

ANIMAL WELFARE

Title: Quantifying a Technique Using Carbon Monoxide for the Depopulation of Swine – NPB #21-073 **REVISED**

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Scientific Abstract:

A 1970 grain truck was modified for the euthanasia of swine by carbon monoxide (CO). AVMA guidelines set forth recommendations for gas engine-generated CO for euthanasia. Carbon monoxide, temperature, and particulate matter levels were quantified in the truck bed. Feeder pigs (45-100 lb.) and breeding age swine (P1-7 sows, >300 lb.) were used to confirm successful tests of the CO euthanasia model. The truck was modified to add exhaust gas cooling and filtration. The truck is completely self-contained, and is mobile to go from site to site.

Carbon monoxide was shown to fill from the top down in the truck bed. Bed height is a consideration, with an impact on time needed to get CO levels high enough at pig level. CO levels were quickly over 6000 ppm, and able to go above 10,000 pm during the trial runs. At levels above 4000 ppm CO, pigs started showing the loss of posture visually.

Exhaust gas temperature was lowered by use of an intercooler. The intercooler brought the exhaust temperatures to within a few degrees of outside air without pigs in the bed. Pig body heat raised the truck bed temperature for a short period after loading and then temperatures leveled off. Both feeder pigs and breeding swine showed no signs of heat stress during the test runs.

Removal of particulate matter was achieved by using a V-bank style filter, MERV14 rating. The filter was able to reduce particulate matter levels by 78% at 2.5 microns and below, and by 100% at 10 microns and below.

The modified grain truck was shown to be successful in euthanizing feeder pigs and breeding age swine while being compliant with AVMA guidelines for using CO generated from gas engines. Producers now have a viable option to assist in a mass depopulation of swine of differing sizes and maintaining welfare of the pig.

These research results were submitted in fulfillment of checkoff-funded research projects. This report is published directly as submitted by the project's principal investigator. This report has not been peer-reviewed.

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