

ANIMAL WELFARE

Title: Validation of a Mobile Electrocutation System for Humane Mass Depopulation of Swine – NPB #20-123

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Scientific Abstract:

During the Spring of 2020, the US Pork industry experienced an unprecedented supply chain interruption because of packing plant closures and slowdowns. This crisis revealed the fact that other than sending pigs to harvest, the US was unprepared for humane mass depopulation of pigs on farm. If the US were to experience a foreign animal disease outbreak such as ASF or FMD, livestock would not be allowed to be transported off the farm for euthanasia. The challenges encountered by the industry pointed to the need for more work developing humane methods of depopulation specifically for on-farm use, that can accommodate large numbers of animals. Therefore, humane and approved methods are needed that can occur on-farm with high throughput capacity, to allow for sites to be depopulated quickly. To this end, we proposed to adapt electrical stunning techniques once utilized in harvest plants into an automated, single step electrical euthanasia system that is fully mobile.

The investigators used an expired patent for an auto-stunner that had been designed for slaughter plant use as the starting point for the project. A brief description of the mobile unit is as follows. A v-belt restrainer was mounted onto a 30' flatbed gooseneck trailer. At the rear of the trailer is a lead up chute that is chute/dock height. The electric components and the electric drive unit for the hydraulic is mounted to the front of the trailer and is powered by connecting to a 3 phase 220-volt power source with 30 amps. A negative contact was positioned to make contact with the left legs of the pigs as the restrainer moved them through the unit. An insulated paddle is lined on one side with a steel contact plate for the hot positive contact point. The pigs enter the unit via the lead up chute, transition into the restrainer which transports them forward to make contact with the negative contact bar followed by the hot paddle. When the pigs are in contact with both the negative contact bar and the hot paddle, head to heart electrical euthanasia occurs with a single step. Pigs maintain the contacts for a minimum of 3 seconds. The restrainer continues to transport the carcasses to the end of the restrainer where they transition onto the exit slide to be discharged from the trailer.

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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Sixty pigs ranging in weight from 56 kg to ~272 kg was processed through the unit for validation. 56 of the 60 pigs were euthanized with the single step automated electrocution as designed. Four pigs required the use of a secondary method to ensure death. The four pigs that required the use of a secondary method to ensure death pointed to size limitations (lower limit) or the need for a lower hold down apparatus. The electrical contacts applied and maintained sufficient electrical contact as the pigs were transported on the restrainer, even on mature Duroc boars with thick coarse hair. Though not a measurable outcome, farm staff that observed the use of the mobile unit all preferred its use versus their standard farm protocols of euthanasia. The mobile unit was found to be effective in performing hands free single step electrical euthanasia with minimal staff needed and to perform a necessary task in the most humane and mentally acceptable manner possible.