CHAPTER 4 DETECTION

CHEMICAL

Normally, the NBC team can expect to be briefed at the assembly area by the CAICO and at the site by technical escort personnel or the EOD team commander as to the type of agent involved. However, there may bean accident/incident where these teams are not present, and the NBC team leader must determine the type of agent involved. In any event, it is the function of the NBC team to determine the extent of contamination and confirm the type of chemical material involved.

PROTECTIVE CLOTHING

The items of protective clothing recommended for protection against chemical hazards are summarized in Table 3. The team leader can readily select the items required for protection against the hazard present.

- **Known Hazard.** If the type of agent is known, the NBC team may dress in the protective clothing most suitable for protection against that hazard (Table 3).
- **Unknown Hazard.** If the team must react quickly and if the type of agent is unknown, the team leader may choose to send a detection team (at least two people), dressed in protective clothing (Table 3), into the contaminated area to make a quick identification. Once the chemical is identified, the remainder of the team must dress in the most suitable protective clothing. If the chemical cannot be identified, it will be assumed to be the most hazardous, and the buty l rubber suit with liner should be worn.

DETECTION AT COMMAND POST LOCATION

When it is initially unknown as to whether explosives are involved in an accident, or the quantity of explosives involved is not known, the command post complex will be located approximately 500 meters upwind of the site to insure that it is out of the fragmentation range and free of contamination. However, the NBC team may be required to perform this function. If the command post and initial hazard area have not been designated by another commander, the first team leader/commander (EOD, NBC, or DECON) that arrives at the incident is required to designate a tentative CP and establish an initial hazard area

Recommended Protective Clothing

Clothing	Nerve	Blister	Agent liquid biological	Blood choking	Dry biological, incapacitating riot	Liquid smoke	Rocket fuel and oxidizers	Foreign chemicals (unknown)
Impregnated undergarments (drawers, shirt, socks, gloves)	(1)	X	X					X
Coveralls, TAP (Cooling suit as req)	X	X	X					X
Coveralls, RFH (____ do ____)							X	
Coveralls, explosive handlers or field clothing	(2)			X	X	X	X	
Boots, TAP	X	X	X			X	X	X
Boot covers TAP (3)	X	X	X	X	X	X		X
Boots combat				X				
Hood, TAP	X	X	X	X(6)	X(6)			X
Hood, M6A2				X(6)	X	X		
Hood, RFH							X	
Protective mask, M17A1				X(6)	X(6)			
Protective mask, M9A1	X	X		X(6)	X(6)			X
Self-contained breathing apparatus	(4)					X	X	
Gloves, cotton				X	X			
Gloves, surgeons or plastic	(2)					X		
Gloves, TAP	X	X	X	X	X	X		X
Gloves, RFH, gray							X	
Gloves, RFH, red							Oxidizers	
Gloves, RFH, green							Fuels	
Apron, TAP				X(5)	X(5)	X		

[1] V-series only.
[2] G-series only.
[3] Boots, rubber, may be substituted if Boot Cover, TAP, is worn.
[4] Self-contained breathing apparatus should be used in lieu of protective masks whenever an oxygen deficient atmosphere exists or in closed areas where high agent concentrations may exist.
[5] Apron, TAP, is used as protection from liquid decontaminants.
[6] Either the M9A1 or the M17A1 mask can be worn.
TAP—Toxicological Agent Protective.
RFH—Rocket Fuel Handlers.

Table 3

(downwind vapor and fragmentation). The procedures outlined below should be followed:

- Approach the site from upwind. Protective masks will be worn when within approximately one mile of the accident/incident site. Periodic sampling for chemical agents will be conducted during the approach to determine when contamination is encountered, its identity, and an opportunity to reassess the team's level of protection.

- There is no fixed location or size for the actual CP area; however, certain rules must be observed.

Mandatory

- The CP area must be upwind of the incident.
- The downwind edge will be at least 500 meters from the incident as indicated by figure 4.

