

**Technical Support Document for the Revisions to the National  
Pollutant Discharge Elimination System Regulations for  
Concentrated Animal Feeding Operations**

Christine Whitman  
Administrator

Tracy Mehan, III  
Assistant Administrator, Office of Water

James A. Hanlon  
Director, Office of Wastewater Management

Linda Boornazian  
Director, Water Permits Division

Jeff Lape  
Chief, Rural Branch

Virginia Kibler  
Project Manager

Water Permits Division  
Office of Wastewater Management  
U.S. Environmental Protection Agency  
Washington, D.C. 20460

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## ESTIMATION OF REGULATED OPERATIONS

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### 1.0 INTRODUCTION TO NPDES PROGRAM

Under the National Pollutant Discharge Elimination System (NPDES) permit program, all point sources that discharge pollutants to waters of the United States must apply for an NPDES permit and may discharge pollutants only under the terms of that permit. Such permits include nationally established technology-based effluent discharge limitations. In the absence of national effluent limitations, NPDES permit writers must establish technology-based limitations and standards on a case-by-case basis, based on the permit writer's best professional judgment.

In addition to the technology-based effluent limits, permits may also include water quality-based effluent limits where technology-based limits are not sufficient to ensure compliance with the water quality standards or to implement a Total Maximum Daily Load (TMDL). Permits may include specific BMPs to achieve effluent limitations, typically included as special conditions. In addition, NPDES permits normally include monitoring and reporting requirements, as well as standard conditions that apply to all permits (such as duty to properly operate and maintain equipment).

EPA's analysis of the final rule includes estimates of the incremental costs and benefits of changes in the NPDES permit regulations in 40 CFR 122. To obtain incremental values, EPA developed estimates of the number of regulated operations for a baseline compliance scenario and a compliance scenario based on the final rule. Section 9.1 describes how EPA derived baseline estimates. Section 9.2 provides the estimates of the number of operations affected under the final rule. Section 9.3 provides estimates of the new expenditures states are expected to incur when they implement the final rule.

### 1.1 Industry Baseline Compliance with 1976 Regulations

EPA promulgated the original NPDES regulations for CAFOs in 1976. For the purposes of this analysis, EPA assumes that all operations covered by the 1976 regulations are currently in compliance with the existing regulatory program. This assumption generates the baseline number of regulated operations estimated for the final rule.

More specifically, EPA assumes that all operations are fully complying with the existing regulations because they fall into one of two categories. The first category consists of those operations that are defined or designated as CAFOs and that have in fact obtained a permit. EPA assumes, for purposes of costing the new regulations, that these CAFOs are in full compliance with their existing permits. The second category consists of all of the other unpermitted AFOs. EPA assumes that these operations do not need a permit because they do not meet the definition

of a CAFO. For example, they might not meet the criteria for being defined as a Medium CAFO, or for Large CAFOs they might meet the criteria, but are excluded from the definition because they do not discharge except in the event of a 25-year, 24-hour storm. In reality, however, there are probably a number of unpermitted operations that are subject to the regulations and should have a permit (for example, they incorrectly claim they are a “no discharge” facility, as discussed in the preamble).

The following sections present EPA’s approach and assumptions for estimating the population of AFOs that are subject to permitting under the 1976 NPDES CAFO permitting regulations. The universe of AFOs and CAFOs is discussed by livestock category, size of operation, and production region. EPA’s assumptions about what is needed to comply with the current CAFO regulations are consistent with EPA’s views as stated in its 1995 CAFO guidance manual, *Guidance Manual on NPDES Regulations for Concentrated Animal Feeding Operations* (USEPA, 1995; USEPA, 1999).

### **1.1.1 Total Medium and Large Animal Feeding Operations**

EPA’s estimates of Large and Medium AFOs by livestock category are provided in Table 1-1. The breakdowns by size are based the following animal thresholds, which are from the 1976 NPDES CAFO regulation. The discussion in this section pertains to which operations in these categories are considered effectively regulated by the 1976 rule.

Large operations that stable or confine more than:

- 1,000 beef cattle
- 700 mature dairy
- 2,500 swine over 55 pounds
- 55,000 turkeys
- 500 horses
- 5,000 ducks
- 30,000 laying hens or broilers using liquid manure systems.

Medium operations that stable or confine:

- 300 to 1,000 beef cattle
- 200 to 700 mature dairy
- 750 to 2,500 swine over 55 pounds
- 16,500 to 55,000 turkeys
- 150 to 500 horses
- 1,500 to 5,000 ducks
- 9,000 to 30,000 laying hens or broilers using liquid manure systems.

AFO estimates for additional animal categories that will be regulated under the final rule have also been included in Table 1-1 to provide a summary of all Medium and Large AFOs potentially regulated as CAFOs. In addition to breakdowns by livestock or poultry category and facility size, Table 1-1 shows that the primary livestock or poultry sectors have been divided into

five production regions consistent with development of the Cost Models. The designation and use of production regions allows for the aggregation of critical data on the number of facilities, production quantities, and financial conditions, which might otherwise not be possible because of concerns about disclosure.<sup>1</sup> The facilities listed below as medium AFOs include all AFOs in that size range and are not limited to those facilities that may be defined or designated under current conditions or the final rule.

**Table 1-1. Total 1997 Facilities with Confined Animal Inventories by Livestock or Poultry Sector, Operation Size, and Region.**

<b>Sector</b>	<b>Region</b>	<b>Medium Operations</b>	<b>Large Operations</b>
<b>Beef</b>	Central	326	557
	Mid-Atlantic	100	11
	Midwest	2,198	1,124
	Pacific	44	74
	South	14	0
	Total	2,682	1,766
<b>Dairy</b>	Central	1,034	401
	Mid-Atlantic	1,407	103
	Midwest	1,503	96
	Pacific	1,406	759
	South	430	91
	Total	5,780	1,450
<b>Swine</b>	Central	153	82
	Mid-Atlantic	905	1,220
	Midwest	8,484	2,431
	Pacific	31	15
	South	328	176
	Total	9,901	<b>3,924</b>

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<sup>1</sup> For example, USDA Census of Agriculture data are not typically released unless there is a sufficient number of observations to ensure confidentiality. Consequently, if data were aggregated on a state basis (instead of a regional basis), many key data points needed to describe the industry segments would be unavailable.

**Table 1-1 (continued). Total 1997 Facilities with Confined Animal Inventories by Livestock or Poultry Sector, Operation Size, and Region.**

<b>Sector</b>	<b>Region</b>	<b>Medium Operations</b>	<b>Large Operations</b>
<b>Layer</b>	Central	301	143
	Mid-Atlantic	394	211
	Midwest	346	312
	Pacific	110	125
	South	819	321
	<b>Total</b>	<b>1,970</b>	<b>1,112</b>
<b>Broiler</b>	Central	694	164
	Mid-Atlantic	2,892	413
	Midwest	411	56
	Pacific	184	15
	South	6,221	984
	<b>Total</b>	<b>10,402</b>	<b>1,632</b>
<b>Turkey</b>	Central	67	36
	Mid-Atlantic	692	88
	Midwest	574	149
	Pacific	110	45
	South	172	70
	<b>Total</b>	<b>1,615</b>	<b>388</b>
<b>Heifers<sup>1</sup></b>	Central	195	145
	Mid-Atlantic	0	0
	Midwest	395	0
	Pacific	134	97
	South	0	0
	<b>Total</b>	<b>724</b>	<b>242</b>
<b>Veal<sup>1</sup></b>	Central	3	0
	Mid-Atlantic	1	0
	Midwest	53	12
	Pacific	0	0
	South	0	0
	<b>Total</b>	<b>57</b>	<b>12</b>
<b>Horses</b>	<b>Total</b>	<b>1,123</b>	<b>195</b>
<b>Ducks</b>	<b>Total</b>	<b>71</b>	<b>21</b>
<b>Grand Total</b>		<b>34,325</b>	<b>10,742</b>

<sup>1</sup>New livestock category in the final rule.



### **1.1.2 Baseline Compliance Estimates**

The following subsections describe the livestock or poultry categories that EPA assumes are in full compliance with current NPDES regulations for CAFOs. In general, the large operations shown in Table 1-1 are currently defined as CAFOs, unless they are exempt because they have no discharges except in the event of a 25-year, 24-hour storm. Therefore, subsequent estimates of large operations currently in compliance include the large AFOs shown in Table 1-1. The exception for large layer and broiler operations is discussed below. The medium operations in Table 1-1 may be defined as CAFOs if either of the following conditions apply:

- Pollutants are discharged into navigable waters through a man-made ditch, flushing system, or other similar man-made device (the “MMD discharge” condition).
- Pollutants are discharged directly into waters of the United States, which originate outside of and pass over, across, or through the facility, or otherwise come into direct contact with the animals confined in the operation (the “direct contact” condition).

