewater to be applied.
  - Any other factors necessary to determine the maximum application rate identified in accordance with this Linear Approach.
- ii. Narrative Rate Approach. Expresses a narrative rate of application that results in the amount, in tons or gallons, of manure, litter, and process wastewater to be land applied. CAFOs selecting the narrative rate approach to address rates of application must include in the NMP submitted to the permitting authority the following information for each crop, field, and year covered by the NMP, which will be used by the permitting authority to establish site-specific permit terms:
- The maximum amounts of nitrogen and phosphorus that will be derived from all sources of nutrients (pounds/acre for each crop and field).
  - The outcome of the field-specific assessment of the potential for nitrogen and phosphorus transport from each field. ***[If a state does not have an N transport risk assessment, the NMP must document any basis for assuming that nitrogen will be fully used by crops.]*** The CAFO must specify any conservation practices used in calculating the risk rating.
  - The crops to be planted in each field or any other uses of a field such as pasture or fallow fields, including alternative crops if applicable. Any alternative crops included in the NMP must be listed by field, in addition to the crops identified in the planned crop rotation for that field.
  - The realistic annual yield goal for each crop or use identified for each field for each year, including any alternative crops identified.
  - The nitrogen and phosphorus recommendations from ***[the permitting authority to specify acceptable sources]*** for each crop or use identified for each field, including any alternative crops identified.
  - The methodology (including formulas, sources of data, protocols for making determination, etc.) and actual data that will be used to account for: (1) the results of soil tests required by Parts II.A.4.b and III.A.3.g of this permit, (2) credits for all nitrogen in the field that will be plant-

available, (3) the amount of nitrogen and phosphorus in the manure, litter, and process wastewater to be applied, (4) consideration of multi-year phosphorus application (for any field where nutrients are applied at a rate based on the crop phosphorus requirement, the methodology must account for single-year nutrient applications that supply more than the crop's annual phosphorus requirement), (5) all other additions of plant available nitrogen and phosphorus to the field (i.e., from sources other than manure, litter, or process wastewater or credits for residual nitrogen), (6) timing and method of land application, and (7) volatilization of nitrogen and mineralization of organic nitrogen.

- Any other factors necessary to determine the amounts of nitrogen and phosphorus to be applied in accordance with the Narrative Rate Approach.
  - NMPs using the Narrative Rate Approach must also include the following projections, which will not be used by the permitting authority in establishing site-specific permit terms:
    - i. Planned crop rotations for each field for the period of permit coverage.
    - ii. Projected amount of manure, litter, or process wastewater to be applied.
    - iii. Projected credits for all nitrogen in the field that will be plant-available.
    - iv. Consideration of multi-year phosphorus application.
    - v. Accounting for other additions of plant-available nitrogen and phosphorus to the field.
    - vi. The predicted form, source, and method of application of manure, litter, and process wastewater for each crop.
4. Signature. The NMP shall be signed by the owner/operator or other signatory authority in accordance with Part VII.E of this permit (Signatory Requirements).
  5. A current copy of the NMP shall be kept on site at the permitted facility in accordance with Part VII.C of this permit and provided to the permitting authority upon request.
  6. Recordkeeping Requirement
    - a. Large CAFOs using the linear rate approach must calculate the maximum amount of manure, litter, and process wastewater to be land applied at least once each year using the results of the most recent representative manure, litter, and process wastewater tests of nitrogen and phosphorus. Such representative test must be taken within 12 months of the date of land application.

- b. All CAFOs using the narrative rate approach must calculate maximum amounts of manure, litter, and process wastewater to be land applied at least once each year using the methodology specified in the NMP pursuant to Part III.A.3.h of this permit before land applying manure, litter, and process wastewater. Such calculations must rely on the following data:
    - i. A field-specific determination of soil levels of nitrogen and phosphorus. For nitrogen, the determination must include a concurrent determination of nitrogen that will be plant available. For phosphorus, the determination must include the results of the most recent soil test conducted as required in Parts II.A.4.b and III.A.3.g of this permit.
    - ii. The results of the most recent representative manure, litter, and process wastewater tests for nitrogen and phosphorus taken within 12 months of the date of land application, as required in Parts II.A.4.b and III.A.3.g of this permit, in order to determine the amount of nitrogen and phosphorus in the manure, litter, and process wastewater to be applied.
  - c. Identify and maintain all records necessary to document the development and implementation of the NMP and compliance with the permit.
7. Changes to the NMP
- a. When a CAFO owner or operator covered by this permit makes changes to the CAFO's NMP previously submitted to the permitting authority, the CAFO owner or operator must provide the permitting authority with the most current version of the CAFO's NMP and identify changes from the previous version, except that annual calculations of application rates for manure, litter, and process wastewater as required in Part III.A.6.a of this permit (for the Linear Approach) and Part III.A.6.b of this permit (for the Narrative Rate Approach) are not required to be submitted to the permitting authority.
  - b. When changes to an NMP are submitted to the permitting authority, the permitting authority will review the revised NMP to ensure that it meets the requirements of Parts II.A and III.A.3 of this permit. If the permitting authority determines that the changes to the NMP necessitate revision to the terms of the NMP incorporated into the permit issued to the CAFO, the permitting authority must determine whether such changes are substantial. Substantial changes to the terms of an NMP incorporated as terms and conditions of a permit include the following:
    - i. Addition of new land application areas not previously included in the CAFO's NMP, except if the added land application area is covered by the terms of an NMP incorporated into an existing NPDES permit and the CAFO complies with such terms when applying manure, litter, and process wastewater to the added land.
    - ii. For NMPs using the Linear Approach, changes to the field-specific maximum annual rates of land application (pounds of nitrogen and phosphorus from

manure, litter, and process wastewater). For NMPs using the Narrative Rate Approach, changes to the maximum amounts of nitrogen and phosphorus derived from all sources for each crop.

- iii. Addition of any crop or other uses not included in the terms of the CAFO's NMP.
- iv. Changes to site-specific components of the CAFO's NMP, where such changes are likely to increase the risk of nitrogen and phosphorus transport to waters of the United States.
- v. If the permitting authority determines that the changes to the terms of the NMP are not substantial, the permitting authority will include the revised NMP in the permit record, revise the terms of the permit on the basis of the site-specific NMP, and notify the CAFO and the public of any changes to the terms of the permit on the basis of revisions to the NMP.
- vi. If the permitting authority determines that the changes to the terms of the NMP are substantial, the permitting authority will notify the public, make the proposed changes and the information submitted by the CAFO owner or operator available for public review and comment, and respond to all significant comments received during the comment period. The permitting authority may require the CAFO to further revise the NMP, if necessary. Once the permitting authority incorporates the revised terms of the NMP into the permit, the permitting authority will notify the CAFO of the revised terms and conditions of the permit. *[The permitting authority can specify a period for processing substantial changes and the permit should state where and how notice to the public will be provided.]*

## B. Terms of The Nutrient Management Plan

Any CAFO authorized under this general permit must comply with the terms of the CAFO's site-specific NMP, as established by the permitting authority pursuant to the procedural requirements of Part III.A of this permit. The terms of the NMP for each CAFO authorized by this permit are a part of this permit and are set forth as follows:

*[The permit must clearly establish that the terms of the NMP are enforceable terms and conditions of the permit. In addition, the permitting authority must identify how the terms of the NMP are documented and included or otherwise incorporated into the permit. Any permit text must be part of the text of the permit as a whole. The location of the CAFO's entire NMP must also be identified so that the public can refer to the document as a whole.]*

### Permit Terms and Conditions

*[In this section add the site-specific components of the NMP that are necessary to meet the requirements of 40 CFR part 122.42(e)(5(i) or (ii)].*

## Part IV. Special Conditions

### A. Facility Closure

The following conditions shall apply to the closure of lagoons and other earthen or synthetic lined basins and other manure, litter, or process wastewater storage and handling structures:

1. Closure of Lagoons and Other Surface Impoundments
  - a. No lagoon or other earthen or synthetic lined basin shall be permanently abandoned.
  - b. Lagoons and other earthen or synthetic lined basins shall be maintained at all times until closed in compliance with this section.
  - c. All lagoons and other earthen or synthetic lined basins must be properly closed if the permittee ceases operation. In addition, any lagoon or other earthen or synthetic lined basin that is not in use for a period of 12 consecutive months must be properly closed unless the facility is financially viable, intends to resume use of the structure at a later date, and either (1) maintains the structure as though it were actively in use, to prevent compromise of structural integrity; or (2) removes manure and wastewater to a depth of one foot or less and refills the structure with clean water to preserve the integrity of the synthetic or earthen liner. In either case, the permittee shall notify the **[PERMITTING AUTHORITY]** of the action taken and shall conduct routine inspections, maintenance, and record keeping as though the structure were in use. Before restoration or use of the structure, the permittee shall notify the **[PERMITTING AUTHORITY]** and provide the opportunity for inspection.
  - d. All closure of lagoons and other earthen or synthetic lined basins must be consistent with *[insert citation to specific standards as determined to be applicable by the permitting authority]*. Consistent with that standard, the permittee shall remove all waste materials to the maximum extent practicable and dispose of them in accordance with the permittee's NMP, unless otherwise authorized by the **[PERMITTING AUTHORITY]**.
  - e. Unless otherwise authorized by the **[PERMITTING AUTHORITY]**, completion of closure for lagoons and other earthen or synthetic lined basins shall occur as promptly as practicable after the permittee ceases to operate or, if the permittee has not ceased operations, 12 months from the date on which the use of the structure ceased, unless the lagoons or basins are being maintained for possible future use in accordance with the requirements above.
2. Closure Procedures for Other Manure, Litter, or Process Wastewater Storage and Handling Structure

No other manure, litter, or process wastewater storage and handling structure shall be abandoned. Closure of all such structures shall occur as promptly as practicable after the permittee has ceased to operate, or, if the permittee has not ceased to operate, within 12 months after the date on which the use of the structure ceased. To close a

manure, litter, or process wastewater storage and handling structure, the permittee shall remove all manure, litter, or process wastewater and dispose of it in accordance with the permittee's NMP, or document its transfer from the permitted facility in accordance with off-site transfer requirements specified in this permit [*Insert Permit Cite*], unless otherwise authorized by the [PERMITTING AUTHORITY].

## B. Additional Special Conditions

*[This section is to be used by the permitting authority to specify any additional special conditions such as procedures for emergency discharge impact abatement, irrigation control, spill control procedures, specific measurements to be collected (i.e., rainfall), and groundwater protection requirements (e.g., monitoring, liners) that are determined necessary by the permitting authority.]*

## Part V. Discharge Monitoring and Notification Requirements

### A. Notification of Discharges Resulting from Manure, Litter, and Process Wastewater Storage, Handling, On-site Transport and Application

If, for any reason, there is a discharge of pollutants to waters of the United States, the permittee is required to make immediate oral notification within 24 hours to the [PERMITTING AUTHORITY (CONTACT NUMBER)] and notify the [PERMITTING AUTHORITY] in writing within 5 working days of the discharge from the facility. In addition, the permittee shall keep a copy of the notification submitted to the [PERMITTING AUTHORITY] together with the other records required by this permit. The discharge notification shall include the following information:

1. A description of the discharge and its cause, including a description of the flow path to the receiving waterbody and an estimate of the flow and volume discharged.
2. The period of noncompliance, including exact dates and times, the anticipated time it is expected to continue, and steps taken or planned to reduce, eliminate and prevent recurrence of the discharge.

