BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:

CONCENTRATED ANIMAL FEEDING OPERATIONS (CAFOS): PROPOSED AMENDMENTS TO 35 ILL. ADM. CODE 501, 502 AND 504	))))	R 2012-023

NOTICE OF ELECTRONIC FILING

To: **Attached Service List**

PLEASE TAKE NOTICE that on January 8, 2013, I electronically filed with the Clerk of the Pollution Control Board of the State of Illinois: **COMMENTS OF DR. JOHN E. IKERD** (with attachments) on behalf of Prairie Rivers Network, Illinois Citizens for Clean Air and Water, Natural Resources Defense Council and Environmental Law & Policy Center (collectively, "Environmental Groups") copies of which are attached hereto and herewith served upon you.

Respectfully Submitted,

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312-795-3747

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COMMENTS OF DR. JOHN E. IKERD

My name is John Ikerd. I am a Professor Emeritus of Agricultural Economics at the University of Missouri in Columbia, Missouri. My curriculum vita and highlighted works are included with these comments (Attachments 1 and 2).

I currently make my home in Fairfield, Iowa. Over the past 20 years, I have worked with rural residents in 16 states and 3 provinces of Canada who were dealing with issues related to Concentrated Animal Feeding Operations or CAFOs. I spent half of my 30-year academic career at four major agricultural colleges working on research and extension programs related to animal agriculture as a specialist in livestock marketing. In addition, I grew up on a small dairy farm in rural Missouri and have spent my entire professional life working with farmers and other people in rural communities.

I offer comment on behalf of the Environmental Groups (Prairie Rivers Network, Environmental Law and Policy Center, Illinois Citizens for Clean Air and Water, and Natural Resources Defense Council). Being an agricultural economist, I will focus my comments on the potential economic impacts of implementing the regulations that are the subject of this rulemaking, and by implication, the economic impacts of implementing the Environmental Groups regulatory proposal, which I will refer to as the IEPA CAFO Rules and the Environmental Proposal, respectively.

I have reviewed the Economic Analysis of the Final Revisions to the National Pollutant Discharge Elimination System Regulation and the Effluent Guidelines for Concentrated Animal Feeding Operations prepared by the U.S. Environmental Protection Agency, USEPA 821-R-03-002 (USEPA Report) in which USEPA assessed the economic impacts of its 2003 CAFO Rule. *See* USEPA Report: Executive Summary and Section 3 (Attachment 3). The economic assessment conducted by USEPA for its 2003 CAFO Rule was used by the Illinois Environmental Protection Agency (IEPA) as the basis for its economic impact assessment of the IEPA CAFO Rules.

It should be noted that USEPA's 2003 CAFO Rule had a universal duty to apply requirement that required all CAFOs to obtain NPDES permit coverage. The 2003 rule also required all CAFOs (regardless of permit coverage) to control nutrient releases from production and land application areas. In the USEPA Report, EPA assumed that all CAFOs would follow the same standards for waste management regardless of their permit status. S*ee* 2008 CAFO Rule

Preamble (submitted as Environmental Groups Attachment 2 to Pre-filed Testimony of Arnold Leder, at 73 Fed. Reg. 70469). As such, the USEPA Report is an important source of information regarding the economic impacts of the Environmental Proposal, which requires the same technical standards *for land application* regardless of permit status. The USEPA Report is also an important source of information regarding the economic impacts of the IEPA CAFO Rules, though any impacts found in the USEPA Report will likely be overstated when applied to the IEPA CAFO Rules, wherein production and land application area technical standards apply only to permitted CAFOs.

I agree with the conclusion of the IEPA that the USEPA Report provides the essential information for assessing the economic impacts of the IEPA CAFO rules on Illinois livestock producers and on the Illinois economy in general. Any refinements to the USEPA analysis needed to more accurately reflect the unique CAFO regulations and economic situation in Illinois would not change any of the basic conclusions (discussed below) regarding the economic impacts of the USEPA's 2003 CAFO Rule. As indicated by IEPA, any differences between the federal CAFO regulations and Illinois' CAFO regulations would not significantly affect the aggregate economic impacts or the general conclusions of the analysis.

The USEPA Report provides estimates of the cost of implementing that Agency's 2003 CAFO Rule for CAFOs with more than 1,000 animal units (AUs) and for those with 300-1,000 AUs under two different technology options. USEPA has estimated the costs for facilities that land apply using nitrogen-based application rates only (Option 1) and also the cost to facilities that land apply based on nitrogen-based application rates, except in those instances where USEPA believes that phosphorus-based rates are likely to be appropriate (Option 2). The estimated costs per head of livestock and poultry under Option 2, which most closely resembles Illinois' regulatory proposal, ranged from less than 1% to 11% of total operating costs for beef and heifers, from <1% to 31% for hogs, 1% to 12% for dairy, and <1% to 36% for broilers (Table 3-6b, Costs as a Share of Model CAFO Total Operating Costs (Minimum and Maximum), ($1997), USEPA Report).

Since the most stringent regulations apply only to CAFOs with more than 1,000 AUs, USEPA limited its analysis of the financial effects of the regulations to CAFOs with >1,000 AUs. Smaller CAFOs would have greater flexibility in complying with the regulations, likely resulting in even smaller financial impacts. The USEPA Report concluded that for CAFOs with >1,000 AUs, only 3% of beef, 5% of hog, and 1% of broiler operations would experience economic "stress" in complying with ELG regulations (Table 3-7, Financial Effects of the ELG on CAFOs (>1,000 AU), Option 1 and Option 2, USEPA Report). USEPA estimated that 30% of dairy, 12% of hogs, and 36% of broiler operations would feel "moderate" financial effects. Considering all types of operations, USEPA estimated the 2003 CAFO Rule could be implemented by 83% of all CAFOs without any significant financial effects (Table 3-7, USEPA Report).

The USEPA essentially concluded that the 2003 CAFO regulations would simply require all permitted operations to follow the same general manure management practices that the vast majority of CAFO operations are already following. The USEPA study suggested that compliance would require CAFO operators to do little more than simply adopt the best

technologies available that are economically achievable. Industry leaders have widely proclaimed that all responsible CAFO operators have already adopted the best economically achievable manure management technologies and practices. If this is the case, under the new regulations *responsible* CAFO operators would no longer have to compete with *irresponsible* operators. This would hold true for the Environmental Groups' proposal as well, as their additions to the IEPA CAFO Rules in essence memorialize requirements that all CAFOs should already be implementing. It would seem that responsible operators would welcome such regulations. Industry leaders should welcome the regulations as a means of eliminating the few bad actors from the animal agriculture industry.

In the 2004 USEPA report, Permitting for Environmental Results - NPDES Profile: Illinois, IEPA estimated there were approximately 500 Large CAFOs in the State of Illinois, although they indicated they did not have a precise number (Attachment 4). Using the IEPA's estimate of the number of CAFOs and the upper limit of stress found in the USEPA Report (5% of hog operations), at most, 25 CAFOs in Illinois would experience financial stress from complying with the Environmental Proposal, and even fewer would experience financial stress from complying with the IEPA CAFO Rules given the more lax standards in that proposal.

In addition, USEPA concluded the new regulations would have an even smaller economic impact on new CAFO operations, as they would not have to deal with obsolete facilities and existing manure management arrangements with surrounding landowners. New operations wouldn't have to remodel existing facilities that are incompatible with new regulations or renegotiate existing manure management arrangements with surrounding landowners. There is no reason to believe the IEPA CAFO Rules will be an obstacle to the establishment of new CAFOs or a threat to existing producers or to the future of animal agriculture in Illinois.

The economic impacts of the IEPA CAFO Rules on the agricultural economy of Illinois would be even smaller than on CAFO operators. In fact, the economic impact on the overall production and prices of meat, milk, and eggs will be so small as to be negligible. First, estimated changes in production resulting from compliance with the 2003 CAFO regulations were minimal. USEPA estimated 0.1% of beef and 0.2% of dairy production quantity changes post-compliance, with no estimated changes in production of hogs, broilers, layers or turkeys. (Table 3-17, Post Compliance Farm Production Changes, USEPA Report). The same would likely be true for the IEPA CAFO Rules and the Environmental Proposal.

Second, USEPA estimated the expected changes in production-level prices and found increases in production-level prices of less than "one-half of one percent" for beef, dairy, hogs, broilers, eggs, and turkeys. Changes for beef and pork were estimated at less than "one-twentieth of one percent" (Table 3-15, Post Compliance Farm Level Price Changes, USEPA Report). By way of contrast, production-level prices for these same commodities changed from year-to-year by averages of from 4% to 15% during the 1990s and have been even more volatile since.

Third, from 50% to 75% of the total retail cost of meat, milk, and eggs, depending on the product, is accounted for by costs of assembling, processing, transportation, packaging, retailing, advertising, and other marketing costs, not by the cost of the cattle, hogs, chickens, raw milk, or of the costs of basic commodities (based on regular reports on farm-to-retail price spreads by the

U.S. Department of Agriculture's (USDA) Economic Research Service, *available at*: http://www.ers.usda.gov/data-products/price-spreads-from-farm-to-consumer.aspx). Thus the small changes in production levels resulting from small changes in production costs associated with the new CAFO regulations will have no effect on 50% to 75% of the retail cost of meat, milk, or eggs. It should not be surprising that USEPA-estimated changes in retail prices for the end products produced in CAFOs would rise by less than one-half as much as the already negligible rises in production-level prices (Table 3-16, Post-Compliance Retail Level Price Changes, USEPA Report). Any changes in retail prices of meat, milk, and eggs resulting from these regulations are so small that they are likely to be lost in the process of rounding the numbers in USDA price reports.

The USEPA Report was quite detailed and inclusive, including consideration of a wide range of scenarios regarding how producers and markets might respond to the new regulations. However, there seems no point in further belaboring USEPA's conclusions. The basic conclusions were essentially the same for all scenarios examined in the report. USEPA's overall estimate of total economic cost of the 2003 CAFO regulations for Option 2 was $289 million, which included $6 million for state/federal administrative costs (Table ES-5, Total Annual Monetized Social Costs and Benefits (millions $2001), CAFO >1,000 AU, USEPA Report). In summary, there is nothing to indicate that the IEPA CAFO Rules or the Environmental Proposal would have a significant financial impact on Illinois CAFO operators or on the livestock industry of Illinois.

The same conclusion would hold for Illinois' NPDES permit fees. The total cost of an NPDES fee will quite likely average less than $0.50 per animal unit (AU) of feeding capacity, which would amount to about $1/10^{th}$ of 1% of total operating costs. Even if the per-AU fee was twice or three times as large, it would not have a significant effect on the financial health or economic competitiveness of Illinois livestock producers or the agricultural economy of Illinois.

As indicated previously, USEPA's findings regarding the economic impacts of the 2003 CAFO rule are more applicable to the Environmental Proposal than to the IEPA CAFO Rule. The important point is that under neither regulatory scheme, would implementation of new CAFO regulations have a significant impact on the overall livestock industry of Illinois.

Unfortunately, the USEPA analyses of "benefits" arising from CAFO regulations were not nearly as comprehensive or refined as their estimates of costs. USEPA restricted its estimates to "monetized benefits" of those positive impacts on the environment for which it had readily available data or previous studies to support its numbers. All of the estimated benefits related to improved water quality. The largest benefit included in the USEPA Report was the increased value of recreational uses of surface water, including boating, fishing, and swimming. Reduced pollution of private wells was the next largest contributor of economic benefits. The USEPA Report also included the estimates of the economic value of improved commercial fishing in the Gulf of Mexico and other coastal waters as a result of reduced pollution from CAFOs in streams draining into the oceans at up to $3.4 million/year (Table ES-5, Total Annual Monetized Social Costs and Benefits (millions $2001), CAFO >1,000 AU, USEPA Report).

USEPA economic analysts listed a number of other economic benefits of the 2003 CAFO regulations that the agency was unable to "monetize" or express in dollar-and-cent values.

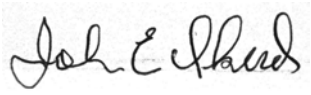
USEPA mentioned specifically: reduced euthrophication and pathogen contamination of estuaries and coastal waters, reduced "pathogen" contamination in private and public underground sources of drinking water and the associated treatment costs, reduced health and environmental risks from antibiotics, hormones, metals, and salts associated with routine operation and episodic pollutant discharge events, reduced odor and air emissions, and avoided loss in the value of property located near CAFOs. Benefits from improvements in soil properties and reduced fertilizer use from better manure management practices were also not capable of being monetized. Supporting documentation of these costs was provided for the record, but specific values for these and other similar benefits were not included in the USEPA estimate of total benefits (Table ES-5, USEPA Report).

Perhaps USEPA thought it was unnecessary to attempt to estimate these additional benefits because the total benefits of $204 to $340 million for Option 2 were high enough to offset the total costs of $289 million. The report should not be interpreted to mean that the monetized benefits represent a complete estimate of total economic benefits. In fact USEPA provided compelling evidence that the non-monetized benefits would occur if the NPDES regulations were implemented. It is not unreasonable to conclude that the non-monetized benefits of implementing these regulations might represent five or ten times the monetized benefits. A single outbreak of E-Coli resulting in the death of several people and linked to drinking water polluted by CAFOs could impose far more economic cost on the livestock industry as a whole than the costs of environmental regulation that would prevent such an outbreak.

In addition, the most important economic costs of "under-regulated" CAFOs are impossible to measure in dollars and cents. These are the costs resulting from the social fabric of rural communities being ripped apart by the controversies surrounding the establishment and operation of CAFOs. This has happened and is happening in dozens if not hundreds of rural communities all across the continent. The additional costs include the costs of rural cultures that are being lost as young people of great promise leave CAFO communities for places that will accommodate more desirable environmental, social, and economic qualities of life. There is simply no way to put an economic value on the true total costs of under-regulated CAFOs and thus the total benefits of effective CAFO regulations.

Dated: December 20, 2012

Respectfully submitted:



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Dr. John Ikerd

Attachment 1:
Curriculum Vitae of Dr. John E. Ikerd

John E. Ikerd

Name:	John E. Ikerd	**Initial Appointment Year:**	1988
Department:	Agricultural Economics	**Member Graduate Faculty:**	yes
Academic Rank:	Emeritus Professor	**Member Doctoral Faculty:**	no

Program Narrative Statement

As state co-coordinator of extension programs in sustainable agriculture, Ikerd was responsible for implementing a national professional development program for extension workers and others who provided Missouri with information related to sustainable agriculture. Other major research and educational programs included participatory on-farm research and demonstration programs and evaluation of impacts of sustainable agriculture on quality of life of farm families and others in rural communities. Dr. Ikerd was project leader for a three-state, five-year program, with funding from the W.K. Kellogg Foundation, which linked sustainable agriculture and sustainable community development.

Education:

Ph.D. (University of Missouri) (1970) (Agricultural Economics)
M.S. (University of Missouri) (1967) (Agricultural Economics)
B.S. (University of Missouri) (1961) (Agricultural Economics)

Professional Service and Activities:

Co-coordinator of Sustainable Agriculture Extension Programs, University of Missouri--1995 to 2000.

Liaison to States, USDA Sustainable Agriculture Research and Education (SARE) program--1993-1995.

Professor and Head, Department of Extension Agricultural Economics, University of Georgia, 1984-1988.

Professor and Extension Economist, Department of Agricultural Economics, Oklahoma State University, 1976-1984.

Associate Professor and Extension Economist, Department of Economics, North Carolina State University, 1970-76.

President, Southern Agricultural Economics Association, 1986 (Also served as first and second vice president, president elect, and past president, SAEA 1983-87).

Honors & Awards:

- Outstanding Extension Program, American Agricultural Economics Assn. - 1997
- Outstanding Extension Program, Western Agricultural Economics Assn. - 1997
- Diversity Work Award, USDA Cooperative Extension Service - 1994
- Outstanding Extension Program, American Agricultural Economics Assn. - 1986
- Outstanding Extension Program, Western Agricultural Economics Assn. - 1985

Publications - 1991-1998:

	Last 7 years	Career		Last 7 years	Career
Referred journal articles:	8	20	**Book Reviews:**	4	4
Professional (Choices) & Major Popular Articles:	21	25	**Published Proceedings:**	52	118
Extension Educational Materials:	11	40	**Official Extension Publications:**	0	49
Abstracts in Journals:	10	25	**Research Reports:**	10	29
Other Publications:	37	75	**Chapters in Books:**	9	9

Key Publications, 1991-1998:

Ikerd, John E. "Applying LISA Concepts on Southern Farms," Southern Journal of Agricultural Economics, Volume 23, Number 1, 1991. (pp. 43-52).

John E. Ikerd, "The Question of Good Science," American Journal of Alternative Agriculture, Henry Wallace Institute for Alternative Agriculture, Greenbelt, MD. Vol. 8, No.2, 1993.

George Bird and John Ikerd, "Sustainable Agriculture: A Twenty-First Century System," THE ANNALS, The American Academy of Political and Social Science, Philadelphia, PA.

Ikerd, John, Gary Devino and Suthijit Traiyongwanich. 1996. Evaluating the Sustainability of Alternative Farming Systems: A Case Study, American Journal of Alternative Agriculture, Volume 11, Number 1. (pp 25-29).

Ikerd, John E. 1996. Sustaining the Profitability of Agriculture , @ Proceedings, American Agricultural Economics Association Pre-conference, The Economists Role in the Agricultural Sustainability Paradigm, San Antonio, TX, July 27.

Botha, Nells and John Ikerd. "What is sustainable agriculture?" Farmers Weekly, Effective Farming Publications, Pietermaritzburg, South Africa, March 24, 1995, (pp. 17-18).

Ikerd, John E. "Assessing Health of Agroecosystems from a Socioeconomic Perspective," 1st International Symposium on Ecosystem Health and Medicine, International Society of Ecosystem Health and Medicine, University of Guelph, Guelph, Ontario, CAN, June 19-23, 1994. (pp.48-49).

Ikerd, J.E. Socioeconomic Considerations in Developing Sustainable Farming Systems, Agronomy Abstracts, American Society of Agronomy, Madison, WI, 1994. (p. 542).

Ikerd, J.E. Government Policy Options and Implications for Weed Management Alternatives, Agronomy Abstracts, American Society of Agronomy, Madison, WI, 1994. (p.79).

Ikerd, John E. "Systems Research in Sustainable Agriculture: Economics, Ecology, and Quality of Life," Selected Paper, American Agricultural Economics Association, American Journal of Agricultural Economics, Vol 76, No. 5, December, 1994.(p.1271).

Ikerd, John. "Understanding and Managing the Multi-Dimensions of Sustainable Agriculture," Southern Regional Sustainable Agriculture Professional Development Program, SARE Regional Training Consortium, Gainesville, FL, January 1997.

Ikerd, John. "Returning the Sacred to Food and Farming," 12th Annual Sustainable Agriculture Conference, North Carolina Farm Stewardship Association, Flat Rock, NC, November 1997.

Ikerd, John E. "Sustainable Agriculture, Community Development, and Large-Scale Swine Production." in Pigs, Profits, and Rural Communities , edited by Kendall M. Thu and E. Paul Durrenberger, State University of New York Press, Albany, NY. (pp157-169).

Ikerd John E. "Social, Economic, and Cultural Impacts of Large-scale Confinement Animal Feeding Operations," Paper presented at "Who Owns America? II Conference," Land Tenure Center, Madison, WI, June 3-6, 1998.

Grants, 1991-1996:

Extension Service- USDA

- Sustainable Agriculture, Agenda for Action, National Council, $220,000, 1991.
- Strategic Planning and Implementation Sustainable Agriculture Extension, $72,500, 1994-1996.

Cooperative State Research Service -USDA

- On-Farm Research and Evaluation of Sustainable Farming Systems, $65,000, 1992.
- Evaluating Rural Community Impacts of Sustainable Agriculture, $99,000, 1992.
- Sustaining A Desirable Quality of Life on Small Farms, $30,000, 1996; $30,000, 1997; $32,900, 1998.
- Strengthening Grant -- Tennessee State University Subgrant -- Sustainable Agriculture, $67,750, 1995.
- Sustainable Agriculture Professional Development Program, $20,000, 1995; $22,000, 1996; $22,500, 1997; $24,000, 1998.

U.S. Department of Energy

- Implications of LISA for Energy Conservation in U.S., $48,500, 1991.

U.S. Environmental Protection Agency

- LISA Alternatives for Environmental Protection, $32,000, 1991.

Missouri Department of Natural Resources

- Changes in Farming Systems Needed to Reach T by 2000, $50,000, 1991
- Non-point Source Pollution Demonstration and Education, $129,000, 1992
- Sustainable Agriculture Education to Reduce Water Quality Risks, $50,000, 1995

Missouri Department of Agriculture

- Sustainable Agriculture Demonstration Program, $345,000, 1994-98.

W.K. Kellogg Foundation

- Sustaining Rural Community Development Through Sustainable Agriculture, $1,200,000, 1995-2000.

Congressional Testimony

Ikerd, John E., "Marketing Activities in Sustainable Agricultural Systems: Another Piece of the Profitability Puzzle," Symposium on Agricultural Industrialization and the Family Farm, Joint Economic Committee, Congress of the United States, October 21, 1992,

Ikerd, John E., Information and Educational Needs for Sustainable Agriculture, Testimony Presented to U.S. House of Representatives Agricultural Subcommittee hearing on Sustainable Agriculture, Washington DC, July, 1989.

Special Reports

Ikerd, John. 1997. "Southeast Region-Regional Diversity Assessment," Special Report to University Extension by UE Diversity Task Force, March 1997.

Ikerd, John. 1997. "Affirmative Action Conference-Group Discussion Notes," Special Report to University Extension by UE Diversity Task Force, March 1997.

Lummus, James R. and John Ikerd. "On-farm Trials and Demonstration Results 1993," Special Project Report, Department of Agricultural Economics, University of Missouri, Columbia, MO, February, 1994.

Ikerd, John E., Gary Devino and Suthihit Traiyongwanich, "Potential Local Economic Impacts of Alternative Systems of Farming: A Case Study," Department of Agricultural Economics, University of Missouri, Columbia, MO, December, 1994.

Van Dyne, Donald L., John E. Ikerd and Sandra J. Monson, "Estimated Oil Production Resulting from Producing Oilseed Crops on CRP Land for Use as Industrial Feedstocks in the U.S.," Department of Agricultural Economics, University of Missouri Columbia, MO, October, 1994.

Monson, Sandra and John E. Ikerd, "Assessment of Changes in Missouri Farming Systems Needed to Reach T by Two-Thousand," Special Research Project Report to Missouri Soil and Water Conservation Districts Commission, Missouri Department of Natural Resources, October, 1993.

Ikerd, John E., Sandra J. Monson and Donald L. Van Dyne, "Financial Incentives Needed to Encourage Adoption of Sustainable Agriculture," Special Report of Environmental Protection Agency and U.S.D.A. Sponsored Project, University of Missouri, Columbia, MO, April 1992.

Van Dyne, Donald L., Sandra J. Monson and John E. Ikerd, " Low Input Sustainable Agriculture: Implications for Conservation of Non-Renewable Energy," Special Report of Department of Energy and U.S.D.A. Sponsored Project, University of Missouri, Columbia, MO, April 1992.

Magazines and Trade Publications:

Ikerd, John. 1999. "A Revolution Row by Row." Columbia Daily Tribune, Columbia, MO. Tuesday, March
30, 1999.

Ikerd, John. 1999. "Common Sense, The New American Revolution," Small Farm Today, Clark, MO, April 1999, (pp. 30-32).

Ikerd, John. 1999. "The New American Farm," Farm Journal, Guest Viewpoint, Special Feature Page, December 1999.

Ikerd, John. 1999. "Farm Crisis in Rural America! Why?" Mid-Missouri Business Journal, December 6-19, 1999.

Ikerd, John. 1997. "Local Food Systems," Small Farm Today, Clark, MO, April/May, 1997. (p. 11).

Ikerd, John. 1996. "The Industrialization of Agriculture: Why We Should Stop Promoting It," Small Farm Today, February, 1996 (pp 50-52).

Ikerd, John. 1996. "Agroecological Opium: A Comment," Choices, American Agricultural Economic Association, First Quarter, 1996 (pp 41-43).

Ikerd, John. 1996, "Dry times ahead -- 100 years of weather records point to 20 year wet/dry cycles," Missouri Ruralist, June 1996. (pp 6-8).

McKissick, John and John Ikerd, July 1996, "Retaining Ownership in Cattle Cycles," The Livestock Roundup, Livestock Marketing Information Center, Lakewood, CO. (pp. 3-4).

Botha, Nells and John Ikerd. "What is sustainable agriculture?" Farmers Weekly, Effective Farming Publications, Pietermaritzburg, South Africa, March 24, 1995, (pp. 17-18).

Ikerd, John. "Greenies and Aggies gotta get along," Missouri Ruralist, Farm Progress Publications, Columbia, MO, Vol 136, No.3, (pp43-44).

Ikerd, John. "Farming for Today and Tomorrow," Commentary, St. Louis Post-Dispatch, Page 7B, May 3, 1995.

Ikerd, John E. "Sustainable Agriculture: A Chance for Small Farmers to Get a Bigger Piece of the Pie," Small Farm Today, Missouri Farm Publishing Inc., Clark, MO, Vol. 11, No. 1, February, 1994, (pp. 36-38).

Ikerd, John E. "Meatless Advocates Are Simply Wrong," The Kansas City Star, Kansas City, MO, October 13, 1993.

Ikerd, John E. "There is Room for Meat at the Table," Rural Missouri, Rural Electric Cooperative Association, Jefferson City, MO, December, 1993.

Ikerd, John E. "Animal Agriculture May Be Necessary for Sustainable Ag," FEEDSTUFFS, Miller Publishing Co. Minneapolis, MN, December, 1993.

Ikerd, John E. "Sustainable Agriculture: A New Public Mandate for Agriculture," The County Agent, Century Communications, Niles, Il, Vol. LIV:(3), p.4-5. Summer 1993.

Ikerd, John E., "Organic Farming and Sustainable Agriculture: Two Related but Distinctly Different Concepts," Small Farm Today, Volume 10, Number 1, February, 1993. (pp. 30-31)

Ikerd, John E. "Is Sustainable Agriculture Really That Radical?" Progressive Farmer, My Thoughts, August, 1992 (p.10).

Ikerd, John E., "Wanted: A New Paradigm for Agriculture," Missouri Farm Magazine, March-April, 1991, pp. 18-19.

Ikerd, John E., "Livestock in Sustainable Farming Systems," Missouri Farm Magazine, May/June 1991, pp. 18-19.

Ikerd, John E., "Wanted: A New Paradigm for Agriculture," The County Agent, Volume LII, Number 3, Summer 1991, pp 6-7.

Conference Proceedings:

Ikerd, John E. 1999. "Shared Leadership, Shared Responsibility and Shared Rewards: A Model for Sustainable Agriculture Programming." Presented at Sustainable Agriculture Concepts, Tools, and Northeast Regional Issues, Northeast Regional SARE PDP Program, Williamstown, MA, January 6-8, 1999.

Ikerd, John E. 1999. "Sustainable Farming and Rural Community Development." Presented at 20th Anniversary NPSAS Winter Conference, North Plains Sustainable Agriculture Association, Bismarck, ND. February 5-7, 1999.

Ikerd, John E. 1999. "Small Farms, Their Role in Our Farming Future." Presented at the 10th Anniversary Upper Midwest Organic Farming Conference, March 4-6 1999, Sinsinawa Mount Center, Sinsinawa, WI. Sponsored by UMOFC, Viroqua, WI.

Ikerd, John E. 1999. "In Harmony with Nature," presented at AgriExpo '99, Columbia, MO. March 23, 1999. Sponsored by the University of Missouri.

Ikerd, John E. 1999. "Environmental Risks Facing Farmers." Presented at Tri-State Conference for Risk Management Education, Pocono Manor, Pennsylvania, May 5-6, 1999. Sponsored by USDA Farm Services Agency.

Ikerd, John E. 1999. "Revolution-Row by Row." Presented at 1999 Big River/Clean Water Week. Sponsored by the Sierra Club, Washington, DC, June 10-15, 1999.

Ikerd, John E. 1999. "The Real Economics of Livestock Factories." Presented at 1999 Big River/Clean Water Week. Sponsored by the Sierra Club, Washington, DC, June 10-15, 1999.

Ikerd, John E. 1999. "Rethinking the Economics of Self-Interests." Presented at Annual Conference of Organization for Competitive Markets, Omaha, NE, August 20, 1999.

Ikerd, John E. 1999. "Foundational Principles: Soils, Stewardship, and Sustainability." Presented at Southern Regional Soils Train-the-Trainer Workshop, SARE Professional Development Program, Raleigh, NC. September 22-24, 1999.

Ikerd, John E. 1999. "Small Farmers-The True Farmers." Presented at Mid-Atlantic Small Farms Conference, Aberdeen, Maryland, Maryland Coop Extension. October 1-2, 1999.

Ikerd, John E. 1999. "The New American Farm." Presented at the 1999 Resilience Annual Fall Conference, Creola, OH. October 9, 1999.

Ikerd, John E. 1999. "The Small Farm Revolution." Presented at the 2nd National Small Farm Conference, St. Louis, MO, October 12-15, 1999. Organized by the USDA CSREES Small Farms Program in collaboration with Lincoln University.

Ikerd, John E. 1999. "Crisis and Revolution in American Agriculture." Presented at Citizens Hearing on Pork Production and the Environment, Brandon, Manitoba, Canada. October 29-31, 1999.

Ikerd, John E. 1999. "Healing and Creativity, A Whole Vision for Rural America." Presented at National Catholic Rural Life Conference, Des Moines, IA. November 5-6, 1999.

Ikerd, John E. 1999. "Hallmarks of Sustainable Farming Systems." Presented at Scientific Conference on Organic Agriculture-Building the Bridges, Saskatoon, Saskatchewan, Canada. November 14, 1999.

Ikerd, John E. 1999. "Search for Solutions, the Need for a Paradigm Shift." Presented at Scientific Conference on Organic Agriculture-Building the Bridges, Saskatoon, Saskatchewan, Canada. November 14, 1999.

Ikerd, John E. 1999. "Specialized Systems and the Economical Stakes." Prepared for presentation at an international conference, "Organic Agriculture Faces the Specialization of Production Systems." Sponsored by Jack Cartier Center, Lyon, France. December 6-9, 1999.

Ikerd, John E. 1998. "Sustainable Agriculture as a Rural Economic Development Strategy," report of joint research project with University of Missouri and Tennessee State University cooperating, University of Missouri, Columbia, MO.

Ikerd, John E., Donald Osburn and J.C. Owsley. 1998. "Some Missouri Farmers' Perspectives of Sustainable Agriculture," report of joint research project with University

of Missouri and Tennessee State University cooperating, University of Missouri, Columbia, MO.

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Ikerd, John E., "A Farm Decision Support System for Sustainable Farming Systems," Journal of Farming Systems Research and Extension, Volume 1, Number 1, Association of Farming Systems Research and Extension, 1990.

Collaborators: MU & National/International

- John Allen, University of Nebraska, Kellogg Sustainable Communities Grant

- Laura DeLind, Michigan State University, Kellogg Sustainable Communities Grant

- Dyremple Marsh, Lincoln University, Sustainable Agriculture Extension Grants

Current Activities: Since retiring from the University in early 2000, Ikerd spends most of his time writing and speaking out on issues related to sustainable agriculture with an emphasis on the economics of sustainability.

Attachment 2:
Highlighted Works of Dr. John E. Ikerd

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Biographical Sketch:

Dr. Ikerd was raised on a small dairy farm in southwest Missouri and received his BS, MS, and Ph.D. degrees in agricultural economics from the University of Missouri. He worked in private industry for a time and spent thirty years in various professorial positions at North Carolina State University, Oklahoma State University, University of Georgia, and University of Missouri before retiring in early 2000. Since retiring, he spends most of his time writing and speaking on issues related to sustainability with an emphasis on economics and agriculture.

Since retiring from the University of Missouri, Ikerd has maintained an active speaking schedule, speaking at more than 300 venues during the past ten years, including venues all across the United States and Canada, as well as in Australia, Norway, Sweden, Scotland, South Korea, and Costa Rica. Most of these presentations relate to sustainable agriculture, organic farming, small farms, agricultural industrialization, and quality of life issues. However, many presentations relate to broader issues of food, economics, globalization, social change, and personal transformation. Since retiring, he has also written five books, four chapters for books, and two forwards for books written by others.

Other Professional Activities:

Prior to retirement, Dr. Ikerd state co-coordinator for Missouri of sustainable agriculture extension programs from 1995 to 2000. Ikerd was responsible for implementing state-wide professional development programs related to sustainable agriculture. Other major research and educational programs included participatory on-farm research and demonstration programs and evaluation of impacts of sustainable agriculture on the quality of life of farm families and others in rural communities. Dr. Ikerd was project leader for a three-state, five-year program from 1995 to 2000, with funding from the W.K. Kellogg Foundation, linking sustainable agriculture and sustainable community development.

Academic Positions:

- Co-coordinator of Sustainable Agriculture Extension Programs, University of Missouri--1995 to 2000.
- Liaison to States in Southern and Northeast Regions, USDA Sustainable Agriculture Research and Education (SARE) program--1993-1995.

- Professor and Head, Department of Extension Agricultural Economics, University of Georgia, 1984-1988.
- President, Southern Agricultural Economics Association, 1986 (Also served as first and second vice president, president elect, and past president, SAEA 1983-87).
- Professor and Extension Economist, Department of Agricultural Economics, Oklahoma State University, 1976-1984.
- Associate Professor and Extension Economist, Department of Economics, North Carolina State University, 1970-76.