The number of medium operations meeting either condition is not known with any great degree of certainty. EPA derived estimates of the medium livestock operations that might meet either condition based on the best available information from USDA Extension personnel, state water quality staff, industry representatives, and other stakeholders, and BPJ judgement. The estimates are generally based on best estimates of the share of operations that might meet at least one condition. EPA multiplied these percentages by the estimate of total medium operations to derive the number of CAFOs for the medium category. In some instances, information supported different percentages across regions. The following sections provide EPA’s estimates of the number of medium CAFOs under current regulations.

#### ***1.1.2.1 Beef***

The beef industry is concentrated in the Midwest Region. The second largest production area is the Central Region.

EPA’s estimates of the number of medium-size beef AFOs with a direct discharge or stream running through part of the production area were developed through various contacts with state agricultural and environmental personnel and USDA contacts. There are very limited data addressing these criteria, and opinions vary even within production regions. Information obtained from key states in each region indicates that the share of AFOs potentially meeting either criterion ranges from approximately 3 percent (Funk, 2002) to less than 6 percent in the Midwest (Lawrence, 2002). The share is less than 10 percent in the Central and Pacific Regions (Johnson, 2002), and close to 0 percent in the Mid-Atlantic and South Regions (Kniffen, 2002; Sadler, 2002). Using conservative values to account for some uncertainty regarding conditions in other states, EPA assumed that 6 percent of Medium AFOs in the Midwest Region would meet the CAFO definition and that 10 percent would meet it in the Central and Pacific Regions. The assumption for the Mid-Atlantic and South should be close to zero, but EPA assumed a nonzero value to allow for the possibility of some Medium CAFOs in the states not contacted. There are 114 Medium AFOs in these regions and EPA assumed that 4 percent of regional AFOs would

meet the CAFO definition, which generates approximately 5 CAFOs throughout both regions. Table 1-2 reports the number of Medium CAFOs that EPA estimates may be defined as CAFOs under the 1976 NPDES CAFO regulations, by region, based on these assumptions.

**Table 1-2. Regulated Beef Feeding Operations by Size Category Assuming Full Compliance.**

<b>Region</b>	<b>Total</b>	<b>Medium Facilities</b>	<b>Large Facilities</b>
Central	590	33	557
Mid-Atlantic	15	4	11
Midwest	1,255	131	1,124
Pacific	79	5	74
South	1	1	0
Total	1,940	174	1,766

### ***1.1.2.2 Dairy***

Compared to other livestock categories, dairies are relatively evenly distributed across all regions except the South. The large dairies tend to be concentrated in the Central and Pacific Regions, while the Midwest and Mid-Atlantic have the most medium dairies. Many of these dairies were designed and built on or near waters of the United States and, therefore, have direct contact. Others have some type of MMD discharge. Estimates for the percentage of dairies in the Midwest Region with direct contact or MMD discharge have a large range. Bickert (1999) estimated less than 10 for each criteria and Groves (1999) estimated a range of 25 percent to 75 percent for the direct contact criterion and almost zero percent for the MMD discharge. Holmes (1999) estimated that 15 percent of operations would have direct contact and 40 to 50 percent would have an MMD discharge. EPA assumed that, on average, 45 percent for the medium-size dairies throughout the Midwest would meet either criterion. This estimate places greater weight on the estimates of Holmes (<20 percent across criteria) and Bickert (55 to 65 percent across criteria). EPA assumed a slightly higher percentage of 55 percent for the Mid-Atlantic to reflect a higher propensity for direct contact in that region. According to Johnson (1999), less than 10 percent of medium-size operations in California will have either direct contact or an MMD discharge. EPA assumed that 10 percent of operations throughout the Pacific Region would be defined CAFOs. EPA assumed that the CAFO share in the Central Region is 20 percent, and 35 percent in the South. These are BPJ estimates based on the belief that operations in these regions are less likely than Midwest operations to meet either criterion, but more likely than Pacific Region operations.

Table 1-3 reports EPA's estimates of medium dairy CAFOs. Nationwide, approximately one-third of all medium operations are defined as CAFOs. Table 1-3 also shows that all large operations should be effectively regulated by the existing requirements either because they have

a discharge permit or because they have no discharge except in the event of the 25-year, 24-hour storm event.

**Table 1-3. Regulated Dairy Feeding Operations  
by Size Category Assuming Full Compliance.**

<b>Region</b>	<b>Total</b>	<b>Medium Facilities</b>	<b>Large Facilities</b>
Central	608	207	401
Mid-Atlantic	877	774	103
Midwest	773	677	96
Pacific	900	141	759
South	241	150	91
Total	3,399	1,949	1,450

### **1.1.2.3 Swine**

The swine industry is heavily concentrated in the Midwest. This is particularly true for medium-size operations. The Mid-Atlantic is the second largest production region, followed by the South Region.

Table 1-4 shows that all large swine AFOs are assumed to be effectively regulated under the 1976 NPDES CAFO regulations because they are either permitted or exempt because they have no discharges except in the event of a 25-year, 24-hour storm. Based on contacts with USDA Extension personnel, EPA assumes that approximately 15 percent of facilities in this size category (across all regions) have direct contact or use an MMD (Greenless, et al., 1999; Steinhart, 1999).

**Table 1-4. Regulated Swine Operations  
by Size Category Assuming Full Compliance.**

<b>Region</b>	<b>Total</b>	<b>Medium Operations</b>	<b>Large Operations</b>
Central	105	23	82
Mid-Atlantic	1,355	135	1,220
Midwest	3,704	1,273	2,431
Pacific	20	5	15
South	225	49	176
Total	5,409	1,485	3,924

#### ***1.1.2.4 Layers***

Under the 1976 NPDES CAFO regulations, a layer operation is defined as a large CAFO if it confines more than 30,000 birds and uses a wet manure management system, or if it maintains more than 100,000 birds using continuous overflow watering and has the potential to discharge pollutants to waters of the U.S. EPA recognizes that continuous overflow watering is an outdated technology that has fallen out of favor in the layer industry. Therefore, EPA's estimates of the effectively regulated baseline large CAFO operations is based on those that use a wet manure management system.

The estimates of large layer CAFOs include operations with actual wet manure-handling systems and operations that create a crude wet manure-handling system. Currently, as many as 60 percent of the operations in the South and Central Regions use a wet manure-handling system, whereas only 0 to 5 percent of the operations use a wet system in the other regions.

As noted in EPA's 1995 permitting guidance, dry poultry operations are subject to the NPDES regulations if they establish a "crude liquid manure system" by stacking manure or litter in an outside area unprotected from rainfall and runoff. Including these operations as defined large CAFOs brings the total for the South and Central Regions to approximately 70 percent of large operations and approximately 7 percent of operations in other regions. These additions based on storage practices are based on conversations with industry personnel, who indicate that layer operations generally have long-term (> 6 months) storage, after which the manure is either sold or land applied (Funk, 1999; Jacobson, 1999; Patterson, 1999; Thomas, 1999; Tyson, 1999; York, 2000). The large CAFO estimates in Table 1-5 reflect the number of operations having either type of wet manure system.

For medium-size operations, either the MMD discharge or the direct contact condition must apply for operations that either have a wet manure-handling system or create a crude one. The regulated medium-size layer operations in Table 1-5 reflect combined estimates for both types of operations.

For operations with wet manure-handling systems, EPA obtained estimates from experts in the five states that have the largest regional shares of operations. These estimates indicate that the CAFO conditions are rarely met, bordering on 0 percent of operations in any region (Carey, 2002; Ramsey, 2002; Parsons, 2002; Hopkins, 2002; Johnson, 2002, Earnst, 2002, and Solainian, 2002). EPA derived a share estimate by assuming a worst-case average of two CAFOs per state, the total of 10 CAFOs equals approximately 3 percent of the 349 Medium AFOs in these states. Applying this percentage to all medium-sized wet layer AFOs generates a total CAFO estimate of 24.

Similarly, experts for key states in the Central, Mid-Atlantic, Midwest, and South Regions indicated that very few, if any, medium-sized dry operations stored manure outside of the production houses in a manner that might meet either of the CAFO conditions (Carey, 2002; Ramsey, 2002; Parsons, 2002; Hopkins, 2002; Jones, 2002; and Solainian, 2002). Rather than assume there are no Medium CAFOs in these regions, EPA derived a share estimate by assuming

that an average of two operations per state stored manure outside (i.e., eight total in the four states) and in all cases the practice led to either a direct contact condition or an MMD condition. The resulting number of CAFOs accounts for 2 percent of medium-sized AFOs in these states. EPA applied this percentage to all AFOs in these regions. EPA used a slightly higher estimate of 5 percent for the Pacific Region based on information provided by Johnson (2002) and Earnst (2002). These assumptions generate a total of 26 Medium CAFO operations.