### B. Monitoring Requirements for All Discharges from Retention Structures

If any overflow or other discharge of pollutants occurs from a manure and/or wastewater storage or retention structure, whether or not authorized by this permit, the [PERMITEE] shall take the following actions:

1. All discharges shall be sampled and analyzed. Samples must, at a minimum, be analyzed for the following parameters: total nitrogen, ammonia nitrogen phosphorus,



fecal coliform, 5-day biochemical oxygen demand (BOD5), total suspended solids, pH, and temperature. The discharge must be analyzed in accordance with approved EPA methods for water analysis listed in 40 CFR Part 136. ***[The permitting authority may specify additional parameters that are to be analyzed (e.g., metals).]***

2. Record an estimate of the volume of the release and the date and time.
3. ***[The permitting authority should insert the specific procedures that are to be followed by the permittee in collecting these samples. The permitting authority should also specify the time frame for reporting the results of the analyses.]*** The discharge must be collected in accordance with approved EPA methods for water analysis listed in 40 CFR Part 136.
4. If conditions are not safe for sampling, the permittee must provide documentation of why samples could not be collected and analyzed. For example, the permittee may be unable to collect samples during dangerous weather conditions (such as local flooding, high winds, hurricane, tornadoes, electrical storms, and such). However, once dangerous conditions have passed, the permittee shall collect a sample from the retention structure (pond or lagoon) from which the discharge occurred.

### C. General Inspection, Monitoring, and Record-Keeping Requirements

The permittee shall inspect, monitor, and record the results of such inspection and monitoring in accordance with Table V-A.

**Table V-A. NPDES Large CAFO Permit Record-Keeping Requirements**

Parameter	Units	Frequency
<b>Permit and Nutrient Management Plan</b> <i>(Note: Required by the NPDES CAFO Regulation—applicable to all CAFOs)</i>		
The CAFO must maintain on-site a copy of the current NPDES permit, including <b>[SPECIFY MECHANISM TO IDENTIFY SITE-SPECIFIC TERMS]</b> .	N/A	Maintain at all times
The CAFO must maintain on-site a current, site-specific NMP that reflects existing operational characteristics. The operation must also maintain on-site all necessary records to document that the NMP is being properly implemented with respect to manure and wastewater generation, storage and handling, and land application. In addition, records must be maintained that the development and implementation of the NMP is in accordance with the minimum practices defined in 40 CFR part 122.42(e).	N/A	Maintain at all times

**Table V-A. NPDES Large CAFO Permit Record-Keeping Requirements** *(continued)*

Parameter	Units	Frequency
<b>Soil and Manure/Wastewater Nutrient Analysis</b> <i>(Note: Required by the CAFO ELG—applicable to Large CAFOs)</i>		
Analysis of manure, litter, and process wastewater to determine nitrogen and phosphorus content. <sup>a</sup>	ppm Pounds/ton	At least annually after initial sampling
Analysis of soil in all fields where land application activities are conducted to determine phosphorus content. <sup>a</sup>	ppm	At least once every 5 years after initial sampling
<b>Operation and Maintenance</b> <i>(Note: Required by the CAFO ELG—applicable to Large CAFOs)</i>		
Visual inspection of all water lines	N/A	Daily <sup>b</sup>
Documentation of depth of manure and process wastewater in all liquid impoundments	Feet	Weekly
Documentation of all corrective actions taken. Deficiencies not corrected within 30 days must be accompanied by an explanation of the factors preventing immediate correction.	N/A	As necessary
<b>Operation and Maintenance</b> <i>(Note: Required by the CAFO ELG—applicable to Large CAFOs)</i>		
Documentation of animal mortality handling practices	N/A	As necessary
Design documentation for all manure, litter, and wastewater storage structures including the following information:		
• Volume for solids accumulation	Cubic yards/ gallons	Once in the permit
• Design treatment volume	Cubic yards/ gallons	term unless revised
• Total design storage volume <sup>c</sup>	Cubic yards/ gallons	
• Days of storage capacity	Days	
Documentation of all overflows from all manure and wastewater storage structures including: <i>(Note: Required by the NPDES Regulation—applicable to all CAFOs)</i>		
• Date and time of overflow	Month/day/ year	Per event
• Estimated volume of overflow	Total gallons	Per event
• Analysis of overflow (as required by the permitting authority)	TBD	Per event

**Table V-A. NPDES Large CAFO Permit Record-Keeping Requirements** *(continued)*

Parameter	Units	Frequency
<b>Land Application</b> <i>(Note: Required by the CAFO ELG—applicable to Large CAFOs)</i>		
For each application event where manure, litter, or process wastewater is applied, documentation of the following by field:		
• Date of application	Month/day/ year	Daily
• Method of application		Daily
• Weather conditions at the time of application and for 24 hours before and after application	N/A	Daily
• Total amount of nitrogen and phosphorus applied <sup>d</sup>	Pounds/acre	Daily
Documentation of the crop and expected yield for each field	Bushel/acre	Seasonally
Documentation of the actual crop planted and actual yield for each field	Bushel/acre	Seasonally
Documentation of test methods and sampling protocols used to sample and analyze manure, litter, and wastewater and soil.	N/A	Once in the permit term unless revised
Documentation of the basis for the application rates used for each field where manure, litter, or wastewater is applied.	N/A	Once in the permit term unless revised
Documentation showing the total nitrogen and phosphorus to be applied to each field including nutrients from the application of manure, litter, and wastewater and other sources	Pounds/acre	Once in the permit term unless revised
Documentation of manure application equipment inspection	N/A	Seasonally
<b>Manure Transfer</b> <i>(Note: Required by the NPDES CAFO Regulation—applicable to Large CAFOs)</i>		
For all manure transfers the CAFO must maintain the following records:		
• Date of transfer	N/A	As necessary
• Name and address of recipient	N/A	As necessary
• Approximate amount of manure, litter, or wastewater transferred	Tons/gallons	As necessary

**Notes:**

- a. For the specific analyses to be used, see the state nutrient management technical standard.
- b. Visual inspections should take place daily during the course of normal operations. The completion of such inspection should be documented in a manner appropriate to the operation. Some operations might wish to maintain a daily log. Other operations might choose to make a weekly entry, when they update other weekly records that required daily inspections have been completed.
- c. Total design volume includes normal precipitation less evaporation on the surface of the structure for the storage period, normal runoff from the production area for the storage period, 25-year, 24-hour precipitation on the surface of the structure, 25-year, 24-hour runoff from the production area, and residual solids.
- d. Including quantity/volume of manure, litter, or process wastewater applied and the basis for the rate of phosphorus application.

## D. Additional Monitoring Requirements

*[This section is to be used by the permitting authority to specify any additional monitoring and analysis that the permittee is to perform.]*

1. Additional monitoring for some high risk operations: Upon notification by **[PERMITTING AUTHORITY]**, the permittee may be required to conduct ambient monitoring of surface or groundwater or both. For example, facilities with historical compliance problems, especially large facilities, facilities with significant environmental concerns, or facilities impacting impaired waterbodies. *[The permitting authority should establish appropriate ambient surface and groundwater monitoring requirements in the NPDES permit.]*
2. Upon request by **[PERMITTING AUTHORITY]**, the permittee may be required to collect and analyze samples including but not limited to soils, surface water, groundwater, or stored waste in a manner and frequency specified by **[PERMITTING AUTHORITY]**.

## Part VI. Annual Reporting Requirements

*[This example permit includes the minimum information required by the NPDES regulations. The permitting authority can use its discretion concerning additional information required to be submitted with the annual report.]*

- A. The permittee must submit an annual report to the permitting authority by [Date] of each year.
- B. The annual report must include the following information:  
*[The permitting authority can use its discretion and authority to request additional information from the permittee. The permitting authority might wish to provide an example of the specific format for the annual report. An example report is included in the NPDES CAFO Permit Writer Guidance.]*
  1. The number and type of animals, whether in open confinement or housed under roof.
  2. Estimated amount of total manure, litter, and process wastewater generated by the CAFO in the previous 12 months (tons/gallons).
  3. Estimated amount of total manure, litter, and process wastewater transferred to other person by the CAFO in the previous 12 months (tons/gallons).
  4. Total number of acres for land application covered by the NMP.
  5. Total number of acres under control of the CAFO that were used for land application of manure, litter, and process wastewater in the previous 12 months.
  6. Summary of all manure, litter, and process wastewater discharges from the production area that have occurred in the previous 12 months, including date, time, and approximate volume.

7. A statement indicating whether the current version of the CAFO's NMP was developed or approved by a certified nutrient management planner.
8. Actual crops planted and actual yields for each field for the preceding 12 months.
9. Results of all samples of manure, litter or process wastewater for nitrogen and phosphorus content for manure, litter and process wastewater that was land applied.
10. Results of calculations conducted in accordance with Part III.A.6.a of this permit (for the Linear Approach) and Part III.A.6.b of this permit (for the Narrative Rate Approach).
11. Amount of manure, litter, and process wastewater applied to each field during the preceding 12 months.
12. For CAFOs using the Narrative Rate Approach to address rates of application:
  - i. The results of any soil testing for nitrogen and phosphorus conducted during the preceding 12 months.
  - ii. The data used in calculations conducted in accordance with Part III.A.3.h of this permit.
  - iii. The amount of any supplemental fertilizer applied during the preceding 12 months.

