

CONTAMINATION CONTROL

1. GENERAL. Contamination control reduces the spread of contamination; therefore, rigid, established operating procedures must be followed to achieve the objective of contamination control. Procedures consist of:

a. Initial monitoring on arrival to determine the preliminary site characterization and personnel contamination.

b. Anti-contamination procedures to reduce the spread of contamination.

c. Strict Contamination Control Line (CCL) procedures to control contamination spread during response, recovery, and/or remediation operations.

d. A contamination control capability must be available on-site beginning with the IRF initial reconnaissance through to RTF final recovery operations. It is imperative to personnel safety that a Contamination Control Station (CCS) is established and operating while personnel are in the contaminated area.

2. PERSONNEL MONITORING AND DECONTAMINATION. Personnel who were potentially exposed during the accident, later cloud passage, or post-accident entry into the contaminated area should be given a high priority in response actions. People to be considered include casualties, bystanders and sightseers, military and civilian response personnel, residents, business employees, and customers in the contaminated area. Early definition of the perimeter is important so that potentially contaminated people may be identified and measures taken to prevent the contamination of additional people. Initially, the military may have the only effective radiation detection instruments at the scene and may monitor potentially contaminated civilians. Responsibility for monitoring civilians shifts to DOE, State radiation control personnel, or civilian authorities and/or representatives as they arrive on-scene with appropriate instruments. Personnel are usually monitored at a CCS; however, during the initial response when the number of radiation detection instruments and monitoring personnel is limited, alternative procedures must be devised if large numbers of people are involved. Depending on resources and requirements, the DoD IC may decide to establish more than one CCS. If sufficient resources exist to support multiple stations, processing contaminated or potentially contaminated civilian residents through a station separate from that used for response force personnel may be desirable.

a. Monitoring and Decontaminating Potentially Exposed Medical Treatment Facilities. Immediately after an accident, injured personnel may be removed for medical treatment, or fatalities may be moved to a hospital or morgue without being monitored for contamination. The potential contamination of a medical treatment facility, morgue, or ambulance might present a health problem for the staff and other patients. Therefore, judgments must be made as to whether casualties have been removed from the contaminated area and, if so, what facilities are involved. Those facilities and the transportation resources used should be notified of the potential problem. Paragraph 4.a.(1)(l) of the Medical page describes procedures a medical facility may use to control the spread of contamination. Deployment of a radiological monitoring team to check the contamination of vehicles and facilities involved, and to assist in decontamination or other

measures, as appropriate, in order to prevent the spread of contamination should be given the highest priority.

b. The Contamination Control Station

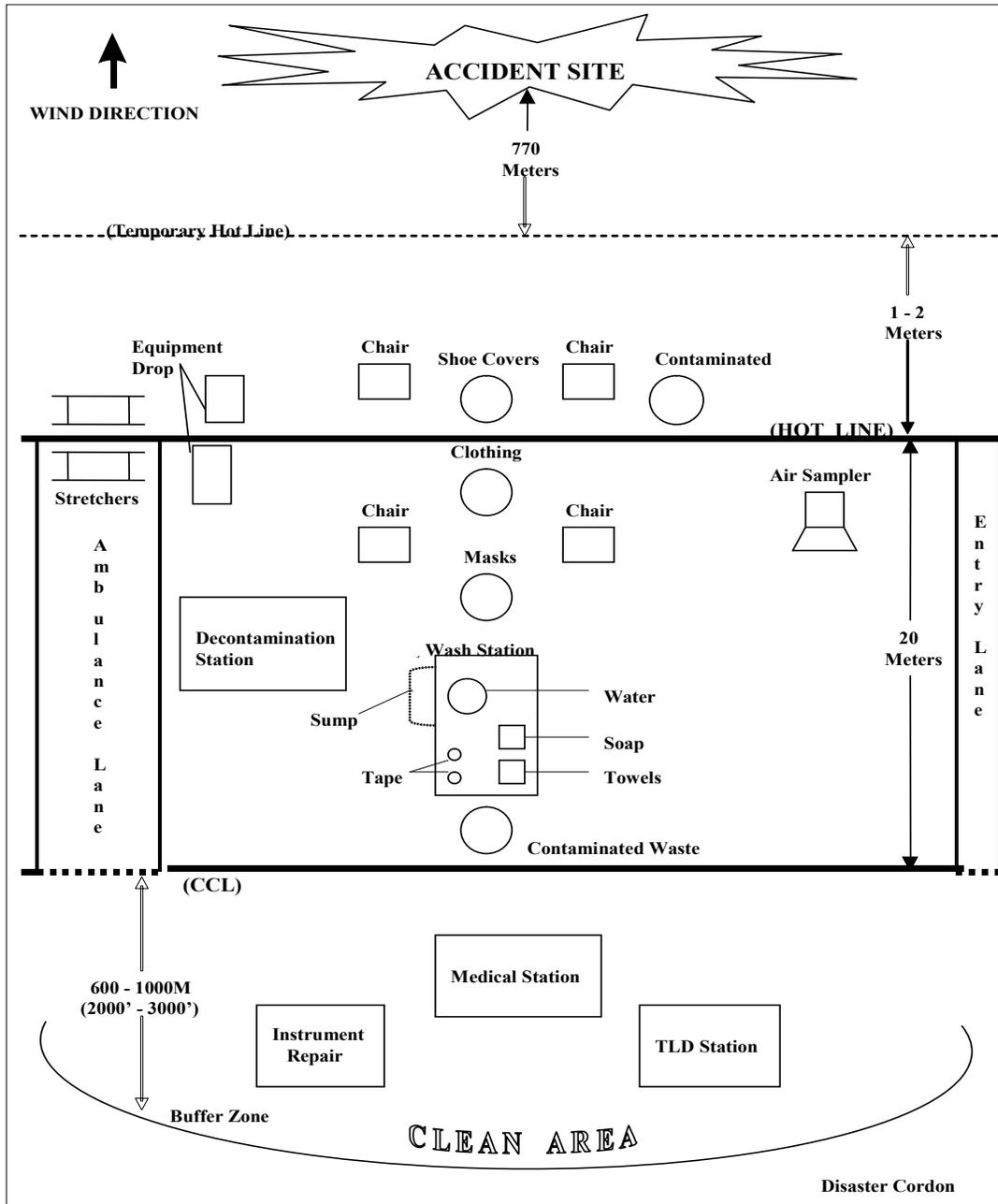
(1) The CCS is used to ensure radioactive contamination is not transferred from an area that is already contaminated to an area that is not contaminated through the orderly processing of personnel, equipment, and vehicles entering and leaving the contaminated area. The quantities of material, workforce requirements, and physical layout of the CCS discussed in this chapter are notional and are provided for information only. The actual amounts of material used and physical location of CCS elements shall depend on conditions on-scene at an actual accident.