**Table 1-5. Regulated Layer Operations  
by Size Category Assuming Full Compliance.**

<b>Region</b>	<b>Total</b>	<b>Medium Operations</b>	<b>Large Operations</b>
Central	107	8	99
Mid-Atlantic	26	8	18
Midwest	28	7	21
Pacific	13	5	8
South	259	22	237
<b>Total</b>	<b>433</b>	<b>50</b>	<b>383</b>

**1.1.2.5 Broilers**

Under the 1976 NPDES CAFO regulations, broiler operations with more than 30,000 birds are defined as CAFOs only if they use a liquid manure-handling system; operations with 9,000 to 30,000 birds and a liquid manure-handling system would also need to meet either the MMD discharge or the direct contact condition to be defined a CAFO. Because few, if any, broiler operations use a liquid manure-handling system, the only way by which a broiler operation is defined as a CAFO currently is if, through its manure-handling practices, it creates a form of liquid manure-handling system (Carey, 1999). As noted, dry poultry operations may establish a “crude liquid manure system” by stacking litter in an outside area unprotected from rainfall or runoff. This analysis assumes that at most 10 percent of the large broiler operations and 5 percent of the medium operations stack litter temporarily, in a manner consistent with EPA’s interpretation of a liquid manure handling system and, therefore, would be defined as CAFOs (York, 2000). Furthermore, EPA assumed that no broiler operations would otherwise have direct contact with waters of the U.S. (WOUS) or an MMD based on information provided by regional experts (Carey, 1999; Gale, 1999; Lory, 1999; Patterson, 1999; Thomas, 1999; Tyson, 1999). Table 1-6 presents regulated broiler operation numbers.

**Table 1-6. Regulated Broiler Operations  
by Size Category Assuming Full Compliance.**

<b>Region</b>	<b>Total</b>	<b>Medium Operations</b>	<b>Large Operations</b>
Central	51	35	16
Mid-Atlantic	186	145	41
Midwest	26	20	6
Pacific	11	9	2
South	409	311	98
<b>Total</b>	<b>683</b>	<b>520</b>	<b>163</b>

**1.1.2.6 Turkeys**

EPA assumes turkey operations with more than 55,000 birds (1,000 AUs) are in compliance, being either permitted or exempt because they have no discharges except in the event of a 25-year, 24-hour storm. The only other turkey AFOs subject to the NPDES program are those having between 16,500 and 50,000 birds and an MMD discharge; no operations meet the direct contact conditions. Because virtually all turkey operations use dry litter systems (Battaglia, 1999; Carey, 1999; Jones, 1999), the only that have the potential to discharge are those operations that have established a crude liquid manure system through the use of waste management practices that allow contact between manure and rainwater. EPA assumed that 5 percent of the medium operations in the South Region and 2 percent in the other regions have established crude liquid systems. Table 1-7 presents the number of turkey feeding operations in full compliance by region and size.

**Table 1-7. Regulated Turkey Operations  
by Size Category Assuming Full Compliance.**

<b>Region</b>	<b>Total</b>	<b>Medium CAFOs</b>	<b>Large CAFOs</b>
Central	38	2	36
Mid-Atlantic	102	14	88
Midwest	160	11	149
Pacific	47	2	45
South	78	8	70
<b>Total</b>	<b>425</b>	<b>37</b>	<b>388</b>

### *1.1.2.7 Designated Operations*

A medium facility that is not defined a CAFO may be designated a CAFO under the 1976 NPDES CAFO regulations if a permit authority determines that it is a significant contributor of pollutants to waters of the United States. A small facility can be designated a CAFO only if pollutants are discharged into navigable waters through a man-made ditch, flushing system or other similar man-made device, or pollutants are discharged directly into WOUS that originate outside of and pass over, across, or through the facility, or otherwise come into direct contact with the animals confined in the operation.

EPA has historically made very limited use of the designation provisions of the NPDES CAFO regulation that was promulgated in 1976. It is understood that only a few operations have been designated CAFOs over a 25-year span of existing NPDES CAFO regulations. Because the final rule does not alter the conditions for designation, EPA assumes that designation will continue to occur in a limited number of cases where an AFO does not meet the regulatory definition of a CAFO, but is determined to be a significant contributor of pollutants to WOUS based on site-specific conditions.

EPA does not possess any location-specific information regarding which AFOs may meet the conditions for designation. Furthermore, EPA expects that many of these operations that have conditions that might make them candidates for designation would be able to seek out technical assistance through voluntary programs to alter those conditions and avoid designation. These two factors make estimating future designations difficult, but the ability to prevent being designated a CAFO should minimize the number of designations.

Based on the limited use of this provision under the current regulation and the ability of operators to address conditions that might lead to designation, EPA assumed no more than 0.5 percent of all medium AFOs would be designated CAFOs. Table 1-8 shows the estimates of designated Medium CAFOs under the current rule by sector.

Designation would in almost all cases be the tool of last resort to address small operations that are found to be significant contributors of pollutants. Most, if not all, of these operations would be able to avoid designation through technical assistance offered by USDA and other voluntary programs. Although a lack of empirical data regarding discharge conditions at small operations makes it difficult to derive designation estimates, EPA believes designation of Small CAFOs will occur in only a very limited number of cases, if at all. Given this, EPA assumed a very small number of designations be assigned to each sector for the purposes of estimating cost and burdens for the final rule.

**Table 1-8. Estimated Small and Medium Designated CAFOs  
over a 5-Year Period by Sector.**

Sector	Medium Designated CAFOs	Small Designated CAFOs
Beef	13	2
Dairy	28	2
Swine	50	2
Layer	8	2
Broiler	50	2
Turkey	8	2
Heifers	3	0
<b>Total</b>	160	12

**1.1.2.8 Summary of Baseline Compliance Estimates by Size and Type**

The estimated number of regulated AFOs based on an assumption of full compliance with the existing regulations is presented in Table 1-9. The estimates include the large and medium beef, dairy, swine, broiler, layer, and turkey operations that are CAFOs by definition or that meet the 25-year, 24-hour storm exemption and the medium-size operations that potentially meet either the MMD discharge or the direct contact condition. The estimates also include the 195 horse operations that have 500 or more horses and, therefore, meet the definition of a large CAFO, and 157 large duck operations that meet current CAFO definitions. The horse CAFOs comprise 50 farms, 45 racetracks, and 100 fairgrounds (Tetra Tech, 2002). EPA does not have information to indicate that any of the 1,123 medium horse AFOs will meet either condition to be CAFOs by definition, and EPA does not expect any medium or small horse AFOs to be designated CAFOs. For ducks, EPA assumed that all facilities greater than 5,000 head were either permitted or claimed the storage exemption. EPA assumed no duck operations in the medium category met the current definition of a CAFO. Finally, the estimates in Table 1-9 include the medium and small designated CAFOs.

**Table 1-9. Summary of Effectively Regulated  
Operations by Size and Livestock Sector.**

Livestock Category	Total	Defined CAFOs		Designated CAFOs	
		Medium CAFOs	Large CAFOs <sup>1</sup>	Medium	Small
Beef	1,955	174	1,766	13	2
Dairy	3,429	1,949	1,450	28	2
Swine	5,461	1,485	3,924	50	2
Layer	443	50	383	8	2
Broiler	735	520	163	50	2



Turkey	435	37	388	8	2
Horse	195	0	195	0	0
Duck	157	0	157	0	0
Heifers	3	0	0	3	0
Total	12,813	4,215	8,426	160	12

<sup>1</sup>Includes permitted CAFOs and Large AFOs that are in current compliance because they do not discharge except in the instance of the 25-year, 24-hour storm event.

This summary of animal operations that should currently have NPDES permits does not correspond with the number of NPDES permits issued to date. Most sources place the estimate of the number of operations covered by NPDES permits at approximately 4,100 (SAIC, 1999).

There are two main reasons for the large disparity between these numbers. First, many of the large operations opt out of the NPDES program because they claim they do not discharge except in the event of a 25-year, 24-hour storm. Second, many authorized states have declined to issue NPDES permits for CAFOs, relying instead on regulatory mechanisms other than the NPDES program to regulate CAFOs.

## **1.2 Affected Entities under the Final Rule**

The final rule will increase the number of regulated operations as well as the number of operations needing to obtain an NPDES permit, which will include newly covered operations and large operations currently claiming the storm exemption. It will also affect the permit requirements of facilities already operating under permit coverage.

