## Ambient Ammonia and Related Amines in and Around a Mink Production Facility

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In areas where ammonia (NH<sub>3</sub>) is a significant air pollutant or nuisance concern, knowledge of all potential source locations and strengths is paramount. The USEPA's 2014 National Emissions Inventory estimates that nearly 80% of the national NH<sub>3</sub> emissions are attributable to the agricultural sector and 68% of the 80% are estimated to originate from animal husbandry. According to the NEI's 2014 Technical Support Documentation (TSD), emission factors were included for cattle, sheep, swine, and poultry, but not for fur production. Similarly, the developing 2017 NEI TSD does not mention air pollutant emissions from the fur production sector. In regions of the US and elsewhere where fur production may be prominent, these facilities could be important sources of NH<sub>3</sub> and other important chemical species. Anecdotal reports often cite odors as a common problem near such facilities. Few studies, mostly in northern Europe, have quantified fur production facilities' air pollutants.

In summer of 2017, the opportunity arose to monitor NH<sub>3</sub> and related amines (methyl amine (MA), dimethyl amine (DMA), and trimethyl amine (TMA)) in and around an active fur production facility in northern Utah. The facility consisted of multiple, open-air houses with 644 to 4,354 minks per house. Two to three Ogawa passive NH<sub>3</sub> samplers were suspended along the midline of each house and were deployed for four separate sample periods. The Ogawa's collect gas-phase ammonia, and theoretically related amines, by diffusion and subsequent adsorption onto a citric acid-coated pad. After recovery, the exposed pads were transferred to a USDA-ARS laboratory for quantification by ion chromatography. At present, many of the analyses remain to be finalized. However, preliminary examination showed the investigators were able to detect not only the expected NH<sub>3</sub>, but also the various amines in several of the samples. From data currently available, gas-phase concentrations of NH<sub>3</sub> inside the housing facility were shown to be >250 ppb, while the outside air concentrations inside poultry and cattle CAFOs (concentrated animal feeding operations) are often reported to be between 1-10 ppm (1000-10,000 ppb). In this presentation, concentrations of ammonia and target amines will be presented and estimates of the pollutant emissions strengths will be assessed.