## Part VII. Standard Permit Conditions

### A. General Conditions

1. In accordance with the provisions of 40 CFR Part 122.41 *et. seq.*, this permit incorporates by reference all conditions and requirements applicable to NPDES Permits set forth in the Clean Water Act, as amended, (the Act) and all applicable regulations.
2. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation, and reissuance; for denial of a permit renewal application; and/or for requiring a permittee to apply for and obtain an individual NPDES permit.
3. The permittee shall comply with effluent standards and prohibitions established under section 307(a) of the Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.
4. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

5. The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state/tribal or local laws or regulations.
6. The permittee shall furnish to the permitting authority, within a reasonable time, any information that the permitting authority might request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the permitting authority, on request, copies of records required to be kept by this permit.
7. Nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance. Any false or materially misleading representation or concealment of information required to be reported by the provisions of the permit, the Act, or applicable regulations, which avoids or effectively defeats the regulatory purpose of the permit may subject the permittee to criminal enforcement pursuant to 18 U.S.C. 1001.
8. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state/tribal law or regulation under authority preserved by section 510 of the Act.
9. The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.
10. Bypass
  - a. *Definitions*
    - i. Bypass means the intentional diversion of waste streams from any portion of a treatment facility.
    - ii. Severe property damage means substantial physical damage to property, damage to the treatment facilities that causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
  - b. *Bypass not exceeding limitations.* The permittee may allow any bypass to occur that does not cause effluent limitations to be exceeded but only if it also is for essential maintenance to assure efficient operation. Those bypasses are not subject to Parts VII.A.10.c. and 10.d.of this permit.
  - c. *Notice*



- iii. The permittee submitted notice of the upset as required in Part VII.D.5 of this permit (24-hour notice).
  - iv. The permittee complied with any remedial measures required under Part VII.A.14 of this permit (duty to mitigate).
- d. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.
12. *Duty to reapply.* If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit.
13. *Need to halt or reduce activity not a defense.* It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity to maintain compliance with the conditions of this permit.
14. *Duty to mitigate.* The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit, which has a reasonable likelihood of adversely affecting human health or the environment.
15. *Inspection and entry.* The permittee shall allow the permitting authority, or an authorized representative (including an authorized contractor acting as a representative of the permitting authority), upon presentation of credentials and other documents as may be required by law, to do the following:
- a. Enter the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit.
  - b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit.
  - c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit.
  - d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location.

## **B. Proper Operation and Maintenance**

The permittee shall, at all times, properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes the operation of backup or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit.



## C. Monitoring and Records

1. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.
2. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 5 years from the date of the sample, measurement, report, or application. That period may be extended by request of the permitting authority at any time.
3. Records of monitoring information shall include the following:
  - a. The date, exact place, and time of sampling or measurements.
  - b. The individual(s) who performed the sampling or measurements.
  - c. The date(s) analyses were performed.
  - d. The individual(s) who performed the analyses.
  - e. The analytical techniques or methods used.
  - f. The results of such analyses.
4. The permittee shall follow the following monitoring procedures:
  - a. Any required monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit or approved by the Regional Administrator.
  - b. The permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instruments at intervals frequent enough to ensure accuracy of measurements and shall maintain appropriate records of such activities.
  - c. An adequate analytical quality control program, including the analyses of sufficient standards, spikes, and duplicate samples to ensure the accuracy of all required analytical results shall be maintained by the permittee or designated commercial laboratory.
5. INSERT MONITORING REPORTS STANDARD CONDITION 40 CFR part 122.41(l)(4) HERE.

## D. Reporting Requirements

1. The permittee shall give notice to the permitting authority as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when any of the following are true:
  - a. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR part 122.29(b).

- b. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. The notification applies to pollutants that are subject neither to effluent limitations in the permit, nor to notification requirements under 40 CFR 122.42(a)(1).
    - c. The alteration or addition results in a significant change in the permittee's manure use or disposal practices, and such alteration, addition, or change could justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an NMP.
2. The permittee shall give advance notice to the **[PERMITTING AUTHORITY]** of any planned physical alterations or additions or changes in activity that could result in noncompliance with requirements in this permit.
3. This permit is not transferable to any person except after notice to the **[PERMITTING AUTHORITY]**. The **[PERMITTING AUTHORITY]** may require modification or revocation and reissuance of the permit to change the name or the permittee and incorporate such other requirements as might be necessary under the Act.
4. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each scheduled date.
5. The permittee shall report any noncompliance that could endanger human health or the environment. Any information must be provided orally to **[PERMITTING AUTHORITY CONTACT INFORMATION]** within 24 hours from the time that the permittee becomes aware of the circumstances. A written submission shall also be provided to **[PERMITTING AUTHORITY]** within 5 days of the time the permittee becomes aware of the circumstances. The report shall contain the following information:
  - a. A description of the noncompliance and its cause.
  - b. The period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue.
  - c. Steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.
6. The following shall be included as information, which must be reported within 24 hours:
  - a. Any unanticipated bypass that exceeds any effluent limitation in the permit.
  - b. Any upset that exceeds any effluent limitation in the permit.
  - c. Violation of a maximum daily discharge limitation for any of the pollutants listed by the permitting authority in the permit to be reported within 24 hours.

The permitting authority may waive the written report on a case-by-case basis for reports under the above if the oral report has been received within 24 hours.

7. The permittee shall report all instances of noncompliance not reported under above and of this section, at the time monitoring reports are submitted. The reports shall contain the information listed in Part VII.D.6 of this permit.
8. Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the **[PERMITTING AUTHORITY]**, the permittee shall promptly submit such facts or information to the **[PERMITTING AUTHORITY]**.

## E. Signatory Requirements

All applications, reports, or information submitted to the **[PERMITTING AUTHORITY]** shall be signed and certified consistent with 40 CFR part 122.22:

1. All notices of intent shall be signed as follows:
  - a. For a corporation: By a responsible corporate officer. For the purpose of this section, a responsible corporate officer means either of the following:
    - i. A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation.
    - ii. The manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions that govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
  - b. For a partnership or sole proprietorship: By a general partner for a partnership or the proprietor, respectively.
2. All reports required by the permit and other information requested by the **[PERMITTING AUTHORITY]** shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if the following are true:
  - a. The authorization is made in writing by a person described above.
  - b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of

plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or any individual or position having overall responsibility for environmental matters for the company. A duly authorized representative may thus be either a named individual or an individual occupying a named position.

- c. The written authorization is submitted to the **[PERMITTING AUTHORITY]**.

## F. Certification

Any person signing a document under this section shall make the following certification:

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”

## G. Availability of Reports

Any information submitted pursuant to this permit may be claimed as confidential by the submitter. If no claim is made at the time of submission, information may be made available to the public without further notice.

## H. Penalties for Violations of Permit Conditions

1. Criminal Penalties:
  - a. Negligent violations: The Act provides that any person who negligently violates section 301, 302, 306, 307, 308, 318, or 405 of the Act or any condition or limitation implementing those provisions in a permit issued under section 402 is subject to a fine of not less than \$2,750 nor more than \$27,500 per day of violation, or by imprisonment for not more than one year, or both.
  - b. Knowing violations: The Act provides that any person who knowingly violates sections 301, 302, 306, 307, 308, 318, or 405 of the Act or any permit conditions implementing those provisions is subject to a fine of not less than \$5,500 nor more than \$55,000 per day of violation, or by imprisonment for not more than 3 years, or both.
  - c. Knowing endangerment: The Act provides that any person who knowingly violates sections 301, 302, 303, 306, 307, 308, 318, or 405 of the Act or permit conditions implementing those provisions and who knows at that time that he or she is placing another person in imminent danger of death or serious bodily injury is

subject to a fine of not more than \$275,000, or by imprisonment for not more than 15 years, or both.

- d. False statements: The Act provides that any person who knowingly makes any false material statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under the Act or who knowingly falsifies, tampers with, or renders inaccurate, any monitoring device or method required to be maintained under the Act, shall upon conviction, be punished by a fine of not more than \$11,000, or by imprisonment for not more than 2 years, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment shall be by a fine of not more than \$22,000 per day of violation, or by imprisonment of not more than 4 years, or by both. [See section 309(c)4 of the Clean Water Act.]
2. Civil penalties: The Act provides that any person who violates a permit condition implementing sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a civil penalty not to exceed \$27,500 per day for each violation. [See section 309(d).]
  3. Administrative penalties: The Act provides that the Administrator may assess a Class I or Class II administrative penalty if the Administrator finds that a person has violated sections 301, 302, 306, 307, 308, 318, or 405 of the Act or a permit condition or limitation implementing these provisions, as follows [See section 309(g).]:
    - a. Class I penalty: Not to exceed \$11,000 per violation nor shall the maximum amount exceed \$27,500.
    - b. Class II penalty: Not to exceed \$11,000 per day for each day during which the violation continues nor shall the maximum amount exceed \$137,500.

## Part VIII. Definitions

**Animal feeding operation** means a lot or facility (other than an aquatic animal production facility) where the following conditions are met: (i) animals (other than aquatic animals) have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period, and (ii) crops, vegetation, forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility.

**Application** means the U.S. Environmental Protection Agency standard national forms for seeking coverage under for an NPDES permit, including any additions, revisions or modifications to the forms; or forms approved by U.S. Environmental Protection Agency for use in *approved states*, including any approved modifications or revisions [e.g. for NPDES general permits, a written NOI pursuant to 40 CFR part 122.28; for NPDES individual permits, Form 1 and 2B pursuant to 40 CFR part 122.1(d)].

**Concentrated animal feeding operation (CAFO)** means an AFO that is defined as a Large CAFO or Medium CAFO by 40 CFR parts 122.23 (4) and (6), or that is designated as a CAFO.

**Fecal coliform** means the bacterial count (Parameter 1 at 40 CFR part 136.3 in Table 1A), which also cites the approved methods of analysis.

**Grab sample** means a sample that is taken from a wastestream on a one-time basis without consideration of the flow rate of the wastestream and without consideration of time.

**Land application** means the application of manure, litter, or process wastewater onto or incorporated into the soil.

**Land application area** means land under the control of a CAFO owner or operator, whether it is owned, rented, or leased, to which manure, litter, or process wastewater from the production area is or could be applied.

**Large CAFO** means an AFO that stables or confines as many as or more than the numbers of animals specified in any of the following categories: (i) 700 mature dairy cattle, whether milked or dry; (ii) 1,000 veal calves; (iii) 1,000 cattle other than mature dairy cows or veal calves. Cattle includes but is not limited to heifers, steers, bulls and cow/calf pairs; (iv) 2,500 swine each weighing 55 pounds or more; (v) 10,000 swine each weighing less than 55 pounds; (vi) 500 horses; (vii) 10,000 sheep or lambs; (viii) 55,000 turkeys; (ix) 30,000 laying hens or broilers, if the AFO uses a liquid manure handling system; (x) 125,000 chickens (other than laying hens), if the AFO uses other than a liquid manure handling system; (xi) 82,000 laying hens, if the AFO uses other than a liquid manure handling system; (xii) 30,000 ducks (if the AFO uses other than a liquid manure handling system); or (xiii) 5,000 ducks (if the AFO uses a liquid manure handling system).

**Liquid manure handling system** means a system that collects and transports or moves waste material with the use of water, such as in washing pens and flushing confinement facilities. That includes the use of water impoundments for manure or wastewater treatment.

**Manure** is defined to include manure, litter, bedding, compost and raw materials or other materials commingled with manure or set aside for land application or other use.

