

# SWGDOG SC8– SUBSTANCE DETECTOR DOGS

## Explosives Detection

Posted for Public Comment 6/3/07 – 8/1/07. Approved by the membership 8/15/2007.

**Statement of purpose:** To provide recommended guidelines for training, certification and documentation pertaining to explosives detector canines.

### 1. Initial Training

- 1.1. The training shall be conducted by a qualified explosives detector canine team trainer who is a competent individual from an entity that utilizes a structured curriculum with training designed to achieve specific learning objectives.
- 1.2. The training course shall include training to detect the following mandatory groups of explosives that contain the following substances (see Appendix 8.1 for details):
  - 1.2.1. RDX
  - 1.2.2. PETN
  - 1.2.3. TNT
  - 1.2.4. Dynamite
  - 1.2.5. Black powder
  - 1.2.6. Double base smokeless powder
- 1.3. The following substances may be included in the detection training as required by mission or specific threat (see examples in Appendix 8.2 ):
  - 1.3.1. Ammonium nitrate
  - 1.3.2. Black powder substitutes
  - 1.3.3. Blasting agents
  - 1.3.4. Cast boosters
  - 1.3.5. Composition B
  - 1.3.6. Emulsions
  - 1.3.7. Nitrome thane
  - 1.3.8. Photoflash/fireworks/pyrotechnic powders
  - 1.3.9. Plastic explosives (unmarked and marked with detection agent)
  - 1.3.10. Semtex
  - 1.3.11. Single based smokeless powder
  - 1.3.12. Slurries
  - 1.3.13. Tetryl
  - 1.3.14. Water gels
  - 1.3.15. Home made explosives (HME) that include:
    - 1.3.15.1. Chlorate based mixtures (e.g., potassium chlorate)
    - 1.3.15.2. Nitrate based mixtures (e.g., ANFO nitrate)
    - 1.3.15.3. Perchlorate based mixtures (e.g., potassium perchlorate)
    - 1.3.15.4. Urea nitrate
    - 1.3.15.5. Peroxide based explosives
      - 1.3.15.5.1. Due to the extreme instability of peroxide-based explosive compounds, training must be done under the

guidance of a qualified chemist or bomb technician and qualified explosives canine instructor/trainer who follow a training objective.

1.3.15.6. Hexamethylene Triperoxidediamine (HMTD)

1.3.15.7. Triacetone triperoxide (TATP)

1.3.16. Emerging Threats – Such as liquid explosives

1.4. Trainers and handlers shall be aware of whether or not the explosives they are using for training are tagged.

1.4.1. Taggants – The antiterrorism and effective death penalty act of 1996 (Section 842 of Title 18, United States Code) mandated that as of April 24, 1997, all plastic explosives manufactured in the United States be marked with a chemical detection agent. The taggants are simply nitro compounds which vaporize rapidly and are added to enhance the detection of plastic explosives by instrumental analysis. Any plasticized high explosive (i.e., Detasheet, Flex X, Primasheet, C4, Semtex) legally manufactured after 4/24/97, contains taggants. They are listed below:

1.4.1.1. EDGN (ethylene glycol dinitrate semtex discontinued in the mid-90's)

1.4.1.2. DMNB (Dimethyl Dinitro Butane)

1.4.1.3. o-MNT (Ortho-Mono nitrotoluene) less used Ortho-Mononitrotoluene (o-MNT)

1.4.1.4. p-MNT (Para-Mononitrotoluene) Used by France and Russian

1.5. The training shall include varying quantities (typically varying by orders of magnitude) of the various substances (dependent on region, mission and operational deployment needs).

1.6. The training shall include exposing the canine to various heights and depths of training aid placement in different training scenarios.

1.7. The initial training shall continue until the explosives detection canine team is certified or deemed not certifiable.