Honors & Awards:

- Outstanding Extension Program, American Agricultural Economics Assn. – 1997
- Outstanding Extension Program, Western Agricultural Economics Assn. - 1997
- Outstanding Diversity Work Award, USDA Cooperative Extension Service - 1994
- Outstanding Extension Program, American Agricultural Economics Assn. - 1986
- Outstanding Extension Program, Western Agricultural Economics Assn. - 1985

Selected Professional Publications:
(Publications listed relate only to work on sustainability, beginning in 1988)

Books:

John Ikerd, *The Essentials of Economic Sustainability* (Bloomfield, CT: Kumarian Press Inc., 2012).

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The Future of Food: Sustainable Agriculture is not Optional
Crisis & Opportunity: Sustainable Agriculture in Rural America
Why Should We Teach Sustainability
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THE SUSTAINING PEOPLE THROUGH AGRICULTURE SERIES
Ethical Issues in Eco-Justice within Western Culture
Beyond Sustainability
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Eating Local: A Matter of Integrity
Agriculture: A Legacy of Land and People
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Small Farmers, Big Markets: Working Together for Sustainability
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Role del Mercadeo en la Agricultura Sostenible
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Thai
บทบาทของการตลาดในระบบการเกษตรแบบยั้งยืน

Korean
지속적인 자본주의는 가능한가

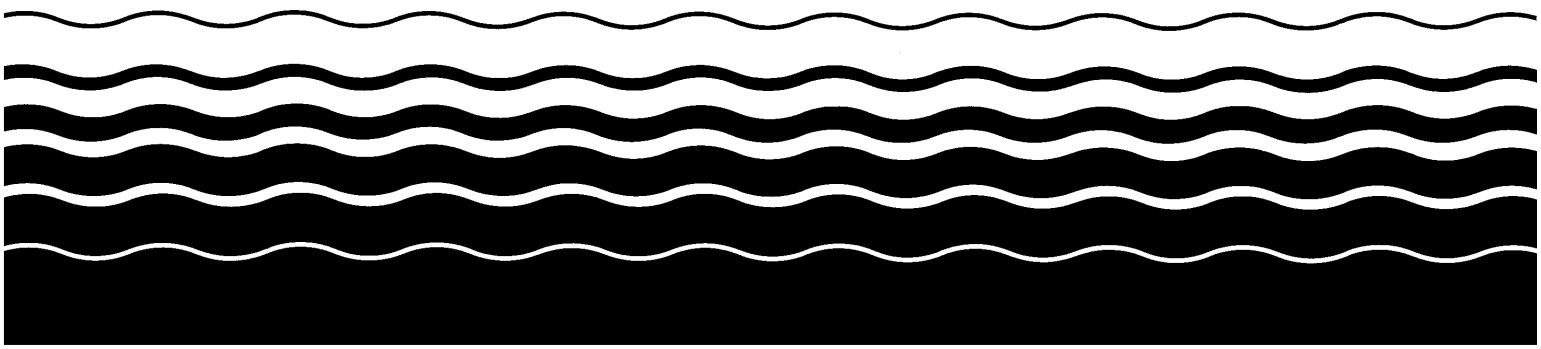
Attachment 3:
USEPA Report: Executive Summary and Section 3

(The full report can be obtained at: http://www.epa.gov/npdes/pubs/cafo_econ_analysis_p1.pdf)

EPA
United States
Environmental Protection
Agency

Economic Analysis of the Final Revisions to the National Pollutant Discharge Elimination System Regulation and the Effluent Guidelines for Concentrated Animal Feeding Operations

December 2002



Economic Analysis of the Final Revisions to the National Pollutant Discharge Elimination System Regulation and the Effluent Guidelines for Concentrated Animal Feeding Operations

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SECTION TWO DATA AND METHODOLOGY FOR ESTIMATING COMPLIANCE COSTS AND ECONOMIC EFFECTS

SECTION THREE TOTAL COSTS AND ECONOMIC IMPACTS OF THE PROPOSED CAFO REGULATIONS (ALL SUBCATEGORIES)

TABLES AND FIGURES

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ACRONYMS

AFO	animal feeding operation
ARMS	Agricultural Resource Management Study
ASAE	American Society of Agricultural Engineers
AU	animal unit
BAT	Best Available Technology
BATEA	Best Available Technology Economically Achievable
BLS	Bureau of Labor Statistics
BMP	best management practice
BNR	biological nutrient removal
BOD	biological oxygen demand
BPJ	best professional judgment
C-E	cost-effectiveness
CAFO	concentrated animal feeding operation
CARD	Center for Agriculture and Rural Development
CC/Q	compliance costs per unit sold
CCI	Construction Cost Index
CE	Central
COD	chemical oxygen demand
CWA	Clean Water Act
DCF	discounted cash flow
EA	economic analysis
EBITDA	earnings before interest, taxes, depreciation, and amortization
ELG	effluent limitations guidelines
EMS	environmental management system
EO	Executive Order
EPA	Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
ERS	Economic Research Service
FAPRI	Food and Agricultural Policy Research Institute
FF	farrow-finish and farrowing
FFSC	Farm Financial Standards Council
FRFA	final regulatory flexibility analysis
FTE	full-time equivalent
GDP	Gross Domestic Product
GF	grow-finish
ICR	Information Collection Request
IRFA	initial regulatory flexibility analysis
IRS	Internal Revenue Service
LCBP	Lake Champlain Basin Program
MA	Mid-Atlantic
MACRS	Modified Accelerated Cost Recovery System
MW	Midwest
NAICS	North American Industry Classification System
NASS	National Agricultural Statistics Service
NCBA	National Cattlemen's Beef Association
NCSU	North Carolina State University
NEWWT	Northeast Wisconsin Waters for Tomorrow, Inc.
NFI	net farm income
NMPF	National Milk Producers Federation
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPPC	National Pork Producers Council
NRCS	Natural Resources Conservation Service
NRDC	Natural Resources Defense Council
NSPS	New Source Performance Standards
O&M	operation and maintenance
OSHA	Occupational Safety and Health Administration
PA	Pacific
POTW	publicly owned treatment works
RFA	Regulatory Flexibility Act

RIMS II	Regional Input-Output Modeling System
SBA	Small Business Administration
SBAR	Small Business Advisory Review
SBREFA	Small Business Regulatory Enforcement Fairness Act
SER	Small Entity Representative
SIC	Standard Industrial Classification
SO	South
TIAER	Texas Institute for Applied Environmental Research
TSS	total suspended solids
TWF	toxicity weighting factor
UMRA	Unfunded Mandates Reform Act
USDA	United States Department of Agriculture
WASDE	World Agricultural Supply and Demand Estimates
WWTP	wastewater treatment plant

EXECUTIVE SUMMARY

ES.1 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) is revising and updating the two primary regulations that ensure that manure, wastewater, and other process waters generated by concentrated animal feeding operations (CAFOs) do not impair water quality. EPA's final regulatory changes affect the existing National Pollutant Discharge Elimination System (NPDES) provisions and the existing effluent limitations guidelines (ELG) for "feedlots." The NPDES provisions define and establish permit requirements for CAFOs, and the ELG establish the technology-based effluent discharge standard that is applied to CAFOs. Existing regulations were originally promulgated in the 1970s. EPA is revising the regulations to address changes that have occurred in the animal industry sectors over the past 25 years, to clarify and improve implementation of CAFO requirements, and to improve the environmental protection achieved under these regulations. Final revisions to the NPDES and ELG regulations are referred to in this report as the final CAFO regulations.

On January 12, 2001, EPA published a proposal to revise and update these regulations (66 FR 2959), referred to in this report as the "2001 Proposal." The Economic Analysis that supports the 2001 Proposal contains information on EPA's estimates of the cost, financial effects, and monetized benefits of the proposed revisions. That analysis, titled *Economic Analysis of the Proposed Revisions to the National Pollutant Discharge Elimination System Regulation and the Effluent Guidelines for Concentrated Animal Feeding Operations*, is referred to in this report as the "Proposal EA" (USEPA, 2001a). EPA also published two Notices of Data Availability in the Federal Register (66 FR 58556 and 67 FR 48099). These Notices present new data and information EPA has received since the 2001 Proposal, soliciting further public review and comment.

The revisions EPA is promulgating affect who must apply for a permit under the NPDES program, who is subject to the ELG, and what the ELG requires. A summary of the current, proposed, and final NPDES and ELG regulations for CAFOs is presented in Section 1 of this report. See Section 4 of the final rule preamble for a discussion of the final regulations.

This Economic Analysis (EA) summarizes EPA's analysis of the estimated annual compliance costs and the economic impacts that may be incurred by affected operations that are subject to the final revisions. Additional information on the regulatory alternatives considered by EPA for the 2001 Proposal are presented in the EA supporting the proposed regulations (USEPA, 2001a). The report covers financial impacts to CAFOs, potential impacts on processors of livestock and poultry products, and market and other secondary impacts such as impacts on prices, quantities, trade, employment, and output. It also responds to requirements for small business analyses under the Regulatory Flexibility Act (RFA) as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) and for cost-benefit analyses under Executive Order 12866 and the Unfunded Mandates Reform Act (UMRA).

This EA summarizes EPA's analysis of the estimated annual compliance costs and the economic impacts that may be incurred by affected operations that are subject to the final revisions. EPA also provides additional material on the final CAFO regulations in the *Development Document for the Final Revisions to the National Pollutant Discharge Elimination System Regulation and the Effluent Guidelines for Concentrated Animal Feeding Operations*, which discusses how the Agency estimated the compliance costs of the final regulations. EPA's detailed benefit analysis, titled *Environmental and*

Economic Benefit Analysis of the Final Revisions to the National Pollutant Discharge Elimination System Regulation and the Effluent Guidelines for Concentrated Animal Feeding Operations, provides information about existing water quality impairments associated with animal production operations and estimates the extent to which these impairments might be mitigated by the final CAFO regulations.

ES.2 DATA AND METHODOLOGY

ES.2.1 Data Sources

EPA did not conduct an industry-wide survey of all CAFOs. Rather, the Agency is relying on existing data sources and expertise provided by numerous government agencies, state agricultural extension service agencies, and land grant universities, as well as information from industry trade associations, agricultural professionals, and environmental groups. This data collection effort is described in the 2001 Proposal (66 FR 2960) and detailed in the Proposal EA. Major data sources are discussed in detail where they are used to conduct the analyses presented in this report or reference other supporting documents in the rulemaking record.

For its engineering cost analysis, EPA uses industry and cost information from various sources, including USDA, the land grant universities, state agricultural extension agencies, and industry. EPA uses these data to develop its model CAFOs and to extrapolate CAFO level costs to all operations nationwide. A key source of data used to estimate compliance costs and economic impacts on the regulated community is the 1997 Census of Agriculture. The Census is conducted by the National Agricultural Statistical Service (NASS) every five years and provides information on the number of feedlots, their geographic distributions, the amount of cropland available to land apply animal manure generated from animal confinement operations, and other information. These data are compiled by NASS, with the assistance of personnel at USDA's Natural Resources Conservation Service (NRCS), who developed a methodology to identify information specific to animal confinement operations. All Census data provided to other government agencies, including EPA, are aggregated to preserve confidential business information. As detailed in the 2001 Notice, EPA has received additional data and information since proposal that have been incorporated into the Agency's analysis for the final regulations. EPA's *Development Document* supporting the proposed and final rule (USEPA, 2001 and 2002) presents the Census data used along with other USDA data and other source data that EPA uses for its cost analysis.

For EPA's economic impact analysis, the Agency obtained financial data for livestock and poultry operations from a variety of sources, including USDA, the land grant universities, and industry. EPA uses these data to depict baseline financial conditions at representative model CAFOs and to extrapolate CAFO level impacts to all operations nationwide. As detailed in both the 2001 Notice and the 2002 Notice, EPA received additional data and information since proposal that have been incorporated into the Agency's analysis for the final regulations. To assess broader market changes from the CAFO regulations, EPA compiled additional industry and market data from a wide range of USDA data and land grant university research. A detailed summary of the data and citations of the sources of these data are provided in the Proposal EA, supplemented by data and other information presented in this report.

A key source of financial data is USDA's Agricultural Resource Management Study (ARMS). This study is compiled by NASS and USDA's Economic Research Service (ERS) and provides complete

financial accounting data for U.S. farms for each of the major commodity sectors affected by the final CAFO regulations. These data are used to depict farm financial conditions and to evaluate regulatory impacts. ERS provided data for representative farms that were obtained through special tabulations of the available survey data, conducted by ERS, that differentiate the financial conditions among operations by commodity sector, facility size (number of animals onsite), and major farm producing region. As with the Census data, USDA aggregated these data in a manner that preserves both the statistical representativeness and confidentiality of the respondent survey data. EPA also obtained financial data from various land grant universities, including enterprise budgets that portray financial conditions for an operation's livestock or poultry enterprise. In particular, the University of Missouri's Food and Agricultural Policy Research Institute (FAPRI) submitted financial data for several sectors that had been collected as part of their evaluation of EPA's Proposal EA. EPA also obtained financial data from the National Cattlemen's Beef Association (NCBA) based on a survey of its membership to obtain financial statistics specific to cattle feeding operations. Section 2.3 and other sections of this report discuss these data in more detail and describe how these data sources contribute to EPA's analyses.

ES.2.2 Methodology

EPA assessed financial effects on regulated CAFOs based on predicted changes to select financial criteria. The economic model that EPA used to evaluate financial impacts on CAFOs uses a representative farm approach. Under this general framework, EPA constructed a series of model facilities ("model CAFOs") that reflect EPA's estimated compliance costs and readily available financial data. EPA used these model CAFOs to develop an average characterization for a group of operations based on certain distinguishing characteristics for each sector, such as facility size and production region, that can be shared across a broad range of facilities.

EPA developed two sets of models for determining economic impacts at animal confinement operations—cost models and financial models. EPA evaluated compliance costs based on more than 170 farm level cost models that were developed to depict conditions at and to evaluate compliance costs for select representative CAFOs. The cost models are differentiated by commodity sector, farm production region, facility size, and land availability for application of manure. EPA's cost models provide the estimated compliance costs, which are compared to corresponding financial models that characterize financial conditions across different types of operations. (Like the cost models, the financial models are also differentiated by sector, facility size, and production region.) Economic impacts under a post-regulatory scenario are approximated by extrapolating the average impacts for a given model CAFO across the larger number of operations that share similar production characteristics and are identified by that CAFO model. A summary of this overall approach is provided in Section 2.

For the purpose of estimating the costs that would be incurred by CAFOs to comply with the regulations, EPA estimated costs associated with four broad cost components: nutrient management planning, facility upgrades, land application, and technologies for balancing on-farm nutrients. Nutrient management planning costs include manure and soil testing, record-keeping, and plan development. Facility upgrades reflect costs for additional or improved manure storage, mortality handling, runoff controls, reduction of fresh water use where appropriate, and additional farm management practices. Land application costs address agricultural application of nutrients, including hauling of excess manure off-site and adjusting for changes in commercial fertilizer needs, and reflect differences among operations based on cropland availability for manure application.

EPA evaluated compliance costs using a representative facility approach based on approximately 1,600 farm level cost models to depict conditions and to evaluate compliance costs for select representative CAFOs. The major factors used to differentiate individual model CAFOs include the commodity sector, the farm production region, and the facility size (based on herd or flock size or the number of animals on-site). EPA's model CAFOs primarily reflect the major animal sector groups, including beef cattle, dairy, hog, broiler, turkey, and egg laying operations. Practices at other subsector operations are also reflected in the cost models, such as replacement heifer operations, veal operations, flushed-cage layers, and hog grow-finish and farrow-finish facilities.

Another key distinguishing factor incorporated into EPA's cost models is information on the availability of cropland and pastureland for land application of manure nutrients. For this analysis, nitrogen and phosphorus rates of land application were evaluated for three categories of cropland availability: (1) CAFOs with sufficient cropland for all manure generated on-site; (2) CAFOs with some, but not enough, cropland to accommodate all of the manure produced at the facility; and (3) CAFOs with no cropland. EPA used USDA data to determine the number of CAFOs within each of these categories. This information takes into account which nutrient (nitrogen or phosphorus) is used as the basis to assess land application and nutrient management costs. Additional information on this costing approach is provided in Section 2 of this report.

For the purpose of estimating costs and financial effects to CAFOs with between 300 and 1,000 AU, EPA assumes that costs that will be incurred by those sized operations to comply with BPJ-based limitations under the revised NPDES regulations are similar to the estimated costs that would be incurred if operations with between 300 and 1,000 AU had to comply with the ELG.

To estimate the impacts of the final regulations, EPA examined the economic effects on regulated CAFOs and national markets. Estimated financial impacts on regulated entities cover both existing and new CAFOs that will be affected by the final regulations. Results presented here focus on economic effects from the CAFO regulations affecting CAFOs with more than 1,000 AU because only large facilities will be subject to the effluent guidelines and NSPS. EPA's analysis also presents the estimated effects on existing operations that are small businesses.

EPA evaluated the economic achievability of the rule on existing operations based on changes in representative financial conditions across three financial criteria: (1) an initial screening comparing incremental post-tax costs to total gross revenue ("sales test"), (2) projected post-compliance cash flow over a 10-year period ("discounted cash flow analysis"), and (3) an assessment of an operation's debt-to-asset ratio under a post-compliance scenario ("debt-asset test").

EPA used the results from these analyses to divide affected CAFOs into three financial impact categories: Affordable, Moderate, and Stress. CAFOs experiencing affordable or moderate impacts are considered to have some financial impact on operations, but EPA does not expect the costs of complying with this rule to make these operations vulnerable to closure. EPA considers that for CAFOs in both the "Affordable" and "Moderate" impact categories the final requirements are likely to be economically achievable. Operations experiencing financial stress, however, are considered to be vulnerable to closure because of the costs of this rule. EPA considers that for CAFOs in the "Stress" impact category, the final requirements are likely not economically achievable. EPA believes that there may be mitigating factors that could reduce the number of facilities experiencing financial stress, such as the availability of cost-share assistance and long-run market adjustment.

EPA conducted its analysis first at the farm level based on data reflecting financial conditions for the entire farm operation (e.g., reflecting income and cost information spanning the entire operation, thus considering the operation's primary livestock production, along with other income sources such as secondary livestock and crop production, government payments, and other farm-related income). Based on the farm level results, EPA also assessed the financial effects on CAFOs at the enterprise level (e.g., limiting the scope of the assessment to the operation's livestock or poultry enterprise, and excluding other non CAFO-related sources of income from the analysis). By evaluating the financial criteria at both the farm level and the enterprise level, EPA's analyses address comments expressed by many commenters, including FAPRI, other land grant university researchers, and industry, as well as USDA.

Starting with the farm level analysis, EPA considers the regulations to be economically achievable for a representative model CAFO if the average operation has a post-compliance sales test estimate within an acceptable range, a positive post-compliance cash flow over a 10-year period, and a post-compliance debt-to-asset ratio not exceeding a benchmark value. Specifically, if the sales test shows that compliance costs are less than 3 percent of sales, or if post-compliance cash flow is positive and the post-compliance debt-to-asset ratio does not exceed a benchmark (depending on the baseline data) and compliance costs are less than 5 percent of sales, EPA considers the options to be "Affordable" for the representative CAFO group. (Although a sales test result of less than 3 percent does indicate "Affordable" in the farm level analysis, further analysis is conducted to determine the effects at the operation's livestock or poultry enterprise.) The benchmark values assumed for the debt-asset test are sector-specific. EPA assumes a 70 percent benchmark value for the debt-asset test to indicate financial stress in the hog and dairy sectors, and an 80 percent benchmark for the debt-asset test to indicate financial stress in the beef cattle sector. These benchmark values address public comment received and alternative debt and asset data submitted for the livestock sectors. For the poultry sectors, however, EPA did not obtain alternative debt and asset data and continues to evaluate data used for proposal against a 40 percent benchmark value.

A sales test of greater than 5 percent but less than 10 percent of sales with positive cash flow and a debt-to-asset ratio of less than these sector-specific debt-asset benchmark values is considered indicative of some impact at the CAFO level, but at a level not as severe as those indicative of financial distress or vulnerability to closure. These impacts are labeled "Moderate" for the representative CAFO group. EPA considers both the "Affordable" and "Moderate" impact categories to be economically achievable by the CAFO, subject to the enterprise analysis (see below). If, with a sales test of greater than 3 percent, post-compliance cash flow is negative or the post-compliance debt-to-asset ratio exceeds these sector-specific debt-asset benchmarks, or if the sales test shows costs equal to or exceeding 10 percent of sales, EPA considers the final regulations to be associated with potential financial stress for the entire representative CAFO group. In such cases, each of the operations represented by that group might be vulnerable to closure. For operations that are determined to experience financial "Stress" at the farm level, the final requirements are likely not economically achievable.

The enterprise level analysis builds on the farm level analysis, evaluating effects at a farm's livestock or poultry enterprise. If the farm level analysis shows that the regulations impose "Affordable" or "Moderate" effects on the operation, the enterprise level analysis is conducted to determine whether the enterprise's cash flow is able to cover the cost of regulations. This analysis uses a discounted cash flow approach similar to that used to assess the farm level effects, in which the net present value of cash flow is compared to the net present value of the total cost of the regulatory options over the 10-year time frame of the analysis. Over the analysis period, if an operation's livestock or poultry enterprise maintains a cash flow stream that both exceeds the cash costs of the rule (operating and maintenance

costs plus interest) and covers the net present value of the principal payments on the capital, EPA concludes that the enterprise will likely not close because of the CAFO rule. This analysis is conducted on a pass/fail basis. If the net present value of cash flow minus the net present value of the rule's costs is greater than zero, the enterprise passes the test and the enterprise is assumed to continue to operate. EPA considers these results to indicate that the final requirements are economically achievable. If the net present value of cash flow is not sufficient to cover the net present value of the cost of the rule, EPA assumes that the CAFO operator would consider shutting down the livestock or poultry enterprise. That is, if an operation fails the enterprise level analysis, these operations are determined to experience financial "Stress" and the final requirements are likely not economically achievable.

In response to comments, EPA conducted additional supplemental analysis to determine the effects of the regulation under two different scenarios. One scenario takes into consideration the effects of long-run market adjustment following implementation of the final regulations. This analysis is conducted using simulated changes in producer revenue given changes in market prices as depicted by EPA's market model, which uses estimates of price and quantity response in these markets. A second scenario takes into consideration potential cost share assistance under Federal and State conservation programs, assuming that a portion of costs are covered by cost sharing subject to programmatic constraints. Given the uncertainty of whether CAFO income will rise in response to long-run market adjustment or whether available cost share dollars will effectively offset compliance costs at regulated CAFOs, EPA's analysis to determine whether the regulation is "economically achievable" does not rely on such assumptions as part of its regulatory analysis and therefore reflects the highest level of impacts projected. However, EPA presents the results of this analysis assuming both some degree of cost passthrough and no cost passthrough, as well as some degree of cost share assistance and no cost share assistance, along with the results of its lead analysis. More information on this decision framework is provided in Section 2.

EPA's market analysis evaluates the effects of the final regulations on national markets. This analysis uses a linear partial equilibrium model adapted from the COSTBEN model developed by USDA's Economic Research Service. The modified EPA model provides a means to conduct a long-run static analysis to measure the market effects of the final regulations in terms of predicted changes in farm and retail prices and product quantities. Market data used as inputs to this model are from a wide range of USDA data and land grant university research. Once price and quantity changes are predicted by the model, EPA uses national multipliers that relate changes in sales to changes in total direct and indirect employment and also to national economic output. These estimated relationships are based on the Regional Input-Output Modeling System (RIMS II) from the U.S. Department of Commerce. The details of the market analysis are described in Section 2 and also in the Proposal EA.

Additional information on how EPA developed the cost models is provided in the *Development Document*. See also EPA's detailed responses to public comments received on proposal and both Notices of Data Availability published on this rule. These comments and the Agency's response are in the Comment Response Document that is available in the rulemaking record.

ES.3 REGULATED COMMUNITY

The animal sectors covered in this analysis include the cattle, veal, heifer, dairy, hog, broiler, egg layer, and turkey sectors. Not all confinement operations (animal feeding operations or AFOs) in these sectors may be CAFOs and thus subject to the final regulations. Table ES-1 presents the estimated

number of operations that would be defined or designated as a CAFO under the final revisions. CAFOs in the 300 to 1,000 animal units (AU)[1] size category that EPA expects would be defined as CAFOs under the existing NPDES regulation are labeled in table as "Status Quo."

Section 2 of the Proposal EA (USEPA, 2001a) presents more detailed information on the regulated community, including a profile of the various CAFO sectors and meat and poultry processors.

Table ES-1. Number of Potential Operations *Defined* or *Designated* as CAFOs (1997)

Sector	Total Operations Defined as CAFOs		
	>1,000 AU	300-1,000 AU "Status Quo"	Designated CAFOs <1,000 AU
	(number of operations)		
Cattle	1,766	174	15
Veal	12	230	0
Heifers	242	7	3
Dairy	1,450	1,949	30
Hogs	3,924	1,485	52
Broilers	1,632	520	52
Layers-dry	729	26	8
Layers-wet	383	24	2
Turkeys	388	37	10
Total CAFOs	**10,526**	**4,452**	**172**

Source: USEPA (see Section 3). "Layers: wet" are operations with liquid manure systems. "Layers: dry" are operations with dry systems. Number of designated facilities shown over 5 year period.

ES.4 ANNUAL INCREMENTAL COSTS

ES.4.1 Costs to Regulated CAFOs

EPA estimates the annual incremental costs of compliance using the capital and recurring costs derived in the *Development Document*. EPA converts these costs to incremental annualized costs, as described in Appendix A. Annualized costs better describe the actual compliance costs that a model

[1] As defined for the final CAFO regulations, one animal unit (AU) is equivalent to one slaughter or feeder cattle, calf or heifer; 0.7 mature dairy cattle; 2.5 hogs (over 55 pounds) or 5 nursery pigs; 55 turkeys; 30 egg-laying chickens (where a wet manure management system is used), and 125 broilers and 82 egg-laying chickens, regardless of the animal waste system used.

CAFO would incur, allowing for the effects of interest, depreciation, and taxes. EPA uses these annualized costs to estimate the total annual compliance costs and to assess the economic impacts of the final requirements to regulated CAFOs by taking the annualized costs for each CAFO model and aggregating them on the basis of the number of affected CAFOs represented by each model. Section 2 and Appendix A provide more details on the cost annualization methodology and results.

This EA presents the results of two technology options where EPA has estimated the cost of land application based on nitrogen-based application rates only (Option 1) and also the cost of land application based on nitrogen-based application rates, except in those instances where EPA believes that phosphorus-based rates are likely to be appropriate (Option 2). The final rule specifies that the determination of application rates is to be based on the technical standards established by the Director and EPA expects that these standards will require phosphorus-based application, where appropriate. The rule also provides for these standards to include appropriate flexibilities in the use of phosphorus-based rates, such as multi-year phosphorus application, but the potential costs savings resulting from these flexibilities are not reflected in the analysis. As a result, the cost and economic impacts of this rule may have been overestimated.

EPA evaluated the costs of these technology options for all operations defined as CAFOs with more than 1,000 AU and for those operations that are defined as CAFOs with between 300 and 1,000 AU. EPA calculates these costs using the data and approaches described in the *Development Document* (USEPA, 2002) and in Section 2 of this report. For the purpose of estimating total regulatory costs of the final CAFO regulations, EPA assumes that the individual per-CAFO costs to comply with the effluent guideline regulations are similar to the costs that will be incurred by operations with between 300 and 1,000 AU to comply with the revised NPDES requirements (although these smaller-sized operations will be subject to BPJ and not the ELG requirements). These cost estimates, therefore, may further be overstated for this size category.

Table ES-2 summarizes EPA's estimates of the total annualized costs to existing CAFOs due to the regulations. The table shows these costs broken out by sector and broad facility size category. Results are shown for both Option 1 and Option 2. As shown in the table, EPA estimates the total estimated costs to CAFOs range from $141 million (Option 1) to $326 million annually (Option 2), expressed as pre-tax, 2001 dollars. Roughly one-half of this cost is incurred by the dairy sector, with another roughly 30 percent incurred within the cattle sectors (including the beef, veal, and heifer sectors). (Total estimated social costs include an additional $9 million to Federal and State governments; see Section 5.)

Of this total, EPA estimates that the cost to operations with more than 1,000 AU range from $119 million (Option 1) to $273 million annually (Option 2). Total estimated costs to facilities defined as CAFOs with between 300 and 1,000 AU range from $19 million (Option 1) to $39 million annually (Option 2). EPA estimates that of the total cost to additional operations that may be designated as CAFOs ranges from about $3 million to $4 million annually, depending on the regulatory option. More information on these costs is provided in Section 3, along with cost information on alternative regulatory options EPA considered.

Table ES-2. Annual Pre-tax Cost of the Rule, $2001 (Option 1 & Option 2)

Sector	Number of Operations		Aggregate Incremental Costs			
	CAFOs >1,000 AU	CAFOs 300-1,000 AU	Total	CAFOs >1,000 AU	CAFOs 300-1,000 AU	Designated CAFOs
	(number)		($2001, millions, pre-tax)			
ELG Option 1						
Fed Cattle	1,766	174	$19.2	$17.8	$1.1	$0.3
Veal	12	230	<$0.1	<$0.1	<$0.1	$0.0
Heifer	242	7	$3.5	$1.3	$2.1	$0.1
Dairy	1,450	1,949	$71.5	$59.7	$11.3	$0.5
Hogs	3,924	1,485	$8.6	$6.4	$2.1	$0.1
Broilers	1,632	520	$18.5	$15.3	$2.1	$1.1
Layers - Dry	729	26	$6.6	$6.3	$0.1	$0.2
Layers - Wet	383	24	$6.4	$6.4	$0.0	<$0.1
Turkeys	388	37	$6.3	$5.9	$0.2	$0.2
Total	**10,526**	**4,452**	**$140.6**	**$119.1**	**$19.0**	**$2.5**
ELG Option 2						
Fed Cattle	1,766	174	$88.2	$85.8	$1.9	$0.5
Veal	12	230	$0.0	<$0.1	<$0.1	$0.0
Heifer	242	7	$6.3	$3.8	$2.4	$0.1
Dairy	1,450	1,949	$151.1	$128.2	$22.0	$0.9
Hogs	3,924	1,485	$34.8	$24.9	$9.5	$0.4
Broilers	1,632	520	$20.5	$16.8	$2.4	$1.3
Layers - Dry	729	26	$7.5	$7.2	$0.1	$0.2
Layers - Wet	383	24	$8.9	$8.4	$0.5	<$0.1
Turkeys	388	37	$8.7	$8.1	$0.3	$0.3
Total	**10,526**	**4,452**	**$326.0**	**$283.2**	**$39.1**	**$3.8**

May not add due to rounding. Number of operations do not include designated facilities. See notes Table 3-1.
"Layers: dry" are operations with dry manure systems. "Layers: wet" are operations with liquid manure systems.

These aggregated cost estimates reflect pre-tax costs. However, EPA's model calculates both pre-tax and post-tax costs (see Section 2.2.4). The post-tax costs reflect the fact that a CAFO would be able to depreciate or expense these costs, thereby generating a tax savings. Post-tax costs thus are the actual costs the CAFO would face. Pre-tax costs reflect the estimated total social cost of the regulations, including lost tax revenue to governments. Pre-tax dollars are used when comparing estimated costs to monetized benefits that are estimated to accrue under the final regulations (see Section 5). All costs presented in this section are presented in terms of pre-tax 1997 dollars and do not account for annual tax savings to CAFOs. However, post-tax costs are also used to evaluate impacts on regulated facilities using a discounted cash flow analysis, as presented in Section 3.3. EPA's estimated compliance costs presented in the *Development Document* are also estimated in 1997 dollars because 1997 is the base year of the analysis (USEPA, 2002). Estimated costs have been converted from 1997 dollars to 2001 dollars using the Construction Cost Index (ENR, 2002).

ES.4.2 Costs to the NPDES Permitting Authority

The NPDES permitting authority would incur additional costs to alter existing State programs and obtain EPA approval to develop new permits, review new permit applications, and issue revised permits that meet the final regulatory requirements. EPA expects that NPDES permitting authorities will incur administrative costs related to the development, issuance, and tracking of general or individual permits.

State and Federal administrative costs to issue a general permit include costs for permit development, public notice and response to comments, and public hearings. States and EPA might also incur costs each time a facility operator applies for coverage under a general permit due to the expenses associated with a NOI. These per-facility administrative costs include initial facility inspections and annual record-keeping expenses associated with tracking NOIs. Administrative costs for an individual permit include application review by a permit writer, public notice, and response to comments. An initial facility inspection might also be necessary.

EPA assumes that under the final regulations more than 15,500 CAFOs would be permitted. This estimate consists of about 15,000 CAFOs covered by State permits and about 500 CAFOs covered by Federal permits. Administrative costs incurred by State permitting authorities are expected to be $8.5 million. EPA permitting authorities will incur the remaining $0.3 million. EPA has expressed these costs in 2001 dollars, annualized over the 5-year permit term using a 7 percent discount rate. A summary of this analysis is available in section 10 of the preamble to the final rule. More information is is available in Section 5 of this report. See also the *NPDES Support Document* (USEPA, 2002n) and in the *Development Document* (USEPA, 2002).

