Waste Anesthetic Gas (WAG) Scavenging System Guidance

I. Purpose and Introduction

The intent of this guidance document is to describe waste anesthetic gas (WAG) scavenging systems and safety precautions. Utilizing anesthetic gases for anesthesia in animals presents an occupational health risk through unintended human exposure. Exposure to second-hand anesthetic gases has been associated with concerns for increased potential risk of adverse reproductive outcomes. Cardiovascular and respiratory effects may result from acute exposure and liver and kidney effects may result from chronic exposure to waste anesthetic gases. To reduce the human health risks, it is necessary to prevent WAG from escaping into the workspace, which can be accomplished by using this guidance.

II. Scope

This guidance document is intended for use by all individuals who administer gas anesthetics to research animals.

III. Engineering Controls to Reduce Human Exposure to WAG (Listed in order from most effective to least effective)

A. Local exhaust ventilation
   i. Chemical Fume Hood
   ii. Hard-ducted Biological Safety Cabinet
   iii. Slot Hood

B. Active WAG Scavenging
   i. Building Vacuum System
   ii. Auxiliary Vacuum Pump (WAG tubing from nose cones, induction chambers, etc. should exhaust into a certified chemical fume hood or hard-ducted biological safety cabinet.)

C. Passive WAG Scavenging
   i. Activated Charcoal Canisters

Note: In addition to the listed engineering controls, WAG should only be used in well-ventilated rooms where there is no recirculation of exhaust air.

IV. Procedure

A. Ensure that all individuals responsible for gas anesthesia use are properly trained. Training is provided by the Research Animal Resource Center (RARC).

B. Maintain equipment in good working order and have it inspected/certified annually. Anesthetic gas vaporizers, chemical fume hoods, hard-ducted biological safety cabinets, and other local exhaust ventilation types should be inspected/certified annually.

C. Utilize local exhaust ventilation (chemical fume hood, hard-ducted biological safety cabinet, etc.) as a means of WAG scavenging whenever possible because it is the most effective method. The induction chamber(s), nose cone(s), gas manifold, and exhaust tubing should all be located in the local exhaust hood.
If a building vacuum system is available, these can be used for rebreather-type gas anesthesia systems. Consult the manufacturer’s instructions prior to installation and use. Auxiliary vacuum pumps are available for both rebreather and non-rebreather type gas anesthesia systems. Consult with the Environmental & Occupational Health (EOH) Unit prior to installation and use.

Activated charcoal canisters should only be used when the previously mentioned scavenging systems are not available. Activated charcoal canisters must be used in accordance with the manufacturer’s directions. Activated charcoal canister usage logs that track canister weights and usage times must be maintained and kept on file. A template activated charcoal canister tracking log is available from the Research Animal Resource Center (RARC).

**Note:** Activated charcoal canisters only adsorb halogenated anesthetics (e.g. isoflurane). Nitrous oxide cannot be used with these systems.

D. Work in a well-ventilated area (e.g. rooms with 10-15 air changer per hour) with no recirculation of the room exhaust.

E. Maintain as much distance as possible between the source of the gas (nose cones, induction chambers, etc.) and yourself.

F. Intubate animals whenever possible. If nose cones must be used, ensure that the device seals tightly around the face of the animal.

**V. Safety and Occupational Health**

A. For medical emergencies: Call 911

B. Contact the Environmental & Occupational Health (EOH) Unit at 608.890.1992 or eoh@uhs.wisc.edu for WAG scavenging system consultation or to schedule exposure monitoring. Website: http://www.uhs.wisc.edu/eho/

C. Personnel who are pregnant or considering pregnancy should consult with their personal physician or UHS Occupational Medicine at 608.265-5610. Website: http://www.uhs.wisc.edu/occ-medicine/

D. Contact the Research Animal Resource Center (RARC) at 608.262.0400 or trainer@rarc.wisc.edu for anesthesia system training. Website: https://www.rarc.wisc.edu/

**VI. References**