**Medium CAFO** means any AFO that stables or confines as many or more than the numbers of animals specified in any of the following categories: (i) 200 to 699 mature dairy cattle, whether milked or dry cows; (ii) 300 to 999 veal calves; (iii) 300 to 999 cattle other than mature dairy cows or veal calves. Cattle includes but is not limited to heifers, steers, bulls and cow/calf pairs; (iv) 750 to 2,499 swine each weighing 55 pounds or more; (v) 3,000 to 9,999 swine each weighing less than 55 pounds; (vi) 150 to 499 horses, (vii) 3,000 to 9,999 sheep or lambs, (viii) 16,500 to 54,999 turkeys, (ix) 9,000 to 29,999 laying hens or broilers, if the AFO uses a liquid manure handling system; (x) 37,500 to 124,999 chickens (other than laying hens), if the AFO uses other than a liquid manure handling system; (xi) 25,000 to 81,999 laying hens, if the AFO uses other than a liquid manure handling system; (xii) 10,000 to 29,999 ducks (if the AFO uses other than a liquid manure handling system); or (xiii) 1,500 to 4,999 ducks (if the AFO uses a liquid manure handling system) and either one of the following conditions are met (a) pollutants are discharged into waters of the United States through a man-made ditch, flushing system, or other similar man-made device; or

(b) pollutants are discharged directly into waters of the United States that originate outside and pass over, across, or through the facility or otherwise come into direct contact with the animals confined in the operation.

**Notice of Intent (NOI)** is a form submitted by the owner/operator applying for coverage under a general permit. It requires the applicant to submit the information necessary for adequate program implementation, including, at a minimum, the legal name and address of the owner or operator, the facility name and address, type of facility or discharges, and the receiving stream(s). 40 CFR § 128.28(b)(2)(ii).

**Process wastewater** means water directly or indirectly used in the operation of the CAFO for any or all of the following: spillage or overflow from animal or poultry watering systems; washing, cleaning, or flushing pens, barns, manure pits, or other AFO facilities; direct contact swimming, washing, or spray cooling of animals; or dust control. Process wastewater also includes any water that comes into contact with or is a constituent of raw materials, products, or by-products including manure, litter, feed, milk, eggs, or bedding.

**Production area** means that part of an AFO that includes the animal confinement area, the manure storage area, the raw materials storage area, and the waste containment areas. The animal containment area includes but is not limited to open lots, housed lots, feedlots, confinement houses, stall barns, free stall barns, milk rooms, milking centers, cowyards, barnyards, medication pens, walkers, animal walkways, and stables. The manure storage area includes but is not limited to lagoons, runoff ponds, storage sheds, stockpiles, under house or pit storages, liquid impoundments, static piles, and composting piles. The raw materials storage area includes but is not limited to feed silos, silage bunkers, and bedding materials. The waste containment area includes but is not limited to settling basins, and areas within berms and diversions that separate uncontaminated stormwater. Also included in the definition of production area is any egg washing or egg processing facility, and any area used in the storage, handling, treatment, or disposal of mortalities.

**Small CAFO** means an AFO that is designated as a CAFO and is not a Medium CAFO.

**Setback** means a specified distance from waters of the United States or potential conduits to waters of the United States where manure, litter, and process wastewater may not be land applied. Examples of conduits to surface waters include open tile line intake structures, sinkholes, and agricultural well heads.

**The Act** means Federal Water Pollution Control Act as amended, also known as the Clean Water Act as amended, found at 33 U.S.C. 1251 *et seq.*

**Vegetated buffer** means a narrow, permanent strip of dense perennial vegetation established parallel to the contours of and perpendicular to the dominant slope of the field for the purposes of slowing water runoff, enhancing water infiltration, and minimizing the risk of any potential nutrients or pollutants from leaving the field and reaching waters of the United States.

**Waters of the United States** means (1) all waters that are used, were used in the past, or might be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide; (2) all interstate waters, including interstate wetlands; (3) all other waters such as intrastate lakes, rivers, and streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters: (a) that are or could be used by interstate or foreign travelers for recreational or other purposes; from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or that are or could be used for industrial purposes by industries in interstate commerce; (4) all impoundments of waters otherwise defined as waters of the United States; (5) tributaries of waters identified in (1) through (4) of this definition; (6) the territorial sea; and (7) wetlands adjacent to waters (other than waters that are themselves wetlands) identified in items (1) through (6) of this definition.

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**Appendix A. (Insert Form 2B/Notice of Intent or Appropriate State Form)**

**Appendix B. (Insert State Technical Standards for Nutrient Management)**

**Appendix C. Historic Properties Requirements**

**Appendix D. Notice of Termination**



# Appendix

# K

## NRCS Conservation Practice Standards



## U.S. Department of Agriculture, Natural Resources Conservation Service Conservation (USDA-NRCS) Practice Standards

This appendix describes selected conservation practice standards developed by USDA-NRCS that NPDES permit writers and inspectors might encounter in their review of CAFO nutrient management plans. USDA-NRCS maintains the most recent national version of many of the standards along with their associated job sheets and statements of work in its National Handbook of Conservation Practice Standards (available at <http://www.nrcs.usda.gov/Technical/Standards/nhcp.html>).

Each state's NRCS office adopts and may modify those practices that are applicable in that state. Some state NRCS offices also develop state-specific standards that are not found in the national handbook. NPDES permit writers and inspectors should refer to the practice standards that are applicable in their state. All state-specific conservation practice standards are available in the Electronic Field Office Technical Guide (eFOTG, available at <http://www.nrcs.usda.gov/technical/efotg/>). To find a specific standard, use the interactive maps on eFOTG to select the appropriate state and county. Then select Section IV from the menu at the left side of the screen for a list of practice standards available in that state.

### **Conservation Practice: Access Control (Code 472)**

#### **Application: Production Area**

Barriers can be used to prevent, restrict, or control access to an area to maintain or improve the quantity and quality of natural resources or to minimize liability and human health concerns. Barriers consist of natural or artificial structures such as logs, vegetation, earth fill, boulders, fences, gates, electronic and sonic devices, and signs. In those cases where a waterbody is present in the feedlot area of the operation, the NMP should address the installation and maintenance of a fence, or similar barrier, to prevent animals from entering the water. In addition, the slope of the feedlot should be contoured to divert runoff away from the waterbody.

### **Conservation Practice: Access Road (Code 560)**

#### **Application: Production Area**

The standard establishes a travel-way for equipment and vehicles constructed as part of a conservation plan.

The purpose of this practice is to provide a fixed route for vehicular travel for resource activities involving the management of timber, livestock, agriculture, wildlife habitat, and other conservation enterprises while protecting the soil, water, air, fish, wildlife, and other adjacent natural resources where access is needed from a private or public road or highway to a land use enterprise or conservation measure, or where travel ways are needed in a planned land use area.

Access roads range from seasonal use roads, designed for low speed and rough driving conditions, to all-weather roads heavily used by the public and designed with safety as a high priority. Some roads are constructed for a single purpose only; i.e., control of forest fires, logging and forest management activities, access to remote recreation areas, or access for maintenance of facilities.

Access roads should be located so as to minimize adverse effects on wetlands, waterbodies, wildlife habitat, and air quality. Considerations should be given to the following:

- ▶ Effects on downstream flows or aquifers that would affect other water uses or users.
- ▶ Effects on the volume and timing of downstream flow to prohibit undesirable environmental, social or economic effects.
- ▶ Short-term and construction-related effects of this practice on the quality of on-site downstream water courses.
- ▶ Overall effects on erosion and the movement of sediment, pathogens, and soluble and sediment-attached substances that would be carried by runoff from construction activities.
- ▶ Effects on wetlands and water-related wildlife habitats that would be associated with the practice.
- ▶ Establishing vegetation on road shoulders wider than 2-4 feet.
- ▶ Limiting the number of vehicles and vehicle speed will reduce the potential for generation of particulate matter and decrease safety and air quality concerns.

### **Conservation Practice: Agrichemical Handling Facility (Code 309)** **Application: Production Area**

An agrichemical handling facility has an impervious surface to provide a safe environment on farm and ranch operations for the storage, mixing, loading and cleanup of agrichemicals. The practice is also used to retain incidental spillage, retain leakage, and reduce pollution to surface water, groundwater, air, and/or soil.

The practice applies where

- ▶ The handling of agrichemicals creates significant potential for pollution of surface water, groundwater, air or soil and a facility is needed to properly manage and handle the chemical operation.
- ▶ An adequate water supply is available for filling application equipment tanks, rinsing application equipment and chemical containers as needed for the operation.
- ▶ Soils and topography are suitable for construction.

The standard does not apply to the handling or storage of fuels or to commercial or multi-landowner agrichemical handling operations.

**Conservation Practice: Anaerobic Digester (Code 366)****Application: Production Area**

An anaerobic digester is a component of a waste management system that provides biological treatment in the absence of oxygen. Anaerobic digesters are designed to treat manure and other by-products of animal agricultural operations for one or more of the following reasons:

- ▶ To capture biogas for energy production.
- ▶ To manage odors.
- ▶ To reduce the net effect of greenhouse gas emissions.
- ▶ To reduce pathogens.

The practice applies where

- ▶ Biogas production and capture are components of a planned animal waste and by-product(s) management system.
- ▶ Sufficient and suitable organic feedstocks are readily available.
- ▶ Existing facilities can be modified to the requirements of this standard or for new construction.
- ▶ The operator has the interest and skills to monitor and maintain processes or contracts with a consultant to provide the services.

**Conservation Practice: Animal Mortality Facility (Code 316)****Application: Production Area**

Animal mortality facilities treat and dispose of livestock and poultry carcasses for routine or catastrophic mortality events. Such facilities reduce effects on surface and groundwater resources, reduce odors, and decrease the spread of pathogens. The planning and design of animal mortality facilities or processes must conform to all federal, state, and local laws, rules, and regulations.

This conservation practice applies to livestock and poultry operations where animal carcass treatment or disposal is needed. This practice, however, might not be applicable to catastrophic mortality resulting from disease, unless directed by the appropriate state or federal authority (the state veterinarian or USDA APHIS).

**Conservation Practice: Composting Facility (Code 317)****Application: Production Area**

A composting facility is a structure or device to contain and facilitate the controlled aerobic decomposition of manure or other organic material by microorganisms into a biologically stable organic material that is suitable for use as a soil amendment.

The purpose of this practice is to reduce the pollution potential and improve the handling characteristics of organic waste solids. Composting facilities can also be used to produce a soil amendment that adds organic matter and beneficial organisms, provides slow-release plant-available nutrients, and improves soil condition.

This application applies where

- ▶ Organic waste material is generated by agricultural production or processing.
- ▶ The facility is a component of a planned waste management system.
- ▶ The facility can be constructed, operated, and maintained without polluting air or water resources.
- ▶ The compost can be applied to the land or marketed to the public.