ES.5 FINANCIAL EFFECTS

ES.5.1 Existing CAFOs

Table ES-3 presents the results of EPA's analysis of the estimated CAFO financial effects in terms of the number of operations that will experience affordable, moderate, or stress impact because of this rule. Results are shown by sector for CAFOs with more than 1,000 AU only. The analysis evaluates the regulatory impacts on existing CAFOs with more than 1,000 AU only because this size of operation

only would be subject to the ELG regulations (and, therefore, EPA has determined whether the final ELG requirements reflect Best Available Technologies Economically Achievable or BATEA. Operations with fewer than 1,000 AU would be subject to "Best Professional Judgement" [BPJ]).

EPA's analysis results are shown in Table ES-3. For Option 1, the analysis indicates that, among all CAFOs with more than 1,000 AU in the veal, heifer, dairy, hog, turkey, and egg-laying sectors, the impacts due to this rule can be characterized as "Affordable" or "Moderate." Therefore, EPA considers this option to be economically achievable for existing facilities in these animal sectors. EPA estimates that a total of 15 existing CAFOs (less than 1percent of all CAFOs with more than 1,000 AU) would experience financial stress and might be vulnerable to closure. By sector, EPA estimates that 12 beef operations (1 percent of affected beef CAFOs) and 3 broiler operations (less than 1 percent of affected broiler CAFOs) might close as a result of complying with the final regulations.

For Option 2, the analysis indicates that, among all CAFOs with more than 1,000 AU in the veal, dairy, turkey, and egg-laying sectors, the impacts due to this rule can be characterized as "Affordable" or "Moderate." Therefore, EPA considers this option to be economically achievable for existing facilities in these animal sectors. (Moderate impacts might be incurred by operations in some sectors, but these impacts are not considered to result in facility closure.) In the beef cattle, heifer, hog, and broiler sectors, however, EPA's analysis indicates that the final rule would cause some existing CAFOs to experience financial stress, making these operations vulnerable to facility closure. Across all sectors, EPA estimates that 285 existing CAFOs (about 3 percent of all all CAFOs with more than 1,000 AU) would experience financial stress and might be vulnerable to closure. By sector, EPA estimates that 49 beef operations (3 percent of affected beef CAFOs), 22 heifer operations (9 percent), 204 hog operations (5 percent of affected hog CAFOs), and 10 broiler operations (1 percent) might close as a result of complying with the final regulations. See Section 3 of this report for more information.

These estimates of the number of potential CAFO closures are cumulative and reflect the results of both the farm level analysis and the enterprise level analysis. These estimated closure rates are generally consistent with the findings of economic achievability of previous effluent guidelines for other industrial point source categories. Based on the results of this analysis, EPA concludes that both Option 1 and Option 2 would be considered economically achievable for existing CAFOs.

These results are based on an analysis that does not consider the longer term effects on market adjustment and also available cost-share assistance from Federal and State farm conservation programs. EPA believes that such adjustments could lessen the economic impacts of the final regulations over time. Sections 3.3.5 show the results of this analysis under assumptions of long-run market adjustment and cost-share assistance.

These results reflect estimated costs for two technology options where EPA has estimated the cost of land application based on nitrogen-based application rates only (Option 1) and also the cost of land application based on nitrogen-based application rates, except in those instances where EPA believes that phosphorus-based rates are likely to be appropriate (Option 2). Given that the final rule provides for appropriate flexibilities in the use of phosphorus-based rates, such as multi-year phosphorus application, EPA has not accounted for the potential costs savings resulting from these flexibilities in its analysis. As a result, the economic impacts presented here may be overestimated. Also, for the purpose of this analysis, EPA assumes that small business CAFOs with between 300 and 1,000 AU would incur costs similar to those estimated for CAFOs with more than 1,000 AU (although these smaller-sized operations will be subject to BPJ and not the ELG requirements under the revised NPDES requirements). These upper end cost estimates could, therefore, overstate the financial effects for this size category.

Table ES-3. Financial Effects of the ELG on CAFOs (>1,000 AU), Option 1 and Option 2

Sector	Number CAFOs (>1,000AU)	Affordable	Moderate	Stress	Affordable	Moderate	Stress
		(Number)			(Percent of Total Operations)		
ELG Option 1							
Fed Cattle	1,766	1,754	0	12	99%	0%	1%
Veal	12	12	0	0	100%	0%	0%
Heifer	242	242	0	0	100%	0%	0%
Dairy	1,450	1,232	218	0	85%	15%	0%
Hogs	3,924	3,924	0	0	100%	0%	0%
Broilers	1,632	1,334	294	3	82%	18%	0%
Layers - Dry	729	729	0	0	100%	0%	0%
Layers - Wet	383	383	0	0	100%	0%	0%
Turkeys	388	388	0	0	100%	0%	0%
Total	**10,526**	**9,998**	**512**	**15**	**95%**	**5%**	**0%**
ELG Option 2							
Fed Cattle	1,766	1,717	0	49	97%	0%	3%
Veal	12	12	0	0	100%	0%	0%
Heifer	242	220	0	22	91%	0%	9%
Dairy	1,450	1,019	431	0	70%	30%	0%
Hogs	3,924	3,249	470	204	83%	12%	5%
Broilers	1,632	1,032	590	10	63%	36%	1%
Layers - Dry	729	729	0	0	100%	0%	0%
Layers - Wet	383	383	0	0	100%	0%	0%
Turkeys	388	388	0	0	100%	0%	0%
Total	**10,526**	**8,749**	**1,491**	**285**	**83%**	**14%**	**3%**

Source: USEPA. May not add due to rounding.
"Layers: dry" are operations with dry manure systems. "Layers: wet" are operations with liquid manure systems.

Section 3 of this report also presents the results of alternative regulatory options considered in the 2001 Proposal. Also presented are potential closures assuming that operations with fewer than 1,000 AU might have been subject to the ELG, as was proposed by EPA.

ES.5.2 Small Business CAFOs

Table ES-4 shows EPA's estimate of the number of small businesses that would be affected by the final regulations. EPA's analysis indicates that the final rule could cause financial stress to some small businesses, making these businesses vulnerable to closure (assuming no cost passthrough and cost-share assistance). Section 4 of this report provides more detailed information.

The Small business Administration (SBA) defines a "small business" in the livestock and poultry sectors in terms of average annual receipts (or gross revenue). SBA size standards for these industries define a "small business" as one with average annual revenues over a 3-year period of less than $0.75 million for dairy, hog, broiler, and turkey operations; $1.5 million for beef feedlots; and $9.0 million for egg operations. EPA defines a "small" egg laying operation for purposes of its regulatory flexibility assessments as an operation that generates less than $1.5 million in annual revenue. EPA consulted with SBA on the use of this alternative definition. A summary of EPA's rationale and supporting analyses pertaining to this alternative definition is provided in the record and in Section 4.

Given these considerations, EPA defines a "small business" for this rule as an operation that houses or confines less than 1,400 fed beef cattle (includes fed beef, veal, and heifers); 300 mature dairy cattle; 2,100 market hogs; 37,500 turkeys; 61,000 layers; or 375,000 broilers. The approach used to derive these estimates is described in Section 4 and in the record.

EPA estimates that of the approximately 238,000 animal confinement facilities in 1997, roughly 95 percent are small businesses. Not all of these operations would be affected by the final rule. Table ES-4 shows EPA's estimates of the number of small business CAFOs that would be affected by this rule. For this analysis, EPA estimates that about 6,200 affected CAFOs across all size categories are small businesses, accounting for more than 40 percent of the estimated 14,515 affected facilities. EPA estimates that among CAFOs with more than 1,000 AU about 2,330 operations are small businesses (accounting for about one-fourth of all CAFOs in this size category). Most affected small businesses are in the broiler sector. Among CAFOs with between 300 and 1,000 AU, EPA estimates about 3,830 operations are small businesses (accounting for the majority of operations in this size category), and most of the affected small businesses are in the hog, dairy, and broiler sectors.[2]

For the 2001 proposal, EPA conducted a preliminary assessment of the potential impacts on small business CAFOs based on the results of a costs-to-sales test (66 FR 3101). This screen test indicated the need for additional analysis to characterize the nature and extent of impacts on small entities. Based on the results of this initial assessment, EPA projected that it would likely not certify that the proposal, if promulgated, would not impose a significant economic impact on a substantial number of entities. Therefore, EPA convened a SBAR Panel and prepared an Initial Regulatory Flexibility Analysis (IRFA) pursuant to §§609(b) and 603 of the RFA, respectively. The 2001 proposal provides more

[2] For reasons noted in the record, EPA believes that the number of small broiler operations is overestimated and might actually include a number of medium and large broiler operations that should not be considered small businesses.

information on EPA's small business outreach and the Panel activities during the development of this rulemaking (66 FR 3121). Section 10 of the preamble to the final rule summaries EPA's Final Regulatory Flexibility Analysis (FRFA), as required under §604 of the RFA. This analysis is provided in Section 4.

In examining the effects on small businesses for the final rule, EPA followed the same approach used to evaluate the impacts on existing CAFOs, as described in Section ES.2. For the purposes of this analysis, EPA assumes that small business CAFOs with between 300 and 1,000 AU would incur costs similar to those estimated for CAFOs with more than 1,000 AU (although these smaller-sized operations will be subject to BPJ and not the ELG requirements under the revised NPDES requirements). These upper end cost estimates could, therefore, overstate the financial effects for small businesses in this size category. For past regulations, EPA has often analyzed the potential impacts to small businesses by evaluating the results of a costs-to-sales test, measuring the number of operations that will incur compliance costs at varying threshold levels (including ratios where costs are less than 1 percent, between 1 and 3 percent, and greater than 3 percent of gross income). EPA conducted such an analysis at the time of the 2001 proposal, indicating that about 80 percent of the estimated number of small businesses directly subject to the rule as CAFOs might incur costs in excess of three percent of sales. EPA believes that its more refined analysis used for its general analysis (presented here) better reflects the potential impacts to regulated small businesses.

Using the approach used to evaluate the impacts on existing CAFOs, EPA's analysis indicates that the final rule could cause financial stress to some small businesses, making these businesses vulnerable to closure. These results are presented in Table ES-4.

For Option 1, the analysis indicates that, among all small business CAFOs in the veal, dairy, hog, turkey, and egg-laying sectors, the impacts due to this rule can be characterized as "Affordable" or "Moderate." EPA estimates that a total of 172 small businesses (3 percent of all small business CAFOs with more than 300 AU) would experience financial stress and might be vulnerable to closure. By sector, these closures are comprised of about 131 small businesses in the beef sector, 38 businesses in the heifer sector, and 3 businesses in the broiler sector. Most of these (nearly 90 percent) are operations with fewer than 1,000 AU. For Option 2, the analysis indicates that, among all small business CAFOs in the veal, dairy, hog, turkey, and egg-laying sectors, the impacts due to this rule can be characterized as "Affordable" or "Moderate." EPA estimates that a total of 262 small businesses (4 percent of all small business CAFOs with more than 300 AU) would experience financial stress and might be vulnerable to closure. By sector, these closures are comprised of about 183 small businesses in the beef sector, 50 businesses in the heifer sector, and 19 businesses in the broiler sector. Nearly 90 percent of these potential closures are operations with fewer than 1,000 AU. See Section 4 of this report for more information.

These estimates of the number of potential CAFO closures are cumulative and reflect the results of both the farm level analysis and the enterprise level analysis. These results are based on an analysis that does not consider the longer term effects on market adjustment and also available cost-share assistance from Federal and State farm conservation programs. EPA believes that such adjustments could lessen the economic impacts of the final regulations over time.

Table ES-4. Results of EPA's Small Business Analysis, Option 1 and Option 2

Sector	Number of Small Business CAFOs	Affordable	Moderate	Stress	Affordable	Moderate	Stress
		(Number)			(Percent of Total Operations)		
Option 1							
Fed Cattle	712	581	0	131	82%	0%	18%
Veal	12	12	0	0	100%	0%	0%
Heifer	327	289	0	38	88%	0%	12%
Dairy	1330	1330	0	0	100%	0%	0%
Hogs	1485	1485	0	0	100%	0%	0%
Broilers	1823	1395	424	3	77%	23%	0%
Layers: Dry	24	24	0	0	100%	0%	0%
Layers: Wet	407	407	0	0	100%	0%	0%
Turkeys	31	31	0	0	100%	0%	0%
Total	**6151**	**5554**	**424**	**172**	**90%**	**7%**	**3%**
Option 2							
Fed Cattle	712	529	0	183	74%	0%	26%
Veal	12	12	0	0	100%	0%	0%
Heifer	327	277	0	50	85%	0%	15%
Dairy	1330	1306	24	0	98%	2%	0%
Hogs	1485	1483	2	0	100%	0%	0%
Broilers	1823	1026	780	19	56%	43%	1%
Layers: Dry	24	24	0	0	100%	0%	0%
Layers: Wet	407	407	0	0	100%	0%	0%
Turkeys	31	31	0	0	100%	0%	0%
Total	**6151**	**5129**	**806**	**262**	**83%**	**13%**	**4%**

Source: USEPA. See Economic Analysis. May not add due to rounding. Does not includes the number of CAFOs includes designated facilities. Assumes that the costs that will be incurred by those sized operations to comply with BPJ-based limitations under the revised NPDES regulations are similar to the estimated costs that would be incurred if Medium CAFOs had to comply with the ELG.
"Layers: dry" are operations with dry manure systems. "Layers: wet" are operations with liquid manure systems.

ES.5.3 New CAFOs

EPA evaluated impacts on new source CAFOs by comparing the costs borne by new source CAFOs to those estimated for existing sources. That is, if the expected cost to new sources is similar to or less than the expected cost borne by existing sources (and that cost was considered economically achievable for existing sources), EPA considers that the regulations for new sources do not impose requirements that might grant existing operators a cost advantage over new CAFO operators and further determines that the NSPS requirements are affordable and do not present a barrier to entry for new facilities. In general, costs to new sources from NSPS requirements are lower than the costs for retrofitting the same technologies at existing sources since new sources are able to apply control technologies more efficiently than existing sources that might incur high retrofit cost. New sources will be able to avoid the retrofit costs that will be incurred by existing sources. Furthermore, new sources might be able to avoid the other various control costs facing some existing producers through careful site selection. The requirements promulgated in today's rule do not give existing operators a cost advantage over new CAFO operators; therefore, the NSPS do not present a barrier to entry for new facilities. Examples of avoided retrofit costs and costs of total containment systems and waste management, including land application, for both existing and new sources, are provided in Section 4 of the preamble to the final regulations. More detailed information is provided in the *Development Document* (USEPA, 2002) and related cost reports, as well as in Section 3.

ES.5.4 National Markets

EPA's market analysis evaluates the effects of the final regulations on commodity prices and quantities at the national level. The analysis also presents EPA's estimate of national and regional employment changes, net trade, and changes in economic output, among other supplemental analyses. Section 3 of this report provides more detailed information.

EPA expects that predicted changes in animal production might raise producer prices as the market adjusts to the final regulatory requirements. For most sectors, EPA estimates that producer price changes will rise by less than one percent compared to the pre-regulation baseline price. At the retail level, EPA estimates that poultry and red meat prices will rise about one cent per pound. EPA also estimates that egg prices will rise by about one cent per dozen and that milk prices will rise by about one cent per gallon. Trade and employment effects are also expected to be modest.

EPA also considered whether the final rule could have community level and/or regional impacts if it substantially altered the competitive position of livestock and poultry production across the nation, or led to growth or reduction in farm production (in- or out-migration) in different regions and communities. Ongoing structural and technological changes in these industries have influenced where farmers operate and have contributed to locational shifts between the traditional production regions and the emergent, nontraditional regions. Production is growing rapidly in the emergent regions because of competitive pressures and because specialized producers tend to have the advantage of lower per-unit costs of production. This is especially true in hog and dairy production.

To evaluate the potential for differential impacts among farm production regions, EPA examined employment impacts by region. EPA also evaluated whether the final requirements could result in substantial changes in volume of production, given predicted facility closures, within a particular production region. EPA concludes from these analyses that regional and community level effects are

estimated to be modest, but do tend to be concentrated within the more traditional agricultural regions. This analysis is discussed in Section 3.

EPA does not expect that this rule will have a significant impact on where animals are raised. On one hand, on-site improvements in waste management and disposal, as required by the final rule, could accelerate recent shifts in production to more nontraditional regions as higher-cost producers in some regions exit the market to avoid the relatively high retrofitting costs associated with bringing existing facilities into compliance. On the other hand, the final regulations might favor more traditional production systems where operators grow both livestock and crops, since these operations tend to have available cropland for land application of manure nutrients. These types of operations tend to be more diverse and less specialized and, generally, smaller in size. Long-standing farm services and input supply industries in these areas could likewise benefit from the final rule, given the need to support on-site improvements in manure management and disposal. Local and regional governments, as well as other nonagricultural enterprises, would also benefit.

ES.6 COST-BENEFIT ANALYSIS

As Table ES-5 shows, the economic value of the environmental benefits EPA is able to monetize (i.e., evaluate in dollar terms) is comparable to the estimated costs of the rule. EPA has estimated the monetized benefits of the final rule for all operations with more than 1,000 AU. For Option 1, total monetized benefits for CAFOs with more than 1,000 AU range from $141 million to $224 million. For Option 2, total monetized benefits for CAFOs with more than 1,000 AU range from $204 million to $340 million annually. These benefit estimates are expressed as pre-tax, 2001 dollars and have been calculated assuming a 7 percent discount rate. Monetized benefit categories are primarily in the areas of improved surface water quality (measured in terms of enhanced recreational value), reduced nitrates in private wells, reduced shellfish bed closures from pathogen contamination, and reduced fish kills from episodic events. EPA also identified a number of benefits categories that could not be monetized, including reduced euthrophication of estuaries, reduced pathogen contamination in private wells, reduced health and environmental risks associated with episodic pollutant discharge events, drinking water treatment cost savings, reduced odor and air emissions, and avoided loss in property value near CAFOs, among other benefits. These benefits are described in more detail the *Benefits Analysis* and other supporting documentation provided in the record.

These estimated benefits compare to EPA's estimate of the total social costs covering both industry and permit authority costs for operations with more than 1,000 AU only. These costs range from $125 million (Option 1) to $289 million (Option 2) annually for all CAFOs with more than 1,000 AU, as was estimated in the Agency's *Benefit Analysis*. These costs include compliance costs to all CAFOs, as well as administrative costs to Federal and State governments. EPA estimates of the administrative cost to Federal and State governments to implement this rule is $9 million per year. There may be additional social costs that have not been monetized. However, these costs are estimated based on the cost of land application based on nitrogen-based application rates, except in those instances where EPA believes that phosphorus-based rates are likely to be appropriate. As discussed previously, the final rule includes provisions for appropriate flexibilities in the use of phosphorus-based rates, such as multi-year phosphorus application, but the potential costs savings resulting from these flexibilities are not reflected in the analysis. Therefore, the costs of this rule may have been overestimated.

Table ES-5 Total Annual Monetized Social Costs and Benefits (millions $2001), CAFO >1,000 AU

Category	Option 1	Option 2
Total Monetized Social Costs		
Industry Compliance Costs (pre-tax):	$119	$283
State/Federal Administrative Costs:	$6	$6
Total Social Costs	*$125*	*$289*
Total Monetized Benefits		
Improved Surface Water Quality	$102.4 - $182.6	$166.2 - $298.6
Reduced Incidence of Fish Kills	$0.0 - $0.1	$0.1
Improved Commercial Shell Fishing	$0.1 - $2.0	$0.3 - $3.4
Reduced Contamination of Private Wells	$33.3	$30.9
Reduced Contamination of Animal Water Supplies	$4.7	$5.3
Reduced Eutrophication of Estuaries	$0.1	$0.2
Reduced Water Treatment Costs	$0.7 - $1.0	$1.1 - $1.7
Reduced eutrophication & pathogen contamination of coastal & estuarine waters	not monetized	not monetized
Reduced pathogen contamination of private & public underground sources of drinking water	not monetized	not monetized
Reduced human & ecological risks from antibiotics, hormones, metals, salts	not monetized	not monetized
Improved soil properties	not monetized	not monetized
Reduced cost of commercial fertilizers for non-CAFO operations	not monetized	not monetized
Total Benefits	**$141.3 + [B] - $223.8 + [B]**	**$204.1 + [B] - $340.2 +[B]**

Source: USEPA. May not add due to rounding. [B] represents the non-monetized benefits of the rule.

These cost and benefit estimates are also expressed as pre-tax, 2001 dollars and have been calculated assuming a 7 percent discount rate. See Section 5 for more information.

ES.7 OTHER INFORMATION

This report presents a summary of estimated per-animal and per-facility costs by animal sector (Section 3 and Appendices B and D). It also presents an overview of the cost annualization approach

(Appendix A), details on the model used to estimate changes in producer prices associated with the final regulations (Appendix C), and the results of a cost-effectiveness analysis (Appendix E).

Section 2 of the Proposal EA (USEPA, 2001a) provides a detailed industry profile of the affected regulated livestock and poultry sectors and meat and poultry processors. The Proposal EA also details the model used to estimate economic impacts on CAFOs and national level markets (Section 4 and Appendix B). Appendix D of the Proposal EA also shows the results of sensitivity analyses EPA conducted for the 2001 Proposal.

This report does not include a detailed presentation of the economic benefits that are expected to accrue as a result of the final CAFO regulations. That analysis is provided in the *Benefits Analysis* (USEPA, 2002k) that supports this rulemaking. The *Development Document* (USEPA, 2002) provides more detailed information on the farm level costs that EPA estimates for this analysis.

ES.8 ORGANIZATION OF THE REPORT

This report is organized to allow those interested in the impacts on a specific industry sector to find information easily. The sections of the report are as follows:

- Section 1 provides a summary of the existing, proposed, and final regulations affecting CAFOs.
- Section 2 describes the data and methodologies EPA uses to estimate the total annual incremental costs and the economic impacts that would be incurred by the livestock and poultry industry as a result of the final CAFO regulations, highlighting changes EPA has made since the 2001 Proposal in response to public comments.
- Section 3 presents a summary of the estimated national, annual costs and the economic impacts on regulated facilities of the final CAFO regulations.
- Section 4 presents the results of EPA's Final Regulatory Flexibility Analysis and describes the possible financial effects on small businesses.
- Section 5 presents a discussion of the regulatory costs and benefits pursuant to Executive Order 12866 and the Unfunded Mandates Reform Act (UMRA).
- Section 6 presents the references used throughout the report and its appendices.
- Appendix A presents a description of EPA's method to annualize costs and more detailed information on the annualized costs used as inputs to EPA's CAFO level economic analysis.
- Appendix B shows EPA's annualized compliance cost estimates for the ELG technology option chosen for the final regulations.
- Appendix C describes EPA's methodology for estimating changes in farm revenue based on predicted changes in market prices and quantities attributable to the final regulations.

- Appendix D shows EPA estimates of financial effects on operations with more than 300 AU for the ELG technology option chosen for the final regulations.

- Appendix E presents EPA's analysis of the cost-effectiveness of the final CAFO regulation, in terms of pollutant removal effectiveness for nutrients and other priority pollutants, and background information on the methods EPA used for the C-E analysis.

SECTION THREE

TOTAL COSTS AND FINANCIAL EFFECTS OF THE FINAL CAFO REGULATIONS

This section presents the national level aggregate compliance costs and economic impacts on regulated facilities under the final CAFO regulations. Section 3.1 describes the regulated sectors and presents EPA's estimates of the number of affected facilities. Section 3.2 presents EPA's estimates of the expected pre-tax costs (2001 dollars) to industry as a result of the final CAFO regulations for both the NPDES and ELG revisions. (Section 5 of this report presents additional costs of the final regulations to Federal and State permitting authorities.) Section 3.3 and 3.4 present the results of EPA's analysis that evaluates the financial effects on CAFOs with more than 1,000 AU under the effluent guideline regulations. Section 3.3 examines the impact on existing facilities of complying with the final ELG requirements for Best Available Technologies Economically Achievable (BATEA); Section 3.4 examines the impact to new facilities on complying with the final ELG requirements for New Source Performance Standards (NSPS). Finally, Section 3.5 presents the results of EPA's market level analysis, focusing on the potential secondary impacts of the final NPDES and ELG regulations on both consumer and farm level prices and quantities, as well as changes in employment and economic output at the national level.

3.1 IDENTIFICATION AND NUMBER OF AFFECTED CAFOs

3.1.1 Identification of Affected Industry Sectors

3.1.1.1 Beef Subcategory

Cattle feedlots are identified under NAICS 112112 (SIC 0211, beef cattle feedlots) and NAICS 112111, beef cattle ranching and farming (SIC 0212, beef cattle, except feedlots). This sector comprises establishments primarily engaged in feeding cattle and calves for fattening, including beef cattle feedlots and feed yards (except stockyards for transportation).

The beef cattle industry can be divided into four separate producer segments:

- *Feedlot operations* fatten or "finish" feeder cattle before slaughter and constitute the final phase of fed cattle production. Calves usually begin the finishing stage after reaching 6 months of age or reaching at least 400 pounds. Cattle are typically held for 150 to 180 days and weigh 1,150 to 1,250 pounds (for steers) or 1,050 to 1,150 pounds (for heifers) at slaughter.

- *Veal operations* raise male dairy calves for slaughter. The majority of calves are "special fed" or raised on a low-fiber diet until about 16 to 20 weeks of age, when they weigh about 450 pounds.

- *Stocker or backgrounding operations* coordinate the flow of animals from breeding operations to feedlots by feeding calves after weaning and before they enter a feedlot. Calves are kept 60 days to 6 months or until they reach a weight of about 400 pounds.

- *Cow-calf producers* typically maintain a herd of mature cows, some replacement heifers, and a few bulls, and they breed and raise calves to prepare them for fattening at a feedlot. Calves typically reach maturity on pasture and hay and are usually sold at weaning. Cow-calf operators may also retain the calves and continue to raise them on pasture until they reach 600 to 800 pounds and are ready for the feedlot.

AFOs in this sector that might be affected by the final regulations include facilities that confine animals. More information on the types of facilities in this sector that might be covered by the final regulations is provided in the *Development Document* (USEPA, 2002) and the rulemaking record.

3.1.1.2 Dairy Subcategory

Operations that produce milk are identified under NAICS 11212, dairy cattle and milk production (SIC 0241, dairy farms). A dairy operation may have several types of animal groups present, including the following:

- *Calves* (0 to 5 months)
- *Heifers* (6 to 24 months)
- *Lactating dairy cows* (currently producing milk)
- *Cows close to calving and dry cows* (not currently producing milk)
- *Bulls*

AFOs in this sector that might be affected by the final regulations include facilities that confine animals. More information on the types of facilities in this sector that might be covered by the final regulations is provided in the *Development Document* (USEPA, 2002) and the rulemaking record.

3.1.1.3 Hog Subcategory

Hog operations that raise or feed hogs and pigs either independently or on a contract basis are identified under NAICS 11221, hog and pig farming (SIC 0213, hogs). Hog operations may be categorized by six facility types based on the life stage of the animal in which they specialize:

- *Farrow-to-wean* operations that breed pigs and ship 10- to 15-pound pigs to nursery operations.
- *Farrowing-nursery* operations that breed pigs and ship 40- to 60-pound "feeder" pigs to growing-finishing operations.
- *Nursery* operations that manage weaned pigs (more than 10 to 15 pounds) and ship 40- to 60-pound "feeder" pigs to growing-finishing operations.
- *Growing-finishing or feeder-to-finish* operations that handle 40- to 60-pound pigs and "finish" them to market weights of about 255 pounds.

- *Farrow-to-finish* operations that handle all stages of production from breeding through finishing.

- *Wean-to-finish* operations that handle all stages of production, except breeding, from weaning (10- to 15-pound pigs) through finishing.

AFOs in this sector that might be affected by the final regulations include facilities that confine animals. More information on the types of facilities in this sector that might be covered by the final regulations is provided in the *Development Document* (USEPA, 2002) and the rulemaking record.

3.1.1.4 Poultry Subcategory

Poultry operations can be classified into three individual sectors based on the type of commodity in which they specialize. These sectors include operations that breed and/or raise the following:

- *Broilers* or young meat chickens that are raised to a live weight of 4 to 4.5 pounds and other meat-type chickens, including roasters that are raised to 8 to 9 pounds. Classification: NAICS 11232, broilers and other meat-type chickens (SIC 0251, broiler, fryer, and roaster chickens).

- *Turkeys and turkey hens*, including whole turkey hens that range from 8 to 15 pounds at slaughter, depending on market, and also turkey "canners and cut-ups" that range from 22 to 40 pounds. Classification: NAICS 11233, turkey production (SIC 0253, turkey and turkey eggs).

- *Hens that lay shell eggs*, including eggs that are sold for human consumption and eggs that are produced for hatching purposes. Classification: NAICS 11231, Chicken egg production (SIC 0252, chicken eggs), and NAICS 11234, poultry hatcheries (SIC 0254, poultry hatcheries).

AFOs in this sector that might be affected by the final regulations include facilities that confine animals. More information on the types of facilities in this sector that might be covered by the final regulations is provided in the *Development Document* (USEPA, 2002) and the rulemaking record.

3.1.2 Estimated Number of AFOs and Regulated CAFOs

USDA reports that there were 1.1 million livestock and poultry farms in the United States in 1997 (USDA/NASS, 1999a). This number includes both confinement and non-confinement (grazing and rangefed) production, as well as both commercial and noncommercial operations. As shown in Table 3-1, USDA reports that about 240,000 operations raise animals in confinement (Kellogg, 2002). USDA estimates the number of operations with confined animals by focusing on those operations that meet certain minimum characteristics based on USDA assumptions in terms of the number of animals at an operation. This approach does not specifically focus on characteristics that meet the regulatory definition of an animal feeding operation, as codified at 40 CFR Part 122, according to the number of days animals are confined or the amount of vegetative cover at the production area. As stated in the 2001 Notice, EPA believes this is a reasonable approach to estimate the potential number of confinement operations, given best available data and other limited information.

To estimate the number of AFOs and "potential" CAFOs, USDA first defines "farms with confined livestock types" to be farms with 4 or more animal units of any combination of fattened cattle, milk cows, swine, chickens or turkeys (Kellogg, 2002). In USDA's analysis, the use of animal units is based on the USDA definitions of 1,000 pounds of liveweight and not EPA's regulatory definitions, which are expressed in terms of the number of animals on-site (codified in 40 CFR Part 122). USDA estimates of the number of "potential" CAFOs is based on EPA's regulatory definitions used for the proposed regulations. As defined for the proposed CAFO regulations, one animal unit (AU) is equivalent to one slaughter or feeder cattle, calf or heifer; 0.7 mature dairy cattle; 2.5 hogs (over 55 pounds) or 5 nursery pigs; 55 turkeys; 30 egg-laying chickens (where a wet manure management system is used), and 100 broilers and egg-laying chickens, regardless of the animal waste system used. (Note that the final regulation instead defines one AU as equivalent to 125 broilers and 82 egg-laying chickens; see the final rule preamble). The primary source of data for USDA's estimate is the 1997 Census of Agriculture (Census). More information on these data is provided in Kellogg (2002) and the 2001 Notice (66 FR 58556).

Table 3-1 shows EPA's estimates of the number of operations that would be defined as CAFOs under the final regulation (based on USDA's estimates). Size groups shown break out facilities by broad AU size groups (>1,000 AU and increments among operations with between 300 AU and 1,000 AU).[23] The data reflected in this table are adjusted from USDA's original estimates to account for layer facilities (800 operations) with wet manure management systems that have a different AU scale and that were not accounted for in USDA estimates of potential CAFOs. EPA's estimates also differ because other poultry sector data are assessed using a different AU scale—1,000 AU equals 125,000 broilers and 82,000 egg laying chickens—where a dry manure management system is used. EPA estimates further breakouts of the number of egg operations by the type of manure management systems, as well as among hog operations, by whether these are farrow-finish and farrowing operations (grouped under FF) or grow-finish (GF) operations. More information on EPA's estimates is provided in the *Development Document* (USEPA, 2002) and the rulemaking record.

As shown in Table 3-1, EPA estimates that there were about 10,500 operations that confine more than 1,000 AU in 1997, accounting for about 5 percent of all confinement operations. Total operations with between 300 and 1,000 AU are estimated at about 33,100 operations (Table 3-1). Table 5-2 in Section 5 of this report shows EPA's estimate of the number of CAFOs by State and EPA region.

To assess the number of operations with between 300 and 1,000 AU that are *defined* as CAFOs under the existing NPDES permit requirements, EPA uses available data to determine the share of all operations in this size group that are affected by the final regulations. EPA uses data and information from USDA, State extension service experts, and agricultural professionals to derive percentage estimates of the number of operations in each sector that meet the conditions of the existing rule for being defined as a CAFO. Table 3-2 shows the resultant number of operations with 300 to 1,000 AU that EPA expects will be defined as CAFOs based on the existing NPDES regulations (labeled in the table as "Status Quo"). More detailed information on EPA's estimates is in the *NPDES Support Document* available in the rulemaking record (USEPA, 2002n).

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[23] As defined for the final CAFO regulations, one animal unit (AU) is equivalent to one slaughter or feeder cattle, calf or heifer; 0.7 mature dairy cattle; 2.5 hogs (over 55 pounds) or 5 nursery pigs; 55 turkeys; 30 egg-laying chickens (where a wet manure management system is used), and 125 broilers and 82 egg-laying chickens, regardless of the animal waste system used.

