

## ***Appendix N. Three Mile Canyon Farms: A Case Study on Dairy Worker Exposure to Ammonia and Hydrogen Sulfide***

The National Institute for Occupational Safety and Health (NIOSH) is the research arm of the Occupational Health and Safety Administration. The Hazard Evaluation and Technical Assistance Branch (HETAB) of NIOSH conducts field investigations of possible health hazards in the workplace.

The following is excerpted from the Department of Health and Human Services Centers for Disease Control and Prevention National Institute for Occupational Safety and Health, Health Hazard Evaluation Report (HETA #2005-0217-2996).

In June of 2005, the National Institute for Occupational Safety and Health (NIOSH) received a confidential employee request for a health hazard evaluation at Threemile Canyon Farms' Columbia River Dairy in Boardman, Oregon. The requestors reported health effects such as cough, sore throat, throat infection, burning eyes, dizziness, and headache and concerns about exposure to dust and chemicals such as ammonia and hydrogen sulfide. In response to the request, two NIOSH medical officers and two NIOSH industrial hygienists visited the facility in August 2005. The visit included an opening conference, a tour of the farm, observation of work practices, exposure monitoring, and confidential employee interviews.

The sources of ammonia and hydrogen sulfide stem from the waste products produced by the large number of cows on the farm. The hydrogen sulfide is formed as a byproduct of animal waste as organic sulfur-containing materials undergo natural decomposition. Ammonia is produced during the decomposition of organic forms of nitrogen present in the feces as well as the conversion of urea, mainly found in the urine.

NIOSH investigators randomly selected 56 workers for confidential medical interviews. Twenty-four workers were from the Holstein and Jersey dairy farms, sixteen were from Sixmile dairy farm, nine were from Threemile dairy farm, and the remaining seven were from the crop farm. Questionnaires were administered to each participant to inquire about symptoms, work history, and practices at the

farm. NIOSH also obtained and reviewed the farm's workers' compensation report for 2005 and the OSHA injuries and illnesses logs for the past 5 years.

NIOSH investigators toured the farm's dairy operations, including the Holstein and Jersey milking barns, holding pens, breeding operations, and manure lagoons. Observation of employee work practices were made at these locations and investigators spoke with workers about the training they received, their concern for potential hazards, and their use of personal protective equipment.

Personal breathing zone and area air samples for ammonia and hydrogen sulfide were collected at the sites visited during the investigation. Samples were collected at the waste-containing lagoon during dredging operations, the pens where dairy cows were kept between milkings, the composting area, and the milking operation.

As a result of their investigation, NIOSH investigators found the following:

- The concentration of ammonia was within recommended levels.
- The concentration of hydrogen sulfide was within recommended levels.
- Some employees had upper airway/mucosal irritation symptoms such as tearing eyes, coughing, and sneezing, which were attributed to road dust.
- Employees did not always use personal protective equipment.

Based on the findings above, NIOSH investigators made the following recommendations:

For Managers

- Maintain and change out air filters on heavy equipment cab ventilation systems on a scheduled basis.
- Continue to take steps to control the dust levels by utilizing dust suppression techniques.
- Provide fog-resistant face shields for employees whose work presents a potential for chemical splashes.

For Workers

- Wear the required personal protective equipment for the job being performed.

*For information on the worker health standards promulgated by NIOSH, see*

*Appendix M.*

**One Task Force Member asked the Task Force to consider the following with regard to the NIOSH case study of investigation of occupational exposure at Threemile Canyon Farms:**

- It was not peer-reviewed. At the first Task Force meeting the group agreed to only use sound science.
- It neglects to look at a number of gases associated with human health such as carbon monoxide, VOCs or other particulate matter.
- The study was not carried out over a period of time with continual monitoring.
- Wind and atmospheric conditions contribute to emissions. No information is presented on temperature, barometric pressure , humidity, wind speed etc.
- All readings were giving in ppm not ppb. Just because the instrument says zero in ppm does not mean the method (or instrument) is accurate at small concentrations.
- Readings were not taken to cover the dusk turnings of the lagoon. Typically that is when emissions are greatest.
- If this study is to be included, there needs to be just as much ink dedicated to CAFO worker studies.