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**Atomization Treatment to Improve Air Quality
in a Swine Concentrated Animal Feeding
Operation (CAFO)**

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Species: Swine
Use Area: Animal Housing
Technology Category: Other Treatment
Air Mitigated Pollutants: Particulate Matter (PM),
Viable Bacteria, Ammonia

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System Summary:

Juergens Environmental Control Systems are designed to reduce particulate matter (PM), viable bacteria and ammonia and utilizes a high pressure atomization solution. Treatment consists of a formulation comprising proprietary proportions of corn oil, citric acid, ethyl alcohol, eucalyptus, vanilla and water. The formulation was developed to reduce airborne PM and ammonia through short- and long-term mechanisms. The short-term mechanisms include oil encapsulation through electrostatic attraction and coagulation. Long-term reductions occur through the suppression of dust re-suspension. Citric acid is added to neutralize gaseous ammonia. Alcohol helps dry the atomized aerosol and serves as an adjuvant so that formulation components are in complete suspension. Vanilla is added providing a deception for the olfactory senses, and eucalyptus for its respiratory medicinal property. Final formulation is atomized for 5 seconds, six times a day at a pressure of 235 psi (1620 kPa) and a rate of 45 mL/m². The nozzles are located on the ceiling at 5 or 10 foot centers for complete coverage of the treated area and were designed to produce an aerosol 1-10 μ m diameter under conditions of this formulation and pressure.

Applicability and Mitigating Mechanism:

- Atomization treatment is effective at swine housing systems, such as in finishing, breeding and gestation production systems.
- The oil is in a water formulation that includes alcohol, citric acid, vanilla and eucalyptus to dry and help mix the atomization solution, neutralize gaseous ammonia, and provide a pleasant odor, respectively.
- The oil formulation is applied under high pressure, yielding micron-sized charged particles that efficiently remove PM through electrostatic attraction and coagulation.

Limitations:

- Suggested equipment service is twice a year, checking for plugged nozzles and cleaning solution filters.
- Dust is encapsulated with oil and may stick to gating and fan louvers.
- Future high quality field studies are needed.

Cost:

Field application of the atomization system and solutions are subject to change. The fixed cost of the system for 1000 - 8000-pig finishing operation averages \$1.96 - \$7.79 per pig per 3 year term (shipping and installation labor not included). The cost of atomization operating averages \$ 0.01 per pig per day over one year. The fixed cost of the system for 500-5000-sow operation averages \$9.00 – \$16.00 per sow per 3 year term (shipping and installation labor not included). The cost of atomization averages \$.01 per sow per day over one year.