Other Considerations. The following should be considered when selecting the CP area:

- **Elevation.** Keep CP at a higher elevation than the accident site with at least one point in the CP area within sight of the accident site.

- **Access.** Area must be readily accessible to vehicles and equipment needed to perform the mission.

- **Natural Protection.** If possible, pick an area where at least a portion of the CP can be shielded from the explosive hazards presented by the incident.

- **Shielding.** Being shielded from public view is desirable, but it is particularly important where a personnel decontamination station is being operated.

- After a favorable area for the CP has been selected, additional checks for agent contamination must be made.

DETECTION AT HOT LINE AND CONTAMINATION REDUCTION AREA

Additional checks must be made to insure that the hot line and contamination reduction area are located in a contamination free area. A minimum of three aerosol/vapor tests using the enzyme ticket and one test using the color banded tubes (mandatory checks in figure 4) should be made. These tests should be performed approximately 50 meters apart on the hot line to insure complete coverage of the contamination reduction area. The surface of the ground should be visually checked for obvious liquid agent contamination and should be sampled with the ABC M8 Detector Paper. The vapor tests (blue, yellow, green, and red band tube tests) need only be accomplished once, in the center of this area (see TM 3-6665-254-12 for use of the ABC M18A2 Detector Kit). If all tests are negative the team leader can have the team unmask in accordance with instructions contained in FM 21-40. If the contaminant is known, tests need be made only for that material. Periodic checks of the wind direction will be made at approximately 30-minute intervals to insure that the CP remains upwind of the site as long as a downwind hazard exists.

APPLICABLE TO DETECTION IN BOTH AREAS

Biological agents cannot be detected by current field detection procedures. The area can be assumed to be free of biological agent contamination unless intelligence information of physical evidence at the site indicates an enemy biological agent has been used. See FM 21-40 for further information on indications of an enemy biological attack. If biological agent contamination is suspected, a sample may be taken using the M34 CBR sampling kit and sent to a medical laboratory for identification.

