

DISPOSAL OF WASTE GAS ANESTHETICS

I. Purpose/Scope

The purpose of this Standard Operating Procedure (SOP) is to establish procedures for waste anesthetic gas disposal in the research facilities.

II. References

- Commentary and recommendations on control of waste gas anesthetics in the workplace. JAVMA, Vol 209, No 1, July 1,1996, pp. 75-77
- Atmospheric waste isoflurane concentrations using conventional equipment and rat anesthesia protocols. Contemporary Topics in Laboratory Animal Science, Vol 41, No 2, March 2002, pp 10-17
- Comparison of three commercially available activated charcoal canisters for passive scavenging of waste isoflurane during conventional rodent anesthesia. Contemporary Topics in Laboratory Animal Science, Vol 42, No 2, March 2003, pp 10-15
- Controlling trace gas levels in Understanding Anesthesia Equipment 4th edition, 1999, Lipincott, Wilkins & Wilkins publisher

III. Policy

Under all circumstances where volatile anesthetics are employed, there will be appropriate disposal of waste gas anesthetics, also referred to as scavenging. When possible, active scavenging through the College of Veterinary Medicine's waste gas disposal system should be utilized. If gas anesthesia must be conducted in an area that is not interfaced with this system, a passive scavenging system may be utilized. However, passive systems that vent waste gases to floor level and rely on inhalant anesthetic gases being heavier than room air are unacceptable and may never be utilized.

When charcoal canisters are used for passive scavenging, the following procedures must be employed:

- The charcoal canister should always be upright and below the vaporizer of the anesthesia machine so that the heaviness of the waste gases is exploited
- The charcoal canister should be as far removed from the administering anesthetist as possible
- The charcoal canister must be weighed before the first use and the weight recorded on the canister
- The charcoal canister must be weighed after each use or after 4 hours of continuous use and the current weight recorded on the canister
- When the canister has increased in weight over the initial pre-use weight by 50 grams, the canister is considered saturated and must be disposed of and replaced with a new canister
- When possible, the charcoal canister or the entire anesthesia unit should be placed in a non-recirculating fume hood during the administration of anesthesia

The following techniques/procedures should be routinely utilized during anesthetic procedures to reduce the amount of waste gas to be scavenged:

- Lowest gas concentrations and oxygen flow rates as needed to maintain anesthesia
- Room ventilation to exceed 15 air changes an hour
- Minimization of “masking down” animals
- Discontinuation of vaporizer when moving animal from induction box to face mask
- Avoidance of turning on flowmeters or vaporizers before use on animal
- Tightly fitting face masks
- Use of a face mask equipped with an evacuation line
- Anesthesia system that is well maintained and certified annually
- Use of cuffed endotracheal tubes, as opposed to uncuffed
- Use of an agent specific, keyed filler system for refilling vaporizers

The following techniques/procedures should be routinely utilized to reduce the amount of environmental pollution and contamination of volatile anesthetics following the discontinuation anesthesia:

- Flushing of the residual gases out of the breathing system and into the scavenging system
- Allow recovering patient to breathe oxygen through the breathing system as long as possible to decrease the amount of anesthetic gases expelled from the patient into the environment
- Thoroughly wash all breathing circuits, tubes, induction chambers, and hoses after each use
- Wrap retired charcoal canisters in plastic before disposal

To ensure that the scavenging systems employed are functioning adequately, the following must be performed for every machine:

- Each machine must be “checked out” by the administering anesthetist before every use. This includes an evaluation of the oxygen supply, flow meter, breathing system, breathing bag, scavenging bag, soda sorb, charcoal canister, and endotracheal tube
- Annual evaluation and certification of the machine
- Semiannual monitoring of trace gas pollutants. If a machine emits waste gas in excess of 2 ppm in one hour or 10 ppm over 8 hours, the use of that machine shall be discontinued immediately until a recertification/repair is conducted