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Standard Guide for Use and Development of Sodium Cyanide As a Predacide¹

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INTRODUCTION

Vertebrate animal control as a science is very primitive, lacking many of the research tools and procedures which are well established in other biological areas. Indeed the field still remains more of an art or skill highly dependent upon field experience usually garnered by trial and error. This is particularly true in dealing with the higher forms that are neither domestic nor commensal. All are capable of elementary reason as well as learned behavioral patterns; thus pesticidal work with these forms has been very difficult and in some areas impossible to standardize. However, the committee recognizes that the effort to do so must be made both to improve the science related and to provide some reasonable safeguards for legitimate environmental concerns.

1. Scope

1.1 This guide covers the use of sodium cyanide as a predacide. Cyanide has long been used in devices for predator control. Because of its demonstrated effectiveness as a lethal agent, the development of basic efficacy data seems redundant. However, since the effectiveness of the toxicant is directly related to the use of specific delivery systems, a use and development statement is deemed both desirable and necessary. This is a state-of-the-art document.

1.2 For use and development, this guide applies most of the known data from federal and private operations in the United States. However, both the application and chemical techniques have considerable potential for research and development in other countries, as well as in North America. For this reason alone, a standard defining much field experience on safety and efficacy should be retained as a guide, in the opinion of the committee.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* Specific hazard statements are given in Sections 3 and 11.

2. Delivery Method

2.1 *Function*—An ejection mechanism is used to propel a quantity of sodium cyanide into a canid's mouth from a shell or capsule as the animal triggers the device by pulling up on the baited top.

2.1.1 *Humane Coyote Getter (HCG)*—Sodium cyanide (NaCN) is gravity-packed in a primed .38-special caliber pistol shell (0.5 to 1.0 grain pistol powder may be added as a propellant) to within 4 to 6 mm of the shell lip. Prior to toxic loading, technical grade NaCN is mixed with an anticaking agent so that the total toxic agent load is between 0.2 and 0.8 g, depending upon the species. A wad is then inserted to separate the chemical mixture from the flush, pliable asphaltic waterproofing which is applied as the top seal. Hang fires and misfires may occur as with any pistol ammunition.

2.1.2 *Spring-Loaded Sodium Cyanide Ejection Device (SLSCED)*—The cyanide container is a translucent plastic capsule molded into a shape that approximates the size of a .44-caliber pistol shell. The center of the capsule base is thin to permit easy rupturing. The NaCN mixture (containing the anticaking and drying agent) is gravity-packed in the capsule to within 2 to 3 mm of the lip. A high-impact plastic wad is inserted into or over the top of the capsule and held in place by a small amount of pliable plastic or other sealant.

2.2 Ejection Devices:

2.2.1 *HCG Firing Device*—The HCG firing device is a closed, cast-metal tube about 30 mm long. It is threaded at the top to accommodate the shell holder into which the cartridge is inserted. A shell is pushed into the bottom of the cylindrical shell holder which in turn is screwed in place on top of the firing unit. The firing device contains a spring, a firing pin, and a trigger arm. When released, the cone-shaped projection in the center of the plunger emerges from the firing device, striking and igniting the center-fire primer in the base of the shell. (This ejects the material into the target animal's mouth.) Proper emphasis and selection of the attractant (see 6.3 and 7.7) can render the application very target specific.

2.2.2 *SLSCED Ejection Device*—The SLSCED ejection device is somewhat similar to the HCG device in principle;

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however it is longer, about 75 mm, to contain a more powerful spring. A6-mm diameter flat-top plunger emerges from the top, and when released, extends 30 mm above the top of the unit. When the plunger is released, the bottom seal of the capsule ruptures and the plunger forces the cyanide and wad out of the capsule into the target animal's mouth.

3. Storage and Handling

3.1 Shells and capsules containing sodium cyanide (NaCN) should be stored at room temperatures under conditions of low humidity. Storage periods should not exceed 12 months. Shells and capsules should be replaced and disposed of whenever corrosion, broken seals, or malformation occur, or at least every 3 months under use conditions.

3.2 When transporting these devices in the field, the individual NaCN shells and capsules should not be separated from the boxes until needed for use. Shell and capsule holders should be stored in sealed containers. If lubrication of the ejection mechanism is needed, graphite dust or lightweight mineral oil (not machine oil) should be used.