**Conservation Practice:** Conservation Buffers  
Contour Buffer Strips – (Code 332)  
Contour Stripcropping – (Code 585)  
Filter Strip – (Code 393)  
Grassed Waterways – (Code 412)  
Riparian Forest Buffer – (Code 391)  
Stripcropping – (Code 586)  
Terrace – (Code 600)  
Windbreak – (Code 380)

**Application:** Land-Application Areas/Production Area

All the conservation practices identified in the USDA *CNMP Technical Guidance* are considered together because they all function to intercept sediment and other pollutants to prevent them from reaching surface waters. Buffers function by intercepting runoff containing nutrients, sediments and other potential pollutants; storing the runoff; and then releasing it slowly into the waterbody. Buffers also reduce and contain flooding by slowing water discharge into streams and providing an area for surplus water. Windbreaks also can be used to reduce wind erosion and the deposition of soil into surface water. Some of the conservation buffers can be applied in the land-application areas and to the production area. Those practices include filter strips, contour buffer strips, and grassed waterways. The use of such conservation practices around the production area would likely be limited to those instances where surface water is near the production area.

**Contour Buffer Strips:** Contour buffer strips are strips of perennial vegetation, such as grass, alternated with wider cultivated strips that are farmed on the contour. Contour buffer strips allow runoff and trap sediment. Because the grass buffer strip is established on the contour, runoff flows evenly across the entire surface of the strip, reducing sheet and rill erosion. The grass slows runoff, helping the water soak into the soil and reducing erosion. Sediment, nutrients and other pollutants are filtered from the runoff as it flows through the strip thereby improving surface water quality. Buffer strips should be at least 15 feet wide and usually make up one-fifth to one-third of the slope. The specific recommendations

for establishing buffers vary from site to site. Cultivated strip widths are determined by variables such as slope, soil type, field conditions, climate, and erosion potential. Contour buffer strips are unsuitable in fields where irregular, rolling topography makes following a contour impractical.

**Contour Stripcropping:** In stripcropping, crops are arranged so that a strip of grass or forage is alternated with a strip of row crop (such as corn). The crops are planted across the slope of the land, as in contour buffer strips. Less than half the field should be planted in row crops. The grass or forage strips reduce erosion, slow runoff water, and trap sediment. The practice combines the benefits of contouring and crop rotation. Strip cropping is not as effective if the crop strips are too wide, especially on steep slopes. Maximum crop strip widths range from 130 feet, for 1 to 2 percent slopes down, to 50 feet for 21 to 25 percent slopes.

**Grassed Waterways:** Grassed waterways are natural or constructed vegetated channels designed to direct surface water, flowing at non-erosive velocities, to a stable outlet (another vegetated channel, earth ditch, or the like). Grassed waterways usually are used to control gully erosion. In concentrated flow areas, grassed waterways can act as an important component of erosion control by slowing the flow of water and filtering sediment. Other benefits of grassed waterways include the safe disposal of runoff water, improved water quality, improved wildlife habitat, reduced damage associated with sediment, and an improvement in overall landscape aesthetics. Grassed waterways are typically used to control runoff in a field. There might be circumstances, however, where they are used to control runoff from the production area of an operation. Grassed waterways are usually planted with perennial grasses, preferably native species where possible. Some common grass species used in waterways are timothy, tall fescue, and Kentucky bluegrass. Grassed waterways are generally constructed to be either trapezoid or parabolic in cross section, with the requirement that the bottom (shorter) width of trapezoidal waterways not exceed 100 feet unless multiple or divided waterways are provided to control the meandering of low flows.

**Filter strips:** Filter strips are areas of grass or other permanent vegetation that intercept runoff, trapping sediment and pesticides before they reach a body of water. A properly installed buffer can effectively trap 90 percent of sediment and nitrate moving from a farm field. A filter strip can be 20 to 120 feet wide and is usually planted with native grasses. Filter strips are one type of conservation buffer that is often applied to the area between the production area and an adjacent waterbody. In those areas, a filter strip is a gently sloping grass area that is planted between the livestock yard and drainage ways to streams and is managed to filter runoff from the livestock yard. Influent waste is distributed uniformly across the high end of the strip and allowed to flow through the strip. Nutrients and suspended material remaining in the runoff water are filtered through the grass, absorbed by the soil, and ultimately taken up by the plants. Filter strips should be designed and sized to match the characteristics of the livestock yard. A typical practice is to make the filter strip area about equal to the livestock yard area.

**Riparian Buffers:** Riparian buffers are streamside vegetation consisting of trees, shrubs, and grasses. They are used to intercept pollutants from an adjacent farm field. Riparian buffers provide many important benefits by reducing the amounts of both eroded soil sediment and nonpoint source pollutants (such as pesticides, herbicides, and surplus nutrients) that enter surface water.

**Terraces:** Although terraces are not true buffer strips, they are linear conservation practices that perform similar functions (e.g., water diversion, sediment trapping). They are more commonly installed as a diversion measure. A diversion is an earthen embankment, channel, or combination ridge and channel that is built across a slope to intercept and store water runoff. Pollutants in terraces can leach into groundwater. Some terraces are built level from end to end to contain water used to grow crops and recharge groundwater. Others, known as gradient terraces, are built with some slope or grade from one end to the other and can slow water runoff. Both help to reduce soil erosion. In the production area, terraces can be used as a part of an overall diversion system based on the topography of the feedlot. An earthen ridge or terrace can be constructed across the slope upgrade from a production area to prevent runoff from entering the area or to direct runoff from one area of the yard to a common collection area.

**Windbreaks:** The main purpose of windbreaks is to reduce wind erosion of soil from agricultural fields and to protect farmsteads from severe wind. Windbreaks redirect the wind and modify its force. They also provide habitat, food, and migration corridors for wildlife; aesthetic benefits; livestock protection; and energy conservation. (Adapted from NRCS's *National Handbook of Conservation Practices*, at <http://www.nrcs.usda.gov/technical/standards/nhcp.html>.)

## **Conservation Practice: Conservation Crop Rotation (Code 328)**

### **Application: Land-Application Area**

Crop rotation combined with recommended tillage practices can play an important role in reducing wind and water erosion. Solid-seed crops such as small grains provide more protection against water erosion than row crops, and permanent crops like hay or pasture provide even more protection. Managing crops to provide sufficient residue throughout the year is essential for satisfactory control of both wind and water erosion.

No-till or minimum-till farming is highly desirable as a conservation practice, but crop rotation must be used to reduce the buildup of insects, weeds and disease-causing organisms. Crop rotation also means that succeeding crops are of a genus, species, subspecies, or variety different from that of the previous crop. Examples are barley after wheat, row crops after small grains, and grain crops after legumes. The planned rotation sequence could be for a 2- or 3-year period or longer. Legumes in the rotation can be used to increase the available soil nitrogen. Symbiotic nitrogen-fixing bacteria called *Rhizobia* form nodules on the roots of leguminous plants and fix atmospheric nitrogen or convert it to organic nitrogen. The amount of nitrogen fixed varies with species, available soil nitrogen, and many other factors. Fixed nitrogen not removed from the land by harvest becomes available to succeeding crops as the legume tissues undergo microbial



decomposition. A well-planned rotation can contribute to more efficient use of plant nutrients. In a 3-year corn/alfalfa rotation, for example, manure can be applied during the corn rotation, resulting in efficient use of nitrogen and often a buildup phosphorus and potassium levels. During the alfalfa phase of the rotation, when manure is not applied, the forage crop uses the soil phosphorus and potassium that were built up during the corn phase of the rotation. The combination of nutrient management and crop rotation can reduce or eliminate the need for purchased fertilizer. If conservation cropping is used in the plan, the inspector should check that the sequence and types of crops being grown are consistent with the plan. The nutrient application rates identified in the plan are based on the specific crop rotation used in the calculations. (Adapted from NRCS *National Handbook of Conservation Practices*, at <http://www.nrcs.usda.gov/technical/standards/nhcp.html>.)

**Conservation Practice: Cover Crop (Code 340)****Application: Land-Application Areas**

A cover crop is a close-growing crop that temporarily protects the ground from wind and water erosion during times when cropland is not adequately protected against soil erosion. Common cover crops include cereal rye, oats, clover, crown vetch, and winter wheat. Cover crops are most often recommended when low residue-producing crops such as soybeans or corn silage are grown on erodible land. Note that if the cover crop is a legume, the nutrient budget calculated in the operation's NMP should account for the addition of nitrogen provided by the crop to the soil.

**Conservation Practice: Critical Area Planting (Code 342)****Application: Production Area**

The USDA standard is for establishing permanent vegetation on sites that have or are expected to have high erosion rates and on sites that have physical, chemical, or biological conditions that prevent the establishment of vegetation with normal practices.

The purpose of this practice is to

- ▶ Stabilize areas with existing or expected high rates of soil erosion by water.
- ▶ Stabilize areas with existing or expected high rates of soil erosion by wind.
- ▶ Rehabilitate and revegetate degraded sites that cannot be stabilized through normal farming practices.
- ▶ Stabilize coastal areas, such as sand dunes and riparian areas.

If gullies or deep rills are present, they will be treated, if feasible, to allow equipment operation and ensure proper site and seedbed preparation. On the basis of a soil test, soil amendments will be added, as necessary, to ameliorate or eliminate physical or chemical conditions that inhibit plant establishment and growth. Required amendments should be

included in the site specification with amounts, timing, and method of application. Such required amendments include

- ▶ Compost or manure to add organic matter and improve soil structure and water holding capacity.
- ▶ Agricultural limestone to increase the pH of acid soils.
- ▶ Elemental sulfur to lower the pH of calcareous soils.

### **Conservation Practice: Diversion (Code 362)**

#### **Application: Production Area**

A diversion is an earthen channel with a supporting ridge constructed across a slope to collect runoff water and safely divert it to a stable outlet, thereby preventing erosion of an area below. Diversions are effective in intercepting storm runoff and directing it away from fields susceptible to erosion, preventing water from flowing over areas where high concentrations of pollutants are present (such as feedlots), and diverting runoff water away from gullies to a stable outlet. The practice can also be applied in land-application areas to reduce nutrient loss.

Diversions can be used to move surface water away from the production area to a clean-water drainage system independent of the water-handling system. Such an approach reduces the amount of water to be handled, reduces the amount of solids eroded from the lot, and maintains available common diversion practices:

- ▶ Waterways, small terraces, and roof gutters to direct water away from the production area.
- ▶ An earthen ridge or diversion terrace constructed across the slope to prevent runoff from entering the production area.
- ▶ A catch basin with a pipe outlet installed above the production area if a diversion terrace is not practical.

All roofs that would contribute to runoff from the production area should have gutters, downspouts, and outlets that discharge water away from the confinement area. The design of the diversion should be based on a 25 year, 24-hour storm.

### **Conservation Practice: Fence (Code 382)**

#### **Application: Production Area/Land-Application Area**

An area of land can be enclosed or divided with a suitable permanent structure that acts as a barrier to livestock.

### **Conservation Practice: Field Border (Code 386)**

#### **Application: Land-Application Areas**

The USDA standard defines a field border as a strip of permanent vegetation established at the edge or around the perimeter of a field.

The practice can be applied to accomplish one or more of the following:

- ▶ Reduce erosion from wind and water.
- ▶ Protect soil and water quality.
- ▶ Manage pest populations.
- ▶ Provide wildlife food and cover.
- ▶ Increase carbon storage.
- ▶ Improve air quality.