### **1.2.1 Final Rule Provisions that Affect the Number of Regulated Operations**

EPA estimates that the final rule increases the potential number of regulated entities by about 2,500 facilities. These facilities are predominantly large, dry poultry operations. Operations that confine immature animals are the second largest component of change. EPA assumes that the number designated under the 1976 rule, assuming full compliance, will be same as the number designated under the final rule. The new sectors and size threshold changes in the final rule that affect the number of regulated operations are:

Large operations that stable or confine:

- 1,000 heifers
- 1,000 veal
- 10,000 small swine under 55 pounds
- 82,000 layers using other than a liquid manure-handling system
- 125,000 broilers using other than a liquid manure handling system
- 30,000 ducks (dry operations)

Medium operations that stable or confine:

- 300 to 1,000 heifers
- 300 to 1,000 veal
- 3,000 to 10,000 small swine under 55 pounds
- 25,000 to 82,000 layers using other than a liquid manure-handling system
- 37,500 to 125,000 broilers using other than a liquid manure-handling system
- 10,000 to 30,000 ducks (dry operations).

In addition, the following revisions to 40 CFR 122 in the final rule may affect currently and newly regulated operations:

- Clarify the definition of an AFO
- Eliminate the 25-yr, 24-hr storm exemption
- Implement duty-to-apply requirement
- Eliminate the mixed animal multiplier
- Include facility closure requirements.

### **1.2.2 Number of Operations Required to Apply for Permit**

The primary impact on the number of NDPES permits issued to CAFOs will come from the addition of dry poultry operations; stand-alone, immature animal operations; and operations previously exempt due to the 25-yr, 24-hr storm provision. As a result of removing the storm exemption, all of the large beef, dairy, swine, wet layer, turkey, and horse AFOs reported in Section 9.1 are considered CAFOs and will need to obtain a permit except in cases where the permitting authority makes a determination that there is no potential to discharge. Table 1-10 provides a summary of the total expected permitted facilities by sector based on the final rule. Many of the estimates are the same as those in Table 1-9. Additions are explained below.

The inclusion of all poultry operations, regardless of manure handling system, brings in all large broiler and dry layer feeding operations. The number of large broiler CAFOs increases from 163 to 1,632. The medium broiler CAFO estimate is unchanged from the baseline estimate because the dry operations that met the medium CAFO conditions before will continue to meet those conditions. Similarly, the number of large layer CAFOs increases from 383 to 1,112, but the Medium CAFO estimates are unchanged because the conditions that define CAFOs in this size category have not changed.

The thresholds for duck operations with dry manure-handling systems were changed from 5,000 to 30,000 ducks for large operations, and from 1,500 to 10,000 ducks for medium operations. These changes were based on data EPA received from Purdue University, The Indiana Poultry Association, and duck producers. The threshold for duck operations with wet manure-handling systems is has not changed and remains 5,000 ducks for large operations and 1,500 ducks for medium operations. Because almost all operations use dry manure-handling systems, the number of large duck CAFOs under the revised size thresholds of the final rule is 21. EPA assumed that the share of medium dry duck operations that meet either the MMD discharge or direct contact condition is the same as the broiler share. Thus, there are four Medium duck CAFOs.

Finally, final rule provisions for stand-alone, immature animal operations adds 488 newly regulated large and medium operations. The Large CAFOs comprise 242 heifer operations and 12 veal operations. EPA assumes that the incidence of medium-sized veal and heifer CAFOs would be the same as the regional percentages in the baseline descriptions for beef and dairy, respectively. These assumptions add 230 medium heifer CAFOs and four medium veal CAFOs to the estimate of regulated operations under the final rule.

**Table 1-10. Summary of CAFOs by Livestock Sector and Region  
Required to Apply for Permit.**

Livestock Category	Total	Defined CAFOs		Designated CAFOs	
		Medium CAFOs	Large CAFOs	Medium	Small
Beef	1,955	174	1,766	13	2
Dairy	3,429	1,949	1,450	28	2
Swine	5,461	1,485	3,924	50	2
Layer	1,172	50	1,112	8	2
Broiler	2,204	520	1,632	50	2
Turkey	435	37	388	8	2
Heifers	475	230	242	3	0
Veal	16	4	12	0	0
Horse	195	0	195	0	0
Duck	25	4	21	0	0
Total	15,367	4,453	10,742	160	12

### 1.3 References

- Battaglia, R. 1999. Department of Animal and Veterinary Science, University of Idaho. Personal communication on April 6 with R. Johnson, DPRA, Alexandria, Virginia.
- Bickert, W. 1999. Dairy Housing Extension Specialist, Michigan State University. Personal communication on May 18 with R. Johnson, DPRA, Alexandria, Virginia.
- Carey, J.B. 2002 . Texas A&M, Poultry Science Department. Personal communication on October 18 with S. Ragland, SAIC, Lakewood, Colorado.
- Carey, J.B. 1999. Swine and Poultry Survey. E-mail message on April 16 to DPRA, Arlington, Virginia.
- Earnst, R. 2002. Poultry Specialist, University of California Davis. Personal communication on October 15 with T. Doley, SAIC, Reston, Virginia.
- Funk, T. 2002. Agricultural Engineer and Extension Specialist, University of Illinois. Personal communication on October 15 with T. Doley, SAIC, Reston, Virginia.
- Funk, T. 1999. FYI. E-mail message on November 23 to DPRA, Arlington, Virginia.
- Gale, J.A. 1999. UT—response. E-mail message on May 5 to DPRA, Arlington, Virginia.
- Greenless, W., et al. 1999. Completed Survey—Iowa. E-mail message on April 27 to DPRA, Alexandria, Virginia.
- Groves, R. 1999. Penn State University Dairy Extension. Personal communication on May 14 via E-mail message to R. Johnson, DPRA, Arlington, Virginia.
- Holmes, B. 1999. Farm Structures Extension Specialist, University of Wisconsin Extension. Personal communication on May 14 with R. Johnson, DPRA, Arlington, Virginia.
- Hopkins, O. 2002. Missouri Department of Natural Resources, Water Pollution Control Program. Personal communication on October 18 with T. Doley, SAIC, Reston, Virginia.
- Jacobson, L.D. 1999. Survey Response—MN. E-mail message on April 14 to DPRA, Arlington, Virginia.
- Johnson, D. 2002. California NRCS, Eng. Section. Personal communication on October 15 with T. Doley, SAIC, Reston, Virginia.
- Johnson, D. 1999. Responses from Calif. regarding dairies and water. E-mail message on May 17 to DPRA, Arlington, Virginia.

- Jones, D. 1999. Department of Agricultural & Bio Engineering, Purdue University. Personal communication on April 25 with R. Johnson, DPRA, Alexandria, Virginia.
- Jones, D. 2002. Department of Agricultural & Bio Engineering, Purdue University. Personal communication on October 18 with T. Doley, SAIC, Reston, Virginia.
- Kniffen, D. 2002. Extension Agent, Pennsylvania State University. Personal communication on October 18 with T. Doley, SAIC, Reston, Virginia.
- Lawrence, J. 2002. Director of Beef Center, Iowa State University. Personal communication on October 18 with T. Doley, SAIC, Reston, Virginia.
- Lory, J.A. 1999. Feeding Operations. E-mail message on April 16 to DPRA, Arlington, Virginia.
- Parsons, G. 2002. Inspector, Missouri Department of Natural Resources. Personal communication on October 17 with S. Ragland, SAIC, Lakewood, Colorado.
- Patterson, P. 1999. Penn State Poultry Science Dept. Personal communication on November 11 with J. DeSantis, DPRA, Arlington, Virginia.
- Ramsey, D. 2002. Division of Water Quality, North Carolina Division of Environmental Management. Personal communication on October 15 with T. Doley, SAIC, Reston, Virginia.
- Sadler, M. 2002. South Carolina Bureau of Water - Industrial Permits Division. Personal communication on October 14 with T. Doley, SAIC, Reston, Virginia.
- Science Applications International Corp. (SAIC). 1999. Aggregated ARMS financial data received by USDA, ERS, and spreadsheet versions of files converted by M. Beljak. May 7.
- Solainian, J. 2002. Arkansas Department of Environmental Quality. Personal communication on October 16 with T. Doley, SAIC, Reston, Virginia.
- Steinhart, T. 1999. Answers to recent questions—Iowa. E-mail message on April 15 to DPRA. Arlington, Virginia.
- Tetra Tech. 2002. Methodology for determining the potential number of duck and horse CAFOs in the United States. Memorandum on July 3 to C. White and G. Kibler, U.S. Environmental Protection Agency from B. Kurapatskie and G. Mallon.
- Thomas, J. 1999. Completed Survey—MS. E-mail message on April 15 to DPRA, Arlington, Virginia.

Tyson, T.W. 1999. Survey response—Alabama. E-mail message on April 22 to DPRA, Arlington, Virginia.