Table 3-1. Number of AFOs and Potential CAFOs (1997)

Sector	Total AFOs	Total Operations by Size Group	
		>1,000 AU [a/]	300-1,000 AU
	(Number of Operations)		
Cattle	17,796	1,766	2,682
Heifers	3,843	242	724
Veal	168	12	57
Dairy	94,787	1,450	5,780
Hogs	51,772	3,924	9,901
Hogs-FF [b/]		1,939	6,112
Hogs-GF [b/]		1,985	3,789
Chickens	24,221	2,744	12,372
Broilers	17,776	1,632	10,402
Layers: dry [b/]	6,445	729	1,170
Layers: wet [b/]		383	800
Turkeys	3,309	388	1,615
Other Cattle [c/]	39,634	0	0
Total CAFOs	**237,821**[d/]	**10,526**	**33,131**

Source: Derived by EPA from USDA estimates (Kellogg, 2002). Rounded to nearest tenth. AFO totals include operations that raise more than a single animal type. Potential CAFOs adjusted for mixed operations. See *Development Document* (USEPA, 2002) for more detailed information.

[1/] As defined for the final CAFO regulations, one AU is equivalent to: one slaughter or feeder cattle, calf or heifer; 0.7 mature dairy cattle; 2.5 hogs (over 55 pounds) or 5 nursery pigs; 55 turkeys; 30 egg-laying chickens (where a wet manure management system is used), and 125 broilers and 82 egg-laying chickens (with a dry waste system).

[2/] Estimated by EPA to break out among production system types (farrowing and farrow-finish [FF] and grow-finish [GF], and laying operations with wet and dry manure management systems).

[3/] Cattle other than fattened cattle or milk cows.

[4/] USDA's estimate of the total number of AFOs is adjusted for specialty cases. Specialty cases (estimated at 2,291 operations) are dairies that went out of business in 1997, swine operations with feeder pigs only, and egg-hatching operations. USDA estimates of the total number of potential CAFOs adjusts for double counting of operations with animal populations in one or more sectors that qualify as potential CAFOs.

Table 3-3 shows estimates of the number of facilities that EPA expects will be *designated* as CAFOs by the permitting authority because they are significant contributors to water quality impairment. EPA does not anticipate that many AFOs with fewer than 1,000 AU will be designated by the permitting authority and subject to the final requirements. EPA is aware of very few AFOs that have been designated as CAFOs in the past 20 years. Based on available USDA analyses that measure excessive nutrient application on cropland in some production areas and other farm level data by sector, facility size, and region, EPA estimates that designation might add 172 operations, expressed over the term of a 5-year permit period nationwide (or, on average, about 35 operations each year). More information on EPA's estimates is available in the rulemaking record (USEPA, 2002n).

Table 3-2. Number of Potential Operations *Defined* as CAFOs (1997)

Sector	Total Operations Defined as CAFOs	
	>1,000 AU	300-1,000 AU
	(number of operations)	
Cattle	1,766	174
Heifers	242	230
Veal	12	7
Dairy	1,450	1,949
Hogs	3,924	1,485
Broilers	1,632	520
Layers - Dry	729	26
Layers - Wet	383	24
Turkeys	388	37
Total CAFOs	**10,526**	**4,452**

Source: EPA's *Development Document* (USEPA, 2002) and NPDES Support Document (USEPA, 2002n). See notes Table 3-1.

Table 3-3. Number of Potential Operations *Designated* as CAFOs (1997-2001)

Sector/Size Category	Total	Operations with	Operations with
	(number of operations)		
Cattle	15	13	2
Veal	0	0	0
Heifers	3	3	0
Dairy	30	28	2
Hogs	52	50	2
Broilers	52	50	2
Layers - Dry	2	1	1
Layers - Wet	8	7	1
Turkeys	10	8	2
Total	**172**	**160**	**12**

Source: EPA's *Development Document* (USEPA, 2002) and NPDES Support Document (USEPA, 2002n). See notes Table 3-1. Estimates are shown projected over a 5-year period.

3.2 ESTIMATED ANNUAL COSTS OF THE FINAL CAFO REGULATIONS

This section presents EPA's estimates of the compliance costs to regulated CAFOs for a range of technology options considered by the Agency during the development of these regulations. (Section 5 of this report presents costs of the final regulations to Federal and State permitting authorities.)

This EA presents the results of two technology options where EPA has estimated the cost of land application based on nitrogen-based application rates only (Option 1) and also the cost of land application based on nitrogen-based application rates, except in those instances where EPA believes that phosphorus-based rates are likely to be appropriate (Option 2). The final rule specifies that the determination of application rates is to be based on the technical standards established by the Director and EPA expects that these standards will require phosphorus-based application, where appropriate. The rule also provides for these standards to include appropriate flexibilities in the use of phosphorus-based rates, such as multi-year phosphorus application, but the potential costs savings resulting from these flexibilities are not reflected in the analysis. As a result, the cost and economic impacts of this rule may have been overestimated.

EPA evaluated the costs of these technology options for all operations defined as CAFOs with more than 1,000 AU and for those operations that are defined as CAFOs with between 300 and 1,000 AU. EPA calculates these costs using the data and approaches described in the *Development Document* (USEPA, 2002) and in Section 2 of this report. For the purpose of estimating total regulatory costs of the final CAFO regulations, EPA assumes that the individual per-CAFO costs to comply with the effluent guideline regulations are similar to the costs that will be incurred by operations with between 300 and 1,000 AU to comply with the revised NPDES requirements (although these smaller-sized operations will be subject to BPJ and not the ELG requirements). These cost estimates, therefore, may further be overstated for this size category.

3.2.1 Compliance Costs to CAFOs Under the Final Regulations

Table 3-4 summarizes the total annualized compliance costs to CAFOs. Results are shown as a range of estimates between Option 1 and Option 2. The table shows these costs broken out by sector and by broad facility size category. As shown in the table, EPA estimates the total estimated costs to CAFOs range from $141 million (Option 1) to $326 million annually (Option 2), expressed as pre-tax, 2001 dollars. Most of this cost (roughly 50 percent) is incurred by the dairy sector, with another roughly 30 percent incurred within the cattle sectors (including beef, veal, and heifer sectors).

Of this total, EPA estimates that the cost to operations with more than 1,000 AU ranges from $119 million (Option 1) to $283 million annually (Option 2). Total estimated costs to facilities defined as CAFOs with between 300 and 1,000 AU ranges from $19 million (Option 1) to $39 million annually (Option 2). EPA estimates that of the total cost to operations that may be designated as CAFOs ranges from about $3 million to $4 million annually, depending on the regulatory option.

These aggregated cost estimates reflect pre-tax costs. However, EPA's model calculates both pre-tax and post-tax costs (see Section 2.2.4). The post-tax costs reflect the fact that a CAFO would be able to depreciate or expense these costs, thus generating a tax savings. Post-tax costs thus are the actual costs the CAFO would face. Pre-tax costs reflect the estimated total social cost of the proposed regulations, including lost tax revenue to governments. Pre-tax dollars are used when comparing

estimated costs to monetized benefits that are estimated to accrue under the final regulations (see Section 5). All costs presented in this section are expressed in terms of pre-tax dollars and do not account for annual tax savings to CAFOs. However, post-tax costs are also used to evaluate impacts on regulated facilities using a discounted cash flow analysis, as presented in Section 3.3.

Estimated compliance costs are initially evaluated in 1997 dollars and then adjusted to 2001 dollars using *Engineering News Record's* Construction Cost Index (CCI) (ENR, 2002).[24] The base year for this analysis is 1997, corresponding with available data from USDA's 1997 Agriculture Census. Estimated compliance costs presented in the *Development Document* are estimated in 1997 dollars (USEPA, 2002).

Table 3-4. Annual Pre-tax Cost of the Rule, $2001 (Option 1 & Option 2)

Sector	Number of Operations		Aggregate Incremental Costs			
	CAFOs >1,000 AU	CAFOs 300-1,000 AU	Total	CAFOs >1,000 AU	CAFOs 300-1,000 AU	Designated CAFOs
	(number)		($2001, millions, pre-tax)			
ELG Option 1						
Fed Cattle	1,766	174	$19.2	$17.8	$1.1	$0.3
Veal	12	230	<$0.1	<$0.1	<$0.1	$0.0
Heifer	242	7	$3.5	$1.3	$2.1	$0.1
Dairy	1,450	1,949	$71.5	$59.7	$11.3	$0.5
Hogs	3,924	1,485	$8.6	$6.4	$2.1	$0.1
Broilers	1,632	520	$18.5	$15.3	$2.1	$1.1
Layers - Dry	729	26	$6.6	$6.3	$0.1	$0.2
Layers - Wet	383	24	$6.4	$6.4	$0.0	<$0.1
Turkeys	388	37	$6.3	$5.9	$0.2	$0.2
Total	**10,526**	**4,452**	**$140.6**	**$119.1**	**$19.0**	**$2.5**
ELG Option 2						
Fed Cattle	1,766	174	$88.2	$85.8	$1.9	$0.5
Veal	12	230	$0.0	<$0.1	<$0.1	$0.0
Heifer	242	7	$6.3	$3.8	$2.4	$0.1
Dairy	1,450	1,949	$151.1	$128.2	$22.0	$0.9
Hogs	3,924	1,485	$34.8	$24.9	$9.5	$0.4
Broilers	1,632	520	$20.5	$16.8	$2.4	$1.3
Layers - Dry	729	26	$7.5	$7.2	$0.1	$0.2
Layers - Wet	383	24	$8.9	$8.4	$0.5	<$0.1
Turkeys	388	37	$8.7	$8.1	$0.3	$0.3
Total	**10,526**	**4,452**	**$326.0**	**$283.2**	**$39.1**	**$3.8**

May not add due to rounding. Number of operations do not include designated facilities. See notes Table 3-1.

[24] Adjustment factor = (2001 CCI)/(1997 CCI) = 6342/5825 = 1.0888

3.2.2 Comparison with the Proposed Regulations

For the 2001 Proposal, EPA considered various alternative regulatory options, which are summarized in Table 1-2 in Section 1 of this report. The proposed CAFO regulations noted that EPA's "preferred BAT option" at the time of proposal required nitrogen-based and, where necessary, phosphorus-based land application controls at all livestock and poultry CAFOs (Option 2), along with the additional requirement that all cattle and dairy operations (except veal) must conduct ground water monitoring and implement controls if the ground water beneath the production area has a direct hydrologic connection to surface water (Option 3), and with the additional requirement that all hog, veal, and poultry CAFOs achieve zero discharge from the animal production area with no exception for storm events (Option 5). During the Agency's Option Selection process for the final regulations, EPA evaluated these and other options. The results of this analysis are presented in this section; see also USEPA, 2002l (DCN 375086) in the rulemaking record.[25] This comparison presents the results for five technology options (see also Table 1-2):

- Option 1 would require land application at the CAFO to be consistent with proper agricultural practices, including limiting manure application to the nitrogen needs of the crops grown

- Option 2 would require land application at the CAFO to be consistent with proper agricultural practices, including limiting manure application to the nitrogen needs of the crops grown, or where necessary, to the phosphorus needs of the crops

- Option 3 would add to Option 2 by requiring the operation to perform ground water monitoring and controls, unless it can show that the ground water beneath manure storage areas or stockpiles does not have a direct hydrologic connection to surface water

- Option 5 that would add to Option 2 by establishing a zero discharge requirement from the production area that does not allow for an overflow under any circumstances

- Option 7 that would add to Option 2 by prohibiting manure application to frozen, snow-covered or saturated ground.

Compared to the proposed requirements, EPA is promulgating a less costly regulatory option and is limiting the scope of the final revised regulations. See Section 4 of the final preamble for more details.

Table 3-5 summarizes the total annualized (pre-tax) costs of the alternative technology options for each of the ELG technology options that EPA considered in developing the final CAFO regulations. This comparison does not include estimated costs for designated facilities. As shown in the table, among operations with more than 1,000 AU, the total estimated costs across these options range from about $119 million and $640 million per year (pre-tax, 2001 dollars), not including the potential costs to designated CAFO facilities. Note that estimated costs for Option 3 and Option 7 are calculated using a previous set of engineering costs (April 4, 2002) and also assume an alternative AU thresholds for broiler and egg-laying operations (where 1,000 AU would equal 100,000 broiler and egg-laying operation with dry manure systems). Also, EPA did not estimate costs or financial impacts within the cattle and

[25] Costs for Option 3 and Option 7 are calculated using April 4, 2002 engineering costs and alternative AU thresholds for the broiler and egg-laying sector.

dairy sectors under Option 5 because the Agency does not consider housing of large animals under this option to be practicable in these sectors.

More cost information is provided in Tables 3-6(a) and 3-6(b). Table 3-6(a) shows estimated compliance costs on a per-animal (inventory) basis. Table 3-6(b) compares estimated per-animal costs to average operating costs for model CAFOs. Ranges are expressed across minimum and maximum values. Refer also to Appendix B and Appendix D for more detailed cost information.

Table 3-5. Pre-tax ELG Option Costs, by Sector and Size Group ($2001)

Sector	#CAFOs	Option 1	Option 2	Option 3	Option 5	Option 7
All Defined CAFOs >300 AU						
Beef	1,939	$19.0	$87.7	$87.7	N/A	$63.9
Veal	20	<$0.1	<$0.1	<$0.1	N/A	<$0.1
Heifer	472	$3.3	$6.2	$8.3	N/A	$7.7
Dairy	3,398	$71.0	$150.2	$203.5	N/A	$555.4
Hog	5,409	$8.6	$34.6	$148.6	$144.1	$75.3
Broiler	2,152	$17.4	$19.2	$53.2	$31.7	$43.2
Layer	1,162	$12.7	$16.2	$30.9	$17.3	$19.8
Turkey	425	$6.1	$8.4	$12.9	$8.4	$10.2
Total	**14,977**	**$138.2**	**$322.6**	**$545.3**	**$201.5**	**$775.5**
All Defined CAFOs >1,000 AU						
Beef	1,766	$17.8	$85.8	$83.1	N/A	$60.0
Veal	12	$0.0	<$0.1	<$0.1	N/A	<$0.1
Heifer	242	$1.3	$3.8	$4.9	N/A	$4.9
Dairy	1,450	$59.7	$128.2	$152.9	N/A	$442.6
Hog	3,924	$6.4	$24.9	$132.3	$114.5	$64.6
Broiler	2,945	$15.3	$16.8	$47.8	$28.2	$39.7
Layer	960	$12.7	$15.6	$29.3	$16.6	$18.5
Turkey	388	$5.9	$8.1	$12.5	$8.1	$9.9
Total	**10,526**	**$119.1**	**$283.3**	**$462.8**	**$167.4**	**$640.2**
All Defined CAFOs 300-1000 AU						
Beef	173	$1.1	$1.9	$4.6	N/A	$3.9
Veal	8	<$0.1	<$0.1	<$0.1	N/A	<$0.1
Heifer	230	$2.1	$2.4	$3.4	N/A	$2.8
Dairy	1,948	$11.3	$22.0	$50.6	N/A	$112.8
Hog	1,485	$2.1	$9.5	$16.3	$29.6	$10.7
Broiler	520	$2.1	$2.4	$5.4	$3.4	$3.5
Layer	50	$0.1	$0.6	$1.6	$0.7	$1.4
Turkey	37	$0.2	$0.3	$0.4	$0.3	$0.3
Total	**4,451**	**$19.0**	**$39.1**	**$82.5**	**$34.0**	**$135.3**

Source: USEPA. Costs for Option 3 and Option 7 are calculated using April 4, 2002 engineering costs and assume an alternative AU thresholds for broiler and egg-laying operations; see also USEPA, 2002l—DCN 375086). N/A = "not applicable" since EPA does not consider housing of large animals in some sectors to be practicable.

Table 3-6a. Per Head ELG Option Costs (Minimum and Maximum), by Sector and Size Group ($1997).

Sector/ Size Group	Option 1		Option 2		Option 3		Option 5		Option 7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Beef										
>1000 AU	$0.1	$51.1	$2.2	$49.6	$0.8	$61.2	N/A	N/A	$0.8	$135.5
300-1000AU	$3.4	$54.6	$7.4	$69.3	$5.3	$108.2	N/A	N/A	$5.9	$117.0
Veal										
>1000 AU	$1.3	$1.7	$1.3	$1.7	$2.2	$3.2	N/A	N/A	$1.3	$1.8
300-1000AU	$1.3	$4.5	$1.3	$4.5	$1.7	$8.7	N/A	N/A	$1.3	$4.9
Heifer										
>1000 AU	$0.9	$17.1	$3.4	$50.3	$1.7	$63.4	N/A	N/A	$2.5	$124.8
300-1000AU	$3.0	$72.6	$6.7	$65.4	$4.8	$107.5	N/A	N/A	$5.7	$155.4
Dairy										
>1000 AU	$0.6	$92.7	$3.2	$144.0	$3.2	$281.0	N/A	N/A	$46.3	$1,018
300-1000AU	$2.8	$149.3	$6.2	$205.2	$8.9	$532.7	N/A	N/A	$54.8	$1,261
Hog: GF										
>1000 AU	$0.0	$0.7	$0.0	$6.2	$0.1	$9.4	$0.1	$11.2	$0.1	$6.6
300-1000AU	$0.4	$2.3	$0.7	$6.9	$5.4	$18.8	$0.5	$14.2	$1.6	$12.7
Hog: FF										
>1000 AU	$0.0	$0.7	$0.0	$6.2	$0.1	$9.4	$0.1	$11.1	$0.1	$9.0
300-1000AU	$0.4	$2.4	$0.7	$6.9	$5.3	$18.8	$0.5	$14.2	$1.5	$12.7
Broilers										
>1000 AU	$0.01	$0.12	$0.01	$0.17	$0.03	$0.21	$0.01	$0.17	$0.02	$0.17
300-1000AU	$0.01	$0.14	$0.01	$0.21	$0.05	$0.38	$0.01	$0.21	$0.04	$0.29
Layer Wet										
>1000 AU	$0.01	$0.38	$0.01	$0.35	$0.15	$0.49	$0.01	$0.35	$0.02	$0.30
300-1000AU	$0.04	$0.09	$0.04	$0.19	$0.37	$1.03	$0.42	$0.71	$0.10	$0.43
Layer Dry										
>1000 AU	$0.01	$0.06	$0.01	$0.12	$0.01	$0.19	$0.01	$0.12	$0.01	$0.18
300-1000AU	$0.02	$0.12	$0.02	$0.18	$0.04	$0.38	$0.02	$0.18	$0.03	$0.25
Turkeys										
>1000 AU	$0.03	$0.21	$0.03	$0.32	$0.00	$0.46	$0.03	$0.32	$0.06	$0.37
300-1000AU	$0.04	$0.25	$0.04	$0.48	$0.10	$0.85	$0.04	$0.48	$0.09	$0.57

Source: USEPA. Costs for Option 3 and Option 7 are calculated using April 4, 2002 engineering costs and assume an alternative AU thresholds for broiler and egg-laying operations; see also USEPA, 2002l—DCN 375086). N/A = "not applicable" since EPA does not consider housing of large animals in some sectors to be practicable.

Table 3-6b. Costs as a Share of Model CAFO Total Operating Costs (Minimum and Maximum), ($1997).

Sector/ Size Group	Option 1		Option 2		Option 3		Option 5		Option 7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Beef										
>1000 AU	0.0%	11.1%	0.5%	10.8%	0.2%	13.3%	N/A	N/A	0.2%	29.4%
300-1000AU	0.4%	6.0%	0.8%	7.6%	0.6%	11.9%	N/A	N/A	0.7%	12.8%
Veal										
>1000 AU	0.1%	0.2%	0.1%	0.2%	0.2%	0.4%	N/A	N/A	0.1%	0.2%
300-1000AU	0.1%	0.5%	0.1%	0.5%	0.2%	1.0%	N/A	N/A	0.1%	0.5%
Heifer										
>1000 AU	0.2%	3.7%	0.7%	10.9%	0.4%	13.8%	N/A	N/A	0.5%	27.1%
300-1000AU	0.3%	8.0%	0.7%	7.2%	0.5%	11.8%	N/A	N/A	0.6%	17.0%
Dairy										
>1000 AU	0.0%	4.7%	0.2%	7.3%	0.2%	14.2%	N/A	N/A	2.3%	51.2%
300-1000AU	0.2%	7.8%	0.3%	12.0%	0.5%	31.2%	N/A	N/A	2.9%	66.2%
Hog: GF										
>1000 AU	0.0%	3.5%	0.0%	30.9%	0.1%	47.0%	0.1%	55.9%	0.1%	33.0%
300-1000AU	0.2%	1.2%	0.4%	3.6%	2.8%	9.8%	0.2%	7.4%	0.8%	6.6%
Hog: FF										
>1000 AU	0.0%	0.6%	0.0%	5.5%	0.1%	8.4%	0.1%	9.9%	0.1%	8.0%
300-1000AU	0.3%	1.7%	0.5%	4.9%	3.8%	13.3%	0.3%	10.0%	1.1%	9.0%
Broilers										
>1000 AU	1.1%	25.6%	1.1%	36.1%	5.5%	46.6%	1.8%	32.7%	5.1%	39.0%
300-1000AU	1.8%	22.2%	1.8%	32.7%	7.5%	59.2%	1.1%	36.1%	6.5%	42.6%
Layer Wet										
>1000 AU	0.1%	2.3%	0.1%	2.1%	0.9%	2.9%	0.1%	2.1%	0.1%	1.8%
300-1000AU	0.2%	0.5%	0.2%	1.1%	2.2%	6.2%	2.5%	4.2%	0.6%	2.6%
Layer Dry										
>1000 AU	0.1%	0.4%	0.1%	2.1%	0.1%	1.1%	0.1%	0.7%	0.1%	1.1%
300-1000AU	0.2%	0.5%	0.2%	1.1%	0.2%	2.3%	0.1%	1.1%	0.2%	1.5%
Turkeys										
>1000 AU	0.2%	1.2%	0.2%	1.9%	0.0%	2.7%	0.2%	1.9%	0.3%	2.1%
300-1000AU	0.6%	3.5%	0.6%	6.7%	1.4%	11.8%	0.6%	6.7%	1.3%	7.9%

Source: USEPA. Costs for Option 3 and Option 7 are calculated using April 4, 2002 engineering costs and assume an alternative AU thresholds for broiler and egg-laying operations; see also USEPA, 2002l—DCN 375086). N/A = "not applicable" since EPA does not consider housing of large animals in some sectors to be practicable.

3.3 ESTIMATED FINANCIAL EFFECTS ON EXISTING OPERATIONS (BAT ANALYSIS)

Following a brief review of the baseline financial conditions depicted in EPA's model CAFOs (Section 3.3.1), this section presents the financial effects of the regulations on CAFOs with more than 1,000 AU (Section 3.3.2). These results focus on two principal technology options (Option 1 and Option 2), as was done for estimated compliance costs in Section 3.2. Sections 3.3.3 and 3.3.4 show these results under alternative assumptions, including alternative cash flow calculations (Section 3.3.3) and estimates of CAFO closures under alternative assumptions of long-run market adjustment and cost-share assistance (Section 3.3.4). Section 3.3.5 provides additional information regarding other alternative regulatory options considered by the Agency during the development of the rule.

3.3.1 Baseline Financial Health of Model CAFOs

Based on financial data presented in Section 2 (see Tables 2-2 and 2-3), all representative model CAFOs, regardless of sector or size or production region, are considered to be financially healthy in the baseline before the impacts of the final regulations are considered. Using these data, all model CAFOs currently are estimated to have positive discounted cash flow and debt-to-asset ratios below the established benchmark value for this rule (depending on sector).[26] Post-regulatory impacts are measured against this baseline. EPA considers that negative cash flow or debt-to-asset ratios greater than the benchmark value in the impact analysis can be attributed to the compliance costs associated with the regulatory options considered.

3.3.2 Financial Effects on CAFOs under the Final Regulations

This section examines the impact on existing CAFOs with more than 1,000 AU to comply with the final ELG requirements for Best Available Technologies Economically Achievable (BATEA).

Table 3-7 presents the results of EPA's analysis of the estimated CAFO level financial effects in terms of the number of operations that will experience affordable, moderate, or stress impact due to the regulations. Results are shown both for Option 1 and Option 2. Results are shown by sector for operations with more than 1,000 AU only because these are the operations that would be subject to the ELG regulations. Operations with fewer than 1,000 AU would be instead subject to the BPJ of the permitting authority. Section 3.3.5 shows the results of alternative regulatory options assuming that operations with fewer than 1,000 AU would be subject to the ELG, which EPA considered in the 2001 Proposal.

For Option 1, the analysis indicates that, among all CAFOs with more than 1,000 AU in the veal, heifer, dairy, hog, turkey, and egg-laying sectors, the impacts due to this rule can be characterized as "Affordable" or "Moderate." Therefore, EPA considers this option to be economically achievable for existing facilities in these animal sectors. EPA estimates that a total of 15 existing CAFOs (less than 1percent of all CAFOs with more than 1,000 AU) would experience financial stress and might be

[26]As discussed in Section 2, EPA did adjust the available hog enterprise level data from USDA. Among the various reasons for this adjustment were concerns about how to assess impacts for this sector given that the reported data are unanalyzable in this framework (because of consistently negative cash flow calculations).

vulnerable to closure. By sector, EPA estimates that 12 beef operations (1 percent of affected beef CAFOs) and 3 broiler operations (less than 1 percent of affected broiler CAFOs) might close as a result of complying with the final regulations.

For Option 2, the analysis indicates that, among all CAFOs with more than 1,000 AU in the veal, dairy, turkey, and egg-laying sectors, the impacts due to this rule can be characterized as "Affordable" or "Moderate." Therefore, EPA considers this option to be economically achievable for existing facilities in these animal sectors. (Moderate impacts might be incurred by operations in some sectors, but these impacts are not considered to result in facility closure.) In the beef cattle, heifer, hog, and broiler sectors, however, EPA's analysis indicates that the final rule would cause some existing CAFOs to experience financial stress, making these operations vulnerable to facility closure. Across all sectors, EPA estimates that 285 existing CAFOs (about 4 percent of all all CAFOs with more than 1,000 AU) would experience financial stress and might be vulnerable to closure. By sector, EPA estimates that 49 beef operations (3 percent of affected beef CAFOs), 22 heifer operations (9 percent), 204 hog operations (5 percent), and 10 broiler operations (1 percent) might close as a result of complying with the final regulations.

These estimates of the number of potential CAFO closures are cumulative and reflect the results of both the farm level analysis and the enterprise level analysis. These estimated closure rates are generally consistent with the findings of economic achievability of previous effluent guidelines for other industrial point source categories. Based on the results of this analysis, EPA concludes that both Option 1 and Option 2 would be considered economically achievable for existing CAFOs.

These results are based on an analysis that does not consider the longer term effects on market adjustment and also available cost-share assistance from Federal and State farm conservation programs. EPA believes that such adjustments could lessen the economic impacts of the final regulations over time. Sections 3.3.5 show the results of this analysis under assumptions of long-run market adjustment and cost-share assistance.

As already discussed in Section 3.2, this report presents the results of two technology options where EPA has estimated the cost of land application based on nitrogen-based application rates only (Option 1) and also the cost of land application based on nitrogen-based application rates, except in those instances where EPA believes that phosphorus-based rates are likely to be appropriate (Option 2). Given that the final rule provides for appropriate flexibilities in the use of phosphorus-based rates, such as multi-year phosphorus application, EPA has not accounted for the potential costs savings resulting from these flexibilities in its analysis. As a result, the economic impacts presented here may be overestimated. Also, for the purpose of this analysis, EPA assumes that small business CAFOs with between 300 and 1,000 AU would incur costs similar to those estimated for CAFOs with more than 1,000 AU (although these smaller-sized operations will be subject to BPJ and not the ELG requirements under the revised NPDES requirements). These upper end cost estimates could, therefore, overstate the financial effects for this size category.

3.3.3 Sensitivity Analysis Under Alternative Cash Flow Calculations

This section presents the results of a separate sensitivity analysis where EPA calculates alternative cash flows based on the use of other accounting data as a proxy for capital replacement (discussed in more detail in Section 2.3.3).

Table 3-7. Financial Effects of the ELG on CAFOs (>1,000 AU), Option 1 and Option 2

Sector	Number CAFOs (>1,000AU)	Affordable	Moderate	Stress	Affordable	Moderate	Stress
		(Number)			(Percent of Total Operations)		
ELG Option 1							
Fed Cattle	1,766	1,754	0	12	99%	0%	1%
Veal	12	12	0	0	100%	0%	0%
Heifer	242	242	0	0	100%	0%	0%
Dairy	1,450	1,232	218	0	85%	15%	0%
Hogs	3,924	3,924	0	0	100%	0%	0%
Broilers	1,632	1,334	294	3	82%	18%	0%
Layers - Dry	729	729	0	0	100%	0%	0%
Layers - Wet	383	383	0	0	100%	0%	0%
Turkeys	388	388	0	0	100%	0%	0%
Total	**10,526**	**9,998**	**512**	**15**	**95%**	**5%**	**0%**
ELG Option 2							
Fed Cattle	1,766	1,717	0	49	97%	0%	3%
Veal	12	12	0	0	100%	0%	0%
Heifer	242	220	0	22	91%	0%	9%
Dairy	1,450	1,019	431	0	70%	30%	0%
Hogs	3,924	3,249	470	204	83%	12%	5%
Broilers	1,632	1,032	590	10	63%	36%	1%
Layers - Dry	729	729	0	0	100%	0%	0%
Layers - Wet	383	383	0	0	100%	0%	0%
Turkeys	388	388	0	0	100%	0%	0%
Total	**10,526**	**8,749**	**1,491**	**285**	**83%**	**14%**	**3%**

Source: USEPA. May not add due to rounding.

EPA's cash flow analysis uses net cash income estimates and does not consider noncash income and expenses. To address the question of whether EPA may have understated impacts because its discounted cash flow analysis does not include any allowance for depreciation or replacement of capital in its definition of cash flow, the Agency has conducted further sensitivity analysis using reported

accounting depreciation as a proxy for capital replacement to calculate alternative cash flow values for EPA's financial analysis.

For the purposes of this sensitivity analysis, EPA examines the sensitivity of the results of economic impact analysis under an alternative scenario where capital expenditures are set equal to accounting depreciation. These results are contrasted to results in EPA's main analysis, where capital replacement is not reflected as part of the Agency's cash flow calculation. This analysis is conducted at the farm level. Table 2-2 reflect reported depreciation amounts corresponding to financial data obtained for each model CAFO. These sources of financial data do not report estimated capital replacement.

Table 3-8 shows the results of this analysis. Based on this analysis, EPA has determined that the results of the economic impact analysis are not sensitive to the alternate assumptions regarding cash flow. The results of this analysis show that the number of estimated CAFO closures would not be substantially different if allowances for replacement of capital are made. Table 3-9 shows that under these alternative assumptions, the number of potential facility closures rises only slightly from 285 potential closures to 287 closures.

EPA recognizes that cash outlays for capital replacement and additions are required for a firm to remain in business and should be reflected in the cash flows used to assess economic impacts. However, EPA does not conclude from this analysis that accounting depreciation provides a reliable proxy for these continuing capital expenditures. Reported depreciation is a periodic accounting charge for capital assets acquired in the past, and it may be either larger or smaller than annual future capital expenditures for several reasons. Depreciation is based on historical cost, which might not equal the replacement cost of capital assets. Also, reported depreciation is based on various accounting and tax reporting conventions that might bear little resemblance to the actual economic life and consumption of capital assets. Finally, a firm's capital outlay decisions are influenced by the quality of its investment opportunities, the financial health of the enterprise, and general business conditions, which vary over time.

Table 3-8. Financial Effects on CAFOs: Changes to Cash Flow Calculations (Option 2)

Sector	Number of CAFOs	Affordable	Moderate	Stress	Affordable	Moderate	Stress
		Zero Depreciation			100% Depreciation		
		(Number of Affected Operations)					
Fed Cattle	1,766	1,717	0	49	1,715	0	51
Veal	12	12	0	0	12	0	0
Heifer	242	220	0	22	220	0	22
Dairy	1,450	1,019	431	0	1,019	431	0
Hogs	3,924	3,249	470	204	3,249	470	204
Broilers	1,632	1,032	590	10	1,032	590	10
Layers: Dry	729	729	0	0	729	0	0
Layers: Wet	383	383	0	0	383	0	0
Turkeys	388	388	0	0	388	0	0
Total	**10,526**	**8,749**	**1,491**	**285**	**8,747**	**1,491**	**287**

Source: USEPA. May not add due to rounding. See Table 2-8 for definitions: affordable, moderate, and stress.

3.3.4 Supplemental Analyses

Results presented in Section 3.3.1 do not consider the longer term effects on market adjustment and also available cost-share assistance from Federal and State farm conservation programs. EPA believes that such adjustments could lessen the economic impacts of the final regulations over time. To evaluate potential financial effects under such conditions, EPA has conducted further supplemental analysis to assess potential effects under two different scenarios. One scenario takes into consideration the effects of long-run market adjustment following implementation of the final regulations. This analysis is conducted using simulated changes in producer revenue given changes in market prices as depicted by EPA's market model, which uses estimates of price and quantity response in these markets. A second scenario takes into consideration potential cost-share assistance under Federal and State conservation programs, assuming that a portion of costs are covered by cost sharing subject to programmatic constraints. Given the uncertainty of whether CAFO income will rise in response to long-run market adjustment or whether available cost share dollars will effectively offset compliance costs at regulated CAFOs, EPA's analysis to determine whether the regulation is "economically achievable" does not rely on such assumptions as part of its regulatory analysis and therefore reflects the highest level of impacts projected. However, EPA presents the results of this analysis assuming both some degree of cost passthrough and no cost passthrough, as well as some degree of cost share assistance and no cost share assistance, along with the results of its lead analysis. Section 2.4.3 presents an overview of how EPA conducts these analyses and also discusses the Agency's decision not to incorporate such scenarios as part of its determination of economic achievability.

