Recommendations for Ice Arena/Youth Hockey Associations Air Quality Monitoring/Mitigation

- **What are carbon monoxide (CO) and nitrogen dioxide (NO_2)?**
  Carbon monoxide (CO) and Nitrogen Dioxide (NO_2) are byproducts of the burning of fossil fuels in internal combustion engines. CO is a colorless, odorless and tasteless gas and is very hard to detect in your environment. Even at relatively low levels, CO is poisonous because it rapidly accumulates in the blood thereby depleting its ability to carry oxygen. NO_2 has a reddish color and intense smell at high concentrations, but can be difficult to detect at lower concentrations. Prolonged or intense exposure to NO_2 can result in skin and lung irritation. Extreme cases of CO and NO_2 poisoning result in death.

- **At what levels do CO and NO_2 become toxic?**

  For well documented research on Ice Rink Air Quality Information visit the US Ice Rink Association by clicking on: https://www.usicerinks.com/resources/indoor-air-quality
  This website is endorsed by USA hockey and includes all their info as well as info from all the different States and their current protocol. It is a great resource and we encourage you to check it out.

  Minnesota indicates that acceptable air quality limits are one hour average concentrations of less than:
  Carbon monoxide: 20 ppm
  Nitrogen Dioxide: 0.3 ppm

  Minnesota guidelines: https://www.health.state.mn.us/communities/environment/air/arenas/index.html

- **How to avoid CO and NO2 poisoning:**
  - Have a qualified technician regularly inspect all fuel-burning vehicles and equipment used indoors
  - Ensure proper ventilation
  - Install indoor air quality detectors and monitor and log regularly with wall mounted and handheld monitoring devices.

3 SIMPLE STEPS "YOUTH ASSOCIATIONS" CAN TAKE TODAY!!!

1. PURCHASE HANDHELD MONITORING DEVICE & RECORD!

Purchase a handheld monitoring device and record these levels in a log. How do we know it is or is not a problem for the kid's if we are not monitoring? We believe it's a small task to help ensure everyone's safety! Approximately $200 for handheld monitoring device. Make sure you purchase one that measures both Carbon Monoxide & Nitrogen Dioxide levels. (See list of Minnesota recommended monitors attached)

2. MAKE SURE FANS ARE BEING RUN DURING ZAMMING!

Ensure you have ventilation fans in place at your ice arena and monitor that they are turned on / ventilating during all ice cuts. Many associations have fans, but zam drivers are not turning them on. This takes monitoring, teamwork and kind encouragement by associations. Ventilation fans should be left on the ENTIRE time ice resurfacing takes place, as well as 15 minutes after.
If your facility does not have ventilation fans, please review options and consider grants, fundraising, or other ways you might be able to help purchase a system and work with your ice arena.

3. TAKE ACTION!

Corrective action should be taken in the event that a single air sample exceeds the normal levels. (We would suggest you reference Minnesota Department of Health Air quality for indoor ice rink protocol, or visit the US Ice Rink Association website).

Click on these links to access this information:
https://www.health.state.mn.us/communities/environment/air/arenas/index.html
https://www.usicerinks.com/resources/indoor-air-quality

This action should include turning on fans/ventilation equipment, and possibly opening Zamboni doors to increase outdoor air inside the arena, and then resampling every 15 minutes after, until levels return to normal range. If air levels continue to be high, continued corrective measures should be taken including notifying hockey board member and coaches, and hockey practice/games potentially being cancelled if elevated levels persist.