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Negative Air Pressure Cover for Preventing Odor Emission from Earthen Manure Storage

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Species: Swine
Use Area: Manure storage
Technology Category: Cover
Air Mitigated Pollutants: Odor

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System Summary:

An impermeable synthetic cover system was developed by DGH Engineering in Manitoba, Canada for mitigating odor emission from earthen manure storage basins (EMSB). The system uses *lightweight* plastic as the cover so that it is affordable to producers. An air pumping system creates negative pressure between the cover and the manure surface to hold down the cover to ensure the cover is robust enough to withstand wind forces. The air pumping system consists of small exhaust fans (four to six fans of 50 – 70 L/s each) and perforated ducts placed about the EMSB perimeter. Odor emission from the NAP covered EMSB (due to the air pumping system) is negligible (1%) in comparison with the open EMSB. Additional benefits of the NAP cover system include the retention of manure nitrogen, thus increasing the fertilizer value of manure; isolating precipitation from the manure, thereby increasing storage volume; and reducing greenhouse gas (methane) emissions.

Applicability and Mitigating Mechanism:

- Large surface areas of earthen manure storage basins emit large amount of odor to the atmosphere
- A NAP cover forms a physical barrier between the manure surface and the atmosphere to prevent odor release into the atmosphere
- The negative pressure between the cover and the manure surface holds the cover down to resist wind forces.

Limitations:

- When using traditional agitation and pump-out equipment, removing and replacing the cover for pump-out may increase the wear on the cover and add labor and time to the pump-out operation.
- An air assisted agitation system should be used.

Cost:

The capital cost varies from \$10.00 to \$15.00 per m², installed. The annual cost per pig marketed for typical 5,000 and 10,000 head swine finisher operations is estimated to be \$1.40 and \$1.13.