RUTGERS UNIVERSITY Office for Research	RUAC STANDARD OPERATING PROCEDURE	
TITLE: Charcoal Waste Anesthetic Gas Scavenge Canister Use		
SOP Category: Veterinary	**RUAC SOP #: 7.09**	**Page: 1 of 3**
Effective Date: 03/05/2024	**Approval:**	
Revisions: 07/03/2019, 04/01/2020, 5/24/2021		

SCOPE:

This document describes the procedures to be followed when using anesthetic waste gas canisters. This SOP applies to all Animal Care Staff (ACS), ACS Supervisors (ACSS), Veterinary Staff (VS), and Research Staff members (RS) at the Rutgers University facilities.

OBJECTIVE:

To describe and implement safe practices for use and monitoring of activated charcoal waste anesthetic gas scavenge canisters.

PROCEDURES:

Isoflurane is the most commonly used halogenated anesthetic in animal research at Rutgers University. Researchers are at risk of inhalation exposure to waste anesthetic gases (WAG) where adequate measures are not taken to prevent release. Anesthetic gas systems must be used in areas equipped with adequate ventilation. Isoflurane gas anesthesia systems used outside of ducted chemical fume hoods or ducted biosafety cabinets MUST be appropriately connected to an activated charcoal scavenge (scrubbing) canister(s). Charcoal particles within these canisters adsorb waste anesthetic gasses limiting exposure to the human operator. All activated charcoal scavenge canisters MUST be used in accordance with manufacturer recommendations.

A. Materials

Product examples of Activated Charcoal Scavenge Canisters:

- F/air (Omnicom)
- Breath Fresh (Jorgensen Labs Inc)
- ReFresh (EZ-systems)
- VaporGuard (Vet Equip)
- Fluosorber (Harvard Apparatus)
- WAG Activated Charcoal Canisters (Patterson Scientific)

B. Methods

1. Record the baseline WEIGHT and start DATE on the canister label.
2. Connect charcoal scavenge canisters to induction chamber exhaust ports and to all the breathing device exhaust lines.
    a. Whenever possible, place the induction chamber directly within a properly functioning fume hood or ducted biosafety cabinet.
3. Weigh canister and record the value and date directly on the canister label. Weight MUST be recorded BEFORE use and is strongly recommended AFTER use.
    a. Weight monitoring allows for the easy assessment of remaining WAG binding capacity and ensures personnel safety.

   b. All activated charcoal scavenge (scrubbing) canisters product labels list a maximum allowable weight increase over baseline that establishes safe operating capacity.
   c. Read and know your specific canisters weight increase (capacity) allowance as this will be variable across different products.
4. When a canister reaches or exceeds the recommend weight increase the canister MUST be promptly discarded in regular municipal waste and replaced.
5. **All activated charcoal scavenge canisters MUST be positioned in a manner that provides unobstructed gas flow through the venting holes.**
   a. Bottom venting canisters must not be allowed to sit directly on a flat solid surface which obstructs the vent holes.

C. Overview & Exposure Limits

Isoflurane is a halogenated anesthetic gas used in veterinary facilities. OSHA has not established a permissible exposure limit (PEL) for isoflurane and other halogenated anesthetic gases; however, NIOSH has established a ceiling level of 2 parts per million (ppm) that is not to be exceeded in a one-hour time period (NIOSH, https://www.cdc.gov/niosh/hhe/reports/pdfs/2017-0077-3336.pdf).

D. Exposure Sources and Adverse Health Effects

Waste anesthetic gases can escape into the room during anesthesia activities through:

- Tank valves
- High & low pressure connections
- Delivery hoses
- Breathing circuit hose connections
- Opening of induction chamber
- Reservoir bags
- Y connectors
- Poorly fitted face masks

Halogenated anesthetic agents have been linked to reproductive problems and developmental defects in various studies; however, these studies utilized self-administered questionnaires and actual exposure conditions were not known. Other studies have suggested the exposure to waste anesthetic gases (WAGs) can result in decrements in job performance or difficulty performing complex tasks; however, subsequent studies have not reproduced these results (OSHA, https://www.osha.gov/dts/osta/anestheticgases/)

https://ehs.princeton.edu/laboratory-research/animal-research-health-and-safety/administration-of-biological-and/safe-use-of-isoflurane-animal-research

Appendix 1:

Example of charcoal scavenge canister monitoring label.

Canister must be weighed before and after each use.
Starting Weight: _234 g_ Discard Weight (+_50_) = _284 g_

Weight grams		Date	Initials
Before	After		

Requests for label template may be made through your Animal Facility Veterinary Technician.

Charcoal waste gas scavenge canisters purchased directly through Veterinary Service ilabs request will be equipped with this label.