

INSTALLATION AND SEALING OF PHOSPHINE RECIRCULATION SYSTEMS IN SILOS AT U.S. GRAIN ELEVATORS

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Closed loop fumigation (CLF) or gas recirculation system for phosphine fumigation using a low volume blower/piping system per tank was patented by James Cook of Houston, TX in 1980. To make CLF more effective, two large steel tanks (2,000 to 10,000 tonnes/tank) were manifolded to one blower in 1991. In 1995, manifolded phosphine recirculation (MPR) system designs for concrete silos were developed. At five elevators, three to eighteen concrete silos manifolded to one blower will operate as 1,500-10,000 tonne storage units. At four elevators, all under-roof external wall vents will be sealed. Gas from all silos flow through open under-roof wall vents between silos to CLF blower suction pipes. Suction pipes will connect to only one end silo. Blower pressure piping manifolds will connect to the base of each silo in a variety of different plumbing schemes. Silo roof vent and silo base sealing problems required a variety of techniques.

CLF-MPR benefits: 1) smaller work crews, reduced worker exposure; 2) quicker fumigation response; 3) lower fumigant cost ; 4) reduced regulation compliance; 5) better efficacy with less fumigant and less management expertise; 6) blowers moved from site to site minimizes investment.