3.3.4.1 Market Impacts on Facility Income

For the purpose of this analysis, EPA examines regulatory impacts on producers in the livestock and poultry sectors under the assumption that they will experience increased revenues due to long-run market adjustment and resultant higher market prices. This analysis is conducted only for the beef, heifer, hog, and broiler sectors because these are the sectors where EPA's analysis shows there might be facility closures (under assumptions of no cost passthrough). Table 3-10 shows that, under assumptions of long-run market adjustment the number of potential facility closures is reduced from 210 closures (assuming no cost passthrough) to 1 closure in the beef sector (assuming partial cost passthrough).

In this analysis, EPA examines regulatory impacts on producers in the beef, heifer, and broiler sectors under the assumption that they will experience increased revenues due to the impact of the rule on market price. This revenue increase occurs because the effluent guideline increases production costs, shifting the supply curve for the market upward. Market price must then rise in the long run to ensure adequate supply; otherwise, producers will exit the market. The increase in unit price caused by the effluent guideline is illustrated in Figure C-1 in Appendix C of this report, where the shift in the supply curve is shown to equal to annualized compliance costs per unit sold (CC/Q) and the increase in market price is measured as $(P^1 - P^0)$.

In general, the magnitude of the price increase resulting from the revised regulations is largely determined by the price elasticities of supply and demand specified for the market model. Once the market model is specified, EPA can estimate the ratio of the change in price to the per unit compliance costs incurred: $(P^1 - P^0)/(CC/Q)$. In the beef and heifer sector, EPA found this ratio to be equal to 70.7 percent; in the broiler sector this ratio is equal to 68.7 percent. This means if the regulations cause farmers to incur compliance costs of $1.00 per head of cattle, for example, the resulting decrease in cattle supply causes the market price to increase by about $0.71 per head (see Section 2.4.3 for details).

Conceptually, applying this impact of the ELG on facility revenues to the DCF analysis is straightforward. In its DCF analysis, EPA (1) calculates the post-regulatory cash flow for each year of project life by subtracting operating expenses and compliance costs from operating revenues, (2) discounts the result according to project year, and then (3) sums the stream of post-regulatory discounted cash flows over the entire life of the project. Thus, for each year of the project's life, EPA calculates (in simplified form) post-regulatory cash flow as equal to market price multiplied by the number of units sold by the facility (facility revenues) minus operating costs and compliance costs. As a conservative estimate, EPA first performs its DCF analysis assuming that equilibrium market price is unchanged by the rule (i.e., market price is P^0 in Figure C-1). In this analysis, EPA adjusts facility revenues to reflect the increase in market price resulting from the ELG (market price is P^1 in Figure C-1 in Appendix C). See Appendix C of this report for more information.

Table 3-9 shows the results of the supplemental analysis assuming facility revenues reflect the increase in market price resulting from the final regulations. Only the fed cattle, heifer, hog, and broiler sectors are analyzed because CAFOs with more than 1,000 AU in the other sectors would be able to absorb costs associated with the final rule. As the table shows, the compliance costs would be affordable for virtually all CAFOs in these sectors. Only one beef operation would experience financial stress. All other operations in these sectors would be able to absorb the estimated compliance costs under an assumption that market prices would increase in response to regulatory revisions.

Table 3-9. Financial Effects to CAFOs: Partial Cost Passthrough (Option 2)

Sector	Number of CAFOs	Affordable	Moderate	Stress	Affordable	Moderate	Stress
		Zero Cost Passthrough			Partial Cost Passthrough		
		(Number of Affected Operations)					
Fed Cattle	1,766	1,717	0	49	1,765	0	1
Veal	12	12	0	0	ND	ND	ND
Heifer	242	220	0	22	242	0	0
Dairy	1,450	1,019	431	0	ND	ND	ND
Hogs	3,924	3,249	470	204	3,720	204	0
Broilers	1,632	1,032	590	10	1,632	0	0
Layers - Wet	383	729	0	0	ND	ND	ND
Layers - Dry	729	383	0	0	ND	ND	ND
Turkeys	388	388	0	0	ND	ND	ND
Total	**10,526**	**8,749**	**1,491**	**285**	**7,359**	**204**	**1**

Source: USEPA. May not add due to rounding. See Table 2-8 for definitions: affordable, moderate, and stress.

3.3.4.2 Cost-Share Assistance

For the purpose of this analysis, EPA examines regulatory impacts on producers in the livestock and poultry sectors assuming that some portion of the compliance costs will be incurred by Federal and/or State cost-share assistance. This analysis is conducted only for the beef, heifer, hog, and broiler sectors because these are the sectors where EPA's analysis shows there are potential facility closures (under assumptions of no cost sharing). Although other sectors may also receive cost share assistance, EPA has not modeled the effect of cost-share assistance on these types of operations because no stress impacts are measured in these sectors.

For this analysis, EPA assumes that 50 percent of the capital costs of compliance in these sectors would be covered by cost-share assistance. EPA reduced the capital cost of compliance by 50 percent for each of the representative model CAFOs and ran the same economic model as that used for the main analysis, with all other assumptions held constant.

Under an assumption that 50 percent of the capital costs are covered by cost-share assistance, EPA's analysis would assume that total cost sharing for operations with more than 1,000 AU in these four sectors would amount to roughly $20 million annually (1997 dollars). The majority of operations (about 90 percent) would receive less than $10,000 each per year, with a smaller share of operations receiving up to $30,000 each per year in the cattle and broiler sectors. Assuming changes under the 2002 Farm Bill legislation are implemented and there are resulting changes to USDA's farm conservation programs, EPA believes that these are reasonable assumptions for the purposes of conducting a sensitivity analysis.

Table 3-10 shows that, under assumptions of partial cost share assistance (assumed for this analysis to cover 50 percent of the capital expenditure to comply with the revised regulations), the number of potential facility closures is reduced only somewhat from 285 closures to 261 closures (assuming partial cost share assistance). These estimated closures are comprised of 43 beef, 11 heifer, 204 hog, and 3 broiler operations. Among the reasons why these closure results indicate little change assuming cost-share assistance is that EPA's approach applies cost-sharing to estimated capital costs only, whereas the bulk of incurred compliance costs are likely to be annual operating and maintenance costs associated with the land application requirements of the rule, including nutrient management and off-site hauling of excess manure.

3.3.5 Comparison with the Proposed Regulations

EPA considered various alternative regulatory options during the development of this rulemaking. For the Agency's Option Selection process for the final regulations, EPA evaluated these and other options. This section presents the results of these analyses.

Table 3-11 shows the results of EPA's analysis of these alternative options in terms of the number of operations estimated to experience financial stress under these options and that would be vulnerable to facility closure. These results are based on an analysis that does not consider the longer-term effects on market adjustment and also available cost-share assistance from Federal and State farm conservation programs. Note that estimated costs for Option 3 and Option 7 are calculated using a previous set of engineering costs (April 4, 2002) and also assume an alternative AU thresholds for broiler and egg-laying operations (where 1,000 AU would equal 100,000 broiler and egg-laying operation with dry manure systems). Also, EPA does not estimate costs or financial impacts on the cattle and dairy

Table 3-10. Financial Effects on CAFOs: Partial Cost-Share Assistance (Option 2)

Sector	Number of CAFOs	Affordable	Moderate	Stress	Affordable	Moderate	Stress
		Zero Cost Passthrough			50% Cost Share Assistance		
		(Number of Affected Operations)					
Fed Cattle	1,766	1,717	0	49	1,723	0	43
Veal	12	12	0	0	ND	ND	ND
Heifer	242	220	0	22	231	0	11
Dairy	1,450	1,019	431	0	ND	ND	ND
Hogs	3,924	3,249	470	204	3,257	463	204
Broilers	1,632	1,032	590	10	1,485	144	3
Layers - Wet	383	729	0	0	ND	ND	ND
Layers - Dry	729	383	0	0	ND	ND	ND
Turkeys	388	388	0	0	ND	ND	ND
Total	**10,526**	**8,749**	**1,491**	**285**	**6,696**	**607**	**261**

Source: USEPA. May not add due to rounding. See Table 2-8 for definitions: Affordable, Moderate, and Stress.

sectors under Option 5 because the Agency does not consider housing of large animals under this option to be practicable in these sectors).

Among operations with more than 1,000 AU, the expected potential CAFO closures range from about 20 operations to 1,700 operations, depending on the technology option

Table 3-11 also presents economic impacts on all operations with between 300 and 1,000 AU (more than 33,100 operations) and not just those operations that are expected to be *defined* as CAFOs under the regulations (about 4,500 operations). The reason EPA presents its analysis for all operations in this size category is that the Agency had considered extending the ELG regulations to operations in this size category in the 2001 Proposal. As shown in the table, applying these requirements to all operations with between 300 and 1,000 AU could potentially affect a large number of operations, ranging from about 200 operations[27] to nearly 11,000 operations, depending on the regulatory option.

Despite data and analytical changes made to EPA's financial analysis, as presented in both of EPA's Notices (see: USGAO, 2001b, 66 FR 58556 and USGAO, 2002, 67 FR 48099), the results of the Agency's analyses for these various regulatory options did not change much compared to that evaluated and presented for the 2001 Proposal. In particular, these results show that the inclusion of an enterprise level financial analysis does not significantly alter the results of EPA's overall analysis (since the enterprise level results do not always differ substantially from the farm level results across all sectors).

[27]Since EPA does not estimate costs or financial impacts on the cattle and dairy sectors under Option 5, EPA would assume total closures under either Option 1 or Option 2 for those sectors.

The use of alternative financial data overall in the beef and hog sectors, compared to that used for the proposal, does result in substantial changes to EPA's analysis results compared to that conducted for the proposed rule (although more beef operations but fewer hog operations are shown to experience financial stress from estimated compliance costs). EPA's economic results, however, are not driven solely by changes to EPA's financial models but are also driven by underlying changes to the Agency's engineering cost models. As discussed in the 2001 Notice, EPA has expanded the range of cost estimates per representative farm to account for variability across operations based on expected capital and management improvements needed (see 66 FR 58572-58573). The cumulative effect of each of these data and modeling refinements results in EPA's cost and financial models consistently showing that certain types of business operations in the baseline—namely, operations without sufficient land base for land application of manure that may incur high offsite transfer costs, high-technology and management needs, along with higher-cost, low-performing businesses—are more vulnerable to facility closure.

3.4 ESTIMATED FINANCIAL EFFECTS TO NEW OPERATIONS (NSPS ANALYSIS)

This section examines the impacts to new facilities to comply with the final ELG requirements for New Source Performance Standards (NSPS). For this analysis, EPA evaluated impacts on new source CAFOs by comparing the costs borne by new source CAFOs to those estimated for existing sources. That is, if the expected cost to new sources is similar to or less than the expected cost borne by existing sources (and that cost is considered economically achievable for existing sources), EPA considers that the regulations for new sources do not impose requirements that might grant existing operators a cost advantage over new CAFO operators and further determines that the NSPS is affordable and does not present a barrier to entry for new facilities. In general, the costs to new sources from NSPS requirements are lower than the costs for existing sources because new sources are able to apply control technologies more efficiently than existing sources, which may incur high retrofit costs. Not only will new sources be able to avoid the retrofit costs incurred by existing sources, new sources might also be able to avoid the other various control costs facing some existing producers through careful site selection. The requirements promulgated in the final regulation do not give existing operators a cost advantage over new CAFO operators; therefore, the new source performance standards do not present a barrier to entry for new facilities.

Examples of avoided retrofit costs and costs of total containment systems and waste management, including land application, for both existing and new sources, are provided in Section 4 of the preamble. As discussed in the preamble, EPA evaluated economic impacts to new source CAFOs by comparing the costs borne by new source CAFOs to those estimated for existing sources. That is, if the expected cost to new sources is similar to or less than the expected cost borne by existing sources (and that cost was considered economically achievable for existing sources), then EPA considers the regulations for new sources not to impose requirements that might grant existing operators a cost advantage over new CAFO operators and further determines that the NSPS is affordable and does not present a barrier to entry for new facilities. In general, costs to new sources for complying with a given set of regulatory requirements are lower than the costs for existing sources to comply with the same requirements since new sources are able to apply control technologies more efficiently than existing sources that may incur high retrofit cost. New source CAFOs will be able to avoid the retrofit costs that will be incurred by existing sources. For example, the cost of a model total containment system for swine that would meet the no discharge requirement (e.g., incremental cost of deep pit swine house, including land application) typically is less than the cost for an existing source to retrofit water intensive lagoon-based systems that are exposed to precipitation. Among the primary reasons for the capital cost

Table 3-11. Model CAFOs where Compliance Costs result in Financial Stress (Alternative Options)

Sector	Total No.	Option 1	Option 2	Option 3[/1]	Option 5	Option 7[/1]
All Defined CAFOs >300 AU						
Beef	4,448	133	216	2,885	N/A	2,535
Veal	736	0	0	0	N/A	0
Heifers	299	38	63	322	N/A	213
Dairy	7,230	0	0	504	N/A	1,888
Hogs	13,825	0	204	990	665	674
Broilers	12,034	3	19	8,293	108	2,732
Layers	3,082	0	0	0	0	0
Turkeys	2,003	0	0	0	0	0
Total	**43,657**	**174**	**502**	**12,994**	**773**	**8,042**
All Defined CAFOs >1,000 AU						
Beef	1,766	12	49	340	N/A	63
Veal	12	0	0	0	N/A	0
Heifers	242	0	22	71	N/A	58
Dairy	1,450	0	0	3	N/A	393
Hogs	3,924	0	204[/1]	990	665	674
Broilers	1,632	3	10	699	84	541
Layers	1,112	0	0	0	0	0
Turkeys	388	0	0	0	0	0
Total	**10,526**	**15**	**285**	**2,103**	**749**	**1,729**
All Defined CAFOs 300-1000 AU						
Beef	2,682	121	167	2,545	N/A	2,472
Veal	57	0	0	0	N/A	0
Heifers	724	38	41	251	N/A	155
Dairy	5,780	0	0	502	N/A	1,495
Hogs	9,901	0	0	0	0	0
Broilers	10,402	0	10	7,594	24	2,191
Layers	1,970	0	0	0	0	0
Turkeys	1,615	0	0	0	0	0
Total	**33,131**	**159**	**218**	**10,892**	**24**	**6,313**

Source: USEPA. Costs for Option 3 and Option 7 are calculated using April 4, 2002 engineering costs and assume an alternative AU thresholds for broiler and egg-laying operations; see also USEPA, 2002l—DCN 375086).
N/A = "not applicable" since EPA does not consider housing of large animals in some sectors to be practicable.
This table also reflects impacts on all operations 300-1000 AU and not just operations *defined* as CAFOs only.

difference for a new source with total containment is that it does not include an impoundment lagoon, and it experiences reduced operating costs because it handles less waste with substantially lower water and higher solids content than a water-intensive lagoon-based system. New sources may be able to avoid many of the other control costs facing some existing producers through careful site selection, such as choosing to locate at a site with sufficient available land nearby for applying manure. Furthermore, other technologies are available to new sources, that have been implemented by existing sources, that are also capable of achieving the no discharge standard. The preamble of the final rule provides further discussion of these and other technologies. Since the new source requirements for beef and dairy operations are the same as the corresponding existing source requirements, EPA concludes that the NSPS requirements promulgated today do not present a barrier to entry for new facilities. For hog, poultry, and veal operations, where the new source requirements are more stringent than the existing source requirements, EPA concludes that the NSPS requirements do not pose a barrier to entry because of the currently widespread use of animal confinement practices and waste management technologies that can comply with the zero discharge standard, and because these total containment technologies and practices are less costly to implement than water-intensive systems (e.g., such as water flush waste management) that are exposed to precipitation.

As part of its preliminary analysis, EPA costed for zero discharge technologies and showed that these would pose no barrier to entry (see Section 3.4.1 and Section 3.4.2 below); now that operations can choose an alternative option that might be cheaper to implement, EPA believes there is even less likelihood that there is a barrier to entry. More information is provided in the *Development Document* and related cost supporting the final regulations (USEPA, 2002). All new source technologies are widely demonstrated and available in each animal sector.

3.4.1 Beef and Dairy Subcategories

As part of a preliminary analysis, EPA evaluated costs for new beef and dairy operations with more than 1,000 AU. These costs compare the cost of land application requirements for both new and existing source under similar technology requirements reflected by costs estimated for Option 2. The land application requirements for new sources would be identical to those established for existing sources.

EPA's analysis indicates that requiring Option 2 for new sources for the beef and dairy subcategories would not create a barrier to entry because the estimated costs for new sources are less expensive than the BAT costs for existing sources. This determination is based on a comparison of the costs of Option 2 BAT to the costs of Option 2 NSPS on a model-by-model basis. These results are shown in Table 3-12. Estimated Option 2 NSPS costs for new beef and dairy operations are lower than Option 2 BAT costs since they do not include retrofitting costs that would be incurred by existing sources. EPA's comparison of the estimated NSPS and BAT costs shows that the new source costs for some model facilities were estimated to be more than 20 percent lower than those for existing facilities. Furthermore, these requirements are "economically achievable" to existing facilities (see Section 3.3). Therefore, EPA concludes that the NSPS requirements should pose no barrier to entry to new business in these sectors. These cost estimates are available in the record.

3.4.2 Swine, Veal, and Poultry Subcategories

As part of a preliminary analysis, EPA evaluated costs for new swine, veal, and poultry operations with more than 1,000 AU. These costs would require that all discharges of process wastewater from the production area are prohibited and there is no allowance for discharges due to large rainfall events (Option 5). Land application requirements would be similar to those established for existing sources.

EPA's analysis indicates that requiring Option 5 for new sources for the hog, veal, and poultry subcategories would not create a barrier to entry since the estimated costs for new sources are the same as (for veal) or less expensive than the BAT costs for existing sources. This determination is based on a comparison of the costs of Option 2 BAT to the costs of Option 5 NSPS on a model-by-model basis. These results are shown in Table 3-13 (results are not shown for veal, since the costs are the same for NSPS and BAT). Estimated Option 5 NSPS costs for new swine and poultry operations are lower than Option 2 BAT costs since they do not include retrofitting costs that would be incurred by existing sources. EPA's comparison of the estimated NSPS and BAT costs shows that the new source costs for some model facilities were estimated to be more than 50 percent lower than those for existing facilities. Furthermore, these requirements are "economically achievable" to existing facilities (see Section 3.3). Therefore, EPA concludes that the NSPS requirements should pose no barrier to entry to new business in these sectors. These cost estimates are available in the record.

Table 3-12. Percent Difference in Costs between NSPS and BAT Costs, Beef and Dairy Sectors

Sector	Facility Size	Percent Difference
Fed Cattle	M1	-14% to -21%
	M2	-13% to -28%
	M3	-12% to -27%
	L1	-10% to -18%
	L2	-9% to -15%
Dairy	M1	-1% to -19%
	M2	-0.3% to -21%
	M3	-0.7% to -14%
	L1	-0.1% to -23%
Heifers	M1	-21% to -37%
	M2	-21% to -29%
	M3	-17% to -27%
	L1	-15% to -22%

Source: USEPA. Costs for BAT and NSPS Option 2 are calculated using April 4, 2002 engineering costs. Where percentages are negative, NSPS costs are less expensive than the BAT costs. See Table 2-1 for CAFO model definitions. Ranges shown are by region and reflect the average land availability and technology needs categories.

Table 3-13. Percent Difference between NSPS & BATCosts, Hog and Poultry Sectors

Sector	Facility Size	Percent Difference
Hog-GF	M1	-4% to -12%
	M2	-4% to -16%
	M3	-3% to -18%
	L1	-7% to -15%
	L2	-6% to -12%
Hog-FF	M1	-4% to -11%
	M2	-4% to -15%
	M3	-3% to -17%
	L1	-8% to -15%
	L2	-6% to -12%
Layers-Dry	M1	-42% to -43%
	M2	-44% to -46%
	M3	-34% to -36%
	L1	-55% to -58%
	L2	-58% to -63%
Layers-Wet	M3	-60%
	L1	-92%
Broilers	M1	-22% to -59%
	M2	-24% to -65%
	M3	-26% to -70%
	L1	-28% to -74%
	L2	-34% to -81%
Turkeys	M1	-33% to -36%
	M2	-41% to -45%
	M3	-40% to -44%
	L1	-50% to -56%

Source: USEPA. Costs for BAT and NSPS Option 2 are calculated using April 4, 2002 engineering costs. Where percentages are negative, NSPS costs are less expensive than the BAT costs. See Table 2-1 for CAFO model definitions. Ranges shown are by region and reflect the average land availability and technology needs categories.

3.4.1 Comparison with the Proposed Regulations

Table 3-14 compares the Agency's preliminary aggregate, average costs to new sources to those estimated for existing source, across a range of regulatory options considered by EPA. For the 2001 Proposal, these costs reflect new source requirements set forth in the proposal would have required phosphorous-based land application requirements with the added requirements of ground water controls where there is a direct hydrologic connection (Option 3, all sectors) and also total containment from the production area with no exception for a storm event (Option 5, hogs and poultry only). This proposed option is listed in Table 3-14 as the "Proposed Option 3/5 ." These proposed requirements would have applied both to new operations with more than 1,000 AU and to new operations with less than 1,000 AU that are defined as CAFOs. EPA did not consider a total containment option for the cattle and dairy sectors since this was deemed impracticable and not affordable.

As shown in the table, both alternative Option 1 and Option 2 would likely not pose a barrier to entry to new operations since the average NSPS cost is estimated to be less than or equivalent to the BAT costs (and these costs are determined to be economically achievable for existing operations; see Section 3.3). To determine "no barrier to entry" for the other alternative regulatory options that EPA considered for new sources (Option 3, Option 7, and Option 5 for some sectors), the Agency would need to conduct additional analysis before making such a determination. As shown, although the NSPS costs are generally lower than the estimated BAT costs, it is unclear whether imposing similar requirements for existing sources would be economically achievable for those operations or that these costs would not pose a barrier to entry to new operations.

Table 3-14: Facility Level Cost Comparison - New versus Existing Sources (>1000 AU)

Sector	Estimated NSPS Costs			Estimated BAT Costs		
	Proposal Option 3/5	P-based Standards Option 2	P-based & Timing Option 7	N-based Standards Option 1	P-based Standards Option 2	P-based & Timing Option 7
Cattle	$8,000	$5,500	$10,700	$4,700	$9,200	$16,500
Dairy	$15,400	$13,300	$109,100	$30,600	$44,900	$331,000
Hog	$5,700	$5,700	$5,700	$7,700	$18,200	$20,000
Broilers	$5,800	$5,700	$5,700	$11,900	$13,900	$13,900
Layers	$7,600	$7,600	$7,600	$14,200	$21,500	$21,500
Turkeys	$16,100	$16,100	$16,100	$20,900	$30,800	$30,800

Source: USEPA. Costs for BAT and NSPS Option 2 are calculated using April 4, 2002 engineering costs.

3.5 MARKET IMPACTS

This section the results of EPA's market model to predict impacts of the final regulations on consumer and farm level price and quantity. The market model results also form the basis for further projecting changes to national employment, national economic output, and regional employment. EPA

measures economic impacts on the livestock and poultry sectors (direct effects), on industries that provide goods and services to livestock and poultry producers (indirect effects) and from associated expenditures of income earned in direct and indirect activities (induced effects). EPA also predicts impacts on U.S. trade. Section 3.5.1 presents the results of EPA's analysis across all subcategories; Section 3.5.2 presents the results for each individual subcategory (cattle, dairy, hog, and poultry subcategories).

3.5.1 Market Analysis Results Across All Subcategories

This section presents the results of EPA's market model analysis across all subcategories. The results presented in this section are based on the aggregate compliance costs that EPA estimated for both CAFOs with more than 1,000 AU to comply with the effluent guideline revisions and for CAFOs with between 300 and 1,000 AU, if defined as a CAFO, to comply with the NPDES permitting requirements. Results are shown both for Option 1 and Option 2. These market effects are estimated based on estimated regulatory costs presented in Table 3-3.

3.5.1.1 Commodity Prices and Quantities

EPA's market model predicts that the final regulations will not result in significant industry-level changes in production and prices. Predicted changes in animal production might raise producer prices, as the market adjusts to the final regulatory requirements. For all sectors, EPA estimates that farm level prices will rise by less than one percent of pre-regulation baseline prices (Table 3-15). At the retail level, EPA expects that the final regulations will not have a substantial impact on overall production or consumer prices for value-added meat, eggs, and fluid milk and dairy products. EPA estimates that retail price increases resulting from these regulations will also be less than one percent of baseline prices in all sectors (Table 3-16). At the retail level, EPA expects that the final rule will not have a substantial impact on overall production or consumer prices for value-added meat, eggs, and fluid milk and dairy products. EPA estimates that retail price increases resulting from this rule will be less than one percent of baseline prices in all sectors, averaging below the rate of general price inflation for all foods. In terms of retail level price changes, EPA estimates that poultry and red meat prices will rise about one cent per pound. EPA also estimates that egg prices will rise by about one cent per dozen and that milk prices will rise by about one cent per gallon.

Tables 3-15 and 3-16 show predicted farm and retail price changes, as both absolute value and as a percentage of pre-regulation baseline price levels. These economic effects reflect changes to both the effluent guideline regulation and the NPDES permit regulation. For comparison purposes, the average annual percentage change in price from 1990 to 1998 is provided. In all cases, the percent change in price attributable to the regulation is well within the normal year-to-year variability of prices for these products.

Table 3-17 summarizes the forecast reductions in farm level production, following a shift in the supply curve caused by compliance. As shown, predicted quantity reductions are less than two-tenths of one percent of pre-regulation production levels for all sectors. Other than export and import changes, quantity changes at the retail level (not shown) are expected to be directly proportional to changes at the farm level because the model assumes a fixed-proportions production process.

Table 3-15. Post-Compliance Farm Level Price Changes

	Beef	Dairy	Hogs	Broilers	Layers	Turkeys
	($/hundredweight)			(cents/lb.)	(cents/doz.)	(cents/lb.)
Option 1						
1997 Price	66.09	13.38	54.30	37.00	69.80	40.10
Change in Price	0.03	0.05	0.02	0.04	0.17	0.05
Percent Change in Price	0.05	0.34	0.04	0.11	0.24	0.13
Avg. Annual Change (%) (1990-1998)	4.56	7.95	15.24	5.74	11.45	4.37
Option 2						
1997 Price	66.09	13.38	54.30	37.00	69.80	40.10
Change in Price	0.13	0.08	0.09	0.04	0.22	0.07
Percent Change in Price	0.19	0.61	0.17	0.12	0.31	0.18
Avg. Annual Change (%) (1990-1998)	4.56	7.95	15.24	5.74	11.45	4.37

Source: USEPA, except historical data (pre-regulatory average price and average annual change data) that are from USDA/ERS, 1999c, 1998b; USDA/WAOB, 1999, 2001; and NCBA, 2000.

Table 3-16. Post-Compliance Retail Level Price Changes

	Beef	Dairy	Hogs	Broilers	Layers	Turkeys
	($/lb.)	(index)	($/lb.)	(cents/lb.)	(cents/doz.)	(cents/lb.)
Option 1						
1997 Price	2.80	145.50	2.45	151.00	106.00	105.10
Change in Price	0.001	0.45	0.000	0.04	0.17	0.05
Percent Change in Price	0.02	0.31	0.01	0.03	0.16	0.05
Avg. Annual Change (%) (1990-1998)	2.30	2.43	5.07	2.99	7.17	2.39
Option 2						
1997 Price	2.80	145.50	2.45	151.00	106.00	105.10
Change in Price	0.002	0.81	0.001	0.04	0.22	0.07
Percent Change in Price	0.09	0.56	0.05	0.03	0.20	0.07
Avg. Annual Change (%) (1990-1998)	2.30	2.43	5.07	2.99	7.17	2.39

Source: USEPA, except historical data (pre-regulatory average price and average annual change data) that are from USDA/ERS, 1999c, 1998b; USDA/WAOB, 1999, 2001; and NCBA, 2000.

EPA uses the estimated production changes, multiplied by the appropriate per-unit market price, to compute the overall change in market value associated with complying with the final regulations. The overall change in market value is an input to EPA's input-output analysis framework, which allows EPA to compute changes in employment and economic output after compliance.

As demonstrated by the results in these tables, there are only very minor differences in the estimated results between the two regulatory options presented here (Option1 and Option 2).

Table 3-17. Post-Compliance Farm Production Changes

	Beef	Dairy	Hogs	Broilers	Layers	Turkeys
	(million pounds)				(mil. doz.)	(mil. lbs.)
Option 1						
1997 Quantity	47,967	156,100	23,542	27,551	6,473	5,412
Change in Quantity	9	145	3	3	1	1
Percent Change in Quantity	0.0	0.1	0.0	0.0	0.0	0.0
Option 2						
1997 Quantity	47,967	156,100	23,542	27,551	6,473	5,412
Change in Quantity	39	259	11	3	1	2
Percent Change in Quantity	0.1	0.2	0.0	0.0	0.0	0.0

Source: USEPA, except historical data (pre-regulatory quantity data) that are from USDA/ERS, 1998a, and 1998b; USDA/WAOB, 1999; and Putnam and Allshouse, 1999.

3.5.1.2 Aggregate Employment and National Economic Output

EPA does not expect the final regulations to cause significant changes in aggregate employment or national economic output as measured by Gross Domestic Product (GDP). EPA expects, however, that there will be losses in employment and economic output associated with decreases in animal production due to rising compliance costs. These losses are estimated throughout the entire economy, using available modeling approaches, and are not attributable to the regulated community only. This analysis also does not adjust for offsetting activity in other parts of the economy that may be stimulated as a result of the final regulations, such as the construction and farm services sectors.

Employment losses are measured in full-time equivalents (FTEs)[28] per year nationwide. These losses are associated with decreases in commodity production in response to higher compliance costs (Table 3-18). Predicted changes in aggregate employment are measured in terms of both direct and indirect/induced employment.[29]

[28] One FTE is equivalent to 2,080 hours of labor.

[29] *Direct* employment measures the number of jobs related to production and processing, including workers engaged in the manufacture of agricultural inputs and their suppliers. Other *indirect* or *induced* employment provides a broader measure of industry-related employment and includes workers throughout the

Table 3-18. Post-Compliance Changes in Total National Employment (FTEs)

Option	Beef	Dairy	Hogs	Poultry	Total [a/]
Option 1					
Total Baseline Direct [a/] Farm Employment	336,700	483,800	195,900	71,800	1,088,200
Direct Employment	113	370	37	131	651
Direct Wholesale/ Processing Employment	16	15	10	20	60
Consumer/Indirect/ Induced Employment	528	2,020	207	666	3,421
Total Change	657	2,404	254	817	4,133
Option 2					
Total Baseline Direct [a/] Farm Employment	336,700	483,800	195,900	71,800	1,088,200
Direct Employment	476	660	149	159	1,444
Direct Wholesale/ Processing Employment	66	26	40	24	156
Consumer/Indirect/ Induced Employment	2,218	3,603	832	806	7,460
Total Change	2,759	4,289	1,021	990	9,059

Source: USEPA's market model results, in conjunction with RIMS II multipliers (USDC, 1997b). Totals may not add due to rounding and may include double counting because each sector is modeled separately.

[a/] Total farm employment is updated by EPA from 1990 estimates by Abel, Daft & Earley (1993) to account for changes between 1990 and 1997 (Council of Economic Advisors, 2000). Estimates are allocated by sector based on its share of annual farm revenue (USDA/NASS, 1999a) and exclude employment at cattle grazing operations. Processing sector employment is from the 1997 Census of Manufactures (USDC, 1999a) and is, in some cases, allocated to individual sectors based on farm sector employment proportions. See Section 2.5.3 of the Proposal EA USEPA, 2001a). Total employment in 1997 was 129.6 million (Council of Economic Advisors, 2000).

EPA estimates of the reduction in total employment across all sectors to range from about 4,100 jobs lost (Option 1) to about 9,100 jobs lost (Option 2). Table 3-18. This projected change is modest when compared to total national employment, estimated at about 129.6 million jobs in 1997. EPA estimates of the aggregate reduction in national economic output range from about $400 million (Option 1) to about $900 million (Option 2). Table 3-19. This projected change is also modest when compared to total GDP, estimated at $8.5 trillion in 1997 (Council of Economic Advisors, 2000).

economy. More information is provided in Section 4.4 of the Proposal EA.

Table 3-19. Post-Compliance Changes in Total National Economic Output (GDP)

Option	Beef	Dairy	Hogs	Poultry	Total [a/]
	(millions in 1997 dollars)				
Option 1					
Baseline Total					8,318,400
Post-Regulation	65	222	26	80	394
Option 2					
Baseline Total					8,318,400
Post-Regulation	275	397	105	97	873

Source: USEPA's market model results, in conjunction with RIMS II multipliers (USDC, 1997b). Totals may not add due to rounding and may include double counting since each sector is modeled separately.
[a/] Council of Economic Advisors (2002).

