

Unique Tracking Number Assigned by MORTS _____
RESEARCH TOPIC ACCEPTANCE REQUEST (RTAR) FORM
(2 pages suggested, 3 pages maximum)
TC/TG: 10.9 Refrigeration Applications for Foods and Beverages

RESEARCH TOPIC ACCEPTANCE REQUEST (RTAR) FORM

TC/TG 10.9

**Title: Evaluation of Pathogens and Allergens Dispersion in the Aerosol
of the Egg Farm Components: Production, Processing and Cold Storage**

Research Category: Security Safety and Health: Safety under Extraordinary
Circumstances

Research Classification: Applied Research

TC/TG Priority: 2

T C Vote:

For 4

Reasons for negative votes and abstentions

Abstentions 0

Absent 4

Against 1

Reasons for negative votes and abstentions

Against: "I think this is a good project, but the presentation may need to be improved to pass the A S H R A E hierarchy."

Estimated Cost: \$130,000

Other Interested TC/TGs: TC 2.2 Plant and Animal Environment (not yet contacted)

Possible Co-funding Organizations:

Application of Results: Special Publications, Refrigeration Handbook Chapters 17 (Poultry Products) and 20 (Egg Products). Hand Book of fundamentals, Chapter 10 (Environmental Control for Animal and Plants), Seminar Presentations, Airflow Design in Poultry Facility, Cleaner Air Design.

State-of-the-Art (Background): Poultry workers are generally exposed to higher levels of microbial and viral pathogens as well as to allergens. This fact is well known and research projects were conducted in the past on this issue. However, in the last decade many changes have been made in the egg industry. Among them are the emerging of violent and more dangerous pathogens such as Salmonella enteritidis, E. coli O157H, Campilobacter and others. Cooling and ventilation became more aggressive. Poultry houses became very large and numerous large fans and evaporative coolers are installed in the houses to overcome summer heat and the heat produced by the up to 100,000 crowded chickens which reside in one house with body temperatures of 100+ F. Manure is dried on belts while being taken away from houses. Tiny dry particles which contain microbes and allergens are constantly taken to the air and could stay there for days. Farms grew from hundreds thousands hens to several millions. Large amount of dry feed is automatically delivered in to the house and distributed all over. Huge number of dirty eggs are automatically collected and transferred by in-line system into the packaging

room and later in to a breaking room or to cold storage.(A chicken currently lays about 300 eggs/year). Temperatures in walk-in coolers were drastically reduced to 41 – 45 F causing the refrigeration system to work longer and with stronger airflow.

The effect of all these new factors on allergens and pathogens was never evaluated.

Advancement-of-State-of-the-Art: The hazard of the contaminated aerosol was hardly taken into consideration when the ventilation and cooling systems of the new poultry houses and packaging facilities were designed. Pathogens and allergens, which normally found in manure feed and in floor materials used when hens are grown on flat floors as in the case of organic eggs. Dirt is also attached to the shell of just laid eggs. And enter with them into the packaging room. These pathogens and allergens can easily become airborne and stay there for a long period of time endangering employees.

Justification and Value to ASHRAE: This project fits perfectly to ASHRAE'S research Strategic Plan section #4 Improving Security, Safety and Health and now to advance ASHRAE'S role in the safety and security of food production and distribution. Numerous ASHRAE members are working on cooling and ventilation of egg facilities. Many new houses and facilities are built every year due to the need for very large farms and the moving of the industry into the Midwest where feed such as corn and soybean are grown. Furthermore, about 3 million hens are added annually due to population growth in the U.S., which is translated into 30 new houses. The need to take in consideration the hazardous aspects of ventilation and airflow in poultry farms will be fulfill by the results of this research project.

Objectives: To understand the effect of cooling and ventilation used in the ‘new ’ large egg farm on creating hazardous conditions to employees by pathogens and allergens in the aerosol. To provide an information tool to designers in order to strongly reduce these hazards while achieving the technical needs of farmers.

Key References: