RESEARCH ABSTRACT
ENVIRONMENT

**Title:** Laboratory Evaluation and Field Verification of Single Point Monitors (SPMs) for Measuring Aerial Ammonia and Hydrogen Sulfide Associated with Swine Operations - **NPB # 03-139**

**Investigator:** Dr. Hongwei Xin, Professor

**Institution:** Iowa State University

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**Abstract:** Performance of 43-44 Single Point Monitors (SPMs) was evaluated for measuring aerial ammonia ($NH_3$, 0-30 ppm) and hydrogen sulfide ($H_2S$, 0-90 ppb) under laboratory and field conditions. Calibration gas or sample air with various levels of moisture content or dew-point temperature ($t_{dp}$) and gas concentrations were introduced simultaneously to the SPMs and a reference gas analyzer – chemiluminescence analyzer for $NH_3$ and pulsed-fluorescence analyzer for $H_2S$. Linear relationships were observed between readings of the SPMs and those of the respective reference analyzer, and the relationships were influenced by moisture content or $t_{dp}$ of the calibration or sample air. Specifically, average $H_2S$ readings by the SPMs were 66%, 80%, 87% and 97% of those by the reference analyzer for calibration gas at $t_{dp}$ of -22 (dry), 9, 13 and 16 ºC, respectively. In comparison, average $NH_3$ readings by the SPMs were 42%, 86%, 102% and 178% of those by the reference analyzer for calibration gas at $t_{dp}$ of -22, 8.5-10, 12.5-14, and 16-17 ºC, respectively. Coefficient of variation of "as-is" readings among the tested SPMs was up to 15% for $H_2S$ and up to 25% for $NH_3$. Regression equations were developed to compensate for the moisture effect on SPM readings of both gases. The correctional regression equations were able to achieve over 90% of the reference $H_2S$ readings. However, such equations were not as effective in predicting or correcting $NH_3$ readings by the SPMs.