3.5.1.3 Regional and Community Impacts

To evaluate the potential for differential impacts among farm production regions, EPA examined employment impacts by region. EPA also evaluated whether the final requirements could result in substantial changes in volume of production, given predicted facility closures, within a particular production region. EPA concludes from these analyses that regional and community level effects are estimated to be modest, but do tend to be concentrated within the more traditional agricultural regions.

EPA does not expect that this rule will have a significant impact on where animals are raised. On one hand, on-site improvements in waste management and disposal, as required by the final rule, could accelerate recent shifts in production to more nontraditional regions as higher-cost producers in some regions exit the market to avoid the relatively high retrofitting costs associated with bringing existing facilities into compliance. On the other hand, the final regulations might favor more traditional production systems where operators grow both livestock and crops, since these operations tend to have available cropland for land application of manure nutrients. These types of operations tend to be more diverse and less specialized and, generally, smaller in size. Long-standing farm services and input supply industries in these areas could likewise benefit from the final rule, given the need to support on-site improvements in manure management and disposal. Local and regional governments, as well as other nonagricultural enterprises, would also benefit.

Table 3-20 breaks out the estimated regional employment impacts between direct (farm and processing level) and indirect/induced (other economy-wide) job losses.[30] As shown, EPA estimates direct employment losses to be greatest in the Midwest region given the sheer volume of animal production in the region, which includes the Dakotas, Nebraska, and Kansas as well as the Corn Belt and Lake states. In the Midwest region, EPA estimated 300 to 700 direct job losses (depending on the

[30] Indirect effects are a result of changes in consumer spending and thus occur in areas with higher population densities regardless of the animal sectors affected.

option). These estimated job losses include CAFO owner-operator job losses due to business closure. Total estimated job losses, including indirect and induced employment impacts, are more evenly distributed among regions and are greatest in the Mid-Atlantic, which covers areas with both high consumer populations and concentrated hog and poultry operations in North Carolina, Virginia, and the Delmarva Peninsula.

Table 3-20. Regional Distribution of Predicted National Employment Reductions

Region [a/]	Agricultural Sectors Direct	Indirect/ Induced	Total	Percent of Labor Force
	(FTEs)			
Option 1				
Pacific	102	547	649	0.003
Central	123	501	624	0.003
Midwest	268	800	1,068	0.003
South	78	510	588	0.003
Mid-Atlantic	140	1,063	1,203	0.003
Total	**712**	**3,421**	**4,133**	**0.003**
Option 2				
Pacific	192	1,194	1,386	0.006
Central	347	1,092	1,439	0.007
Midwest	700	1,745	2,444	0.007
South	108	1,111	1,219	0.006
Mid-Atlantic	253	2,318	2,571	0.006
Total	**1,599**	**7,460**	**9,059**	**0.007**

Source: USEPA's market model results, in conjunction with RIMS II multipliers (USDC, 1997b). State level employment data are from the U.S. Census Bureau (1999).
Totals may not add due to rounding and may include double counting since each sector is modeled separately.
[a/]Regions are based on the USDA Farm Production Regions (see Figure 4-1in the Proposal EA): Pacific=Pacific, Central=Mountain and Southern Plains, Midwest=Corn Belt, Lake States, and Northern Plains, South=Delta and Southeast, Mid-Atlantic=Northeast and Appalachia.

To further evaluate regional impacts, EPA conducted the following additional assessment. The geography of impacts may be more clearly seen if the information is disaggregated further to the farm production region or state level. Table 3-21 shows the impact of the regulations at the farm production region level. The regions are ranked by the severity of agricultural impacts. The Northern Plains, Corn Belt, and Lake States dominate because of the regulation's focus on hog and cattle operations.

EPA believes that concerns about the potential regional and community effects are, in part, mitigated by changes to the final regulations, as compared to the 2001 Proposal. For the final rule,

Table 3-21. Farm Production Region Distribution of Predicted Changes in (Direct) National Employment

Farm Production Region [a/]	Agricultural Sectors Direct	Indirect/ Induced	Total	Percent of Labor Force
	(FTEs)			
Option 1				
Northern Plains	69	72	141	0.005%
Corn Belt	87	477	564	0.003%
Lake	112	251	363	0.003%
Pacific	102	547	649	0.003%
Southern Plains	63	290	353	0.003%
Mountain	60	211	271	0.003%
Northeast	85	740	825	0.003%
Appalachia	56	323	378	0.003%
Southeast	45	387	432	0.003%
Delta	33	123	156	0.003%
Total	**712**	**3,421**	**4,133**	**0.003%**
Option 2				
Northern Plains	257	157	414	0.014%
Corn Belt	225	1,040	1,264	0.006%
Lake	218	548	766	0.007%
Pacific	192	1,194	1,386	0.006%
Southern Plains	191	633	824	0.007%
Mountain	156	459	615	0.007%
Northeast	148	1,614	1,763	0.006%
Appalachia	104	704	808	0.006%
Southeast	63	844	906	0.006%
Delta	45	268	313	0.007%
Total	**1,599**	**7,460**	**9,059**	**0.007%**

Source: USEPA's market model results, in conjunction with RIMS II multipliers (USDC, 1997b). State level employment data are from the U.S. Census Bureau (1999). Totals may not add due to rounding and may include double counting since each sector is modeled separately.

[a/]USDA Farm Production Regions (see Figure 4-1 in the Proposal EA): Pacific=CA,OR,WA; Mountain= AZ,CO,ID,MT,NV,NM,UT,WY; Southern Plains= OK,TX; Northern Plains= KS,NE,ND,SD; Lake= MI,MN,WI; Corn Belt= IL,IA,IN,MO,OH; Delta= AR,LA,MS; Southeast= AL,FL,GA,SC; Appalachia= KY,NC,TN,VA,WV; Northeast= CT,DE,DC,ME,MD,MA,NH,NJ,NY,PA,RI,VT.

estimated market effects by region are considerably lower than those estimated for the proposal. For example, compared to the proposed rule where EPA estimated direct farm employment losses of more than 3,000 jobs, EPA estimates that the final rule could result in between 700 and 1,600 jobs lost. The Midwest, where EPA predicts the highest predicted job losses, is reduced from nearly 1,300 jobs lost estimated for proposal to between 300 and 700 jobs lost estimated for the final rule. Given these modest estimated effects on national and regional employment, employment effects are not expected to reach levels of concern in more finely drawn geographic regions.

3.5.1.4 Foreign Trade Impacts

Foreign trade impacts are difficult to predict because agricultural exports are determined by economic conditions in foreign markets and changes in the international exchange rate for the U.S. dollar. EPA predicts, however, that foreign trade impacts as a result of the final regulations will be minor given the relatively small projected changes in overall supply and demand for these products and the slight increase in market prices, as described Section 3.5.1.1. Measured as the percentage change in traded volumes, the increases in imports and decreases in exports estimated by EPA will each total less than 1 percent compared to baseline (pre-regulation) levels in each of the commodity sectors. Based on these results, EPA believes that any quantity and price changes resulting from the final regulations will not significantly alter the competitiveness of U.S. export markets for meat, dairy foods, and poultry.

Table 3-22 summarizes the impacts on retail level trade forecast by EPA's market model. By sector, the projected changes in imports compared to baseline trade levels range from a 0.01 percent increase in broiler imports to a 0.85 percent increase in dairy product imports. The predicted drops in U.S. exports range from a 0.01 percent reduction in broiler exports to a 0.14 percent reduction in dairy exports. Baseline information on U.S. imports and exports of livestock and poultry products is available in Section 2.5 of the Proposal EA. As shown in the table, there is little difference in the estimated results between the two regulatory options presented here (Option 1 and Option 2).

Table 3-22. Post-Compliance Retail Product Import and Export Changes

Option	Beef	Dairy	Hogs	Broilers	Layers	Turkeys
	(percent)					
Option 1						
Increase in Imports	0.02	0.48	0.01	0.01	0.15	NA
Decrease in Exports	0.01	0.08	0.01	0.01	0.02	0.03
Option 2						
Increase in Imports	0.09	0.85	0.03	0.01	0.19	NA
Decrease in Exports	0.05	0.14	0.04	0.01	0.02	0.04

Source: USEPA, except historical data that are from Putnam and Allshouse, 1999. NA = Not applicable.

3.5.2 Market Analysis Results across Individual Subcategories

This section presents the results of EPA's market model analysis for each individual subcategory (cattle, dairy, hog, and poultry subcategories). The results presented in this section are based on the

aggregate compliance costs that EPA estimated for both CAFOs with more than 1,000 AU to comply with the effluent guideline revisions and for CAFOs with between 300 and 1,000 AU, if defined as a CAFO, to comply with the NPDES permitting requirements. Results are shown both for Option 1 and Option 2. These market effects are estimated based on estimated regulatory costs presented in Table 3-3. The tables summarizing the results discussed in this section are provided at the end of the section.

Changes in employment and earnings can affect the vitality of local communities. Community impacts are usually determined by employment changes at individual facilities. As facility-specific information and analysis were not within the scope of this study, EPA is not able to speculate on community impacts. However, EPA does disaggregate the national employment results to examine the potential regional employment impacts of the final regulations. EPA allocates estimated national level impacts by production shares across states and does not take into account existing environmental practices or other production factors (see Section 4.4 of the Proposal EA).

3.5.2.1 Beef Sector

Compared to a baseline producer price of $66.09 per hundredweight, EPA's market model predicts that the final CAFO regulations would raise producer cattle prices by $0.03 per hundredweight (Option 1) to $0.13 per hundredweight (Option 2), or little more than 0.20 percent of the baseline producer price (Table 3-23). (All prices are in 1997 dollars.) At the retail level, consumer prices for beef products would rise less than half a cent per pound. At the retail commodity level, EPA's market model predicts that U.S. beef imports would rise by less than 0.1 percent, and U.S. beef exports would decrease by about 0.06 percent compared to baseline quantities.

Table 3-23 also presents EPA's estimates of both the direct (farm and processor level) and total (i.e., national level) reductions in employment for the beef sector. Overall, the decrease in national aggregate employment attributable to regulatory impacts on the beef sector range from about 700 FTE (Option 1) to about 2,800 FTE (Option 2). Projected job losses are estimated throughout the entire economy and are not attributable to the regulated community only. This analysis does not adjust for offsetting increases in other sectors of the economy that might be stimulated as a result of the final regulations. Estimated direct job losses include CAFO owner-operators, employed family members, and hired farm labor. Total farm level employment in the cattle sector was 336,700 FTEs in 1997 (Abel, Daft, and Earley, 1993, as updated by EPA; see Table 2-17 of the Proposal EA). More than 145,000 persons were employed in that sector's processing industries in 1997 (USDC, 1999a).

Table 3-23 shows that the traditional cattle production regions of the Midwest would be the most affected, followed closely by the Central region. None of the impacts represent a significant share of total employment in these regions. Compared to the baseline, EPA estimates the loss in beef agricultural employment at less than 0.02 percent of total regional employment; about half of the estimated agricultural job losses in the beef sector are expected in the Midwest region. Economy-wide employment losses are estimated at less than 0.02 percent of baseline employment.

3.5.2.2 Dairy Sector

Compared to a baseline producer price of $13.38 per hundredweight, EPA's market model predicts that as a result of the final regulations raw milk prices would rise compared to the baseline price

by $0.05 per hundredweight (Option 1) to $0.08 per hundredweight (Option 2). (All prices are in 1997 dollars.) The retail dairy product price index rises by up to 0.8, less than 0.6 percent of the baseline value (Option 2). These price increases are driven by slight changes in the amount produced at the farm level and thus available for consumption (Table 3-24). At the retail commodity level, EPA's market model predicts that U.S. dairy product imports would rise up to 0.9 percent, and U.S. dairy product exports would decrease by about 0.14 percent compared to baseline quantities (Option 2).

Table 3-24 also presents EPA's estimates of both the direct (farm and processor level) and total (national level) changes in employment for the dairy sector. EPA estimates total employment losses attributable to the impact of the regulations on the dairy sector range from about 2,400 FTE (Option 1) to about 4,400 FTE (Option 2). Projected job losses are estimated throughout the entire economy and are not attributable to the regulated community only. This analysis does not adjust for offsetting increases in other sectors of the economy that might be stimulated as a result of the final regulations. Estimated direct job losses include CAFO owner-operators, employed family members, and hired farm labor. Total farm level employment in the dairy sector was 483,800 FTEs in 1997 (Abel, Daft, and Earley, 1993, as updated by EPA). There were more than 141,000 FTE jobs in dairy processing in 1997 (USDC, 1999a).

Table 3-24 shows that the results of EPA's analysis indicate that dairy operations in the Midwest region would be most affected, followed by operations in the Mid-Atlantic and Pacific regions. The loss in dairy agricultural employment is estimated at less than 0.01 percent of total regional employment; about 35 percent of the estimated agricultural job losses in the dairy sector are expected in the Midwest region. Economy-wide employment losses are estimated at less than 0.02 percent of baseline employment for the sector.

3.5.2.3 Hog Sector

Compared to a baseline producer price of $54.30 per hundredweight (hundredweight), EPA's market model predicts that the final CAFO regulations would raise producer prices by by $0.02 per hundredweight (Option 1) to $0.10 per hundredweight (Option 2), or less than 0.2 percent of baseline producer price (Table 3-25). At the retail level, consumer prices for pork products would rise about one-tenth of one cent per pound. These price increases are driven by slight changes in the amount of pork products produced at the farm level and thus available for consumption. At the commodity level, EPA's market model predicts that U.S. pork imports would rise by about 0.03 percent and U.S. pork exports would decrease by about 0.04 percent compared to baseline quantities.

Table 3-25 also presents EPA's estimates of both the direct (i.e., farm and processor level) and total (i.e., national level) reductions in employment for the hog sector. Overall, EPA decreases in national aggregate employment in the hog sector by 300 FTE (Option 1) to about 1,000 FTE (Option 2). Projected job losses are estimated throughout the entire economy and are not attributable to the regulated community only. This analysis does not adjust for offsetting increases in other sectors of the economy that might be stimulated as a result of the final regulations. Estimated direct job losses include CAFO owner-operators, employed family members, and hired farm labor. Total farm level employment of 195,900 FTEs in the hog sector nationwide in 1997 (Abel, Daft, and Earley, 1993, as updated by EPA). Employment in the hog processing sector accounted for over 84,000 FTE jobs in 1997 (USDC, 1999a).

Table 3-25 shows that the traditional hog growing regions of the Midwest would be the most affected, followed by the Mid-Atlantic. None of the impacts represent a significant share of total employment in these regions. Compared to the baseline, EPA estimates the loss in hog agricultural

employment at under 0.01 percent; almost 70 percent of the estimated agricultural job losses in the hog sector are expected in the more traditional Midwest region. Economy-wide employment losses are estimated at under 0.01 percent compared to the baseline.

3.5.2.4 Poultry Sector

A summary of the key results of the market model for the broiler, layer, and turkey sectors is shown in Tables 3-26, 3-27, and 3-28. These tables indicate the predicted changes in farm and retail prices, quantities, national and regional employment, and national economic output.

Compared to a baseline producer price of 37 cents per pound (in 1997 dollars), EPA's market model predicts that the final CAFO regulations would raise broiler producer prices by about 0.05 cents per pound, or about 0.10 percent of the baseline producer price (Table 3-26). At the retail level, consumer prices for broiler products would also rise by about 0.05 cents per pound. Egg prices are projected to increase by under 0.2 cent per dozen under the final regulations, or less than 0.4 percent of the baseline producer price of 69.8 cents per dozen (Table 3-27). Consumer prices for eggs are also projected to rise by about 0.3 cents per dozen. For turkey, EPA's market model predicts that the final CAFO regulations would raise producer prices by under 0.1 cent per pound, less than 0.2 percent of the 40.1 cents per pound baseline producer price (Table 3-28). At the retail level, consumer prices for turkey products would also rise by about 0.2 cent per pound. In most cases, there is little differences between the estimated results for both Option 1 and Option 2.

These price increases are driven by slight changes in the amount of poultry products produced at the farm level and thus available for consumption. At the commodity level, EPA's market model predicts that U.S. egg imports would increase by about 0.20 percent and broiler imports would increase by 0.01 percent compared to baseline imports, but turkey imports would not change. U.S. broiler, turkey, and egg exports would all decrease by less than 0.04 percent relative to baseline exports.

Tables 3-26 through 3-28 also present EPA's estimates of both the direct (farm and processor level) and total (national level) reductions in employment for the poultry sector. Overall, national aggregate employment reductions attributable to the impact of the regulations on the broiler sector are estimated at 400 jobs to 500 jobs lost. National aggregate employment losses in the egg-laying sector would be 300 jobs to 400 jobs lost. In the turkey sector, the analysis shows that about 200 jobs would be lost. Projected job losses are estimated throughout the entire economy and are not attributable to the regulated community only. This analysis does not adjust for offsetting increases in other sectors of the economy that might be stimulated as a result of the final regulations. Estimated direct job losses include CAFO owner-operators, employed family members, and hired farm labor. Total farm level employment in the poultry sector was 71,800 FTEs nationwide 1997 (Abel, Daft, and Earley, 1993, as updated by EPA). More than 204,000 persons were employed in poultry processing in 1997 (USDC, 1999a).

Table 3-26 shows that the dominant broiler producing regions of the South would be the most affected, followed by the Mid-Atlantic. The largest impacts on turkey and egg production would be in the Midwest. None of the impacts represent a significant share of total employment in these regions. Compared to the baseline, EPA estimates the loss in broiler agricultural employment would be less than 0.04 percent; almost 60 percent of the estimated agricultural job losses in the broiler sector are expected in the South (Table 3-26). About 40 percent of egg and turkey industry job losses are expected in the Midwest (Tables 3-27 and 3-28). Again, economy-wide employment losses are estimated at under 0.01 percent compared to baseline employment.

Table 3-23. Summary of Market Model Results for the Beef Sector

Variable	Pre-Regulatory Value/Units	Post-Regulatory Value/Units	
		Option 1	Option 2
Farm Products			
Price	$66.09/cwt	$66.12/cwt	$66.22/cwt
Quantity [a/] Produced	47,967 mil. lbs.	47,958 mil. lbs.	47,927 mil. lbs.
Quantity Exported	331 mil. lbs.	331 mil. lbs.	330 mil. lbs.
Quantity Imported	2,400 mil. lbs.	2,401 mil. lbs.	2,405 mil. lbs.
Retail Products			
Price	$2.80/lb.	$2.801/lb.	$2.803/lb.
Quantity Demanded	26,031 mil. lbs.	26,028 mil. lbs.	26,016 mil. lbs.
Quantity Exported	2,136 mil. lbs.	2,136 mil. lbs.	2,135 mil. lbs.
Quantity Imported	2,343 mil. lbs.	2,344 mil. lbs.	2,345 mil. lbs.
Employment Reduction [b/]			
Direct Farm	336,700 FTEs	113 FTEs	487 FTEs
Direct Processor	145,617 FTEs	15 FTEs	67 FTEs
Total Economy	129.6 mil. FTEs	657 FTEs	2,827 FTEs
Output Reduction			
National	$8,478,600 million	$65 million	$282 million
Regional Farm and Processing Employment Reduction			
Pacific	23,869 FTEs	6 FTEs	27 FTEs
Central	195,434 FTEs	52 FTEs	225 FTEs
Midwest	254,929 FTEs	68 FTEs	293 FTEs
South	1,430 FTEs	0 FTEs	2 FTEs
Mid-Atlantic	6,656 FTEs	2 FTEs	8 FTEs
Total	482,317 FTEs	129 FTEs	554 FTEs

Source: Post-regulatory changes are estimated by USEPA. Pre-regulatory prices, quantities, and trade volumes, see Table 4-16 (Section 4 of the Proposal EA). Pre-regulatory employment, see Table 2-17 (Section 2 of the Proposal EA) allocated to regions based on production as are the post-regulatory values.

[a/] Includes veal and heifer.

[b/] 1 FTE = 2,080 hours of labor.

Table 3-24. Summary of Market Model Results for the Dairy Sector

Variable	Pre-Regulatory Value/Units	Post-Regulatory Value/Units	
		Option 1	Option 2
Farm Products			
Price	$13.38/cwt	$13.43/cwt	$13.46/cwt
Quantity Produced	156,100 mil. lbs.	155,955 mil. lbs.	155,835 mil. lbs.
Retail Products			
Price	145.50 Index	145.95 Index	146.33 Index
Quantity Demanded	155,239 mil. lbs.	155,119 mil. lbs.	155,020 mil. lbs.
Quantity Exported	5,244 mil. lbs.	5,240 mil. lbs.	5,237 mil. lbs.
Quantity Imported	4,383 mil. lbs.	4,404 mil. lbs.	4,421 mil. lbs.
Employment Reduction [a/]			
Direct Farm	483,800 FTEs	370 FTEs	675 FTEs
Direct Processor	141,400 FTEs	15 FTEs	26 FTEs
Total Economy	129.6 mil. FTEs	2,404 FTEs	4,387 FTEs
Output Reduction			
National	$8,478,600 million	$222 million	$406 million
Regional Farm and Processing Employment Reduction			
Pacific	138,725 FTEs	85 FTEs	156 FTEs
Central	91,963 FTEs	57 FTEs	103 FTEs
Midwest	225,389 FTEs	139 FTEs	253 FTEs
South	27,405 FTEs	17 FTEs	31 FTEs
Mid-Atlantic	141,718 FTEs	87 FTEs	159 FTEs
Total	625,200 FTEs	384 FTEs	701 FTEs

Source: Post-regulatory changes are estimated by USEPA. Pre-regulatory prices, quantities, and trade volumes, see Table 4-16 (Section 4 of the Proposal EA). Pre-regulatory employment, see Table 2-17 (Section 2 of the Proposal EA) allocated to regions based on production as are the post-regulatory values.

[a/] 1 FTE = 2,080 hours of labor.

Table 3-25. Summary of Market Model Results for the Hog Sector

Variable	Pre-Regulatory Value/Units	Post-Regulatory Value/Units	
		Option 1	Option 2
Farm Products			
Price	$54.30/cwt	$54.32/cwt	$54.40/cwt
Quantity Produced	23,542 mil. lbs.	23,539 mil. lbs.	23,530 mil. lbs.
Quantity Exported	14 mil. lbs.	14.1 mil. lbs.	14.1 mil. lbs.
Quantity Imported	814 mil. lbs.	813.8 mil. lbs.	814.5 mil. lbs.
Retail Products			
Price	$2.45/lb.	$2.45/lb.	$2.45/lb.
Quantity Demanded	16,863 mil. lbs.	16,862 mil. lbs.	16,857 mil. lbs.
Quantity Exported	1,044 mil. lbs.	1,043.5 mil. lbs.	1,043.2 mil. lbs.
Quantity Imported	633 mil. lbs.	633.1 mil. lbs.	633.2 mil. lbs.
Employment Reduction			
Direct Farm	195,900 FTEs [a/]	37 FTEs	153 FTEs
Direct Processor	84,723 FTEs	10 FTEs	40 FTEs
Total Economy	129.6 mil. FTEs	254 FTEs	1,047 FTEs
Output Reduction			
National	$8,478,600 million	$26 million	$108 million
Regional Farm and Processing Employment Reduction			
Pacific	1,507 FTEs	0 FTEs	1 FTEs
Central	20,128 FTEs	3 FTEs	14FTEs
Midwest	189,391 FTEs	32 FTEs	131 FTEs
South	12,129 FTEs	2 FTEs	8 FTEs
Mid-Atlantic	57,468FTEs	10 FTEs	40 FTEs
Total	280,623 FTEs	47 FTEs	194 FTEs

Source: Post-regulatory changes are estimated by USEPA. Pre-regulatory prices, quantities, and trade volumes, see Table 4-16 (Section 4 of the Proposal EA). Pre-regulatory employment, see Table 2-17 (Section 2 of the Proposal EA) allocated to regions based on production as are the post-regulatory values.

[a/] 1 FTE = 2,080 hours of labor.

Table 3-26. Summary of Market Model Results for the Broiler Sector

Variable	Pre-Regulatory Value/Units	Post-Regulatory Value/Units	
		Option 1	Option 2
Farm Products			
Price	37.00¢/lb.	37.04¢/lb.	37.05¢/lb.
Quantity Produced	27,551 mil. lbs.	27,548 mil. lbs.	27,548 mil. lbs.
Retail Products			
Price	151.00¢/lb.	151.04¢/lb.	151.05¢/lb.
Quantity Demanded	22,508 mil. lbs.	22,506 mil. lbs.	22,505 mil. lbs.
Quantity Exported	5,048 mil. lbs.	5,047.5 mil. lbs.	5,047.4 mil. lbs.
Quantity Imported	5 mil. lbs.	5 mil. lbs.	5 mil. lbs.
Employment Reduction [a/ b/]			
Direct Farm	71,800 FTEs	73 FTEs	88 FTEs
Direct Processor	204,200 FTEs	13 FTEs	15 FTEs
Total Economy	129.6 mil. FTEs	401 FTEs	487 FTEs
Output Reduction			
National	$8,478,600 million	$40 million	$48 million
Regional Farm and Processing Employment Reduction			
Pacific	11,764 FTEs	4 FTEs	4 FTEs
Central	22,826 FTEs	7 FTEs	9 FTEs
Midwest	13,077 FTEs	4 FTEs	5 FTEs
South	156,986 FTEs	48 FTEs	59 FTEs
Mid-Atlantic	71,347 FTEs	22 FTEs	27 FTEs
Total	276,000 FTEs	85 FTEs	103 FTEs

Source: Post-regulatory changes are estimated by USEPA. Pre-regulatory prices, quantities, and trade volumes, see Table 4-16 (Section 4 of the Proposal EA). Pre-regulatory employment, see Table 2-17 (Section 2 of the Proposal EA) allocated to regions based on production as are the post-regulatory values.

[a/] 1 FTE = 2,080 hours of labor.

[b/] Estimated employment across all poultry sectors (Table 2-17 of the Proposal EA).

Table 3-27. Summary of Market Model Results for the Egg-Laying Sector

Variable	Pre-Regulatory Value/Units	Post-Regulatory Value/Units	
		Option 1	Option 2
Farm Products			
Price	69.80¢/doz.	69.97¢/doz.	70.07¢/doz.
Quantity Produced	6,473 mil. doz.	6,472 mil. doz.	6,471 mil. doz.
Retail Products			
Price	106.00¢/doz	106.17¢/doz.	106.27¢/doz.
Quantity Demanded	5,357 mil. doz.	5,356 mil. doz.	5,356 mil. doz.
Quantity Exported	227.8 mil. doz.	227.8 mil. doz.	227.7 mil. doz.
Quantity Imported	7 mil. doz.	7 mil. doz.	7 mil. doz.
Employment Reduction [a/ b/]			
Direct Farm	71,800 FTEs	17 FTEs	27 FTEs
Direct Processor	204,200 FTEs	5 FTEs	7 FTEs
Total Economy	129.6 mil. FTEs	259 FTEs	408 FTEs
Output Reduction			
National	$8,478,600 million	$24 million	$38 million
Regional Farm and Processing Employment Reduction			
Pacific	11,764 FTEs	3 FTEs	4 FTEs
Central	22,826 FTEs	2 FTEs	3 FTEs
Midwest	13,077 FTEs	8 FTEs	13 FTEs
South	156,986 FTEs	5 FTEs	7 FTEs
Mid-Atlantic	71,347 FTEs	4 FTEs	7 FTEs
Total	276,000 FTEs	22 FTEs	34 FTEs

Source: Post-regulatory changes are estimated by USEPA. Pre-regulatory prices, quantities, and trade volumes, see Table 4-16 (Section 4 of the Proposal EA). Pre-regulatory employment, see Table 2-17 (Section 2 of the Proposal EA) allocated to regions based on production as are the post-regulatory values.

[a/] 1 FTE = 2,080 hours of labor.

[b/] Estimated employment across all poultry sectors (Table 2-17 of the Proposal EA).

Table 3-28. Summary of Market Model Results for the Turkey Sector

Variable	Pre-Regulatory Value/Units	Post-Regulatory Value/Units	
		Option 1	Option 2
Farm Products			
Price	40.10¢/lb.	40.15¢/lb.	40.17¢/lb.
Quantity Produced	5,412 mil. lbs.	5,410.6 mil. lbs.	5,410.0 mil. lbs.
Retail Products			
Price	105.10¢/lb	105.15¢/lb.	105.17¢/lb.
Quantity Demanded	4,814 mil. lbs.	4,813 mil. lbs.	4,812 mil. lbs.
Quantity Exported	598 mil. lbs.	597.8 mil. lbs.	597.8 mil. lbs.
Employment Reduction [a/ b/]			
Direct Farm	71,800 FTEs	41 FTEs	59 FTEs
Direct Processor	204,200 FTEs	3 FTEs	5 FTEs
Total Economy	129.6 mil. FTEs	157 FTEs	227 FTEs
Output Reduction			
National	$8,478,600 million	$16 million	$23 million
Regional Farm and Processing Employment Reduction			
Pacific	11,764 FTEs	4 FTEs	5 FTEs
Central	22,826 FTEs	2 FTEs	3 FTEs
Midwest	13,077 FTEs	17 FTEs	25 FTEs
South	156,986 FTEs	6 FTEs	9 FTEs
Mid-Atlantic	71,347 FTEs	15 FTEs	22 FTEs
Total	276,000 FTEs	45 FTEs	65 FTEs

Source: Post-regulatory changes are estimated by USEPA. Pre-regulatory prices, quantities, and trade volumes, see Table 4-16 (Section 4 of the Proposal EA). Pre-regulatory employment, see Table 2-17 (Section 2 of the Proposal EA) allocated to regions based on production as are the post-regulatory values.

[a/] 1 FTE = 2,080 hours of labor.

[b/] Estimated employment across all poultry sectors (Table 2-17 of the Proposal EA).

Attachment 4:
Permitting for Environmental Results
NPDES Profile: Illinois

Permitting for Environmental Results (PER)

NPDES Profile: Illinois

PROGRAM RESPONSIBILITY

State of Illinois: NPDES authority for base program, general permitting, federal facilities
EPA Region 5: NPDES authority for pretreatment and biosolids

Program Integrity Profile

This profile characterizes key components of the National Pollutant Discharge Elimination System (NPDES) program, including program administration and implementation, environmental outcomes, enforcement, and compliance. EPA considers profiles to be an initial screen of NPDES permitting, water quality, enforcement, and compliance programs based on self-evaluations by the States and a review of national data. EPA will use the profiles to identify program strengths and opportunities for enhancements. For more information, please contact Toby Frevert, Illinois EPA, at (217) 558-2012 or Peter Swenson, EPA Region 5, at (312) 886-0236.

Section I. Program Administration

1. Resources and Overall Program Management

The State of Illinois:

Administration of the NPDES program by the Illinois Environmental Protection Agency (IEPA) involves the cooperative efforts of the Bureau of Water Pollution Control's Permit Section, Water Quality Standards Section, Compliance Assurance Section, Field Operations Section, and Division of Legal Counsel. The Surface Water Monitoring and Watershed Management Section issues non-coal mining (quarry) and concentrated animal feeding operation (CAFO) permits. The Mine Program Section develops mining operation NPDES permits. Permits are also reviewed by the Field Operations Section, the Compliance Assurance Section, and the applicant. In addition to the NPDES program, the State must also devote resources to other wastewater-related activities, such as the issuance of State permits to install wastewater infrastructure. As of summer 2004, the Permit Section included 11 permit engineers and three managers. The Water Quality Standards and Mine Program Sections account for six full-time equivalents (FTEs). The Surface Water Monitoring and Watershed Management Sections account for 15 FTEs. The Compliance Assurance Section has 13 FTEs, and six FTEs are in administrative support. There are 39 field inspection personnel, and NPDES activities account for about 30 of those FTEs (not including clerical and management support). Thirteen positions are vacant. The FTEs are supported by monetary resources totaling $8.6 million. Recent budget constraints have prevented filling vacancies. The Illinois legislature has enacted an NPDES fee program. Although IEPA's overall resources have not yet increased with the shift to a fee-based program, the program is expected to bring increased funding for IEPA once State finances have stabilized. This expected increase will allow resources devoted to the NPDES program to increase.

NPDES permit staffing is supported in part by Clean Water Act (CWA) section 106 grant funding, which also funds work in monitoring and water quality standards. Staffing levels have not kept pace

with the increased scope of the NPDES program, including stormwater and CAFOs. Although the number of authorized FTEs has remained fairly constant over the past 5 years, a number of vacant positions have not been filled.

IEPA has a training program for field inspection staff, including required and recommended training for both new and experienced inspectors. Planned training includes IEPA methods and procedures for new staff (including a field procedures manual), ongoing technical training, and health and safety training. IEPA also has a long-established NPDES training program for permit engineers. Upon employment, new permit engineers receive extensive training and work with a senior engineer on all phases of permit development. The senior engineer provides all necessary training, including the regulatory framework of the NPDES program, permitting process, application process, technology-based effluent limits, water quality-based effluent limits (WQBELs), special conditions, and the administrative process. IEPA has developed a permit engineer's manual that provides templates for the efficient and expedient drafting of many NPDES permits. In addition, IEPA makes in-house and outside training programs available for its permit-writing staff. Senior permit engineers, NPDES managers, field inspectors from the regional field offices, and legal staff members are available to advise and assist when unique situations develop. A database is available to track the progress of NPDES permits pending issuance or renewal.

