Standard Operating Procedures for Euthanasia Using Saturated Potassium Chloride (KCl) Solution

1.0 Background on Compound:

1.1 A non-USP saturated or supersaturated solution of KCl may be administered parenterally to produce euthanasia in anesthetized animals.

1.2 KCl is available as a USP drug for IV administration to correct electrolyte imbalance but is not concentrated enough to achieve the required dose need for acceptable euthanasia.

1.3 Although KCl is quite safe when administered orally, it is lethal at 75-150 mg/kg. IV Injection of a lethal dose of KCl produces death by cardiac arrest. KCl eliminates the potassium concentration gradient in cardiac muscle, and the depolarized muscle cannot repolarize. Because cardiac arrest by itself does not meet the criteria for euthanasia, the use of KCl for euthanasia is restricted to animals under general anesthesia.

2.0 Requirements for Use of Compound:

2.1 KCl use must be described in an ASAF and **reviewed and approved** before its use.

2.2 KCl use is allowed only in **anesthetized animals** (surgical or deeper plane of anesthesia).

2.3 Personnel who administer KCl for euthanasia must be **trained and knowledgeable** in anesthesia for the species to be euthanized to ensure an adequate level of animal unconsciousness prior to KCl administration.

2.4 KCl is to be administered **intravenously (IV) or intra-cardiac (IC)** in an anesthetized animal.

2.5 KCl must be **prepared, used, stored, and disposed of** as described below.

3.0 Materials:

- Potassium chloride white crystalline solid
- Scale
- Container and stirring bar or utensil
- Mortar and pestle
- Tap, sterile or distilled water

2.0 Preparation of KCL solution

2.1 Use a mortar and pestle (or other method) to grind the KCL crystals into a course powder. Skipping this step will increase the time it takes for KCl to dissolve in water. Dissolve 40 g in 120mls of hot water. If your water is mineral-rich, it may not dissolve

completely. If this is the case, use distilled water. Once KCL is dissolved, draw it up as needed in syringes. Maintain the KCl solution at room temperature and then discard any unused solution by the end of the day.

4.0 Administration of KCL:

4.1 KCl should be administered only by an intravenous or intracardiac route in anesthetized animals. Consider placing an IV large-bore catheter prior to anesthetizing the animal to ensure venous access and rapid administration of KCl. A dose of 75-150 mg/kg should be used, and the full dose should be administered. Cardiac arrest may occur prior to full administration of the dose. If the full dose is not administered, a secondary physical method must be used to assure death.

4.2 Clinical death typically occurs in less than 3 minutes following administration of the bolus. Muscle movement and fasciculations are commonly observed following the administration of KCl.

5.0 Disposal of Compound:

5.1 Dispose of unwanted KCl as standard waste.

6.0 References:

6.1 Bhatkhande, C.Y. and V.D. Joglekar. Fatal poisoning by potassium in human and rabbit. Forensic Science Vol. 9, 1977, pp. 33–36.

6.2 K. Watanabe, K. Hasegawa and O. Suzuki. A double-suicide autopsy case of potassium poisoning by intravenous administration of potassium aspartate after intake of some psychopharmaceuticals. *Hum Exp Toxicol* 2011 30: 777

6.3 IACUC Policy #29 "Use of Non-Pharmaceutical Grade Substances" https://iacuc.wsu.edu/policies/

6.4 https://aaep.org/sites/default/files/2021-03/KCl_Procedure_%20ISU.pdf