1.8. Initial training shall represent all conditions that could be encountered during a certification process.

## **2. Canine Handler Team Certification**

2.1. Certification for explosives detection dogs shall be comprised of a comprehensive assessment and shall include elements of odor recognition or double blind testing as outlined in the SWGDOG General Guidelines utilizing the following parameters:

2.1.1. Minimum weight of substance odors being tested for certification shall be 113.4 grams (¼ lb).

- 2.1.2. The following substances must be included in the test:
  - 2.1.2.1. RDX other examples to be added
  - 2.1.2.2. PETN
  - 2.1.2.3. TNT
  - 2.1.2.4. Dynamite (containing EGDN and NG)
  - 2.1.2.5. Black powder
  - 2.1.2.6. Double base smokeless powder
- 2.1.3. Recommended optional substances are listed in section 1.3 and may be included in the test based on mission specific requirements.
- 2.1.4. As a minimum, the test shall include the following components:
  - 2.1.4.1. Scenarios resembling searches within the normal operational environment.
  - 2.1.4.2. At least 4 different searches (see categories including additional test areas below) designed to evaluate the canine's ability to recognize the odor, respond to the odor and the handler's ability to recognize this response (3 search areas must be from 2.1.4.).
    - 2.1.4.2.1. Parcels/baggage search (2-6 articles per odor, 2-6 parcels or bags per minute).
    - 2.1.4.2.2. Building/room search, of a 18.6 –111.5 m<sup>2</sup> (200 -1200 sq ft) room with furniture, 1 room per odor. Should take 1.5 minutes or less to search 9.3 m<sup>2</sup>/ 28 m<sup>3</sup> (100 sq.ft./1000 cu. ft.).
    - 2.1.4.2.3. Motor vehicles, exteriors and/or interiors, using 2-6 vehicles per odor. Search time: 3 min per vehicle.
    - 2.1.4.2.4. Open area and perimeter searches of 93 – 930 m<sup>2</sup> (1,000 to 10,000 sq ft) per odor. Search time: 1-3 minutes per 93 m<sup>2</sup> (1000 sq ft).
  - 2.1.4.3. All odors for which the dog will be certified must be tested but not all odors will necessarily be in each type of search and some search areas shall contain no odors (blanks).
  - 2.1.4.4. The recommended maximum time to complete an individual search is listed below but disqualification due to time shall be left to the discretion of the certifiers.
  - 2.1.4.5. The test shall end if the certifiers determine that the canine team is no longer working (e.g., Observable behaviors to be added).
- 2.1.5. Additional test areas based on mission requirements and unique environments may include, but are not limited to the following:
  - 2.1.5.1. Aircraft.
  - 2.1.5.2. Maritime vessels.
  - 2.1.5.3. Mass transit vehicles including buses, light rail cars and subway cars.
  - 2.1.5.4. Large cargo configurations.
  - 2.1.5.5. Person/crowd searches (3-6 persons per odor, 1 minute per person).
  - 2.1.5.6. Odor Recognition test (3-6 cans/containers per odor, 1 minute per can/container).
- 2.1.6. Minimum weight of substance being tested – 113.4 grams (¼ pound).

- 2.1.7. Maximum weight of substance being tested shall be determined by the evaluator and based on mission requirements and associated threat.
  - 2.1.8. Maximum height of hide shall be 2.44 meters (8 ft).
  - 2.1.9. Maximum depth of hide shall be 0.3 meters (1 ft).
  - 2.1.10. Minimum set time shall be 30 min or determined by the evaluator based on mission requirements and the associated threat.
  - 2.1.11. The test shall include a variety of searches designed to evaluate the canine's ability to recognize the odor, respond to the odor and the handler's ability to recognize this response.
  - 2.1.12. Training aids shall not be placed in plain sight.
  - 2.1.13. For successful certification, the canine/handler team shall achieve at least a 90% confirmed alert rate for certification, and a false alert rate not to exceed 10%, as defined and calculated in SC 2.
  - 2.1.14. Excessive handler errors, as defined by the certifying authority, shall result in failure of the team
  - 2.1.15. The canine team should be able to locate all training aids to within a 2 meter (6.56 feet) radius of the source without disturbing the target, regardless of the height of the source, barring extenuating environmental conditions deemed relevant by the certifying official.
- 2.2. Use of distracters
    - 2.2.1. Natural distracters are normally present and vary depending on the area where the certification testing is done.
    - 2.2.2. Placement of distracters in the certification area is required when no natural distracters are present.
    - 2.2.3. Care must be taken not to place artificial distractions in a manner that causes contamination with the test substance odor.
  - 2.3. Deliberate compromise of an evaluation will not be tolerated. Any communication (in person, by cell phone, two way pager, text messaging or by any other means) between handlers and department personnel participating in the evaluation, concerning specifics of an area still being evaluated, placement of explosives training aids or any information that could be regarded as a compromise prior to the termination (by the evaluator) will constitute a compromise of the evaluation. In the event a handler compromises the evaluation, the handler will not be allowed to continue and may be removed from the evaluation.