IEPA was authorized to administer the NPDES program on October 23, 1977; authorized to administer the program for federal facilities on September 20, 1979; and authorized to issue general permits on January 4, 1984. In addition, the State issues State operating permits for land application of municipal biosolids and industrial sludges pursuant to State regulations and design/operational criteria. Illinois does not have authorization for the pretreatment program.

According to the NPDES management report, the State has 279 major facilities, 1,667 minor facilities with individual permits, and 542 non-stormwater minor facilities covered by general permits.

EPA Region 5:

EPA Region 5 carries out direct implementation activities in industrial pretreatment and biosolids in Illinois.

Region 5's NPDES Programs Branch has approximately 0.5 FTE committed to these programs in Illinois. This staffing is adequate for the current workload (pretreatment program reviews, limited biosolids permitting). Congress, however, intended that biosolids requirements would be implemented through permits. The Region estimates that an additional 1 FTE would be needed to issue biosolids permits for all facilities in Illinois. Additional enforcement and compliance staff would also be needed to monitor compliance.

2. State Program Assistance

Region 5 has made progress in helping Illinois obtain biosolids program approval. The Region has helped identify areas of Illinois's program that need to be updated and is working with Illinois to update the identified areas, including State rules. The State's workplan includes a commitment to submit a copy of the State's revised draft rules for review during fiscal year (FY) 2005. After the rules have been finalized, Illinois plans to seek program approval.

EPA Region 5 previously worked with Illinois to prepare several submittals necessary for pretreatment program delegation. The Region remains the pretreatment program approval authority in Illinois. Although not delegated, the State carries out some of the day-to-day implementation activities under the pretreatment program and will assist EPA in other aspects of program implementation as resources allow. In light of these shared responsibilities and competing State priorities, EPA and IEPA have agreed that delegation of this program in the near term is not a high-priority activity.

3. EPA Activities in Indian Country

Not applicable because there are currently no federally recognized Tribes in Illinois.

4. Legal Authorities

EPA is conducting a comprehensive review of the State's legal authorities. This review has not yet been completed. As a result, EPA is reserving this section of the profile; when the legal reviews are complete, EPA will update profiles to include the results of the reviews.

5. Public Participation

An evaluation of the State's legal authorities regarding public participation will be included in the legal authority review. As noted above, the legal authority review section of this profile is reserved pending completion of the legal authority review.

The State of Illinois:

IEPA encourages public participation in the NPDES permitting process. The IEPA public participation policy is regulated by 35 Illinois Administrative Code (IAC) 309.109 through 309.119. By considering comments received through the public participation process and by working with interested individuals and groups, many revisions and improvements have been made to the permitting process. IEPA encourages meaningful public involvement through the preparation of NPDES public notice fact sheets. These fact sheets are prepared consistent with title 40 of the Code of Federal Regulations (CFR) section 124.8. The fact sheets outline the derivation of the permit limits and contain all information required by federal regulations. NPDES permits are placed on public notice in accordance with federal regulations. Individual NPDES permits receive legal public notice by publication in daily or weekly newspapers circulated in the geographic area of the proposed discharge, and all draft permits are available on the Internet. The fact sheet includes the name and telephone number of the permit engineer who drafted the NPDES permit. The permit engineer is available to answer questions and provide clarification or additional information to the interested public. In addition, IEPA maintains and updates a mailing list of interested parties who have requested copies of the proposed NPDES permits, fact sheets, or public notice documents. Those receiving direct mailings include municipal, State, and federal agencies; public interest groups; concerned citizens; and any individual or group expressing an interest in a particular NPDES permit.

IEPA maintains a Web site to interact with, educate, and inform the public. IEPA believes that public involvement and interaction should begin at an early age and has developed a "Kids and Environmental Education" section on its Web site. This section includes pages that provide information for educators and information on internships for those interested in environmental careers. The Web site also includes a section on hot topics, a list of frequently asked questions, and a quick-answer directory. From the Web

site the public can download a citizen complaint form, current rules and regulations, and forms and publications. The Web site also provides links to federal, Illinois, and other relevant sites.

Draft individual permits proposed for issuance are available on IEPA's Web site and generally receive a public comment period of 30 days following legal public notice. Coverage under the general stormwater permits is subject to a 14-day public notice period. Any person may provide comments to IEPA in response to a draft permit. During the comment period, any interested person, organization, or agency may request a public hearing on a draft permit. Based on a review of the issues raised and the amount of public interest, IEPA evaluates whether a public meeting or public hearing will be held. If a public hearing is requested, IEPA may decide whether to hold a public hearing. If a public hearing is held, the public is notified of the hearing date and location at least 45 days before the hearing date. A public hearing is a formal meeting for taking testimony for the record, and it is usually held near the proposed discharge site. A hearing officer chairs the public hearing. The hearing is recorded, and a responsiveness summary is prepared for the record and sent to all participants. Responsiveness summaries are also posted on IEPA's Web site. When a hearing is held on a particular permit, the final permit is also made available on the Web site. IEPA also accepts discharge monitoring reports (DMRs) electronically and provides public access to DMR summary data. IEPA provides public access to stormwater permit notices of intent on its Web site.

Documents relating to NPDES permits are available to interested parties through the Freedom of Information Act (FOIA) at IEPA headquarters. All documents relating to NPDES permits are subject to full disclosure except for those determined to be confidential, part of litigation, or information entitled to protection as trade secrets of the applicant in accordance with 40 CFR 122.7. Effective January 1, 2000, IEPA has new rules (2 IAC 1828) regulating the submission of requests for information pursuant to FOIA. These rules include definitions, procedures for requesting public records, procedures regarding exemption from public disclosure, and appeal rights. The Illinois Audit Privilege Law may keep information from the public in the permitting process that should be released under the CWA. Amendments to this State law that will alleviate EPA's concerns have been introduced into the Illinois General Assembly; EPA is hopeful that they will be passed prior to the close of the current legislative session.

EPA Region 5:

As the pretreatment approval authority in Illinois, EPA is responsible for review and approval of new publicly owned treatment works (POTW) pretreatment programs and all modifications of existing programs. In approving these programs, Region 5 follows the public notice requirements in the General Pretreatment Regulations. Once the Region's review determines that a new or modified proposed program is approvable, the Region requests that the State provide public notice in the relevant local community. If, as is usually the case, no comments are received, the Region transmits an approval letter to the POTW. If comments are received, the Region considers them, makes any necessary revisions, and requests that the State provide public notice of the changes. The Region has also encouraged POTWs to use the option provided in 40 CFR 403.18 whereby the POTWs provide the public notice, and the Region has provided guidance on the necessary contents of such notices.

Some individual NPDES permits and fact sheets issued by the State can be accessed on EPA's Web site. Instructions for accessing these documents are available at http://www.epa.gov/npdes/permitdocuments.

6. Permit Issuance Management Strategy

The State of Illinois:

IEPA developed a permit backlog reduction strategy that includes schedules based on the length of time permits are expired, environmental significance of the discharge, and complexity of the permit.

The following summarizes the status of NPDES permit issuance in Illinois:

Major Dischargers

- There are 279 major discharger permits in Illinois.
- As of the July 9, 2004, Management Report, 81% of major dischargers had current permits. By November 1, 2004, this number had increased to 84%.
- One major permit has been expired for more than 10 years. This facility is currently not discharging and is in the process of transferring its ownership.
- Twenty-five major permits have been expired for over 2 years.
- During calendar years 2001, 2002, and 2003, respectively, 67, 40, and 13 major permits were issued.
- IEPA believes it is on track to meet, by December 31, 2004, the national backlog reduction target of no more than 10% of major permits expired.

Minor Dischargers

- There are currently 1,622 minor discharger permits, a small decrease from the 1,667 referenced in the July 9, 2004, Management Report.
- Sixty-two percent of minor permits are current.
- Sixty-two minor permits have been expired for over 10 years.
- Two hundred and ninety-six minor permits have been expired for over 2 years.
- During calendar years 2001, 2002, and 2003, respectively, 126, 206, and 110 minor permits were issued.
- IEPA has committed to the Region to meet, by December 31, 2005, the national backlog reduction target of no more than 10% of all permits (including minor permits) expired.

IEPA has carried a high backlog of expired permits since calendar year 2000. Many of these permits were held for more than 18 months while IEPA developed, and sought EPA approval of, implementation procedures to develop ammonia limits under new State water quality standards. In addition, resource constraints and shortage of staff have exacerbated the situation. An additional significant work effort was necessary to implement a new NPDES fee program in the State.

IEPA has provided to EPA a list of major and minor permits with a quarterly reissuance schedule for 2004 and 2005. The list includes all the permits that have been expired for 2 or more years. The major permit issuance schedule is incorporated into the Environmental Performance Partnership Agreement (EnPPA), and the minor permit issuance schedule is an attachment to the EnPPA. The Region will track the State's progress on a monthly basis. In addition, the State has memorialized its permit backlog reduction strategy in the EnPPA and plans to meet the national backlog goal by the end of calendar year 2005.

Illinois has taken significant steps to reduce the backlog of expired permits through the use of general permits, including permits for municipal lagoons, public water supplies, non-contact cooling water, CAFOs, and sand and gravel operations.

Table 1: Percentage of Facilities Covered by Current Permits in Illinois

	2000	Nat'l Avg.	2001	Nat'l Avg.	2002	Nat'l Avg.	2003	Nat'l Avg.
Major Facilities	78.6%	74%	75.9%	76%	86.7%	83%	80.4%	84%
Minor Facilities Covered by Individual Permits	79.5%	69%	71.4%	73%	70.4%	79%	64.3%	81%
Minor Facilities Covered by Individual or General Permits	N/A	N/A	N/A	N/A	60.1%	85%	61.8%	86%

Source: Permit Compliance System (PCS), 12/31/00; 12/31/01; 12/31/02; 12/31/03. (The values in the National Data Sources column of the Management Report, measures #19 and #20, are PCS data as of 6/30/04.)

7. Data Management

The State of Illinois:

The State uses EPA's Permit Compliance System (PCS) as the principal tool in the collection and management of NPDES data. The State also uses a FoxPro database for tracking under the State's general stormwater permits and an internal data system to prepare, issue, and track enforcement actions. PCS is used to track combined sewer overflow (CSO) events. Information on sanitary sewer overflow (SSO) events (often detected through citizen complaint) is maintained in individual facility files at IEPA headquarters. An exception is made for major permittees: once the number and volume of SSOs are judged to be significant, the information is tracked in PCS.

Data are not exchanged between the general stormwater permit data system and PCS. IEPA updates PCS manually with NPDES-related documents generated using the internal enforcement system. Data discrepancies have occurred between these systems, resulting in fewer enforcement actions being reported in PCS than were actually taken for minor facilities. Illinois redesigned the internal tracking system in 2003 and believes that the quality of the data is much improved. Efforts to ensure that PCS is up-to-date and complete were also undertaken, with the result that the data in PCS are believed to be complete and accurate for major facilities. Work is still needed to complete data input for minors.

The State collects latitude and longitude data at both the facility and outfall locations. These data are collected through global positioning system (GPS) units and mapping software, in addition to the information provided on the NPDES permit application. The State validates data by cross-referencing two or more sources of information and believes that all gross errors (e.g., facility locations outside the State) have been detected and corrected. Smaller-scale errors are being identified and corrected as field staff validate the latitude/longitude data using GPS units during sample collection and facility inspections. The process of field validating all latitude/longitude data is expected to be lengthy (approximately 5 years), but as the data become available (including metadata), the information will be promptly updated in PCS.

IEPA staff address and correct data discrepancies as they are identified during regular quality control activities. Illinois reviews all DMRs for completeness upon receipt. Checklists itemizing reporting deficiencies are sent to the permittees for follow-up. DMR data are entered in batch mode and subjected to dummy edits to identify data entry errors prior to live updating of PCS. All other segments of PCS data entry are quality checked using PCS update audit processing and several ad hoc PCS retrievals to ensure that the data contained in PCS are as complete and accurate as possible. The State routinely maintains a DMR entry rate above the national goal of 95%. During federal fiscal year 2002, the accuracy of DMR data for major dischargers in PCS was 99.75%.

The State's field operations staff perform overviews of laboratory procedures at NPDES facilities during compliance and performance audit inspections. In addition, effluent data from samples collected during reconnaissance inspections are compared to reported DMR data for inconsistencies. The State participates in the DMR quality assurance program for its major dischargers, and the results are reviewed by the IEPA field staff.

IEPA maintains accurate and up-to-date files and records on NPDES permittees and on the compliance/enforcement actions taken against them. IEPA maintains hard copy files of inspection reports, DMRs, enforcement actions, compliance commitment agreements (CCAs) and Enforcement Decision Group decisions.

Tracking of basic permit information for specific categories of permits (CSOs, SSOs, CAFOs, pretreatment, and biosolids) is discussed in the separate sections on each of these subjects under Section II, Program Implementation.

EPA Region 5:

The Region uses PCS to track all biosolids data required in the annual report for Class 1 and major facilities. The Region provides preprinted DMRs for these facilities, which helps to facilitate the data entry process. Not all facilities use the preprinted form or complete the form in its entirety, however, slowing the data entry process and possibly creating erroneous reporting or numeric violations.

Section II. Program Implementation

1. Permit Quality

The State of Illinois:

To help ensure permit quality, the State has established an NPDES permit writers training program. New permit engineers receive extensive training in the NPDES program and work with senior engineers in all phases of permit development. IEPA has developed an NPDES Permit Review Check Sheet that is used by permit engineers in drafting permits to help ensure consistency, accuracy, and completeness.

The State provides Region 5 copies of the permit application, public notice, fact sheet, draft permit, and supporting documents for permit review. The public notice, fact sheets, and final issued permits are sent to Region 5 for all major permits and general permits. In recent years, the State has improved the fact sheets to ensure that these include all information required by the federal regulations at 40 CFR 124.8 and 124.56, including all proposed effluent limitations with their supporting regulations, standards, and policies. The fact sheets also include information regarding the 7Q10 (the lowest consecutive 7-day stream flow that is likely to occur in a 10-year period) of the receiving stream and waters on the list of impaired water bodies prepared under CWA section 303(d).

IEPA includes 85% removal requirements for municipal wastewater treatment plant permits where the biochemical oxygen demand/carbonaceous biochemical oxygen demand and total suspended solids concentration limits are based on the federal secondary treatment standards. The percent removal requirements are not included in permits when the concentration limits for these parameters are more stringent than the secondary treatment concentration limits. All municipal major dischargers and all dischargers with a dilution ratio of less than five to one (design average flow for the facility to the 7Q10 flow for the receiving water) have concentration limits more stringent than those required under federal secondary treatment standards. IEPA believes that by meeting these limits, dischargers will also satisfy the percent removal requirements.

IEPA's standard review document provides the analysis for reasonable potential to exceed water quality standards and the evaluation for the need for WQBELs.

IEPA's NPDES program meets minimum federal whole effluent toxicity (WET) requirements. WET testing requirements and limits are applied to both municipal and industrial sources. Data generated by either program are reviewed and summarized by Water Quality Standards Section staff, and reports are distributed to the Permit Section. These reports contain recommendations based on the reviewed toxicity tests and may suggest that further monitoring be required in the permit or that WET limits or toxicity reduction evaluations are appropriate. Mixing zones or other considerations pertinent to the WET regulations are addressed in these reports much in the same way that traditional numeric standards are assessed in WQBELs. Currently, the State focuses on monitoring for acute toxicity. EPA recommends that IEPA consider an expanded use of monitoring for chronic toxicity, particularly for discharges to low-flow, effluent-dominated receiving waters.

Reasonable potential analyses are performed by the water quality standards staff. Senior staff members mentor new staff members using the State WET guidance and procedures, as well as EPA's technical support document and approved WET methods.

The State has a narrative water quality standard for toxicity, which can be interpreted as a numeric effluent limit. The State's preference is to use the permit to require a toxicity reduction evaluation to identify and eliminate the cause of toxicity prior to establishing an effluent limit. The State has placed WET limits in only two permits, including one permit addressing sublethal (chronic) effects. That permit is being appealed.

In developing the "permit quality" section of the program profile, State permits were not independently evaluated or compared to a national standard. Rather, the discussion is based primarily on an assessment of the quality assurance/quality control procedures established by the State of Illinois and routine permit quality reviews performed by EPA Region 5.

EPA Region 5:

Each year Region 5 and the State negotiate a list of permits proposed for reissuance that Region 5 will review prior to public notice, concentrating on one or more of the following:

- Permits for wet-weather discharges
- Permits that implement approved TMDLs
- Permits for facilities in critical industrial sectors, such as power plants
- Permits for CSOs linked to water quality impairment
- Permits for discharges where toxicity is a concern
- Permits suggested by the State
- Permits that have been expired for more than 3 years
- Permits for discharges with flows greater than 10 million gallons per day

As stated in the annual EnPPA, the Region will review approximately 5 to 10 facilities.

2. Pretreatment

The State of Illinois:

Although not delegated for the NPDES pretreatment program, the State carries out some of the day-to-day implementation activities under the pretreatment program and assists EPA in other aspects of program implementation as resources allow.

Forty-eight POTWs implement approved pretreatment programs in Illinois.[1] The need for additional POTWs to develop programs is assessed through industrial waste inventories required upon permit reissuance for POTWs with discharge rates at or near 5 million gallons per day. The Region reviews and

[1] The National Data Sources column in the Management Report, measure #8, lists Illinois as having 50 approved programs. This discrepancy is due to the fact that the PCS count on June 12, 2004, included two POTWs under a formerly approved program that no longer has industrial dischargers.

approves submissions for new and modified POTW programs; necessary public noticing is carried out by either the State or the local POTW.

Virtually all of the State's approximately 1,200 significant industrial users (SIUs) discharging to POTWs with approved pretreatment programs have been issued control mechanisms (typically, permits issued by the POTW). The State assesses the status of local permits or other control mechanisms during pretreatment inspections and annual report reviews and takes follow-up action as appropriate. The Region does likewise during EPA-led pretreatment audits.

Illinois has audited 40 of 48, or 83%, of its pretreatment programs in the past 5 years and has conducted 105 pretreatment compliance inspections (PCIs). Additional audits have been conducted but not entered into PCS.

Program deficiencies identified during State oversight that constitute violations of an NPDES permit requirement to implement the pretreatment program are handled under the State's Enforcement Management System. Normally, the response would be a Violation Notice (VN) sent within 60 days of the deficiency's being identified, with immediate initiation of corrective action and completion expected within a maximum of 1 year. Minor deficiencies that do not violate permit requirements are transmitted to the POTW in writing as recommendations, and the status is monitored during future inspections.

EPA Region 5:

Illinois is not authorized to administer the pretreatment program, although Region 5 has previously worked with Illinois to prepare several submissions necessary for delegation. As a result, Region 5 remains the approval authority and conducts certain direct implementation activities.

The Region has worked with the State to review operating permit files and other informational resources to evaluate known potential categorical industrial users (CIUs) discharging to POTWs without approved programs. Many facilities believed to be CIUs have been inspected for verification. The Region does not have CWA authority to permit industrial users, but 56 CIUs discharging to nonapproved POTWs are listed in PCS and are required to report to the Region semiannually regarding compliance with categorical requirements. In nonapproved pretreatment municipalities, all CIUs and some significant, noncategorical industrial users are required to secure operating permits issued by the State under State law. Permits for CIUs require permittees to report to the Region semiannually. Seventy percent of these industrial users have current permits. Compliance with the permit requirement and permit conditions is determined during industrial user inspections conducted at least once every 5 years. In addition, problem discharges from industrial users are investigated when IEPA becomes aware of them through citizen information or during POTW inspections.

The Region has supplemented IEPA's oversight with three audits and two PCIs in the past 5 years, raising the percentage of programs inspected or audited during the 5-year inspection period to 90%. In the context of discussions on the 2005 EnPPA, IEPA has indicated that pretreatment audits and inspections of industrial users (other than inspections of industrial users in nondelegated POTWs) will be an area of disinvestment. As a consequence, Region 5 will increase the number of its own pretreatment audits and inspections in Illinois. The Region has focused its efforts on identifying CIUs in POTWs without pretreatment programs. The Region plans to work to improve the format and content of the annual reports used in the six States in the Region.

The Region strives to transmit reports with required and recommended actions to POTWs within 180 days from completion of an audit; however, because of delays in receiving contractor drafts and other priority activities, this time frame is not always met. To assist POTWs in improving their programs, detailed conferences at the conclusion of audits provide POTWs with immediate feedback on findings. Administrative orders are often issued to track cases where numerous deficiencies have been identified. The Region plans to work to develop a streamlined audit checklist, which might also improve the turnaround time for finalizing audit reports.

3. Concentrated Animal Feeding Operations

Illinois issued a general permit for CAFOs in April 2004. The permit includes effluent limitations based on the Effluent Limitations Guidelines and New Source Performance Standards as well as water quality standards. In addition, the permit requires implementation of a best management practice (BMP) (i.e., nutrient management) plan that meets the nine minimum control measures included in the 2003 changes to the federal clean water regulations for CAFOs. Illinois plans to review BMP plans as part of the permit application process. Although this will add time to the review of permit applications, it will help to ensure the quality of plans.

The State plans to amend its administrative code for CAFOs by submitting a proposed rule change to the Illinois Pollution Control Board in April 2005. In the amended code, EPA expects that Illinois will require CAFOs to apply for permits (or seek a "no potential to discharge" determination) by no later than the applicable date in 40 CFR 122.23(g). The amended code will contain the State's technical standards for nutrient management.

Illinois has inventory information for about 30% of the estimated 500 Large CAFOs in the State. From 2000 to 2002, the State completed periodic, proactive inspections of 154 Large CAFOs. Currently, Illinois is inspecting CAFOs consistent with the Region 5 goal that all Large CAFOs will be inspected at least once every 5 years.

4. Stormwater

The State has issued permits necessary to implement the NPDES Storm Water Phase I and Phase II programs.

The State issued a new general permit for municipal systems subject to the Phase II regulations on December 20, 2002. The permit requires the development and implementation of a stormwater management plan that includes the six minimum measures EPA established in the Phase II regulations. Approximately 420 of the 647 regulated municipalities have applied for coverage under this permit.

The City of Rockford is the only municipal separate storm sewer system subject to Phase I of the national stormwater program. The Rockford permit expired on April 30, 2001. The State suffered staff losses in 2003 and made issuing the Phase II permits a priority. The State continues to work with Rockford to develop the draft renewal permit. This effort involves incorporating information and requirements from the Rock River Watershed Quality Analysis.

The State issued its revised stormwater general permit for construction activities on May 30, 2003. Persons who disturb 1 or more acres of land must obtain permit coverage. The revised general permit

requires the development and implementation of a stormwater pollution prevention plan (SWPPP), including practices to control erosion and sedimentation.

The State also issued its revised stormwater general permit for industrial activities on May 30, 2003. Facilities covered under the industrial stormwater general permit must also develop and implement an SWPPP.

Upon receipt of a Notice of Intent (NOI) to be covered under the general permit for construction site activity or industrial activity, Illinois has a 30-day review period. During that time, the NOI is posted on the State's Web site for 14 days. The public can request more detailed information from IEPA staff.

5. Combined Sewer Overflows/Sanitary Sewer Overflows

There are 108 entities in Illinois with active CSOs. With the exception of one community working to separate its sewer system, all are regulated under NPDES permits that require development and implementation of the nine minimum controls consistent with the National CSO Control Policy.

Historically, communities have been required to meet the treatment technology standards for CSO discharges contained in 35 IAC 306.305. As a result, virtually all municipalities with CSO discharges constructed CSO controls prior to the National CSO Control Policy. Since 1994 municipalities have been required to collect data on their CSO discharges. Those data are evaluated as NPDES permits are reissued, and appropriate CSO control language, including the requirement to develop a CSO assessment report, is included in the reissued NPDES permit. Based on the results of the assessment, further controls may be mandated. For facilities that have more than six discharges per year, the reissued permit requires the development of a CSO control plan unless the community demonstrates that water quality standards are being met. For facilities that have reduced their overflow frequency to six overflows per year or less, post-construction monitoring is required, consistent with the presumption approach in the CSO policy.

Satellite communities (those which own collection sewer systems but do not operate POTWs) that have CSOs are required to obtain NPDES permits. Satellite communities that have combined sewers but do not have CSOs are required to have procedures in place to address proper operation and maintenance of their systems. This is accomplished by including a requirement in the NPDES permit for the treatment authority, requiring that the authority's sewer use ordinance include provisions for proper operation and maintenance for the owners of all combined sewers tributary to the treatment works.

IEPA lists CSO locations during the public notice of all new and reissued CSO NPDES permits and major permit modifications. Permittees of CSOs that discharge to primary contact recreational waters are required to consider signage at the discharge location and potentially impacted downstream waters. As CSO NPDES permits are reissued, the permittee, in cooperation with members of the public, is required to develop (as a condition of the permit) a public notification program to address this issue. There is currently no public notification requirement for SSOs, though these must be reported to the State.

6. Biosolids

The State of Illinois:

The State is modifying technical design criteria and regulations to make them at least as stringent as 40 CFR part 503 and plans to seek partial authorization to administer the biosolids program. IEPA plans to decline acceptance of the septage authority.

Under its existing authorities, IEPA issues separate permits for land application of biosolids. NPDES permits issued by IEPA for POTWs contain language informing the POTWs that they must comply with federal biosolids regulations.

EPA Region 5:

Region 5 carries out direct implementation of the biosolids program in the Region. The level of effort has been reduced because of reduced funding for the program nationwide. Other Regional activities include providing outreach to the regulated community, assisting the States in seeking program approval, and providing technical and compliance assistance. For Illinois, the Region sends out reporting forms to all major POTWs in December or January and to others required to submit annual reports by February 19. The annual report data are entered into PCS. Because resources are limited, EPA Region 5 does not verify that all annual reports have been submitted, nor does it proactively track compliance. Enforcement actions related to biosolids are typically initiated in response to complaints or are part of more comprehensive enforcement actions.

To increase Regional activities and provide for more proactive management of the biosolids program in the future, both the permitting and enforcement programs within EPA headquarters will need to reinvest in the program or provide dedicated funds for program implementation to the Region.

Section III. NPDES Compliance Monitoring and Enforcement Response

In a separate initiative, EPA's Office of Enforcement and Compliance Assurance (OECA), EPA Regions, and the Environmental Council of the States have developed a tool for assessing State performance in enforcement and compliance assurance to ensure that States meet agreed-upon minimum performance levels and provide a consistent level of environmental and public health protection nationwide. OECA will use the State profiles to focus these efforts and identify areas needing further discussion and evaluation.

1. Enforcement Program

The State of Illinois:

IEPA has an enforcement management system (EMS) document that has periodically been updated to ensure consistency and timeliness in compliance and enforcement responses taken across all program media. The latest update is dated October 4, 2004. The EMS is used to define the process by which the various regulatory programs in IEPA pursue compliance with the Illinois Environmental Protection Act and the regulations promulgated under it. The general objective of the EMS is to protect the public health and environment of the State of Illinois through enforcement of the environmental regulatory requirements in a timely, consistent, and fair manner. This enforcement management system seeks to

- Obtain prompt compliance with statutory and regulatory requirements.
- Pose a deterrent to actions that delay or prevent prompt compliance.
- Provide an incentive for timely and responsible compliance behavior.
- Ensure that persons who comply with environmental requirements are not placed at a competitive disadvantage.

The EMS also includes an enforcement response guide that identifies the appropriate informal and formal enforcement responses for specific types of violations occurring at major and minor facilities. The EMS provides for management review as part of the enforcement process. Enforcement cases are tracked in a database, and IEPA holds weekly meetings to discuss enforcement case status and strategies.

Enforcement cases are escalated by referring them to the Illinois Attorney General's Office for enforcement. The length of time noncompliant NPDES permittees are in significant noncompliance (SNC) is directly related to the complexity of the cases along with the resource constraints of the prosecutorial authority. The average duration of SNC significantly improved in 2002 as a result of timelier processing of formal enforcement actions by the prosecutorial authority.

To ensure that adequate penalties are assessed, Illinois follows the penalty policies of the CWA and the Illinois Environmental Protection Act. The Illinois Environmental Protection Act provides for both the civil and criminal penalties. Under the Act, any person who violates certain provisions of the Act or any regulation adopted by the Board is liable for a civil penalty not to exceed $50,000 for the violation and

an additional civil penalty not to exceed $10,000 for each day that the violation continues. For violations of NPDES permits and related violations, the State may assess a civil penalty not to exceed $10,000 for each day that the violation continues. In determining the appropriate civil penalties, Illinois considers a number of factors, including the following:

- The duration and gravity of the violation
- The presence or absence of due diligence on the part of the violator in attempting to comply with requirements of the Act and regulations thereunder
- Any economic benefits accrued by the violator because of delay in compliance with the requirements
- The amount of monetary penalty that will serve to deter further violations by the violator and to otherwise aid in enhancing voluntary compliance with this Act by the violator and other persons similarly subject to the Act
- The number, proximity in time, and gravity of previously adjudicated violations of the Act by the violator

The following table provides the total number of actions taken, the penalty amounts collected, and the supplemental environmental project (SEP) value for each of the past 3 consecutive years:

Table 2: Enforcement Actions

Year	Number of Actions	Penalty Amount	SEP Value
2001	31	$432,900	$117,500
2002	37	$1,567,250	$361,000
2003	20	$381,357	$50,000

EPA Region 5:

The Region has historically evaluated the strength of the State's enforcement program against two key indicators, the percentage of facilities in SNC in any given quarter and the size of the active exceptions list, with the goal of maintaining the former below 10% and the latter below 2%. The Region has viewed these two indicators as the best evidence of whether the State's actions are timely and appropriate and penalty amounts sufficient. Over the course of the next several years, the Region will conduct file audits in all of its States with the intent that these subordinate factors (e.g., timeliness, penalty size) will be more closely assessed to ensure that historic reliance on the two key indicators has been an appropriate means to assess the overall health of the enforcement program.

Illinois and EPA discuss and agree to joint priorities in the context of developing the State's EnPPA. Priorities reflected in the EnPPA may stem from national priorities, Regional priorities, or State priorities. To the extent that EPA's new national priorities are recognized by the State as being an environmental problem within the State, Illinois generally participates in EPA initiatives. EPA recognizes that not all new sectors and all new initiatives at a national level necessarily have

applicability at the State level. In addition to work currently targeted at CSO and SSO issues, the Region hopes to work with the State over the next year to develop a strategy for addressing stormwater Phase II compliance, as well as the issue of failing on-site systems.

The Region targets its efforts to ensure base program integrity, as well as to maximize the environmental benefits of its actions. In terms of the base program, the Region monitors the quarterly noncompliance report and the active exceptions list to ensure that they remain below 10% and 2%, respectively. These targets are routinely met. Generally, because most NPDES program elements have been delegated, State enforcement action is the primary mechanism for managing against these goals; EnPPA agreements and annual work plans contain language indicating that where these goals are not met, federal enforcement action will be a priority.

Currently, a high priority for the Region is enforcement related to CSOs and SSOs. Forty-two percent of the nation's CSO permittees are in the Region, and enforcement related to this pollution source has been a priority. The Region has had a CSO strategy since 1986, and the strategy was most recently updated in 2003. The Region's focus is on those CSOs affecting high-priority beaches, drinking water sources, or other environmentally sensitive areas. Other wet-weather sources of pollution are also being targeted. To this end, the Region has also developed a CAFO permitting and enforcement strategy and is updating its stormwater strategy. The Region is in the early stages of developing a strategy to address failing on-site systems.

The Region has direct implementation responsibilities for the pretreatment and biosolids programs in Illinois. With respect to the pretreatment program, enforcement actions are generally the result of inspections or audits. The inspections and audits are prioritized as described below in the discussion of the Region's inspection strategy. Enforcement actions relating to biosolids are generally prompted by complaints.

EPA's NPDES program has had an enforcement management system since the 1980s. This system is out-of-date, and development of new operating procedures has been a priority for completion by the end of 2004.

The Water Division has a manual system maintained by the enforcement process manager for monitoring the status of cases in the pipeline. A monthly meeting is held to update the status of all proposed actions. In addition, meetings are scheduled with the Office of Regional Counsel approximately every 6 weeks to review the status of cases and potential bottlenecks. In 2002 the Water Division also consolidated a number of databases that were used to track permittees' progress in complying with enforcement actions and made a concerted effort to review all open cases and close out those for which closeout was appropriate. Approximately 40% of the open cases were closed out as a result of this effort.

2. Record Keeping and Reporting

The State of Illinois:

IEPA maintains accurate and up-to-date files and records on NPDES permittees and on the compliance and enforcement actions taken against them. IEPA maintains hardcopy files of inspection reports, DMRs, enforcement actions, CCAs, and Enforcement Decision Group decisions. Enforcement orders are entered into PCS along with any penalties and compliance schedules. As enforcement orders are

finalized, they are also posted to IEPA's Web site for public access. In addition, all NPDES-related Non-Compliance Advisories, VNs, CCAs, and other enforcement actions are entered into PCS on a timely basis. IEPA's EMS includes compliance monitoring and enforcement procedures to be used by all regulatory programs at IEPA, including the enforcement process outlined in section 31 of the Illinois Environmental Protection Act. VNs are issued following the enforcement process outlined in the EMS and section 31. Under section 31, noncompliant permittees that are issued VNs may enter into formal CCAs to establish schedules for returning to compliance. CCAs may be accepted if they include enough specificity to show that the plan is achievable, specific completion dates, and interim milestone dates for significant steps in returning to compliance. All compliance commitments made as part of a CCA are entered into a State database for monitoring. Key events such as "begin construction," "end construction," and "attain operational level," are also entered into PCS for NPDES-related cases.