U.S. Environmental Protection Agency (US EPA). 1999. *State Compendium: Programs and Regulatory Activities Related to Animal Feeding Operations*. U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (US EPA). 1995. *Guidance Manual on NPDES Regulations for Concentrated Animal Feeding Operations*. EPA 833-B-95-001. U.S. Environmental Protection Agency, Washington, D.C.

York, K. 2000. Soil & Water Division, Smithville USDA Service Center. Personal communication on March 2 with J. Blair, DPRA, Arlington, Virginia.

# ESTIMATION OF STATE COSTS

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## 2.0 INTRODUCTION TO NPDES PROGRAM

This section provides EPA’s estimates of the new expenditures States are expected to incur when they implement the final rule. These administrative expenditures are based primarily on estimates of the amount of labor time needed to incorporate new regulatory requirements into existing State NPDES programs and to administer CAFO permits on an annual basis. EPA obtained the labor burden estimates used in this analysis from various sources including communications with staff at EPA regional offices and a small sample of State agencies, previous NPDES-related cost and burden analyses, and comments on the proposed rule. Then EPA asked State agency and EPA regional staff to evaluate whether those estimates were appropriate for administering NPDES permits for CAFOs.

EPA’s cost analysis presumes that States issue fewer than 100 percent of the permits because EPA has responsibility for issuing permits in States that do not have approved NPDES programs. For informational purposes, this section will also show cost estimates pertaining to EPA’s portion of the NPDES permits for CAFOs.

EPA estimated administrative costs for States with approved NPDES programs (hereafter “approved States”) for four categories of activities:

- NPDES rule modification
- NPDES program modification request
- implementation for general permits
- implementation for individual permits.

### 2.1 Rule Modification and Request

Rule modification is a one-time activity in which approved States modify their NPDES programs to incorporate the new requirements contained in the final rule. EPA received substantial comment in this area at proposal and believes that this analysis fully recognizes the types of activities that would be required and their associated burden. Specific actions will vary across States because CAFO permitting practices vary widely. Forty-three States have approved

NPDES base programs through which CAFO permits can be issued.<sup>2</sup> EPA's State Compendium (2001) demonstrates that State permitting programs for CAFOs vary substantially. Some State programs utilize a combination of NPDES and non-NPDES permits while others issue only one or the other type of permit to CAFOs.

Rule modification may involve a variety of activities such as reviewing the final rule requirements, revising regulatory or statutory language, conducting public outreach to solicit inputs or make the public aware of program changes, conducting formal public notification hearings to solicit comments on draft changes, and finalizing and publishing regulatory statutory revisions. For some approved States, rule modification may be as simple as incorporating the final rule by reference. For others, regulatory changes may require a lengthy stakeholder process or changes to state statutes.

Information provided by State agencies suggests that the labor hours required to develop or modify regulations may range from 0.10 full time equivalents (FTEs) to 1.57 FTEs.<sup>3</sup> Hammerberg (2002) indicated that Maryland completes approximately two major rules and several minor rules per year with a staff of three, which suggests a range of 0.25 to 1.0 FTEs per rule depending on the level of complexity. Consistent with the lower end of this range, Allen (2002) agreed with a midpoint estimate of 750 hours or 0.36 FTEs and Coats (2002) provided an estimate of 500 hours or 0.20 FTEs for States in EPA Region 2. At the high end, Sylvester (2002) estimated that a final rule similar to the proposed rule would require 1.57 FTEs to implement in Wisconsin, with approximately one-third of the time devoted to initial drafting, one-third to hearings, and one-third to responding to comments and finalizing the rule. EPA believes that the final CAFO rule is less complex than the proposed rule and most States are not likely to require this level of effort to implement rule revisions. In particular, the final rule will not change the definition of a medium-size CAFO or the designation criteria for small CAFOs, and it will not require the ELG be applied to medium-size CAFOs. Also, it will not require CAFOs to have certified permit NMPs or that those plans be submitted to permitting authorities along with permit applications. Therefore, EPA placed greater weight on the Maryland and EPA Region 2 estimates than the Wisconsin estimate to derive a weighted average of 0.41 FTEs or approximately 850 hours ( $0.45 \times 0.20 \text{ FTE} + 0.45 \times 0.36 \text{ FTE} + 0.10 \times 1.57 \text{ FTE}$ ).

Following rule development, the approved States will need to request EPA approval for the modifications made to their NPDES programs in response to the final rule. These applications consist of a narrative program description including enforcement and compliance plans; a legal certification that the State has authority to implement the program (Attorney General's statement); a compilation of relevant statutes, regulations, guidance, and tribal agreements; and copies of permit application forms, permit forms and reporting forms. In general, the amount of

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<sup>2</sup> Six States—Alaska, Arizona, Idaho, Massachusetts, New Hampshire, and New Mexico—do not have approved NPDES programs. A seventh state, Oklahoma, has an approved base program, but is not authorized to administer the CAFO portion of the NPDES program; EPA Region 6 has responsibility for CAFO permits.

<sup>3</sup> One FTE is equivalent to 2,080 hours.



labor time required to prepare the application will vary. EPA’s labor hour estimate is based on program modification and approval burdens in an active NPDES ICR (“NPDES and Sewage Sludge Management State Program Requirements,” OMB NO. 2040-0057, EPA ICR 0168.07), which estimates 250 hours per State to prepare and submit a request for NPDES Program Modification under 40 C.F.R. Part 123.62. Allen (2002) and Sylvester (2002) concurred with this estimate, but Coats (2002) noted that 80 hours might be sufficient.

Table 2-1 summarizes EPA’s labor assumptions for these one-time costs and provides unit expenditure estimates based on an hourly loaded wage rate of \$29.78 (in 2001 dollars).<sup>4</sup>

**Table 2-1. State Administrative Costs for Rule Development and NPDES Program Modification Requests.**  
(costs in 2001 dollars)

Administrative Activity	Unit Hours	Labor Cost	O&M Cost <sup>1</sup>
<b>State Administrative Costs</b>			
Rule Development	850 per State	\$25,310	\$2,120
NPDES Program Modification Requests	250 per State	\$7,450	
<p>1. States may incur public notification costs twice (i.e., for draft and final rules) while revising their regulations. The O&amp;M cost estimate is based on the same assumption of \$1,000 per public notice that was used for the proposed rule. That estimate assumed that public notices would be placed in four newspapers and each notice cost \$250. The \$1,000 was converted from 1999 dollars to 2001 dollars using the Consumer Price Index (<math>1000 \times 177.1/166.6 = 1060</math>) (BLS, 2002a). This estimate is consistent with a cost estimate for public notification expenses provided by Tilley and Kirkpatrick (2002).</p>			

## 2.2 Permit Implementation

Approved States will incur annual costs to administer their permit programs. To administer State general permits, permitting authorities will need to:

- Update their general permits to incorporate final rule requirements.
- Review Notice of Intent (NOI) forms submitted by CAFO operators seeking coverage under a general permit.
- Inspect CAFOs covered by the general permit.
- Review annual reports submitted by CAFOs covered by general permits.

To administer individual permits, State agencies will need to:

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<sup>4</sup> This estimate was based on the mean hourly wage rate of \$20.53 for Conservation Scientists (SOC 19-1031) employed in the public sector (BLS, 2001) because employees in this occupation will most likely conduct permit review and facility inspections, which account for most of the burden hours. The rate was escalated from 2000 dollars to 2001 dollars using the Employment Cost Index, which indicates a 3.6 percent increase in wages and salaries for state and local government workers from December 2000 to December 2001 (BLS, 2002c). Then, the escalated wage rate ( $\$21.27 = \$20.53 \times 1.036$ ) was converted to a loaded wage rate using a total compensation-to-wage ratio of 1.4, which was the ratio in 2001 for all state and local workers (BLS, 2002b).

- Review application forms (i.e., Forms 1 and 2B)
- Request public comment prior to issuing a permit
- Conduct public hearings, as needed
- Inspect CAFOs covered by individual permits
- Review annual reports submitted by CAFOs covered by individual permits.

To update their general permits, the 43 approved States will need to revise the general permit conditions affected by the final rule (or develop a general permit for CAFOs in the 21 approved States that currently do not have such permits). For example, general permits will need to specify the method(s) that the permit authority is requiring the CAFO owner or operator to use to calculate the rate of appropriate manure application as a special condition, as well as incorporate the NMP requirements listed in 40 C.F.R. 122.42(e)(1). They may also need to reflect changes to animal thresholds between large, medium, and small CAFOs if current permits use the AU approach in the CAFO definition.