The practice is applied around the perimeter of fields. Its use can support or connect other buffer practices within and between fields. The practice can also apply to recreation land or other land uses where agronomic crops including where forages are grown.

### **Conservation Practice: Heavy-Use Area Protection (Code 561)**

#### **Application: Production Area**

The USDA standard establishes the stabilization of areas frequently and intensively used by people, animals, or vehicles by any combination of establishing vegetative cover, surfacing with suitable materials, or installing needed structures.

The purpose of the practice is to provide a stable, non-eroding surface for areas frequently used by animals, people or vehicles. It also helps to protect and improve water quality.

The treated area can include all areas where livestock congregate and cause surface stability problems. That includes feeding areas, portable hay rings, watering facilities, feeding troughs, mineral boxes, and other facilities where livestock concentrations cause resource concerns.

To reduce the negative water quality impact of heavy-use areas, consider locating them as far as possible from waterbodies or water courses. In some cases, it could require relocating the heavily used area rather than armoring an area that is already in use.

### **Conservation Practice: Irrigation Water Management (Code 449)**

#### **Application: Land-Application Area**

Irrigation water management is controlling the rate, amount, and timing of irrigation water in a planned and prudent manner. The purpose of the practice is to manage soil moisture for crop production and erosion control, minimize leaching of soluble plant nutrients, and protect groundwater and surface water quality. Without proper management, fields are often irrigated too often and at excessive rates. If irrigation water is over-applied, the excess water can cause soil erosion and leaching of nutrients and pesticides. Over-application also wastes water, energy, and money. The volume of water applied and the frequency of applications should be determined by crop needs and soil conditions. Soil moisture should be monitored to predict when irrigation is needed. When crops are irrigated, the volume applied should not exceed the available water-holding capacity of the soil in the root zone

or the moisture control zone. In addition, the infiltration rate of the soil should not be exceeded. This practice should be applied in conjunction with other erosion and sediment control practices. (Adapted from NRCS's *National Handbook of Conservation Practices*, at <http://www.nrcs.usda.gov/technical/standards/nhcp.html>.)

**Conservation Practice: Livestock Shade Structure (Code 717)**

**Application: Pasture**

This standard is available in some states but is not included in the *National Handbook of Conservation Practices*. The standard describes a livestock shade structure as a portable, metal frame structure with a mesh fabric roof that is to provide shade for livestock. The practice can be applied as part of a resource management system to protect livestock from excessive heat and also to protect surface waters from pollution by excluding livestock from existing shade on streambanks. The standard includes considerations for the design, placement, construction, operation, and maintenance of livestock shade structures.

**Conservation Practice: Nutrient Management (Code 590)**

**Application: Land Application**

The USDA *CNMP Technical Guidance* uses NRCS Conservation Practice Standard 590, Nutrient Management, to guide the proper land application of nutrients. The standard states that nutrient application rates are to be established considering current soil tests, realistic yield goals and management capabilities. In cases where manure is the source of applied nutrients, the rate also shall be based on an analysis of the nutrient value of the manure, NRCS book values, or historical documented records.

**Conservation Practice: Residue Management (Code 344)**

**No-Till and Strip Till (Code 329A)**

**Mulch Till (Code 345)**

**Ridge Till (Code 346)**

**Application: Land Application**

These cropping practices retain crop residues on or near the surface of a field. As a group these practices are often referred to as conservation tillage. Conservation tillage is any tillage system that leaves at least 30 percent of the field surface covered with crop residue after cropping is completed, and it involves reduced or minimum tillage. The residue can reduce soil detachment by absorbing the impact of falling raindrops. The remaining residue might form small dams that can retard runoff and create puddles of water that absorb raindrop energy, thus reducing soil erosion. Such practices require use of some specialized equipment.

**No-till/strip till:** In these systems, the soil is left undisturbed from harvest to planting except for strips up to one-third of the row width. (The strips could involve only residue disturbance or could include soil disturbance.) Planting or drilling is accomplished using disc openers, coulter(s), row cleaners, in-row chisels, or rototillers. Weeds are controlled

primarily with crop protection products; cultivation can be used for emergency weed control. Other common terms used to describe no-till, include row-till, and slot-till.

**Ridge-till:** Ridge-till is a system in which seeds are planted into a seedbed prepared by scraping off the top of the ridge. The scraped-off ridge usually provides an excellent environment for planting. Ridges are formed during cultivation of the previous year's crop. Ridge-till operations consist of planting in the spring and at least one cultivation to recreate the ridges for the next year. Rows remain in the same place each year and any crop residue on the ridges at planting is pushed between the rows.

**Mulch-till:** This system uses full-width tillage involving one or more tillage strips, which disturbs the entire soil surface and is done before or during planting. Tillage tools such as chisels, field cultivators, discs, sweeps, or blades are used. Weeds are controlled with crop protection products or cultivation or both.

**Conversation Practice: Roof Runoff Management (Code 558)**  
**Application Area: Production Area**

This USDA Conservation Practice Standard is not identified in the *CNMP Technical Guidance*; however, it can be used to address roof runoff entering the production area.

This USDA standard establishes the plans and specifications for designing, constructing, and operating roof runoff management facilities. Such facilities include erosion-resistant channels or subsurface drains with rock-filled trenches along building foundations below eaves, roof gutters, downspouts, and appurtenances.

The purpose of this practice is to prevent roof runoff water from flowing across concentrated waste areas, barnyards, roads and alleys; reduce pollution and erosion; improve water quality; prevent flooding; improve drainage; and protect the environment.

**Conversation Practice: Roofs and Covers (Code 367)**  
**Application Area: Production Area**

The practice standard addresses a rigid, semi-rigid, or flexible manufactured membrane, composite material, or roof structure placed over a waste management facility to provide a roof or cover for

- ▶ Improving water quality.
- ▶ Diverting clean water from animal management areas (i.e., barnyard, feedlot or exercise area) or waste storage facilities.
- ▶ Capturing biogas for energy production.
- ▶ Reducing net effect of greenhouse gas emissions.
- ▶ Improving air quality and reducing odor.

The practice criteria address the structure's service life, materials, loads, design, access, repair, and safety. Operation and maintenance requirements are included.

**Conservation Practice: Sediment Basin (Code 350)****Application: Production Area/Land-Application Area**

The USDA standard defines this practice as a basin constructed with an engineering outlet, formed by an embankment or excavation or a combination of the two.

The purpose of the practice is to capture and detain sediment laden runoff, or other debris, for a sufficient length of time to allow it to settle out in the basin.

This practice applies to urban land, construction sites, agricultural land, and other disturbed lands where

- ▶ Physical conditions or land ownership precludes treatment of a sediment source by installing erosion-control measures.
- ▶ A sediment basin offers the most practical solution.
- ▶ Failure of the basin will not result in loss of life, damage to homes, commercial or industrial buildings, main highways or railroads, or in the use of public utilities.
- ▶ The product of the storage times the effective height of the dam is less than 3,000. Storage is the volume, in acre-feet, in the reservoir below the elevation of the crest of the auxiliary spillway.
- ▶ The effective height of the dam is 35 feet or less. The effective height of the dam is the difference in elevation, in feet, between the auxiliary spillway crest and the lowest point in the cross section taken along the centerline of the dam.
- ▶ The Hazard Class of the dam is low.

**Conservation Practice: Solid/Liquid Waste Separation Facility (Code 632)****Application: Production Area**

A solid/liquid waste separation facility is a filtration or screening device, settling tank, settling basin, or settling channel used to separate a portion of solids from a liquid waste stream.

The practice is used to partition solids, liquids and their associated nutrients as part of a conservation management system to improve or protect air and water quality and animal health, or to meet other management objectives.

This practice applies where solid/liquid separation will

- ▶ Remove solids from the liquid waste stream as a primary treatment process and allow further treatment processes to be applied such as composting and anaerobic digestion.
- ▶ Allow partly digested feed to be separated from the liquid waste stream so that it can be used as a feed supplement or for bedding.
- ▶ Reduce problems associated with solids accumulation in liquid storage facilities.

- ▶ Reduce solids in stored liquids so liquids can be recycled for other uses (i.e. flush water).
- ▶ Reduce solids in stored liquids to better facilitate land application of liquids using irrigation techniques.
- ▶ Assist with partitioning nutrients in the waste stream to improve nutrient management.

**Conservation Practice: Structure for Water Control (Code 587)**  
**Application: Production Area**

The USDA standard establishes a structure in a water management system that conveys water, controls the direction or rate of flow, maintains a desired water surface elevation, or measures water.

The practice can be applied as a management component of a water management system to control the stage, discharge, distribution, delivery, or direction of water flow.

The practice applies wherever a permanent structure is needed as an integral part of a water-control system to serve one or more of the following functions:

- ▶ Convey water from one elevation to a lower elevation within, to, or from a water conveyance system such as a ditch, channel, canal, or pipeline designed to operate under open channel conditions. Typical structures are drops, chutes, turnouts, surface water inlets, head gates, pump boxes, and stilling basins.
- ▶ Control the elevation of water in drainage or irrigation ditches. Typical structures are checks, flashboard risers, and check dams.
- ▶ Control the division or measurement of irrigation water. Typical structures are division boxes and water measurement devices.
- ▶ Keep trash, debris or weed seeds from entering pipelines. A typical structure is a debris screen.
- ▶ Control the direction of channel flow resulting from tides and high water or back-flow from flooding. Typical structures are tide and water management gates.
- ▶ Control the water table level, remove surface or subsurface water from adjoining land, flood land for frost protection, or manage water levels for wildlife or recreation. Typical structures are water level control structures, flashboard risers, pipe drop inlets, and box inlets.
- ▶ Convey water over, under, or along a ditch, canal, road, railroad, or other barriers. Typical structures are bridges, culverts, flumes, invented siphons, and long span pipes.
- ▶ Modify water flow to provide habitat for fish, wildlife, and other aquatic animals. Typical structures are chutes, cold water release structures, and flashboard risers.
- ▶ Provide silt management in ditches or canals. A typical structure is a sluice.

- ▶ Supplement a resource management system on land where organic waste or commercial fertilizer is applied.
- ▶ Create, restore, or enhance wetland hydrology.

### **Conservation Practice: Waste Storage Facility (Code 313)**

#### **Application: Production Area/Land-Application Area**

The USDA standard defines this practice as a waste storage impoundment made by constructing an embankment or excavating a pit or dugout, or by fabricating a structure. The purpose of the standard is to temporarily store wastes such as manure, wastewater, and contaminated runoff as a storage function component of an agricultural waste management system.

Conditions where this practice applies include

- ▶ Where the storage facility is a component of a planned agricultural waste management system.
- ▶ Where temporary storage is needed for organic wastes generated by agricultural production or processing.
- ▶ Where the storage facility can be constructed, operated, and maintained without polluting air or water resources.
- ▶ Where site conditions are suitable for constructing the facility.
- ▶ Facilities using embankments with an effective height of 35 feet or less where damage resulting from failure would be limited to damage of farm buildings, agricultural land, or township and county roads.
- ▶ Where fabricating structures including tanks, stacking facilities, and pond appurtenances.