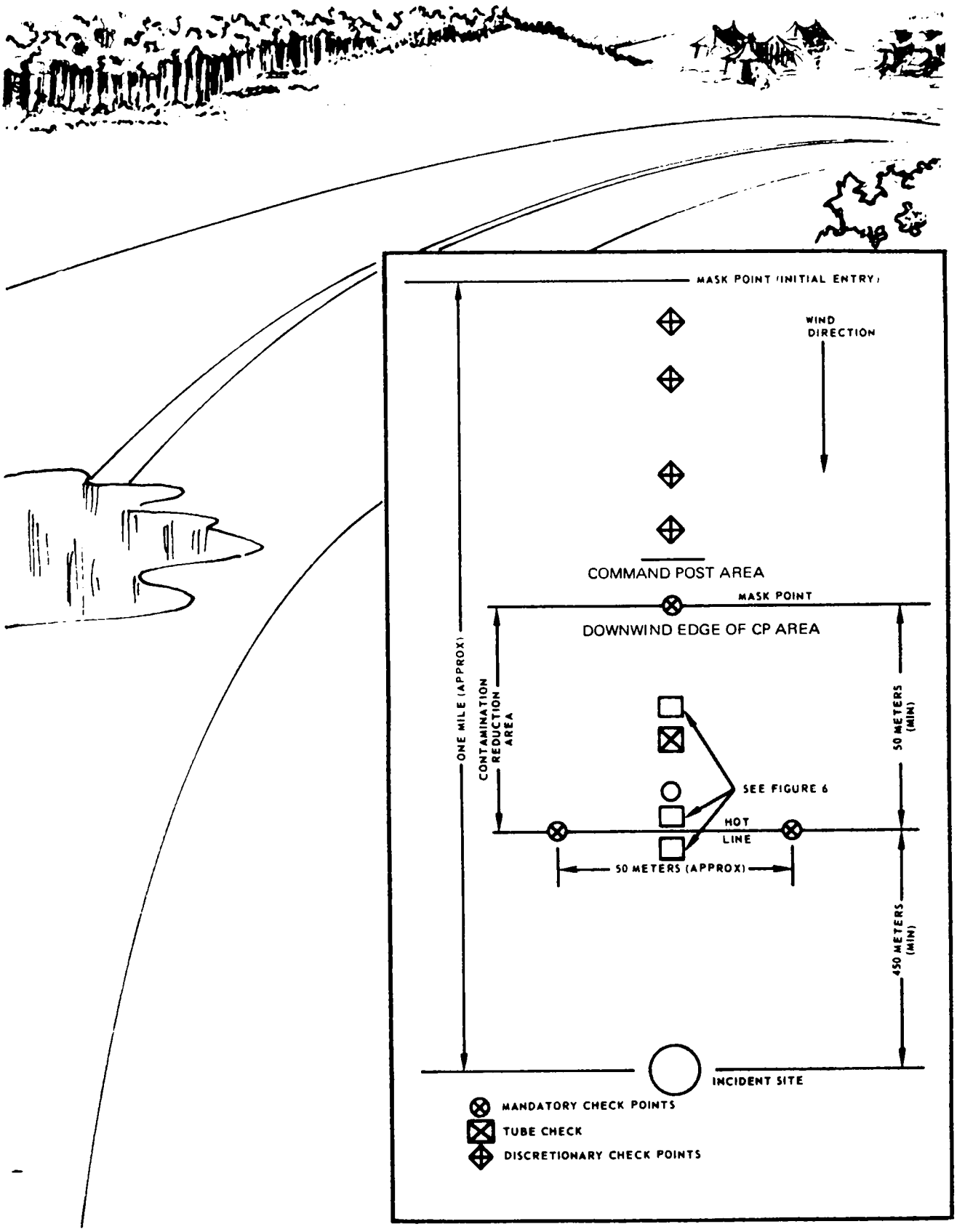


Figure 4. Organization for a Typical Chemical Incident

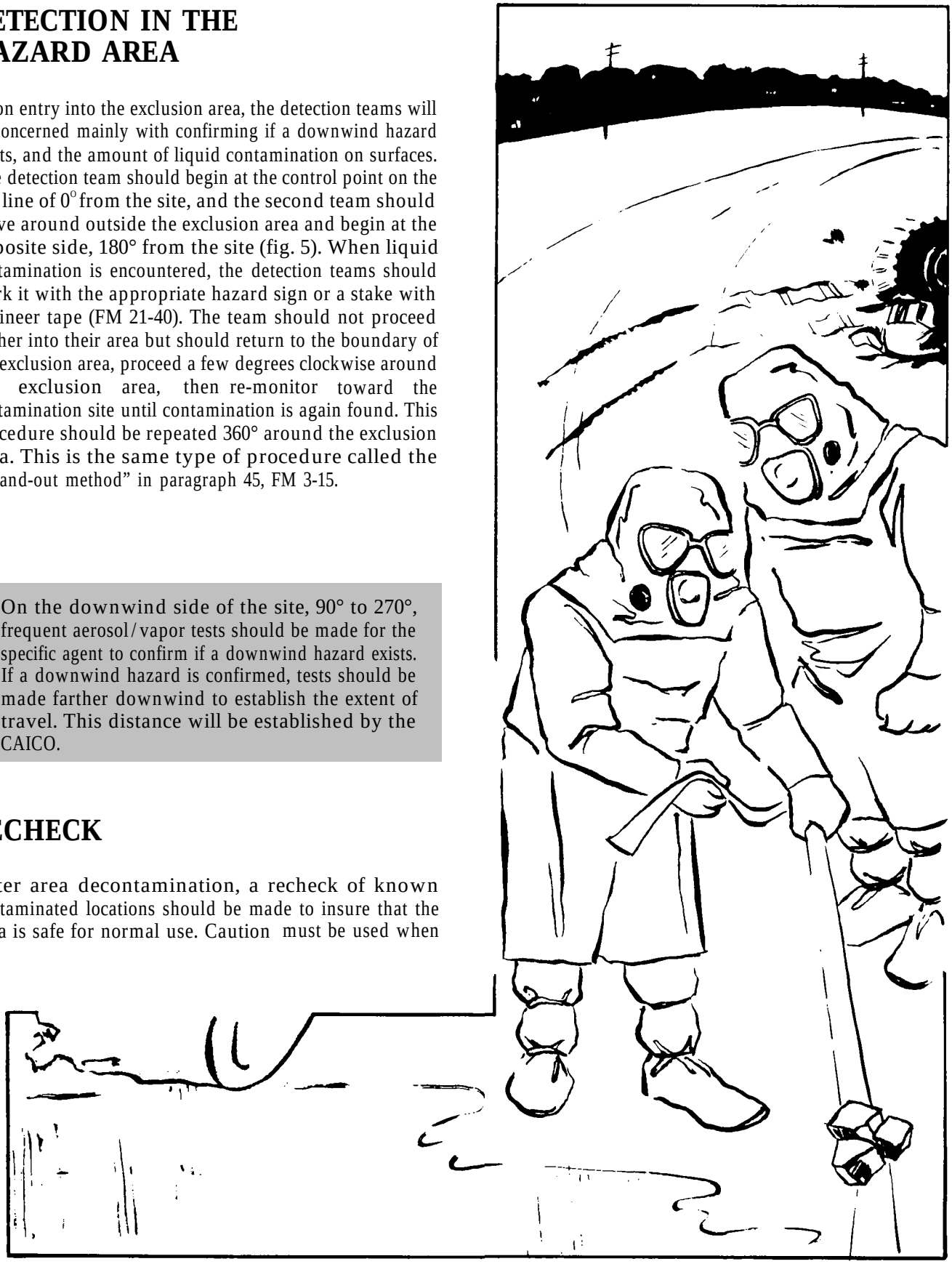
DETECTION IN THE HAZARD AREA

Upon entry into the exclusion area, the detection teams will be concerned mainly with confirming if a downwind hazard exists, and the amount of liquid contamination on surfaces. One detection team should begin at the control point on the hot line of 0° from the site, and the second team should move around outside the exclusion area and begin at the opposite side, 180° from the site (fig. 5). When liquid contamination is encountered, the detection teams should mark it with the appropriate hazard sign or a stake with engineer tape (FM 21-40). The team should not proceed farther into their area but should return to the boundary of the exclusion area, proceed a few degrees clockwise around the exclusion area, then re-monitor toward the contamination site until contamination is again found. This procedure should be repeated 360° around the exclusion area. This is the same type of procedure called the "in-and-out method" in paragraph 45, FM 3-15.

On the downwind side of the site, 90° to 270°, frequent aerosol/vapor tests should be made for the specific agent to confirm if a downwind hazard exists. If a downwind hazard is confirmed, tests should be made farther downwind to establish the extent of travel. This distance will be established by the CAICO.

RECHECK

After area decontamination, a recheck of known contaminated locations should be made to insure that the area is safe for normal use. Caution must be used when