EPA Region 5:

EPA Region 5 develops formal administrative records in accordance with 40 CFR 124.18 for all permits issued by the Region.

3. Inspections

The State of Illinois:

An annual inspection strategy is developed addressing both EPA and State priorities. Inspections are of two general types. The first of these is the compliance inspection. In a typical year, approximately 2,000 compliance inspections involving various levels of detail are conducted by the engineers and environmental specialists in IEPA's seven regional offices. Inspection coverage is planned to include approximately 70% of major dischargers and at least 20% of minor dischargers annually. Inspections within specific discharge sectors, such as CAFOs and stormwater dischargers, are targeted on the basis of their relative importance within the geographic area covered by each regional office. An approximate breakdown of the inspection balance (percentage of inspections conducted) for FY2002 is as follows:

Major facilities	15%
Minor facilities	43%
Livestock facilities	20%
Stormwater inspections	12%
Other inspections	10%

The second type of inspection includes reconnaissance/sampling visits made by technician-level staff. These inspections total 8,000 to 9,000 in a typical year and involve a visual inspection of the discharge and treatment facility to note obvious problems, as well as collection of an effluent sample. The goal is to conduct these inspections six times per year at major facilities, with the remainder of the time spent on continuously discharging minor facilities. (Cooling water discharges, quarries, sand and gravel operations, and drinking water supply discharges are not included in this program.)

Between these two inspection types, inspection coverage in most years exceeds 95% for major dischargers and 70% for minor dischargers (excluding nonpermitted CAFOs).

IEPA has a healthy inspection program in terms of providing a very visible field presence and consistently meeting inspection coverage commitments. EPA has indicated, in the context of EnPPA discussions, that it would like to discuss options for evaluating the effectiveness of the program in detecting deficiencies or noncompliance.

EPA Region 5:

The Region has developed a CWA inspection strategy that describes the manner in which inspections are prioritized and agreed to between the States and EPA. As described in this strategy, a variety of factors influence the selection of inspection targets, including national and regional priorities, case closeout needs, multimedia initiatives, complaints, and coverage requirements. In Illinois, for which EPA is the pretreatment authority, the Region targets its efforts through evaluation of environmental indicators (e.g., increasing concentration of metals in biosolids) and coverage factors (e.g., length of time since the State or EPA performed an audit at a specific municipality). The Region requests that the States perform all other coverage inspections, though most of them have had difficulty in meeting these commitments in recent years. The Region is working with the States to increase the number of inspections they perform but does not have the resources to backstop any State shortfalls. In addition, the Region is concerned that the current requirements for coverage inspections might impede the States and EPA from focusing on those inspections that might result in the greatest environmental benefit and believes that this is an issue that warrants policy discussion at the national level.

4. Compliance Assistance

The State of Illinois:

IEPA's Office of Small Business maintains a list of contacts for divisions within the Agency. This list can be used in informing the regulated community of changes in policy and procedures.

IEPA's Office of Pollution Prevention (OPP) has technical specialists on staff available to conduct pollution prevention opportunity site visits at Illinois businesses and other facilities. The purpose of the site visits is to help facilities apply pollution prevention techniques and practices that can save money, increase efficiency, and improve environmental performance. This service is free and strictly voluntary.

Over the past decade, the OPP technical staff has provided assistance to many kinds of businesses, including electroplaters, metal product manufactures, printers, dry cleaners, hospitals, and auto repair shops.

During the site visit, which typically lasts 2 to 3 hours, IEPA

- Reviews key waste-generating processes and operations
- Assesses the root causes of waste and pollution generation
- Discusses cost-saving pollution prevention opportunities

IEPA follows up the visit with written recommendations and resources to help implement specific pollution prevention projects. Participating facilities are under no obligation to implement the recommendations and are free to decide on the basis of site-specific technical considerations, costs, and management priorities.

IEPA works to integrate pollution prevention into its mainstream functions. IEPA inspectors, permit writers, and compliance personnel have the most frequent contact with businesses and, therefore, the best opportunity to recommend and encourage voluntary pollution prevention practices.

Training has been provided for IEPA staff to increase awareness of pollution prevention techniques and the role pollution prevention can play in helping facilities achieve compliance. IEPA also promotes voluntary pollution prevention during field inspections. Illinois measures the effectiveness of its pollution prevention regulatory integration efforts by monitoring the number of pollution prevention recommendations offered by regulatory staff and surveying facilities that have received pollution prevention advice to determine whether they have implemented one or more recommendations.

In 1999, 11.9% of field inspections included at least one pollution prevention recommendation. Sixty percent of the 117 facilities surveyed that year reported implementing at least one inspector-recommended pollution prevention project. In 2000, 9.1% of IEPA field inspections included at least one pollution prevention recommendation. In 2001 and 2002, approximately 15% of the field inspections included at least one pollution prevention recommendation. Twenty-five percent of the facilities surveyed implemented at least one inspector-recommended pollution prevention project.

IEPA also has a field office onsite technical assistance program for municipal wastewater treatment plants through which trainer operation and maintenance field experts assist communities in addressing factors that limit wastewater treatment plant performance. In FY2003, 15 communities were assisted. Eight achieved compliance, and seven were prevented from going out of compliance through a compliance maintenance assistance effort. IEPA has agreed to host a Region 5 operator trainer conference in FY2005 and a national conference in FY2006.

EPA Region 5:

The Region generally provides extensive compliance assistance when new federal regulations are promulgated. In recent years considerable effort has been placed on compliance assistance related to implementation of both the CAFO regulations and the Phase II stormwater regulations. This assistance includes workshops, formal presentations, and development and distribution of guidance and technical documents, as well as individual site visits.

Within the first year after the new biosolids regulations were published, the Region hosted a satellite broadcast to explain the regulation and its requirements. The Region reached nearly half of the regulated community with this broadcast. The Region has also instituted a small community compliance assistance program for biosolids modeled after the operation and maintenance evaluation program. For the small community assistance program, the Region evaluates compliance assistance activities by reviewing annual reports for regulatory compliance.

Section IV. Related Water Programs and Environmental Outcomes

1. Monitoring

Illinois has a monitoring strategy that addresses each of the elements described in EPA's guidance titled "Elements of a State Water Monitoring and Assessment Program." The strategy provides information on the current State program, including the use of various monitoring designs to serve program objectives. The State uses a 5-year rotating basin cycle, as well as fixed-station networks and other targeted approaches. IEPA is also taking part in the probabilistic national wadeable streams survey through a five-State consortium and continues to consider the implementation of a statewide probabilistic design for river and stream monitoring.

At this time, the Illinois strategy does not encompass a comprehensive program as described in EPA's elements guidance. For example, the strategy does not cover all water body types (e.g., wetlands). Although Illinois collects data for assessing swimming, drinking water, and fish consumption uses, these are not assessed for 100% of applicable waters. Illinois has committed in the EnPPA to provide a revised strategy during FY2005.

The State's comprehensive monitoring strategy will address the manner in which it will improve the number of State waters assessed in order to enhance the understanding and characterization of surface water quality throughout the State.

Data used for establishing permit effluent limits are collected through several monitoring programs, including the ambient water quality monitoring network (213 fixed stations), whole effluent biomonitoring, and facility-related stream surveys (including upstream/downstream studies). As resources allow, facility surveys are scheduled 2 years prior to permit reissuance, whole effluent testing is scheduled about 1 to 1-1/2 years prior to the reissuance of major facility permits, and data are collected from fixed stations nine times per year.

Illinois uses a rotating basin/intensive survey approach, along with fixed-station monitoring, as the primary approach to assessing status. The State monitors 213 fixed stations, approximately 100 stream sites, and 50 to 60 lakes each year. (Other monitoring is also conducted.) To increase assessment coverage, Illinois is assessing the utility of a probabilistic design for streams. As the State increasingly focuses on parameters such as nutrients, bacteria, and sediment, the percentage of waters identified as impaired is likely to rise. The inclusion of additional water body types (large rivers, headwater streams) might also result in increased identification of impaired waters.

2. Environmental Outcomes

The number of waters assessed by Illinois has increased significantly over time. In 1986, 3,400 miles of rivers and streams were assessed, as compared to the 15,491 miles assessed in 2002. Similarly, in 1986, 25,302 lake acres were assessed, as compared to the 148,134 acres assessed in 2002. During this same time period, the percentage of rivers and streams assessed as fully supporting aquatic life use increased from 47% to 65%. Although these two figures are not directly comparable because of design and other

issues, Illinois reports that stream water quality has steadily improved over the past 28 years. According to IEPA, the total number of miles of waters impacted by municipal and industrial point sources has declined; fewer stream miles are being impacted by nonpoint source pollution; and increased species diversity in the Illinois, Rock, and Mississippi Rivers has been documented.

In 2002 Illinois assessed 18% of the stream miles in the State for aquatic life, 4% for swimming, and 7% for fish consumption. Of the assessed stream miles, 65% fully support aquatic life use, 31% fully support swimming, and 58% fully support fish consumption. In addition, the State assessed 976 miles for drinking water, and 74% of these fully support the use. In 2002, 47% of the lake acres in Illinois were assessed for aquatic life, 47% for swimming, and 37% for fish consumption. Of the assessed lake acres, 58% fully support aquatic life use, 13% fully support swimming, and 74% fully support fish consumption. The State also assessed 75,168 lake acres for drinking water, and 87% of these fully support the use. Illinois assessed 100% of the Lake Michigan shoreline miles for aquatic life, 90% for swimming, 100% for fish consumption, and 100% for drinking water. Of the assessed shoreline miles, 100% fully support aquatic life, 24% fully support swimming, 0% fully support fish consumption (because of polychlorinated biphenyl [PCB] fish consumption advisories in Lake Michigan), and 100% fully support drinking water.

[Note: In its water quality reports, Illinois reports assessments on lakes with surface areas greater than 6 acres. In the preceding discussion and in the NPDES Management Report, lakes and ponds less than or equal to 6 acres are included to maintain consistency in comparisons with other States across the country, including States in Region 5.]

3. Water Quality Standards

IEPA reviews the water quality standards for each new, modified, or renewed NPDES permit prior to the initial drafting of the permit. Staff of the Water Quality Standards Section provide the permit engineer with a written technical explanation of the water quality standard pertinent to each permit. Either the permit engineer or the standards specialist may initially identify the parameters that must be reviewed for potential WQBELs. This determination is based on a statistical analysis of existing data compared with in-stream water quality standards, taking into account appropriate dilution. Where a pollutant parameter is determined to have the reasonable potential to cause or contribute to violations of water quality standards, a WQBEL is developed. The standards review document provides the water quality standards calculations (for standards such as ammonia and hardness-based metals that are dependent on other water quality characteristics), the source of data that went into those calculations, an explanation of permit limits influenced by any mixing zones granted, and a summary of reasonable potential to exceed water quality standards for the effluent.

In developing specific WQBELs, IEPA performs a mass-balance calculation for the pollutant in the discharge, based on in-stream dilution available under low-flow conditions and taking into account upstream concentrations of the pollutant in the receiving water. If a pollutant is identified as being discharged to a receiving water that is impaired for that pollutant, IEPA requires that ambient water quality criteria be met at the end of pipe (i.e., no mixing zone is allowed). Where required, an antidegradation analysis is also supplied. In all cases the Water Quality Standards Section reports the CWA section 303(d) status of the receiving water. IEPA encourages the no-discharge option where possible.

IEPA periodically reviews water quality standards as part of the triennial review process to ensure that all pertinent designated uses of waters of the State are properly addressed. Newly adopted standards are scrutinized for their ability to protect designated uses. Water quality standards are subject to the public participation process and Illinois Pollution Control Board adoption process to ensure that they adequately address designated uses. IEPA submits all modifications of Illinois water quality standards to EPA Region 5 for approval pursuant to CWA section 303.

Illinois is implementing a plan to establish numerical nutrient standards as approved by Region 5. Research is being conducted to elucidate cause/effect relationships that will provide technical support to develop appropriate standards. Illinois expects to initiate regulatory adoption of numeric nutrient standards in 2007. Meanwhile, IEPA has proposed an interim effluent standard for phosphorus applicable to new and expanded discharges from large facilities. IEPA continues to participate in the nutrient Regional Technical Assistance Group. The Illinois Nutrient Standards Workgroup Science Committee continues to meet four or five times a year to work through the many details of what will be needed for nutrient standards for Illinois.

Narrative criteria to prevent toxic substances in toxic amounts from occurring in the waters of the State are derived according to the regulations at 35 IAC part 302, subpart F. These are detailed provisions that allow the derivation of water quality criteria for the protection of aquatic life, human health, and wildlife for any substance not covered by a numeric water quality standard. These criteria may then be implemented as permit limits in the same manner as any numeric standard. Agency guidance documents are followed to establish WQBELs. Reasonable potential to exceed water quality standards is determined through the application of EPA's "Technical Support Document for Water Quality-based Toxics Control."

Illinois's water quality standards contain designated uses for general-use water bodies, public and food processing water supplies, secondary contact and indigenous aquatic life, and the Lake Michigan Basin. Illinois submitted a standards revision package to EPA in 2004. The State is in the process of conducting use attainability analyses (UAAs) for the water bodies designated as secondary contact and indigenous aquatic life. Illinois's rules address compliance schedules and implementation of water quality standards. Illinois uses a fecal coliform criterion for protection of recreational uses in the general use water bodies. The State plans to begin using E. coli criteria as part of the upgrades expected in the UAAs under way. IEPA has initiated rulemaking to replace fecal coliform standards with E. coli standards for Lake Michigan recreational beaches.

The State does an antidegradation review for new and increased discharges and publishes the results as part of the public notice for the permit. The following results are possible: the new or increased discharge is allowable, additional treatment or tighter limits are required, a change in outfall location is required, or land application is determined to be an appropriate alternative.

Illinois's antidegradation policy and implementation procedures are found at section 320.105 of the Illinois Pollution Control Board Rules. Illinois's implementation of the antidegradation policy is consistent with the rules adopted by the Pollution Control Board.

Illinois regulations governing NPDES permits for coal mines limit IEPA's ability to apply water quality standards to discharges from mines. As a result, the Region has been reviewing NPDES permits issued by Illinois for coal mines to ensure that all mine permits issued by the State comply with water quality

standards, particularly those for total dissolved solids (TDS) and sulfates. Both of these water quality standards are currently based primarily on protecting water for livestock consumption rather than protecting against impacts on aquatic life. The Region has not objected to permits that use actual stream flow at the time of discharge to ensure compliance with TDS and sulfate water quality standards. In addition, IEPA is considering replacing the existing TDS standard with separate criteria for chlorides and sulfates. Some aquatic toxicity testing for sulfates has been conducted by the State and the coal mining industry. These tests suggest that sulfate's toxicity to aquatic life is related to other water quality parameters and that hardness is a good surrogate for these parameters. Additional toxicity testing to support development of a criterion that reflects this relationship is under way.

In addition, part 406 of IEPA regulations for mine waste effluent and the water quality standards are written in such a way that if a facility qualifies for part 406, it is exempt from the IEPA part 302 water quality standards regulations. IEPA plans to address this through the ongoing criteria development.

IEPA plans to move to a watershed management approach over the next few years by aligning all of its water program work on a watershed basis. A 6-month stakeholder process yielded a framework for watershed planning that will be piloted in the Rock River Basin over the next 12 to 18 months.

4. Total Maximum Daily Loads

The State of Illinois:

Prior to 2004, less than 1% of the 3,578 impairments listed on the 2002 303(d) list had been addressed by a total maximum daily load (TMDL) (18 impairments through final TMDLs).[2] IEPA has produced final TMDLs addressing 74 additional impairments during FY2004. The improvement during FY2004 is a direct result of increased IEPA management focus and greater experience by the IEPA staff. The IEPA has also used section 319 (nonpoint source) funding to produce TMDLs. Continued emphasis on this program area is necessary. IEPA has provided a long-term schedule that indicates that 3,530 of the 3,574 impairments will be addressed by 2015. To keep pace, IEPA will need to address approximately 310 impairments a year through FY2015. According to State information, point sources are not a major source or cause of impairment for Illinois waters.

At this time IEPA has not developed any TMDLs that require reductions in current wasteload allocations (WLAs), and therefore no process has been developed to translate TMDL WLAs into NPDES permit limits. Illinois EPA NPDES permit program staff, however, are involved in the TMDL development process. Permit staff are consulted to determine whether any point source dischargers are located on the water body, and then the records are reviewed to determine whether the discharger contributes to the impairment being addressed. As TMDLs that include WLAs are developed, IEPA will develop procedures for ensuring the inclusion of the WLAs in the NPDES permitting process.

EPA Region 5:

The Region has provided increased funding, training, and contractor assistance to the State in an effort to improve IEPA's performance. The Region has offered increased funding once again, but IEPA has indicated that because of staffing shortages, increased funding will not alleviate the pace-related

[2] The Management Report, measure #41, shows 3,480 TMDLs on the docket at the end of FY2003. This differs from the 3,578 on the 2002 303(d) list because of slightly different delineations of unique water body-pollutant combinations between the National TMDL Tracking System and the 303(d) list.

concerns. The Region recently met with IEPA to discuss ways to streamline the TMDL process and improve performance and is exploring having EPA headquarters staff assist IEPA directly.

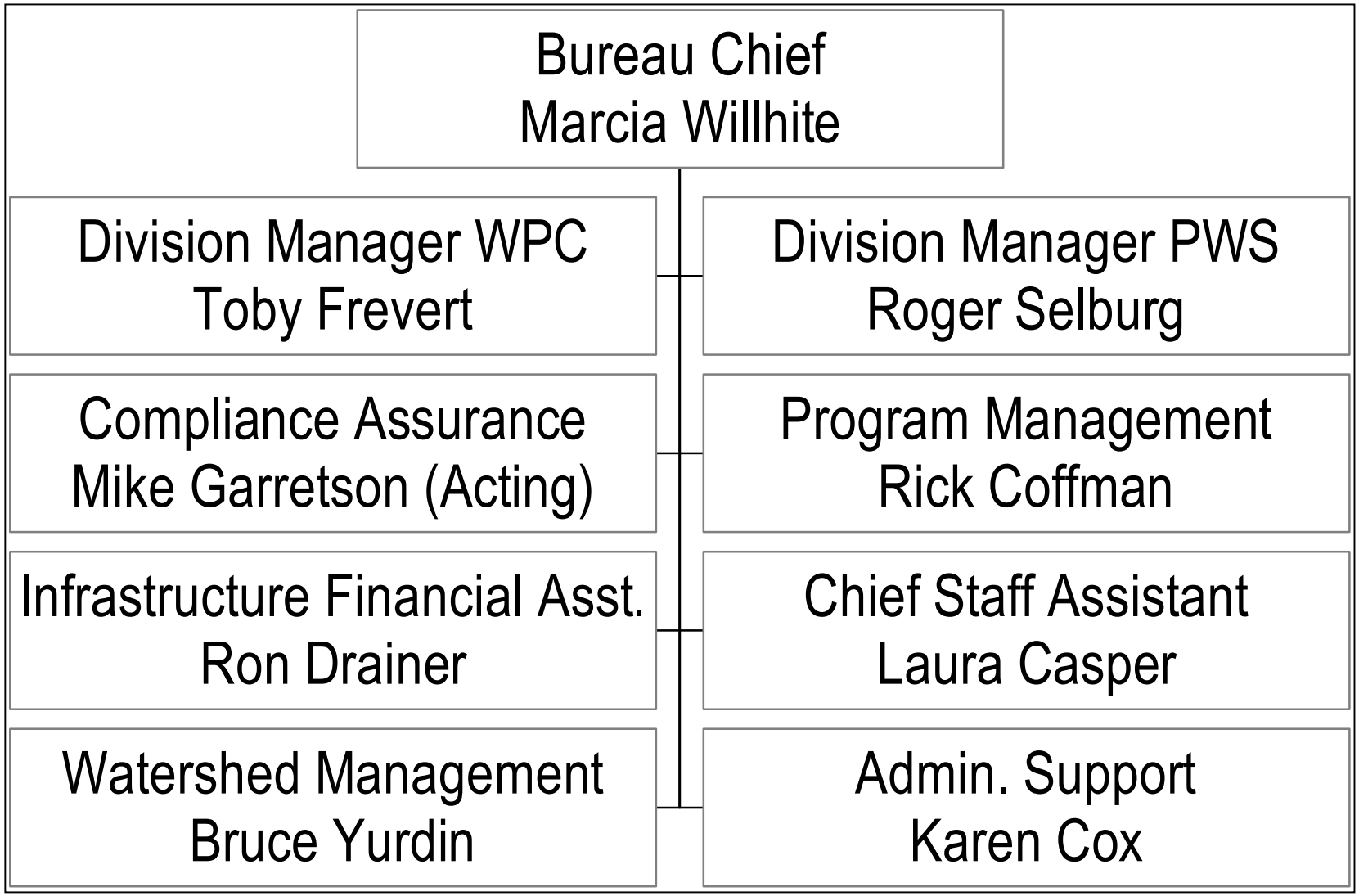
5. Safe Drinking Water Act

IEPA has completed its Source Water Assessment Program as required by the 1996 reauthorization of the Safe Drinking Water Act. Assessments for public water systems include relevant information from the NPDES program for both groundwater and surface water systems. IEPA has mapped the NPDES discharger locations on its source water assessment maps as potential sources of contamination. In addition to the permitted point source discharges, wet-weather discharges are a concern. IEPA is working on revising its methodology for assessing whether surface waters are meeting their designated use as drinking water sources.

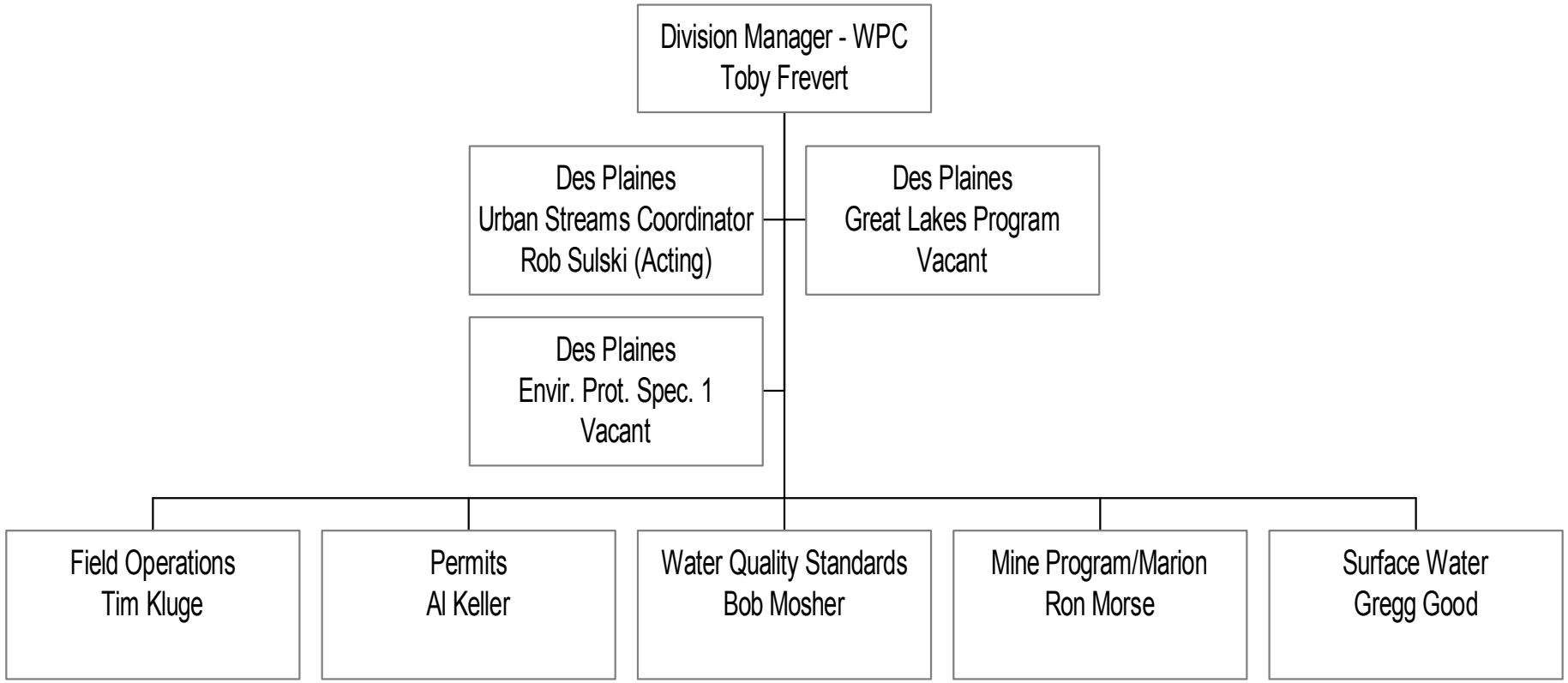
Section V. Other Program Highlights

IEPA is in the process of developing a system for accepting electronic submission of permit applications. IEPA has developed forms, templates, and boilerplate language for efficient and accurate drafting of NPDES permits. The State uses computer programs to accurately perform required calculations. The draft permits are reviewed by the Regional office staff and the management prior to the release of the draft permits for public notice and comment.

BOW Organizational Chart



DWPC Organizational Chart



NPDES Management Report - Fall 2004

Illinois

						National Data Sources		Additional Data	
			Profile Section	GPRA Goal	Nat. Avg.	State Activities	EPA Activities	State Activities	EPA Activities
NPDES Progress									
Universe	1	# major facilities (6,690 total)	I.1		n/a	279	0		
	2	# minor facilities covered by individual permits (42,057 total)	I.1		n/a	1,667	0		
	3	# minor facilities covered by non-storm water general permits (39,183 total)	I.1		n/a	542	0		
	4	# priority permits (TBD)	I.6			--	--		
	5	# pipes at facilities covered by individual permits (142,761 total)	I.7		n/a	7,188	--		
	6	# industrial facilities covered by individual permits (32,505 total)	I.1		n/a	1,366	10		
	7	# POTWs covered by individual permits (15,197 total)	I.1		n/a	571	3		
	8	# pretreatment programs (1,482 total)	II.2		n/a	n/a	50		48
	9	# Significant Industrial Users (SIUs) discharging to pretreatment programs (22,158 total)	II.2		n/a	n/a	1,199		
	10	# Combined Sewer Overflow (CSO) permittees (831 total)	II.5		n/a	108	--		
	11	# CAFOs (current and est. future) (17,672 total)	II.3		n/a	500	--		
	12	# biosolids facilities (TBD '05)	II.6			--	--		
NPDES Program Administration	13	State or Region assessment of State NPDES program (none (N)/assessment (A)/profile (P))	I.1	50 states 2004	n/a	A, P	P		
	14	% pipes at facilities covered by individual permits w/ lat/long in PCS	I.7		46.3%	97.7%	--		
	15	State CAFO legal authority expected (mo/yr)	II.3	2005	n/a	3/05	n/a		
	16	# Withdrawal petitions/legal challenges (22 total)	I.4		n/a	0	n/a		
	17	DMR data entry rate	I.7		95%	100%	--		
	18	# permit applications pending (1,011 total)	I.6		n/a	3	--		
NPDES Program Implementation	19	% major facilities covered by current permits	I.6	90%	83.7%	81.0%	n/a		
	20	% minor facilities covered by current individual or non-storm water general permits	I.6	90% 12/04	87.0%	61.6%	n/a		
	21	# major facilities w/permits expired >10 yrs. (56 total)	I.6		n/a	1	0		
	22	% priority permits issued as scheduled (TBD '05)	I.6	95% 2005		--	--		
	23	% pretreatment programs inspected/audited during 5 yr. inspection period	II.2		85.3%	n/a	90.0%		
	24	% SIUs w/control mechanisms	II.2		99.2%	n/a	98.5%		
	25	% of CSO permittees with long-term control plans developed or required	II.5	75% 2008	82.2%	47.2%	--		
	26	% CAFOs covered by NPDES permits	II.3		35%	4%	--		
	27	% biosolids facilities that have satisfied part 503 requirements (TBD '05)	II.6			--	--		
	28	# Phase I storm water permits issued but not current (76 total)	II.4		n/a	1	n/a		
	29	# Phase I storm water permits not yet issued (5 total)	II.4		n/a	0	n/a		
	30	Phase II storm water small MS4 permits current (Y/N/D (draft)) (35 States)	II.4	100% states 2008	n/a	Y	n/a		
	31	Phase II storm water construction permit current (Y/N/D (draft)) (49 States)	II.4	100% states 2008	n/a	Y	n/a		
NPDES Compliance Monitoring and Enforcement Response	32	% major facilities inspected	III.3		71%	81%	0%		
	33	(inspections at minors) / (total inspections at majors and minors)	III.3		76%	78%	100%		
	34	% major facilities in significant non-compliance (SNC)	III.1		20%	9%	--		
	35	% SNCs addressed by formal enforcement action (FEA)	III.1		14%	37%	--		
	36	% SNCs returned to compliance w/o FEA	III.1		70%	63%	--		
	37	# FEAs at major facilities (666 total)	III.1		n/a	20	1		
	38	# FEAs at minor facilities (1,660 total)	III.1		n/a	56	5		

Explanation of Column Headers:

Profile Section: For each measure, this column lists the section of the profile where the program area (including any additional data for the measure) is discussed.

National Data Sources: The information in these two columns is drawn from two types of sources:

(1) EPA-managed databases of record for the national water program, such as PCS, the National Assessment Database, and the National TMDL Tracking System. NPDES authorities are responsible for populating PCS with required data elements and for assuring the quality of the data. EPA is working to phase in full use of NAD and NTTS as national databases.

(2) Other tracking information maintained by EPA Headquarters for program areas such as CAFOs, CSOs, and storm water.

The definitions document accompanying this Management Report provides a detailed definition of each data element in the National Data Sources columns.

Additional Data: These columns provide additional data in cases where information from other data sources differs from information in the National Data Sources column for reasons such as different timing of the data "snapshot." Additional data should generally adhere to the same narrative definitions as data in the National Data Sources, and should be derived using similar processes and criteria. Our goal is to work with the States on these discrepancies to ensure consistent and accurate reporting. A State contact is available who can respond to queries. The profiles discuss each additional data element.

State Activities: Information in these columns reflects activities conducted by the State program. (Shaded cells in these columns indicate that the work may not be entirely the State's responsibility, but a breakdown of the data into EPA and State responsibilities is unavailable.)

EPA Activities: Information in these columns reflects activities conducted by the EPA Region within the State.

						National Data Sources		Additional Data	
			Profile Section	GPRA Goal	Nat. Avg.	State Activities	EPA Activities	State Activities	EPA Activities
Water Quality Progress									
Universe	39	River/stream miles (3,419,857 total)	IV.2		n/a	87,110	n/a		
	40	Lake acres (27,775,301 total)	IV.2		n/a	309,340	n/a		
	41	Total # TMDLs in docket at end of FY 2003 (52,795 total)	IV.4		n/a	3,480	--		
	42	# TMDLs committed to in FY 2003 management agreement (2,435 total)	IV.4		n/a	35	0		
	43	# Watersheds (2,341 total)	IV.2		n/a	--	--		
Water Quality Administration	44	On-time Water Quality Standards (WQS) triennial review completed (42 States)	IV.3		n/a	Y	n/a		
	45	# WQS submissions that have not been fully acted on after 90 days (32 total)	IV.3	<25% submis-sions	n/a	n/a	1		
Water Quality Implementation	46	State is implementing a comprehensive monitoring strategy (Y/N) (TBD)	IV.1	all states 2005	--	--	--		
	47	% river/stream miles assessed for recreation	IV.2		13.8%	4.0%	n/a		
	48	% river/stream miles assessed for aquatic life	IV.2		22.0%	18.0%	n/a		
	49	% lake acres assessed for recreation	IV.2		49.4%	47.0%	n/a		
	50	% lake acres assessed for aquatic life	IV.2		48.5%	47.0%	n/a		
	51	# outstanding WQS disapprovals (23 total)	IV.3		n/a	0	n/a		
	52	WQS for E. coli or enterococci for coastal recreational waters (12 States)	IV.3	35 states 2008	n/a	N	n/a		
	53	WQS for nutrients or Nutrient Criteria Plan in place (13 States)	IV.3	25 states 2008	n/a	Y	n/a		
	54	Cumulative # TMDLs completed through FY 2003 (10,807 total)	IV.4		n/a	18	--		
	55	# TMDLs completed in FY 2003 (2,929 total)	IV.4		n/a	9	0		
	56	# TMDLs completed through FY 2003 that include at least one point source WLA (5,036 total)	IV.4		n/a	17	--		
Environmental Outcomes	57	% Assessed river/stream miles impaired for swimming in 2000	IV.2		--	75.0%	n/a		
	58	% Assessed lake acres impaired for swimming in 2000	IV.2		--	85.5%	n/a		
	59	# Watersheds in which at least 20% of the water segments have been assessed and, of those assessed, 80% or more are meeting WQS (440 total)	IV.2	600 2008	n/a	--	--		

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CERTIFICATE OF SERVICE

I, Jessica Dexter, hereby certify that I have filed the attached **NOTICE OF FILING** and **COMMENTS OF DR. JOHN E. IKERD** (with attachments on CD) upon the attached service list by depositing said documents in the United States Mail, postage prepaid (or via email where indicated) in Chicago, Illinois on January 8, 2013.

Respectfully submitted,

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R2012-023

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