### **Conservation Practice: Waste Treatment Lagoon (Code 359)**

#### **Application: Production Area**

A waste treatment lagoon is an impoundment made by constructing an embankment or excavating a pit or dugout.

The purpose of the practice is to biologically treat waste, such as manure and wastewater, and thereby reduce pollution potential by serving as a treatment component of a waste management system.

Lagoons should be outside floodplains to minimize the potential for stream contamination and should have as little drainage area as possible.

The practice can be applied under the following conditions:

- ▶ The lagoon is a component of a planned agricultural waste management system.



- ▶ Treatment is needed for organic wastes generated by agricultural production or processing.
- ▶ On any site where the lagoon can be constructed, operated, and maintained without polluting air or water resources.
- ▶ At lagoons using embankments with an effective height of 35 feet or less, where damage resulting from failure would be limited to damage of farm buildings, agricultural land, or township and country roads.

**Conservation Practice: Waste Utilization (Code 633)****Application: Land-Application Areas**

This practice applies where agricultural wastes that include animal manure and wastewater from livestock and poultry operations are generated or used. The standard recommends sampling and analysis requirements for the manure and wastewater as well as record-keeping requirements. In addition to general criteria, the standard includes specific criteria to protect water quality.

All agricultural waste shall be utilized in a manner that minimizes the opportunity for contaminating surface and groundwater supplies. Agricultural waste shall not be applied on soils that are frequently flooded, as defined by the National Cooperative Soil Survey, during the period when flooding is expected. When liquid wastes are applied, the application rate must not exceed the infiltration rate of the soil, and the amount of waste applied must not exceed the moisture-holding capacity of the soil profile at the time of application.

The standard also includes criteria to reduce atmospheric losses and the reduction of odors from spreading operations. (Adapted from NRCS's *National Handbook of Conservation Practices*, at <http://www.nrcs.usda.gov/technical/standards/nhcp.html>.)

**Conservation Practice: Water and Sediment Control Basin (Code 638)****Application: Production Area/Land-Application Area**

The USDA standard defines the practice as an earth embankment or a combination ridge and channel constructed across the slope of minor watercourses to form a sediment trap and water detention basin with a stable outlet.

The practice can be applied as part of a resource management system for one or more of the following purposes:

- ▶ To reduce watercourse and gully erosion.
- ▶ To trap sediment.
- ▶ To reduce and manage onsite and downstream runoff.

This practice applies to sites where

- ▶ The topography is generally irregular.

- ▶ Watercourse or gully erosion is a problem.
- ▶ Sheet and rill erosion is controlled by other conservation practices.
- ▶ Runoff and sediment damages land and works of improvements.
- ▶ Adequate outlets can be provided.

Do not use this standard in place of terraces. When the ridge or channel extends beyond the detention basin or level embankment, use Conservation Practice Standard (600), Terrace or (362) Diversion, where appropriate.

# Appendix



# L

# Nutrient Management Planning Software

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## Software Programs

This appendix describes the types of software available to develop nutrient management plans (NMPs) and which programs are used in specific states. Permit writers should be familiar with the program(s) commonly used in their state to ensure they are familiar with the format and content of NMPs they will be reviewing. Table L-1 below describes which software is being used in each state, and Table L-2 provides a brief description of each software program along with contacts and websites to refer to for more information. EPA has supported the development of Manure Management Planner (MMP), and this appendix briefly outlines how MMP works and who can and should use it.

**Table L-1. Specific software programs available in each state**

State	NMP software available	Description number in Table 2
Alabama	Manure Management Planner (MMP)	4
Alaska		
Arizona		
Arkansas	MMP	4
California	California Central Valley NMP	1
	MMP	4
Colorado	MMP	4
Connecticut		
Delaware	NuMan MD Pro 3.0	10
	MMP	4
Florida	MMP	4
Georgia	MMP	4
Hawaii		
Idaho	Idaho OnePlan	3
Illinois	MMP	4
Indiana	MMP	4
Iowa	MMP	4
Kansas	Nutrient Utilization Plan Worksheet	13
	MMP	4
Kentucky	MMP	4

**Table L-1.** Specific software programs available in each state *(continued)*

<b>State</b>	<b>NMP software available</b>	<b>Description number in Table 2</b>
Louisiana		
Maine		
Maryland	NuMan MD Pro 3.0	10
	NuMan Reporter 2.0	12
	MMP	4
Massachusetts	MMP	4
Michigan	MMP	4
Minnesota	MPCA MMP	5
	NMP for Minnesota	11
	MMP	4
Mississippi	MMP	5
Missouri	MMP	5
Montana	MMP	5
Nebraska	MMP	5
Nevada		
New Hampshire		
New Jersey	MMP	5
New Mexico	NMSU Soil Test Interpretation Report Software	7
	NMSU Dairy Annual Nutrient Manager Software	6
	MMP	4
New York	Cropware	2
North Carolina	North Carolina Nutrient Management Software	8
North Dakota	MMP	4
Ohio	Crop Nutrient Management Software	14
	MMP	4
Oklahoma	MMP	4

**Table L-1.** Specific software programs available in each state *(continued)*

<b>State</b>	<b>NMP software available</b>	<b>Description number in Table 2</b>
Oregon	Oregon OnePlan	15
	MMP	4
Pennsylvania	Penn State NMP Spreadsheet	16
	MMP	4
Puerto Rico		
Rhode Island	MMP	4
South Carolina		
South Dakota	NRCS Tool in South Dakota	9
	MMP	4
Tennessee	MMP	4
Texas	Texas Waste Utilization and Nutrient Management Plan Worksheet	18
Utah	Utah's Manure Actual Nutrient Content spreadsheet	19
	MMP	4
Vermont	MMP	4
Virgin Islands		
Virginia	NuMan Reporter 2.0	12
Washington	MMP	4
West Virginia	NuMan Reporter 2.0	12
Wisconsin	SNAP Plus	17
	MMP	4
Wyoming		

**Table L-2. Description of software programs**

Number	Software	Description	For more information
1	California Central Valley Dairy Waste and Nutrient Management Software	Designed for existing milk cow dairies as mandated by the Waste Discharge Requirements General Order No. R5-2007-0035. The software is applicable to owners and operators of existing milk cow dairies that were operating as of October 17, 2005, filed a complete Report of Waste Discharge in response to the 2005 Report of Waste Discharge Request Letter, and have not expanded since October 17, 2005. The software was developed with a grant from the California State Water Resources Control Board and was designed to minimize leaching of nutrients and salts to groundwater and transport of those constituents to surface water.	See the California EPA website. Adobe PDF Reader software is needed.  <a href="http://www.waterboards.ca.gov/centralvalley/water_issues/dairies/complying_with_general_order/software/index.shtml">http://www.waterboards.ca.gov/centralvalley/water_issues/dairies/complying_with_general_order/software/index.shtml</a>
2	Cropware	Supported by the NYS NRCS, the NYS Department of Agriculture and Markets, and the NYS Department of Environmental Conservation. It is a key component of Comprehensive NMPs (CNMPs) as it can develop plans in accordance with the NRCS Nutrient Management Standard (Standard 590). For effective nutrient management planning, Cropware integrates Cornell crop nutrient guidelines for a full range of agronomic and vegetable crops, nutrient credits from various sources including manure, soil, sod, and fertilizer, and environmental risk indices, including the New York State Phosphorus Runoff Index and the Nitrate Leaching Index.	Cropware Version 2.0.34 operates on Microsoft Windows operating systems and is available to any New York user at no charge. For a Cropware training session, questions about the software, or to order a Cropware CD, contact Patty Ristow at <a href="mailto:plr27@cornell.edu">plr27@cornell.edu</a>  <a href="http://nmisp.cals.cornell.edu/software/cropware.html">http://nmisp.cals.cornell.edu/software/cropware.html</a>
3	Idaho OnePlan	Combines government regulations and current best management practices (BMPs) for agriculture into a single plan. This software is designed to include nutrient, pest and waste management, water quality and wetlands, air quality, financial assistance, endangered species, and petroleum storage tanks.  The OnePlan software questionnaire along with data access to aerial photos, soil data, hydrology maps, roads, and GIS maps is used to generate a report and plan of action with effective area-specific BMPs.	Information on how to become certified to use the Nutrient Management Planner is at <a href="http://oneplan.org/NMPlan.asp">http://oneplan.org/NMPlan.asp</a>  For information regarding NMP software training, contact Hillary Simpson, State Nutrient Management Coordinator at the Idaho State Department of Agriculture at (208) 736-3049 or <a href="mailto:hsimpson@agri.idaho.gov">hsimpson@agri.idaho.gov</a>



**Table L-2. Description of software programs** *(continued)*

Number	Software	Description	For more information
3	Idaho OnePlan <i>(continued)</i>	The Idaho OnePlan Nutrient Management Planner is the only officially recognized planning tool for creating certified NMPs in Idaho. The software and training to become Certified Nutrient Management Planners in Idaho is offered by the state and the USDA.	
4	Manure Management Planner (MMP)	See the description below.	<p><a href="http://www.agry.purdue.edu/mmp/">http://www.agry.purdue.edu/mmp/</a></p> <p>For agronomic questions, contact Brad Joern at (765) 494-9767 or <a href="mailto:bjjoern@purdue.edu">bjjoern@purdue.edu</a></p> <p>For software questions, contact Phil Hess at (765) 494-8050 or <a href="mailto:pjhess@purdue.edu">pjhess@purdue.edu</a></p>
5	MPCA Manure Management Planner	Developed by the Minnesota Pollution Control Agency (MPCA), the MMP is a spreadsheet that is designed to meet Minnesota 7020 feedlot rule requirements. This MMP is required for operations with 100 or more animal units (AU) after October 23, 2000, or when manure from a feedlot capable of holding 300 or more AU is applied by someone other than a certified animal waste technician. Because records of actual manure application practices are required at all facilities with 100 or more AU, this program also has a record-keeping tab.	<p><a href="http://www.pca.state.mn.us/hot/feedlot-management.html">www.pca.state.mn.us/hot/feedlot-management.html</a></p> <p>George Schwint, MPCA Feedlot Engineer, at (303) 214-3793 or <a href="mailto:George.schwint@pca.state.mn.us">George.schwint@pca.state.mn.us</a></p>
6	NMSU Dairy Annual Nutrient Manager Software	Developed by New Mexico State University and USDA, it balances nutrients according to user-defined crops planted, soil analyses, effluent irrigated, dry manure applied, and chemical fertilizers used.	<p><a href="http://aces.nmsu.edu/ces/dairy/tools.html">http://aces.nmsu.edu/ces/dairy/tools.html</a></p> <p>Victor E. Cabrera, Extension Dairy Specialist, at (505) 985-2292 x107 or at <a href="mailto:vcabrera@nmsu.edu">vcabrera@nmsu.edu</a></p>
7	NMSU Soil Test Interpretation Report Software	Microsoft Excel spreadsheet developed by New Mexico State University and NRCS to recommend nutrient application for crop production. This software is a requirement for both organic manure applications and inorganic fertilizer applications to apply the 590 Nutrient Management practice. This software requires soil values including salinity, pH, phosphorous, and potassium obtained from proper soil testing.	<p><a href="http://www.nm.nrcs.usda.gov/technical/water/nmafo.html">http://www.nm.nrcs.usda.gov/technical/water/nmafo.html</a></p>

