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Continuous monitoring of ammonia, carbon monoxide, nitrogen dioxide, and propane (or methane) in ice rinks

Ice arenas have multiple gas hazards in various locations throughout the facility. At the ice surface level, gasoline, propane, natural gas (sometimes diesel) powered equipment such as an ice resurfacer and ice edger produce exhaust composed of carbon monoxide and/or nitrogen dioxide. Other fuel powered equipment such as floor sweepers, lift trucks and other vehicles idling in close proximity can also add to the CO and NO₂ levels. Ammonia is commonly used in the ice chiller mechanical room and if a leak were to occur, it would become a corrosive, toxic gas.

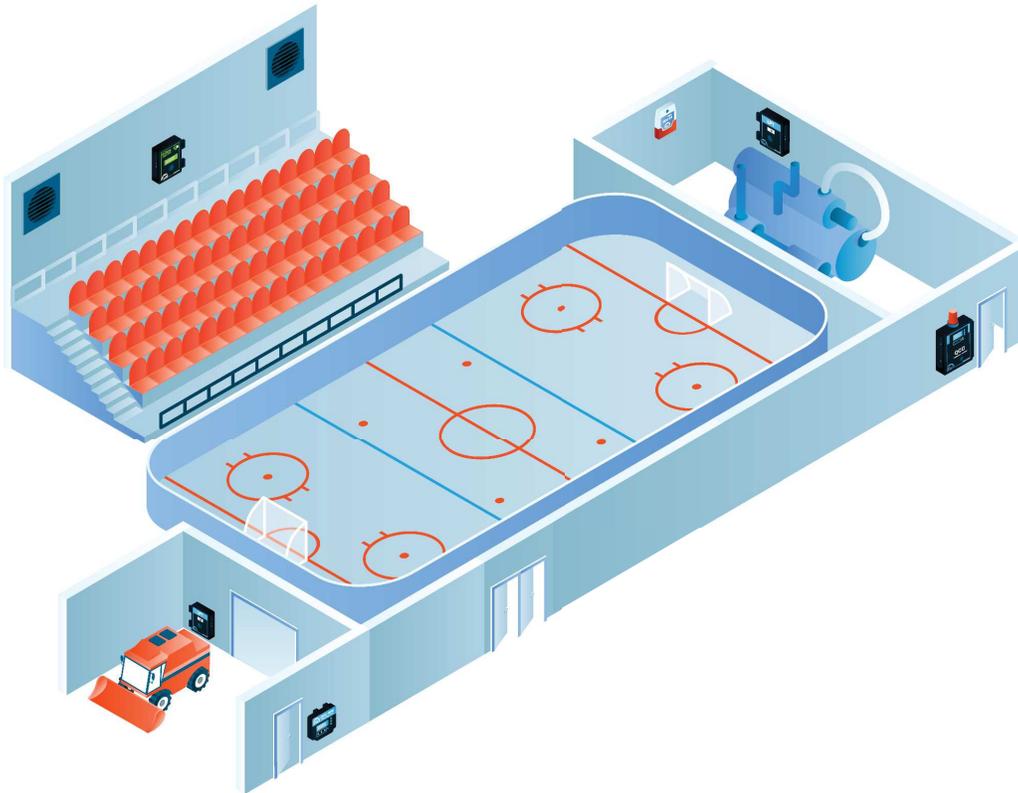
In the parking/maintenance area for the ice resurfacer there are concerns of possible leaks of propane or natural gas (depending what fuels the ice resurfacer) thus there should be a propane or methane gas detector installed to provide continuous monitoring of these potential gas hazards.

Using Critical Environment Technologies' **QCC** Quad Channel Controller with a **CGAS** detector and **LPT-A** transmitters is the solution. Strategic placement of the detection devices provides continuous monitoring for potential leaks and communication with the **QCC** Controller provides a status of the air quality conditions in all potentially hazardous areas.



The QCC Quad Controller should be mounted outside the entrance to the chiller mechanical room to provide a visual check of the gas level readings prior to entering the room. The QCC should be equipped with a top mounted strobe and a manual shut off switch that can be used to shut off the chiller equipment (meets B52 code requirements). Inside the room an LPT-A-NH3 analog transmitter should be mounted on or near the ceiling because ammonia is lighter than air and will typically collect within 12 inches of the ceiling. There should also be a remote Strobe & Horn inside the room, configured to be

activated by the LPT-A relay or one of the QCC relays.



There should be a gas detector near the parking area of the ice resurfacer. If the ice resurfacer is powered by propane, an LPT-A-C3H8 transmitter with a propane sensor should be mounted inside the room, 6 inches from the floor and near the drain channel, as propane is heavier than air and will accumulate in low lying areas. Being so close to the floor, the LPT-A-C3H8 should have a factory installed splash guard to protect the sensor vent from the wet environment of melting ice and splashing water. If the ice resurfacer is powered by natural gas, an LPT-A-CH4 with a methane sensor should be used instead, mounted on or near the ceiling. Outside the door of the

maintenance equipment room should be mounted a QCC-RDM Remote Display Module to provide a visual check of gas levels prior to entering the room.

At the ice surface level either atop the penalty box or score keepers box or in the stands, a CGAS detector with an internal carbon monoxide sensor and nitrogen dioxide sensor should be mounted to monitor gas level readings for the duration of the time the equipment remains running on the surface of the ice and/or throughout the occupied periods as per local regulation requirements.

The CGAS detector will communicate with the QCC using Modbus® communication protocol and the LPT-A will send analog signals the Controller. In the event of a gas build up in excess of the alarm setpoints, the QCC will go into an alarm state, the appropriate relays will be triggered to turn on ventilation fans, trigger on board and remote strobes & horns and any other configured emergency response. The QCC is pre-programmed and field adjustable with time delays, logic control. An optional analog output module is available that offers two 4-20 mA outputs and data logging. The QCC is also available with BACnet® or Modbus® output to a building automation system.