

Title: "Air Emissions from Swine Production Facilities: Assessment of Science and Market-Based Solutions" - **NPB # 02-222**

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Abstract: Increased demand for dietary protein from animal sources has resulted in substantial growth and operational shifts in large-scale livestock production systems. But economically successful intensification of animal agriculture has also resulted in new and emerging environmental challenges that require improved understanding of scientific, technical, economic, and policy issues. In particular, concerns about air quality impacts from livestock production, associated in part with concentrated swine feeding operations, are gaining attention within both the regulatory and research communities.

In order to address these concerns effectively, it is important to consider current scientific and technical knowledge regarding air emissions from swine operations in the context of the entire pork production process, as well as both technical and policy mechanisms by which to achieve market-based solutions. A major key to success in coping with air-quality regulatory concerns is to stop thinking about animal manures as unpleasant waste materials that must be disposed of by least-cost methods and to start thinking of manure and other animal processing residues as valuable natural resources from which additional value-added products can be produced and sold at a profit.

Special attention is given in this report to atmospheric emissions of ammonia (NH₃), hydrogen sulfide (H₂S), methane (CH₄), and particulate matter (PM_{2.5-10}). New approaches to recovery of value-added products from livestock production systems are identified, as are various market mechanisms, pollutant trading regimes, and renewable energy possibilities. Of special importance in formulating viable technical, economic, and policy alternatives for science- and market-based environmental management is understanding and improvement of air quality monitoring, measuring, and modeling capabilities. These considerations are discussed specifically with regard to ammonia and particulate matter emissions.

In this report we recognize technical advancements that have occurred for livestock production and waste management primarily from a technical and pollution prevention approach. But we also point out important market-based opportunities and note potential improvements in monitoring and measuring emissions sources. The report ends with an outline of critical information gaps in which the swine industry and other stakeholders can make a significant contribution by guiding future research efforts.

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