3.3 HCG shells shall be handled as carefully as firearm ammunition. The top seals of shells and capsules should be protected from damage.

3.4 Cyanide dusts in bulk should be sealed in steel, or other appropriate double containers. Keep dry and relatively cool. Rusty containers should be immediately replaced and the material resealed. Bulk containers, once opened, should always be suspect and placed in a storage area with negative pressure and forced ventilation to the outside. **Warning**—HCN gas, the product of humidity in air reacting with sodium cyanide, is essentially odorless, colorless, and rapidly fatal in a closed-air space.

4. Formulation

4.1 The chemical efficiency of this method in the field is much lower than laboratory ingestion would indicate (maximum allowable concentration (MAC) is 8 to 10 mg/kg). Dosages should be based on an approximate LD₁₀₀ of 20 to 30 mg/kg, since the amount of NaCN mixture that enters the mouth of the target animal cannot be metered. Field testing has demonstrated that any mixture less than 20 to 30 mg/kg of toxicant creates sublethal effects.

4.2 Sodium cyanide bulk handling always requires use of an approved MSA (Mine Safety Administration) face mask and special cyanide canister. Impervious gloves and full coverage of limbs are required. Mixing rooms should be of moderate temperature (below 29°C) and of relatively low humidity, not exceeding 20 %. Mixing rooms should have forced ventilation to outside air with a negative air pressure in the rooms. Antidotal materials should be readily accessible.

5. Delivery Areas

5.1 Human population densities and size of land holdings may preclude use in many areas.

5.2 Sodium cyanide and the devices described in 2.2 can be utilized at any altitude, dependent upon seasonal activities and distribution of the target species. The best usage in northern areas is during periods when the canid population is not restricted to denning areas or when food is scarce. In desert or

southern areas, late fall, winter, and spring are the preferred periods of use.

5.3 Target species in North America include members of the genera *Canis*, *Urocyon*, and *Vulpes*.

6. Preparation of Shell and Capsule Holders

6.1 Wrap the outside of the shell or capsule holder with some absorbent material, such as string, wool, cotton, fur, or tape. Tie the material securely in place with string or light wire. The wrapping should not cover the top end of the shell or capsule holder.

6.2 The holder and wrapping may be dipped in hot paraffin, but the inside of the holder should be scraped free of wax.

6.3 Apply fetid scent or lure to the outer sides of the wrapped holder. This is made of ground meat, brains, liver, offal, fish, rodent carcasses, putrified egg fractions, or other materials that are allowed to rot for varying periods. Form a paste-like mixture by mixing the lure with eggs, beaver castor, tonquin pods, commercial trapper-scents, or other attractants.

6.4 The constituents of the lure will vary with the individual user's experiences, the availability, season, and local climate. Experience and experimentation are necessary to devise a combination that will work in a particular area under a given set of circumstances. The scent pasted on the wrapped holder should smell like and have the appearance of carrion, which is highly attractive to canids at some periods. The scent should not cause the canid to roll on the device but should encourage him to lick it, bite it, and attempt to pick it up with his teeth. This lifting action propels all or part of the cyanide load into the target animal's mouth and throat. The scent along with the proper site selection and placement determines the degree of selectivity of the device.

7. Setting Units

7.1 Use the galvanized metal tube or stake that is crimped on one end to hold the device in place. The stake should be from 120 to 300 mm long, depending upon the tightness of the soil. Drive the stake firmly into the ground on the crimped end as far as the trigger slot.

7.2 Depress the spring on the firing or ejector unit with special pliers until the trigger is engaged to hold it in the set position.

7.3 Fit the firing or ejector unit into the stake and hook the trigger in place in the slot or the split ring of a safety top.

7.4 Place a shell or capsule in the shell or capsule holder. Then screw the holder tightly on top of the firing unit. This should be done carefully so as to prevent premature firing. The user should kneel upwind with his face as far removed from the device as possible in order to prevent injury from the wad or NaCN.

7.5 With the HCG device, hold the thumb and first two fingers so the palm is positioned toward the side of the device.

7.6 With the SLSCED device, hold the gloved palm over the top of the capsule holder to smother the load if it is prematurely ejected. The holder can also be screwed onto the firing unit before placing the combined unit in the stake. Gloves when used should be free of contaminating odors of cyanide, oil, scent, etc.

7.7 Smear the fetid scent on the shell or capsule holder as