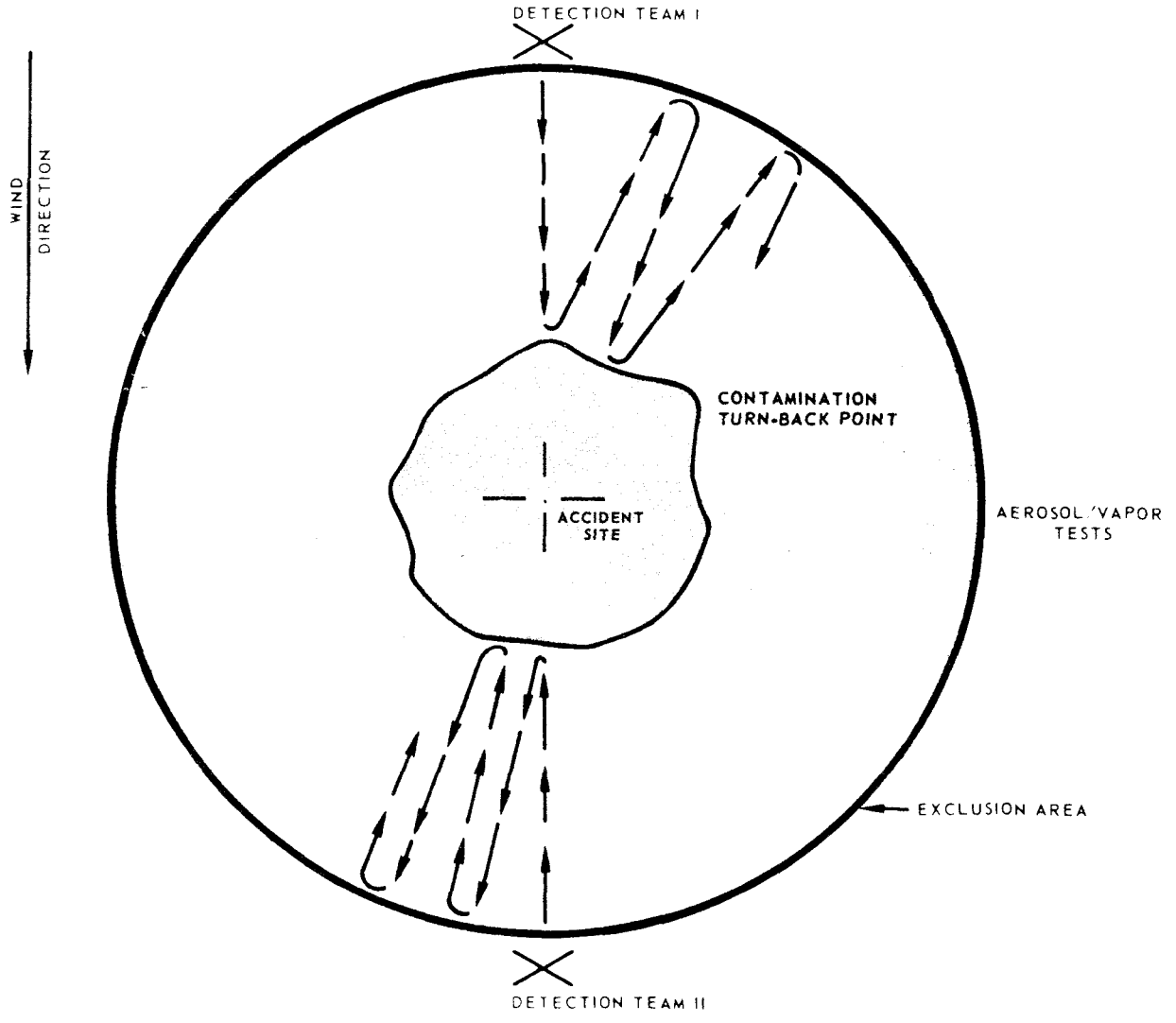


Figure 5. In-and-Out Method

ABC-M8 detector paper is used for rechecking as some decontaminants may cause a color to change; for example, DS2 turns M8 detector paper greenish-black.

UNKNOWN CHEMICAL MATERIAL

Normally, chemical material can be identified by either the technical escort personnel, the shipper, or the shipping documents. However, if the type chemical material is unknown and it cannot be identified with the chemical agent detector kit or by any other means available at the site, aerosol/vapor samples of the material should be taken with the white band tubes. Samples of the material should be sealed in test tubes or other suitable containers. The M34 CBR agent sampling kit may be used for this purpose.

Decontaminate an unknown chemical using a general purpose decontaminant such as supertropical bleach or DS2. Following decontamination, collect samples again to insure complete decontamination once the material has been identified.

The Commander/Director Chemical Systems Laboratory, Aberdeen P.G., MD 21010, should be contacted for instructions for the disposition of all unknown chemical samples. The Edgewood Arsenal operator at AUTOVON 584-2011 can relay incoming calls to the appropriate official.