EPA estimated that States may need 300 hours to revise their general permits to reflect new provisions of the final rule. Information provided by State contacts indicated that initial general permit development was a contentious process that took two (Allen, 1999) to four years (KauzLoric, 1999) to complete. EPA does not believe that the changes necessitated by the final rule (e.g., adding the NMP requirements; adding new recordkeeping or reporting requirements; switching from size thresholds based on AU to animal counts; and altering the ELG, BPJ, or special conditions where necessary) will require the same magnitude of effort as initial permit development. Furthermore, EPA will develop a model permit that States can adopt in whole or part to minimize the costs of permit revisions. Sylvester (2002) estimated that revising Wisconsin's general permit may take 456 hours and Coats (2002) estimated that States in Region 2 would need 160 hours to revise their general permits. EPA's estimate of 300 hours or 0.14 FTE is the approximate midpoint between these estimates. Allen (2002) considered EPA's 300-hour estimate to be acceptable.

Revised general permits will be subject to public comment. EPA estimated costs for the proposed rule based on public notice, comment review, and response requiring 160 hours or 0.08 FTE. Comments from State employees in South Dakota (Pirner, 2001) and Illinois (Willhite, 2001) indicated that costs would be higher because the process for selecting the type of facilities that may be eligible under a general permit will be contentious. Subsequent information obtained by EPA indicates a wide range of time from as little as 100 hours (Coats, 2002) to as much as 968 hours (Sylvester, 2002); Allen (2002) considered EPA's revised estimate of 180 hours to be acceptable. EPA assumed that the 180-hour estimate reflects labor requirements for the 22 States that already provide general NPDES permit coverage for CAFOs (US EPA, 2001) because these States have already resolved the applicability issue, which should not be substantially affected by the final rule. For the 21 States with approved programs that do not currently provide coverage under a general permit, EPA used the high estimate of 968 hours provided by Sylvester (2002) to incorporate additional time for the decision making process regarding which CAFOs would qualify for general permit coverage. The weighted average across all 43 States is approximately 570 hours ( $0.51 \times 180 + 0.49 \times 968$ ) or 0.27 FTE.

Finally, States may conduct hearings regarding general permit revisions (or development for the States that do not provide general permit coverage for CAFOs). For the proposed rule, EPA derived costs for 240 hours based on the assumption that a State holds four hearings, each requiring 60 hours of labor time. Allen (2002) and Coats (2002) considered that assumption acceptable. Sylvester (2002) recommended an alternative estimate of 616 hours based on 12 hearings requiring 48 staff hours each plus an additional 40 hours for material preparation. For the final rule, EPA assumed that its original 240-hour estimate is sufficient for the 22 States that only need to revise existing general permits, and that the 21 States that do not provide general permit coverage for CAFOs will conduct additional hearings. For those States, EPA used the 616-hour estimate. The weighted average across all States is approximately 420 hours ( $0.51 \times 240 + 0.49 \times 616$ ).

Adding together the three labor estimates for general permit development, EPA obtained a total estimate of 1,290 hours per general permit. For the 22 States that already provide general permit coverage, aggregate hours would be 720 hours. For the 21 States that would need to provide general permit coverage and determine which CAFOs are eligible, aggregate hours would be approximately 1,880 hours. It is possible that some of the States not currently providing general permit coverage will continue to rely solely on individual permits for CAFOs. Thus, EPA's cost analysis assumption that all 43 States will incur general permit revision costs provides an upper bound cost estimate.

CAFOs seeking coverage under a State's (or EPA's) general permit will submit completed NOI forms that the permitting authority will need to review and make a determination of coverage. For the proposed rule, EPA estimated that NOI review would require 1 hour. Comments indicated that the labor requirement would be substantially higher. For example, a Wisconsin State employee (Bazzell, 2001) indicated an expected expenditure of approximately 100 hours to review the NOI and accompanying documents. Ohio employees (Jones, et al., 2001) indicated that the estimates provided in the proposed rule did not allow time to ensure that the facilities were meeting all permit conditions. Willhite (2001) also indicated that costs for review of the NOI would be substantially higher. EPA believes that much of the concern regarding its proposed rule estimate centered on review of the proposed permit nutrient plan. For example, 60 hours of the 96-hour Wisconsin estimate pertained to reviewing the content of the NMP (Sylvester, 2002); 32 hours were allocated for review and approval of manure storage and runoff management systems, and 4 hours for general review for completeness of information. The final rule does not require a CAFO to submit this plan with the permit application, so this concern does not pertain to the final rule.

Nevertheless, EPA has revised the information requirements for the NOI and subsequently increased its estimate of the amount of time required for review. The final rule requires the following information be provided on the revised NOI and Form 2B: name and address of operator; manure storage mode and capacity; physical location including latitude and longitude of the production area; number of animals by type; estimated amount of manure generated per year; acreage available for agricultural use of manure, or litter and wastewater (under the control of the owner or operator); estimated amount of manure, or litter and wastewater to be transferred off site; and date for development of NMP, and expected date for full implementation. Reviews

of the revised NOI forms to ensure completeness and accuracy of this required information should not take longer than 4 hours. This estimate is consistent with the one provided by Sylvester (2002). Furthermore, Allen (2002), Coats (2002), and Domingo (2002) indicated four hours would be adequate for NOI review. The annual reports that CAFOs are now required to submit (regardless of permit type) will contain updates for some of the information provided on the NOI form. Consequently, EPA assumed that the State burden to review an annual report, enter data as needed, and maintain CAFO records is the same as the NOI review estimate—4 hours.

EPA assumed that compliance inspections for CAFOs covered by a general permit would require an average of 16 hours, which includes 6 hours for round-trip travel time, 2 hours to prepare for the inspection, 4 hours to conduct the on-site portion of the inspection, and 4 hours for reporting and record keeping. This estimate is slightly greater than the recommendation of 12 hours made by Sylvester (2002), which included 8 hours for the inspection and travel time and 4 hours for reporting and data entry. EPA's estimate also equals the average of two inspection burden estimates in an active NPDES ICR ("Pollutant Discharge Elimination System and Sewage Sludge Management State Programs," OMB NO. 2040-0057, EPA ICR 0168.07). The reconnaissance inspection has a burden estimate of 8 hours and the compliance evaluation inspection has a burden estimate of 24 hours. On average, CAFO inspections will require less time than a typical compliance evaluation inspection, which includes inspection of effluent and receiving waters and discharge monitoring records. A reconnaissance inspection often does not include review of onsite records. Thus, a CAFO inspection that includes review of onsite records in addition to a visual inspection of the operation will most likely require more than eight hours.

State administration costs for individual permits include 100 hours per permit to review Forms 1 and 2B, issue public notices, and respond to comments. EPA increased this estimate from the 70 hours used in its analysis of the proposed rule in response to comments (Muldenner, 2001). Sylvester (2002) and Allen (2002) concurred with this estimate; Harsh (2002) thought it might be low, but Coats (2002) considered it to be twice the time needed.

EPA estimated that the hearing time for an individual permit would require 200 hours based on estimates from Washington State (KauzLoric, 1999), which indicated that a hearing required approximately 100 to 150 hours of State employee time. Using BPJ, EPA assumed an average of two hearings per permit and an average requirement of 100 hours per hearing. This is higher than the estimate per hearing provided by Sylvester (2002). Nevertheless, Sylvester agreed with the estimate, as did Coats (2002) and Allen (2002). Harsh (2002) provided an alternative estimate of 22 to 33 hours. EPA decided to retain an average estimate of 200 hours because some individual permits may attract numerous participants and require multiple hearings.

EPA assumed that the inspection time and annual report review and subsequent recordkeeping costs for operations with individual permits would be the same as operations with general permits. The average inspection time will most likely be the same because most of the 16-hour estimate is spent on activities that will not vary across permit types. Similarly, the annual report

content requirements are the same for all CAFOs regardless of permit type. Thus, the labor requirement is 4 hours.

