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# Dust and Ammonia Control in Poultry Production Facilities Using an Electrostatic Space Charge System

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**Species:** Poultry  
**Use Area:** Animal Housing  
**Technology Category:** Other Treatment  
**Air Mitigated Pollutants:** Particulate Matter,  
Ammonia

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## System Summary:

Air quality within poultry production housing has been a major concern for years, particularly with regard to poultry health. The search for strategies to reduce particulate matter and ammonia emissions from animal housing has led to considerable interest in the poultry industry for practical systems to reduce these air emissions. An electrostatic space charge system (ESCS) was designed to reduce aerial dust and ammonia concentrations within a commercial broiler production house. A study was conducted within a commercial broiler house to evaluate the effectiveness of an ESCS for reducing dust and ammonia concentrations over a period of seven flocks. Results of this study indicate the ESCS significantly reduced airborne dust by an average of 43 percent and reduced ammonia by an average of 13 percent. Commercial application of this technology within the production house has the potential to improve in-house air quality and reduce emissions. Electrostatic fields have not been shown to produce adverse health effects in animals or humans. No differences in bird activity were observed in the form of decreased water consumption or increased mortality. No adverse effects of the continuous charge were observed in the form of stray voltage or static discharge at the feeder and water lines.

## Applicability and Mitigating Mechanism:

- An Electrostatic Space Charge System transfers a strong negative charge to airborne dust particles
- The negatively charged particles precipitate out of the air to grounded surfaces.
- Nitrogen compounds attached to the dust will also precipitate out of the air.
- Application of an electrostatic space charge can be effective in reducing poultry house dust and ammonia concentrations in floor-raised meat-bird housing.
- The system has the potential for use as an emissions control device exterior to animal housing.

## Limitations:

- The incidences of static discharge to workers were minimal. The intensity of a discharge from direct contact with an ESCS ionizer was similar to touching a spark plug wire on a gasoline engine.

## Cost:

The cost of materials and installation of the experimental ESCS unit was approximately \$4,000. Power consumption of the entire system was less than 100 watts during operation. It is reasonable to assume that a commercially available product would have a reduced capital outlay and quicker return on investment than the experimental prototype used within this study.