### **3. Maintenance Training**

- 3.1. This type of training is meant to sustain and enhance the performance of the handler and canine and their ability to work together as a team.
- 3.2. In training, situations are purposely sought where the capabilities of the canine team are challenged in environments which simulate those in which the team may be deployed.

- 3.3. Training sessions shall include the following:
  - 3.3.1. A variety of locations, environments and times of day.
  - 3.3.2. A variety of training aids of varying amounts that may be typically found in operational environments.
  - 3.3.3. A variety of heights, depths, containers and distraction odors.
  - 3.3.4. Various types of searches including vehicles, building, parcels, luggage, and open areas.
  - 3.3.5. Variation in the duration of the searches.
  - 3.3.6. A variety of blank searches.
- 3.4. The canine team shall conduct regular objective-oriented training sessions sufficient to maintain operational proficiency.
  - 3.4.1. Routine training, conducted solely by the handler to maintain the canine team's proficiency and to reinforce odor recognition, is an acceptable form of training but must be combined with supervised training on a regular basis. Supervised training conducted by a qualified trainer other than the handler, in order to improve performance, identify and correct training deficiencies and perform proficiency assessments (refer to SC-1) is considered a best practice.
  - 3.4.2. The canine team shall spend an average of 4 hours per week training to maintain the proficiency level of the team.
- 3.5. Maintenance training shall represent all conditions that could be encountered during a certification process.

#### **4. Training Aids**

- 4.1. Every effort shall be made to train on actual explosives and chemicals used in the making of explosives.
- 4.2. The training aids shall be stored in accordance with local, state and federal regulations.
- 4.3. Training aids shall be labeled and packaged in a manner safe for the handler and canine. Each label shall contain a minimum of the following information:
  - 4.3.1. Training aid tracking codes and/or actual aid names
  - 4.3.2. Training aid tracking codes shall be cross referenced to a reference log maintained within the respective agency.
  - 4.3.3. Information contained within the log shall contain but not be limited to the following: description of aid, date acquired, quantity
  - 4.3.4. Emergency contact information.
- 4.4. The training aid shall be maintained and handled in a manner to avoid loss, spillage, or destruction.

- 4.5. Storage of non-peroxide based training aids shall be in a manner to prevent odor cross contamination or physical contamination, i.e., each training aid substance shall be stored in separate impermeable containers such as paint cans, Teflon sealed glass jars stored within a federal, state or locally approved explosive storage magazine. Special procedures should be followed for the storage of peroxide-based explosives.
  - 4.5.1. To avoid contamination of training aids use separate storage for bulk explosives and training aids.
    - 4.5.1.1. It is recommended that all dynamites containing nitro glycerin, EDGN and all plastic explosives containing taggants such as DMNB, are stored in separate explosive storage magazines. If this is not possible then frequent replacement of training aids is recommended.
- 4.6. The source of the training aids shall be reliable and documented.
- 4.7. Disposal and or the destruction of the training aids shall follow local, state and federal regulations.
- 4.8. Transportation & vehicle storage of training aids shall follow local, state and federal guidelines.
- 4.9. Material Safety Data Sheets (MSDS) must be available for each material utilized.

## **5. Documentation**

- 5.1. The handler, department, and organization shall maintain training records, training materials, proficiency assessments, seizure records, and deployment and utilization records.
- 5.2. Records shall contain discipline-related specifics.
- 5.3. Records shall be standardized within the department, agency and/or organization.
- 5.4. Documents shall be retained in accordance with unit, state and federal guidelines.
  - 5.4.1. Training records shall include but not be limited to the following data:
    - 5.4.1.1. Date and time training took place.
    - 5.4.1.2. Name of the trainer.
    - 5.4.1.3. Type and amount of training aid used.
    - 5.4.1.4. Length of training session
    - 5.4.1.5. Location where training took place.
    - 5.4.1.6. Type of training (e.g., vehicle, luggage, building, open area)
    - 5.4.1.7. Searches and indications, i.e., results of searches.
  - 5.4.2. Certification records shall be kept by the certifying authority and handler and include the following information.
    - 5.4.2.1. Date team was certified.
    - 5.4.2.2. Certification authority, i.e., agency, professional organization

- 5.4.2.3. Name of individual awarding certification.
- 5.4.2.4. Type of materials for which certification granted.
- 5.4.2.5. Location of certification.
- 5.4.2.6. Name of canine and handler.
- 5.4.3. Deployment/utilization records shall contain the following information:
  - 5.4.3.1. Date and time of deployment.
  - 5.4.3.2. Location of deployment.
  - 5.4.3.3. Length of search.
  - 5.4.3.4. Description of activity.
  - 5.4.3.5. Result of search.
  - 5.4.3.6. Other information required by the organization and/or agency.