Table 2-2 summarizes EPA's assumptions for general permit administration and Table 2-3 provides the assumptions used to develop State costs for individual permits. The same State wage rate is used to estimate unit costs. These tables also provide unit cost estimates for EPA, which is the permitting authority in some States.<sup>5</sup>

**Table 2-2. State and Federal Administrative Costs  
Associated With General Permits.  
(costs in 2001 dollars)**

Administrative Activity	Unit Hours	Labor Cost	O&M Cost <sup>1</sup>
<b>State Administrative Costs</b>			
General Permit Development	1,290 per State	\$38,420	\$1,060
- Revise Permit	300 per State		
- Public Notice/Response to Comments	570 per State		
- Public Hearing(s)	420 per State		
Review and Approval of NOIs	4 per CAFO	\$120	
Review Annual Reports	4 per CAFO	\$120	
Facility Inspections	16 per CAFO	\$480	
<b>Federal Administrative Costs<sup>2</sup></b>			
Review and Approval of NOIs	4 per CAFO	\$160	
Review Annual Reports	4 per CAFO	\$160	
Facility Inspections	16 per CAFO	\$640	
<p>1. States may incur public notification costs for the general permit. The O&amp;M cost estimate is based on the same assumption of \$1,000 per public notice that was used for the proposed rule. That estimate assumed that public notices would be placed in four newspapers and each notice cost \$250. The \$1,000 was converted from 1999 dollars to 2001 dollars using the Consumer Price Index (<math>1000 \times 177.1/166.6 = 1060</math>) (BLS, 2002a). This estimate is consistent with a cost estimate for public notification expenses provided by Tilley and Kirkpatrick (2002).</p> <p>2. EPA employees will incur the same hourly burden for these activities as their State counterparts.</p>			

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<sup>5</sup> EPA used an hourly wage rate for a GS12, Step One Federal employee to estimate the cost of EPA staff. The U.S. Office of Personnel Management 2001 General Schedule reported a base annual salary of \$51,927. EPA divided this by 2,080 hours to obtain an hourly rate of \$24.96. Multiplying this rate by 1.6 to incorporate typical Federal benefits (OPM, 1999), EPA obtained a final hourly rate of \$39.94 .

**Table 2-3. State and Federal Administrative Costs  
Associated with Individual Permits.  
(in 2001 dollars)**

Administrative Activity	Unit Hours	Labor Cost	O&M Cost <sup>1</sup>
<b>State Administrative Costs</b>			
Application Review/Public Notification/Response to Comments	100 per CAFO	\$2,980	\$1,060
Public Hearing	200 per CAFO	\$5,960	\$1,060
Review Annual Reports	4 per CAFO	\$120	
Facility Inspections	16 per CAFO	\$480	
<b>Federal Administrative Costs<sup>2</sup></b>			
Application Review/Public Notification/Response to Comments	100 per CAFO	\$3,990	\$1,060
Public Hearing	200 per CAFO	\$7,990	\$1,060
Review Annual Reports	4 per CAFO	\$160	
Facility Inspections	16 per CAFO	\$640	
<p>1. States may incur public notification costs for each individual permit and hearing. The O&amp;M cost estimate is based on the same assumption of \$1,000 per public notice that was used for the proposed rule. That estimate assumed that public notices would be placed in four newspapers and each notice cost \$250. The \$1,000 was converted from 1999 dollars to 2001 dollars using the Consumer Price Index (<math>1000 \times 177.1/166.6 = 1060</math>) (BLS, 2002a). This estimate is consistent with a cost estimate for public notification expenses provided by Tilley and Kirkpatrick (2002).</p> <p>2. EPA employees will incur the same hourly burden for these activities as their State counterparts.</p>			

States may also need to undertake enforcement actions, but EPA has adopted the standard analytical assumption of full compliance for the purposes of estimating State and private sector expenditures. Given CAFO costs that reflect full compliance assumptions, there should be no need for enforcement actions. Therefore, this analysis excludes enforcement costs.

### **2.3 Permit Compliance Forecast for State Cost Analysis**

Although, the overall unit costs for permitting are generally higher than those used in proposal, due to a decrease in the universe of potential permittees under the final rule, States will incur much smaller permitting costs compared to either of the regulatory alternatives considered for

EPA's proposed rule. For the proposed rule, EPA coproposed the following:

- A three-tier alternative in which all Tier 2 facilities would be required to either apply for an NPDES permit or submit certification that they did not meet any conditions necessitating a permit.
- A two-tier alternative that lowered the threshold for AFOs that were automatically defined as CAFOs from 1000 AU to 500 AU.

EPA estimated that 31,930 facilities would be affected under the proposed three-tier option. Under the proposed two-tier option, 25,540 facilities would have required NPDES permits. Based on the provisions of the final rule, EPA estimates that approximately 15,400 operations will require a permit. This estimate includes more than 10,700 large CAFOs, almost 4,500 medium operations defined as CAFOs, and almost 200 designated CAFOs. Because States incur most of their program costs through ongoing permit administration, EPA's final rule will be more cost effective and less burdensome than either of its proposed alternatives.

Of the 15,400 CAFOs requiring NPDES permits, EPA estimates that approximately 13,000 should have permits or meet the 25-year, 24-hour exemption under the 1976 regulations. EPA estimates, however, that only 4,100 permits have been issued, which implies that the permitting impact above the actual compliance baseline is approximately 11,300 permits.

EPA also recognizes that the final rule may affect permit conditions for those CAFOs that already have (or should have) permits. This could affect state costs for issuing permits and conducting inspections. Furthermore, revisions to the permit application forms may increase State review time as well as increase the time it takes producers to complete the forms. Thus, States may incur incremental costs for the baseline CAFOs that do (or should) have NPDES permits now. To simplify the analysis, EPA estimated an upper-bound impact that includes total permitting and inspection costs for all 15,400 CAFOs, although States are already incurring some portion of cost on 4,100 CAFOs. Actual new expenditures, therefore, will be lower than EPA's estimate suggests.

Operators or owners of a large CAFO may submit documentation that there is no potential to discharge in lieu of applying for a permit. The permitting authority would need to review the documentation and make a determination of whether there is a potential to discharge. Although there are no estimates of how many operations may pursue this option, given the stringent requirements, EPA believes that few, if any, operations will claim no potential to discharge. Therefore, EPA's cost analysis assumes that all CAFOs obtain NPDES permits. If any operation chooses to request a no-potential-to-discharge determination, then presumably doing so is as cost effective or more cost effective in the long run than obtaining a permit. Therefore, EPA concludes that its analysis may overstate costs should any CAFOs obtain an exemption based on no potential to discharge.

As noted above, only the approved States will incur costs. To derive State costs, EPA needed to estimate how often the States activities would occur. First, EPA estimated that 97 percent of the

permitted CAFOs are located in these States based on its analysis of USDA livestock operation data. Second, EPA assumed that 70 percent of these CAFOs will request coverage under a State general permit (or EPA's general permit). The remaining 30 percent will obtain individual permits. EPA believes that the split between the two permit types is conservative (i.e., tending to overestimate costs) because the permit conditions for CAFOs are amenable to the use of a general permit. In particular, there are no facility-specific discharge limits that would require individual permitting. Third, EPA assumed that 12 percent of individual permits will require public hearings. The hearing percentage for individual permits is an average of estimates provided for Kansas (4 to 8 percent) and Indiana (15 to 20 percent).

Finally, using best professional judgement, EPA assumed that each CAFO is inspected once within each 5-year permit period, which implies an annual inspection rate of 20 percent. The final rule contains no inspection frequency requirements and for NPDES purposes, this is a relatively high inspection rate because CAFOs fall into the category of nonmunicipal, minor dischargers, which have an annual inspection rate closer to 1 percent. States have indicated, however, that they inspect CAFOs more frequently to ensure compliance with multiple State requirements (US EPA, 2001). Although these frequent inspections may not be necessary to ensure NPDES compliance, inspectors can assess NPDES compliance status. Consequently, EPA increased its inspection rate estimate from 10 percent (used in the proposed rule) to 20 percent to reflect at least one NPDES-related inspection per CAFO every 5 years. This inspection rate includes the inspection required to designate a small or medium CAFO.

Table 2-4 shows how the total estimate of 15,400 CAFOs and preceding assumptions generate the CAFO estimates for each of the permit-related costs shown in Tables 2-2 and 2-3. NPDES permits are valid for up to 5 years. Thus, States incur application review costs for each CAFO once every five years. To derive average annual costs, EPA assumed these costs would be incurred for 20 percent of total CAFOs each year. The annual CAFO column in Table 2-4 reflects this assumption.



**Table 2-4. Derivation of CAFO Estimates  
Used to Calculate Annual Administrative Costs.<sup>1</sup>**

Category	Total	Annual <sup>1</sup>
Total CAFOs	15,400	3,080
State-Issued Permits <sup>2</sup>	14,923	2,985
• General Permits	10,446	2,089
– Inspections	2,089	2,089
• Individual Permits	4,477	895
– Hearings	537	107
– Inspections	895	895
EPA-Issued Permits <sup>2</sup>	477	95
• General Permits	334	67
– Inspections	67	67
• Individual Permits	143	29
– Hearings	17	3
– Inspections	29	29
Detail may not add to totals because of independent rounding. The total CAFO estimate has been rounded to the nearest hundred for the purpose of this UMRA analysis.		
1. Annual CAFO estimates for permit review costs equal total divided by 5 because permits are renewed every 5 years. Annual CAFO estimates for inspections equal 20 percent of total CAFOs.		
2. EPA estimated the number of CAFOs in the 43 states with approved NPDES programs based on its analysis of USDA livestock operation data. EPA used this estimate to split total CAFOs between those receiving State-issued permits and EPA-issued permits.		

