

ENVIRONMENT

Title: Partitioning between pit and wall emission streams of hydrogen sulfide, ammonia, particulate matter, and odor from deep-pit pig finishing facilities for decision support in selecting emission control technologies - **NPB #05-113**

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Abstract:

Air quality and emission measurements for ammonia (NH₃), hydrogen sulfide (H₂S), odor, and particulate matter (or dust) under 10 microns in diameter (PM₁₀) were collected from one room of a mechanically tunnel ventilated barn that contained two 1200 head capacity rooms located side by side (total capacity of 2400 finishing pigs) for approximately six months. The study shows limited value and benefit for the use of pit fans in this deep-pit pig finishing room. Based upon similar ammonia and hydrogen sulfide concentrations that were measured in the center of the barn for all four (0, 4, 10, and 20 cfm/pig) pit ventilation cases used in the experimental protocol, it seems that exhausting a portion of the barn's ventilation air through the pit has little effect on the room's indoor air quality. The NH₃, H₂S, and odor emissions determined in this study show that a disproportionate amount, according to the airflow rates, of these two gases are exhausted from the barn through pit fans if they are operating. This fact should be noted if a producer wants or needs to reduce a pig barn NH₃, H₂S, and/or odor emissions, since there would be a benefit to treating only the pit fan exhaust air with an air emission control technology rather than all of the exhaust air (wall and pit). Finally the PM₁₀ concentrations and emissions from the pit fan air stream are lower than it is for the wall fans. The partitioning of the amount of airborne dust being emitted between the pit and wall fan airstreams has been unknown and is valuable for regulatory purposes and to assist in the design of emission control technologies that are used on either airstream.

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