## **6. Use of records/documentation**

- 6.1. Reliability of the canine team shall be based upon the results of certification and proficiency assessments.
- 6.2. Training records do not necessarily reflect reliability.
- 6.3. Training records are necessary to illustrate the type and amount of training that the team has experienced before and after certification.
- 6.4. Confirmed operational outcomes can be used to determine capability.
- 6.5. Unconfirmed operational outcomes shall not be used to determine capability in that they do not correctly evaluate a canine team's proficiency.

TABLE 8.1 - Main chemical classes of explosives, categorized as mandatory and elective

| EXPLOSIVE CLASSES   | MANDATORY   | ELECTIVE <sup>i</sup>  |
|---|---|--|
| <b>NITRO ALKANES</b><br>(C-NO <sub>2</sub> )                            | <ul style="list-style-type: none"> <li>• None</li> </ul>  | <ul style="list-style-type: none"> <li>• Nitromethane (NM)</li> <li>• 2,3-Ddimethyldinitrobutane (DMNB)</li> </ul>   |
| <b>NITRO AROMATICS</b> (Ar-NO <sub>2</sub> )                            | <ul style="list-style-type: none"> <li>• 2,4,6-trinitrotoluene (TNT)</li> </ul>                             | <ul style="list-style-type: none"> <li>• Dinitrotoluene (DNT)</li> <li>• Picric acid (PA)</li> <li>• Tetranitro-N-methylaniline (Tetryl)</li> </ul>  |
| <b>NITRATE ESTER</b><br>(C-O-NO <sub>2</sub> )                          | <ul style="list-style-type: none"> <li>• Pentaerythritol tetranitrate (PETN)</li> </ul>                     | <ul style="list-style-type: none"> <li>• Methyl nitrate (MN)</li> <li>• Nitroglycerin (NG)<sup>ii</sup></li> <li>• Ethylene glycol dinitrate (EGDN)<sup>ii</sup></li> <li>• Diethylene glycol dinitrate (DEGN)</li> <li>• Nitrocellulose (NC)</li> <li>• Nitroguanidine. (GN)</li> </ul> |
| <b>NITRAMINES</b><br>(C-N-NO <sub>2</sub> )                             | <ul style="list-style-type: none"> <li>• Trinitro-triazacylohexane (cyclonite or RDX)</li> </ul>            | <ul style="list-style-type: none"> <li>• Methylamine nitrate (MAN)</li> <li>• Tetranitro-tetrazacylooctane (Octogen or HMX)</li> <li>• Hexanitroisowurztitan (CL20). specialty military explosive.</li> </ul>  |
| <b>ACID SALTS</b><br>(NH <sup>4+</sup> , NO <sub>3</sub> <sup>-</sup> ) | <ul style="list-style-type: none"> <li>• Ammonium nitrate (AN)</li> <li>• Potassium Nitrate (PN)</li> </ul> | <ul style="list-style-type: none"> <li>• Ammonium perchlorate (AP)</li> <li>• Potassium chlorate (PC)</li> <li>• Potassium perchlorate (PP)</li> <li>• Urea nitrate (UN)</li> </ul>  |
| <b>PEROXIDES</b> <sup>iii</sup><br>(C-O-O-C)                            | <ul style="list-style-type: none"> <li>• None</li> </ul>  | <ul style="list-style-type: none"> <li>• Triacetone triperoxide (TATP)</li> <li>• Hexamethylene triperoxide diamine (HMTD).</li> </ul>   |

<sup>i</sup> Best practice is to select elective explosives from different chemical classes .

<sup>ii</sup> Highly volatile explosives such as NG and EGDN are prone to contaminate other explosives and should be stored separately (e.g. nylon bag, sealed paint can).

<sup>iii</sup> Training on explosives from the peroxide family (TATP and HMTD) should only be conducted under the proper supervision of a qualified chemist and trainer following a training objective.