**Table L-2. Description of software programs** *(continued)*

<b>Number</b>	<b>Software</b>	<b>Description</b>	<b>For more information</b>
8	North Carolina Nutrient Management Software	The North Carolina Nutrient Management Software is useful in writing commercial fertilizer and animal waste plans. It produces NMPs in the required format to meet state requirements for Waste Management Plans for animal operations.	Can be downloaded at <a href="http://www.soil.ncsu.edu/programs/nmp/ncnmwg/nmp/software.htm">http://www.soil.ncsu.edu/programs/nmp/ncnmwg/nmp/software.htm</a>  Vernon Cox at (919) 715-6109
9	NRCS Tool in South Dakota	South Dakota uses the NRCS Tool for developing an initial NMP, the NRCS Tool for annual NMP using the phosphorus assessment tool, and the DENR Tool for calculating manure application rates.	<a href="http://denr.sd.gov/des/sw/ManureNutrientManagementTools.aspx">http://denr.sd.gov/des/sw/ManureNutrientManagementTools.aspx</a>  Kent Woodmansey at (605) 773-3351
10	Nutrient Management for Maryland Version 3.0 (NuMan Pro 3.0)	NuMan Pro 3.0 is the most advanced Windows software available to complete Maryland NMPs. It is derived from the NuMan Reporter 2.0.	<a href="http://www.anmp.umd.edu/Software/index.cfm">http://www.anmp.umd.edu/Software/index.cfm</a>  Direct questions to <a href="http://www.anmp.umd.edu/About_NM/Staff.cfm">http://www.anmp.umd.edu/About_NM/Staff.cfm</a>
11	Nutrient Management Planner for Minnesota	Nutrient Management Planner Version 3.0 was developed by the University of Minnesota Extension Service and the USDA-NRCS. This planning aid will produce an MMP to meet MPCA requirements for most feedlots and NRCS requirements. It is designed to assist producers and agronomists plan and keep records of field-specific fertilizer and manure applications.  Specifically, it can develop annual field-specific NMPs for crop and livestock farms, create long-range strategic NMPs including CNMPs, and provide crop recommendations. The crop recommendations are consistent with the USDA-NRCS-Minnesota 590 Standard for nutrient management and are based on published information from the University of Minnesota Extension Service.	Requires Microsoft Access 2003 or Access 2007 and can be ordered from the University of Minnesota Extension at <a href="http://shop.extension.umn.edu">http://shop.extension.umn.edu</a>  Ann Lewandowski at UM Water Resources Center at <a href="mailto:alewand@umn.edu">alewand@umn.edu</a> or (612) 624-6765.
12	Nutrient Management Reporter Version 2.0 (NuMan Reporter 2.0)	NuMan Reporter 2.0 is a software program designed to help prepare the Maryland Department of Agriculture's Annual Implementation Report (AIR). The AIR describes the nutrient management activities that have been applied over the past year. NuMan Reporter 2.0 is not required to complete this report but facilitates the	<a href="http://www.anmp.umd.edu/Software/numanreporter_features.cfm">http://www.anmp.umd.edu/Software/numanreporter_features.cfm</a>  Contact the Agricultural Nutrient Management Program at (301) 405-1318.

**Table L-2. Description of software programs (continued)**

Number	Software	Description	For more information
12	Nutrient Management Reporter Version 2.0 (NuMan Reporter 2.0) <i>(continued)</i>	reporting process. NuMan Reporter 2.0 can also be used to generate other NMPs. This program is designed to summarize the number of acres, total amount of nutrients recommended as fertilizer, and the total amounts of organic material recommended on a crop code basis.	
13	Nutrient Utilization Plan Worksheet	Form with spreadsheets specific to swine and non-swine facilities to calculate elements required for the NMP.	<a href="http://www.kdheks.gov/feedlots/">http://www.kdheks.gov/feedlots/</a>
14	Ohio Crop Nutrient Management Software	<p>The Crop Nutrient Management software is a tool to help Ohio farmers develop a manure NMP. After soil and manure testing is performed to analyze nutrient availability, the software is used to determine the appropriate nutrient application for each field. The final development of a manure NMP can be done with the assistance of the local Soil and Water Conservation District and the soil conservationist.</p> <p>The software was developed by the Ohio State University Extension and is available at Ohio county Extension offices for a nominal charge.</p>	<p><a href="http://ohioline.osu.edu/agf-fact/0207.html">http://ohioline.osu.edu/agf-fact/0207.html</a></p> <p>For assistance, contact an Ohio county Extension agent or Soil and Water Conservation District technician</p>
15	Oregon OnePlan	<p>The Oregon OnePlan is nutrient management software developed jointly by the Idaho Department of Agriculture, the NRCS, EPA, USDA Agricultural Research Service, University of Idaho College of Agriculture and Marshall and Associates. The software is a modification of Idaho's OnePlan for use in Oregon. It is designed for developing CNMPs and for preparing Field Annual Nutrient Budgets.</p>	<p>At the time of publication, an active link to Oregon OnePlan was not available.</p> <p>Jennifer Zwicke, NRCS Oregon Environmental Engineer at (503) 414-3231 or <a href="mailto:Jennifer.Zwicke@or.usda.gov">Jennifer.Zwicke@or.usda.gov</a></p>
16	Penn State Nutrient Management Plan Spreadsheet	<p>The Penn State Nutrient Management Plan Spreadsheet is a tool designed to produce the necessary components of an NMP as required by Pennsylvania's Nutrient Management Act (Act 38, 2005) Program.</p>	<p><a href="http://panutrientmgmt.cas.psu.edu/main_planning_tools.htm">http://panutrientmgmt.cas.psu.edu/main_planning_tools.htm</a></p> <p>Jennifer Weld, Project Associate at Penn State University, at (570) 366-1558 or <a href="mailto:jlm23@psu.edu">jlm23@psu.edu</a></p>

**Table L-2. Description of software programs** *(continued)*

Number	Software	Description	For more information
17	SNAP-Plus Nutrient Management Software	SNAP-Plus is a Microsoft Windows-based program designed for preparing NMPs in accordance with Wisconsin's Nutrient Management Standard Code 590. It is a simple software program consisting of several models including nutrient management (SNAP), conservation assessment (RUSLE2), and the Wisconsin Phosphorus Index (PI) that is designed to make multiyear nutrient and conservation planning easier.	<a href="http://www.snapplus.net/">http://www.snapplus.net/</a> Sue Porter at (608) 224-4605 or <a href="mailto:Sue.Porter@wisconsin.gov">Sue.Porter@wisconsin.gov</a>
18	Texas Waste Utilization and Nutrient Management Plan Worksheet	The Texas Waste Utilization and Nutrient Management Plan Worksheet develops a plan that will meet the USDA-NRCS Nutrient Management (590) Standard and Waste Utilization (633) Standard for all types of livestock. The worksheet incorporates the animal waste spreadsheet for liquids, solids, biosolids, as well as both poultry-producer and non-producer spreadsheets. It also contains the Phosphorus Index spreadsheet used in Texas.	<a href="http://nmp.tamu.edu/">http://nmp.tamu.edu/</a>
19	Utah's Manure Actual Nutrient Content spreadsheet	No information found	

## Manure Management Planner (MMP)

The U.S. Environmental Protection Agency (EPA), in coordination with the U.S. Department of Agriculture (USDA), has worked on developing a planning tool that would generate a single document that meets the objectives of both agencies. The one document would include the required elements of an NMP and the elements of a voluntary comprehensive nutrient management plan (CNMP) developed in accordance with USDA technical guidance. A CNMP is a plan much like the NMP required by EPA's CAFO regulations. There are some minor differences between the scope of the two documents, such as a CNMP option to include feed management plans (which are not required for the NMP) and an NMP requirement to address chemical disposal (which is not part of a CNMP). However, the EPA and USDA agree that there is no reason why one document could not suffice for both the CNMP and NMP by accommodating both agencies' requirements. To that end, EPA and USDA have partnered to develop MMP, software that integrates both sets of planning requirements. Even though both agencies promote the use of a single tool, it remains the CAFO operator's responsibility to provide that information to the director to meet the requirements of the CAFO rule, because USDA does not make facility-specific information available to other agencies or the public. EPA encourages the use of MMP to facilitate the development and review of NMPs under the NPDES permit program.

The MMP software, developed under a grant from EPA and USDA to Purdue University, is a computer program that provides permitting authorities and producers with a mix of programs, not available elsewhere, to assist in CNMP and NMP development. The objective of the effort was to accelerate the CNMP and NMP development process by integrating other software used to calculate manure application rates. Among those tools are the revised universal soil loss equation (RUSLE2), the Phosphorus Index (PI), and other state-specific risk assessment tools used in CNMP and NMP development. MMP incorporates field-specific data tables that allow the producer to list the type of crops planned, crop rotation by planting season, nutrients available for each crop on the basis of previous manure applications and the rate of application per crop. MMP helps the user allocate manure (where, when, and how much) on a monthly basis for the length of the plan (1–10 years). That allocation process helps determine if the operation has sufficient crop acreage, seasonal land availability, manure storage capacity, and application equipment to manage the manure produced in an environmentally responsible manner. MMP is also useful for identifying changes that may be needed for a non-sustainable operation to become sustainable and determine what changes might be needed to keep an operation sustainable if the operation expands. MMP's data tables provide permitting authorities with specific information that can be extracted as terms of the NMP to be inserted into a permit.

Version 0.3.0.1 (October 11, 2010) of MMP supports 34 states (Alabama, Arkansas, California, Colorado, Delaware, Florida, Georgia, Iowa, Illinois, Indiana, Kansas, Kentucky, Massachusetts, Maryland, Michigan, Minnesota, Missouri, Mississippi, Montana, North Dakota, Nebraska, New Jersey, New Mexico, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Dakota, Tennessee, Utah, Vermont, Washington, and Wisconsin) and generates fertilizer recommendations based on each state's extension guidelines. The MMP software is available without charge. It is strictly a voluntary tool. There might be some situations at a livestock operation, such as varying terrains and unusual cropping sequences, that MMP cannot accommodate; thus the program might not be a good fit for all operators. Permitting authorities and producers can still choose to use established state NMP software to develop and implement their NMP. More information on MMP is at the Purdue University Web site, <http://www.agry.purdue.edu/mmp/>.