## 2.4 Annual State Cost

To obtain the average annual State costs estimates reported in Table 2-5, EPA multiplied the one-time unit costs in Table 2-1 by the number of States expected to incur those costs. These one-time costs were then annualized over 5 years at a 7 percent discount rate.<sup>6</sup> Recurring annual permitting and inspection costs were derived by multiplying the unit costs in Tables 2-2 and 2-3 by their respective annual CAFO estimates in Table 2-4. Total annual State administrative costs are the sum of annualized one-time costs and annual permitting costs. The annual cost estimate for all States is \$8.5 million. Federal costs for administering a portion of permits are shown in Table 2-6 for information purposes.

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<sup>6</sup> Assuming a 5-year annualization period generates a conservative annual estimate that tends to overstate costs because it treats these one-time activities as though they recur every five years, which is unlikely to be the case.

**Table 2-5. Annual State Administrative Costs.**  
(in 2001 dollars)

Administrative Activity	Unit Cost	Units	Total Cost (\$millions)
<b>Up-front State Costs</b>			
Rule Development <sup>1</sup>	\$27,430	43 States	\$1.18
NPDES Program Modification Request	\$7,450	43 States	\$0.32
General Permit Development <sup>1</sup>	\$39,480	43 States	\$1.70
		<b>Up-front Total</b>	<b>\$3.20</b>
		<b>Annualized up-front Costs<sup>2</sup></b>	<b>\$0.73</b>
<b>Average Annual Implementation Costs for Permits and Inspections</b>			
Review and Approve NOIs for General Permits	\$120	2,089 CAFOs per year	\$0.25
Review Applications/Public Notices/Respond to Comments for Individual Permits <sup>1</sup>	\$4,040	895 CAFOs per year	\$3.61
Public Hearings for Individual Permits <sup>1</sup>	\$7,020	107 CAFOs per year	\$0.75
Review Annual Reports (General and Individual Permits)	\$120	14,923 CAFOs per year	\$1.78
Facility Inspections (General and Individual Permits)	\$480	2,984 CAFOs per year	\$1.42
		<b>Annual Permit Costs</b>	<b>\$7.81</b>
		<b>Total Annual Costs</b>	<b>\$8.54</b>
Detail may not add to totals due to independent rounding.			
1. Includes O&M costs.			
2. Total up-front costs annualized over 5 years at a 7 percent discount rate.			

New State expenditures as a result of the final rule are expected to differ across States. Although all approved States will incur up-front costs to revise their rules and implement programs, States with more CAFOs will incur more annual costs. EPA estimated that almost 50 percent of permitted CAFOs are located in seven States: approximately 9 percent in both Iowa and North Carolina; approximately 6 percent in both Georgia and California; and between 5 and 6 percent in each of Nebraska, Minnesota, and Texas. Thus, these States are likely to incur much higher annual costs than other States. State costs will also vary depending on the rate at which they utilize general versus individual permits.

States can use existing sources of financial assistance to revise and implement the final rule. Section 106 of the CWA authorizes EPA to provide federal assistance (from Congressional appropriations) to States, Tribes, and interstate agencies to establish and implement ongoing water pollution control programs. Section 106 grants offer broad support to States to administer programs to prevent and abate surface and ground water pollution from point and nonpoint sources. States may use the funding for a variety of activities including permitting, monitoring, and enforcement. Thus, State NPDES permit programs represent one type of State program that can be funded by Section 106 grants. The total appropriation for Section 106 grants for fiscal

year 2002 was \$192,476,900. On average, eligible States may receive between \$60,000 to \$9,000,000 of the total appropriation.

**Table 2-6. Federal Administrative Costs.**  
(in 2001 dollars)

Administrative Activity	Unit Cost	Units	Total Cost (\$millions) <sup>1</sup>
<b>Average Annual Implementation Costs for Permits and Inspections</b>			
Review and Approve NOIs for General Permits	\$160	67 CAFOs per year	\$0.01
Review Applications/Public Notices/Respond to Comments for Individual Permits <sup>2</sup>	\$3,990	29 CAFOs per year	\$0.15
Public Hearings for Individual Permits <sup>2</sup>	\$7,990	3 CAFOs per year	\$0.03
Review Annual Reports (General and Individual Permits)	\$160	477 CAFOs per year	\$0.08
Facility Inspection (General and Individual Permits)	\$640	95 CAFOs per year	\$0.06
		<b>Annual Permit Costs</b>	<b>\$0.32</b>
Detail may not add to totals due to independent rounding.			
1. EPA used an hourly wage rate for a GS12, Step One Federal employee to estimate the cost of the Agency staff. The U.S. Office of Personnel Management (OPM, 2001) General Schedule reported a base annual salary of \$51,927 in 2001. EPA divided this by 2,080 hours to obtain an hourly rate of \$24.96. Multiplying this rate by 1.6 to incorporate typical Federal benefits (OPM, 1999), EPA obtained a final hourly rate of \$39.94.			
2. Includes O&M costs.			

## 2.5 References

- Allen, P. 1999. Environmental Program Manager, Maryland Department of Environment, Water Management Administration. Personal communication on May 19 with R. Johnson, DPRA, Arlington, Virginia.
- Allen, P. 2002. CAFO Rule State NPDES Burden Estimates. E-mail message on July 26 to T. Cannon, SAIC, Reston, Virginia.
- Bazzell, D. 2001. Public Comment Submitted in Response to EPA's CAFO Rule. Wisconsin Department of Natural Resources. Doc# CAFO201450.
- Bureau of Labor Statistics (BLS). 2002a. Consumer Price Index-All Urban Consumers. [www.bls.gov](http://www.bls.gov).
- Bureau of Labor Statistics (BLS). 2002b. Employer Cost for Employee Compensation. [www.bls.gov](http://www.bls.gov). (Series Id. CCU310000290000D, Total compensation, Public Administration, State and local government)
- Bureau of Labor Statistics (BLS). 2002c. Employment Cost Index. [www.bls.gov](http://www.bls.gov). (Series Id: ECU20003A, Wages and salaries, State and local government)

- Bureau of Labor Statistics (BLS). 2001. 2000 National Industry-Specific Occupational Employment and Wage Estimates. [www.bls.gov](http://www.bls.gov). (SIC 902 - State Government)
- Coats, A. 2002. State/regional respondent burden estimates. E-mail EPA from EPA Region 2 on July 24 to T. Cannon, SAIC, Reston, Virginia.
- Domingo, D. 2002. State/regional respondent burden estimates. E-mail EPA from EPA Region 10 on July 24 to T. Cannon, SAIC, Reston, Virginia.
- Hammerberg, E. 2002. Maryland Department of the Environment. Personal communication on March 8 with C. Simons, DPRA, Virginia.
- Harsh, J. 2002. Kansas Department of Health and Environment. Personal communication on July 31 with T. Cannon, SAIC, Reston, Virginia..
- Jones, C.; Speck, S.; Daily, F. 2001. Public Comment Submitted in Response to EPA's CAFO Rule. Ohio Department of Agriculture; Ohio Department of Natural Resources; Ohio EPA. Doc# CAFO201851.
- KauzLoric, P. 1999. Dairy Program Coordinator, Washington Department of Ecology, Water Quality Program. Personal communication on May 11 with R. Johnson, DPRA, Virginia.
- Muldener, K. 2001. Public Comment Submitted in Response to EPA's CAFO Rule. Kansas Department of Health and Environment. Doc# CAFO202366.
- Pirner, S. 2001. Public Comment Submitted in Response to EPA's CAFO Rule. South Dakota Departments of Environment and Natural Resources and Department of Agriculture. Doc# CAFO201739.
- Sylvester, S. 2002. Wisconsin Department of Natural Resources. Personal communication. August 1, 2002.
- Tilley, M., and Kirkpatrick B. 2002. Arkansas Department of Environmental Quality. Personal communication on March 12 with B. Crowley, DPRA, Virginia.
- U.S. Environmental Protection Agency (US EPA). 2001. *State Compendium: Programs and Regulatory Activities Related to Animal Feeding Operations*. U.S. Environmental Protection Agency, Washington, D.C.
- U.S. Office of Personnel Management (OPM). 2001. *Government Pay Tables, 2001*. <http://www.seemyad.com/gov/USAPAY.htm>
- U.S. Office of Personnel Management (OPM). 1999. *Work Years and Personnel Costs: Fiscal Year 1998*. OMSOE-OWI-98-12. Washington, D.C.: U.S. Office of Personnel Management.

Willhite, M. 2001. Public Comment Submitted in Response to EPA's CAFO Rule. Illinois  
EPA. Doc# CAFO202080.