(2) Persons present at the accident site or in known contaminated areas must be identified and screened to determine whether decontamination or other corrective action is required. Usually this action is done at a CCS. Casualties should be monitored and decontaminated to the extent injuries allow; however, urgent medical treatment has priority and exceptions may be necessary. Procedures for handling contaminated casualties are outlined on the Medical page. An example of a CCS is shown in Figure 1. When processing a large group of people, this type of station is capable of processing a person about every four minutes if no contamination is found. If equipment and monitors are available, additional lines should be established in the station to process large numbers of people. When processing people whose personal clothing is contaminated, the clothing should be bagged separately and a receipt issued for those articles kept. A priority system should be established to allow immediate processing of EOD personnel, monitoring team leaders, and others whose presence or information is needed to ease other response operations. The location of the CCS should be governed by the following constraints:

(a) It must be in an area free of contamination.

(b) Ideally, it should be directly upwind of the accident, but terrain or other considerations may dictate another location. If not upwind, it must be far enough away to prevent airborne or resuspended contamination from entering the CCS.

Figure 1. Personnel CCS (Example)



D31-Q

(c) Initially, it should be outside the fragmentation zone and beyond the perimeter of the contaminated area. After all explosives have been rendered safe, the CCS may be moved closer to the accident site, if appropriate.

(d) It should be in an area relatively free of weeds, bushes, and rocks. A paved or flat compacted surface is recommended. Select an area away from drainage ditches, sewers, or similar features that might collect contamination from the CCS and distribute it throughout a wide area. If the CCS must be established near these areas, dam or dyke the entry or downstream area to prevent uncontrolled runoff or contamination spread.

c. Materials and Workforce.

(1) Where possible, video the CCS processing to help identify personnel who process through the CCS, support post-accident assessment, and for inclusion in the permanent event record. Video is particularly useful when large numbers of people are processed through the CCS by the first responders. If video capability is not available, use still photography to record CCS events.

(2) The materials listed in Table 1. are necessary to establish a CCS. Some items are expendable and need replacement over time. Suitable items may be substituted, as necessary. Frequency and volume of personnel and equipment processing should determine if additional items are needed. Use of National Stock Numbers (NSNs) when ordering shall speed the process. Add additional equipment and supplies, such as cold weather or rain gear, to enable operations under the expected local environmental conditions.

Table 1. CCS Materials List

Equipment	Quantity
Alpha particle monitoring equipment	4
Lighting for night operations	as needed
Low-level beta and/or gamma monitoring instrument	4
Dosimeters	as needed
2-inch or wider masking tape	3 rolls
NBC marking kit or substitute	1
Stools or chairs	4
55-gallon drums or equivalent for storing contaminated items	4
Plastic bags; sized to fit the barrels and/or drums used	20
Brushes	4
Whisk brooms	4
Shovels	4
Traffic cones, ropes, and stakes	as needed
Protective masks (SCBA, if available)	as needed
Personal Protective suits	as needed
Cotton gloves	as needed
Booties or foot covers	as needed
Water container; 5 gallons or larger	1

Table 1. CCS Materials List, continued

Paper towels or substitute	as required
Liquid soap; 1 gallon or more	1
Tables	5
Craft paper, butcher paper, or substitute	1 roll
Rain suits, ponchos, or substitute	as needed
Surgical masks	1 box
Organic solvents; 1 gallon or more	1
Large tent (20 or 40 men) or trailer with popup sun covers	as needed
Portable generator (as needed)	1
Portable heaters, air-conditioners, fans	as needed
Blankets	as needed
Litters	4
Non-slip plastic sheeting	1 roll
Bar Soap (Dozen) and/or Shampoo	as needed
Towels	as needed
Cotton Swabs	as needed
Bioassay Containers	as needed
Hair Brushes	as needed

(3) Each shift of the CCS must have the personnel listed in Table 2. All should be dressed in personal protective suits and masks. Volume and frequency of equipment and personnel processing shall determine if more are needed.

Table 2. CCS Personnel

Position	Function
One medical doctor	Monitor general health and treat personnel injuries.
One health physicist/bioenvironmental engineer	Monitor personnel, area, and facilities for contamination; estimates exposure and assesses effectiveness of decontamination and other contamination control measures.
One CCS supervisor	Monitor supply levels and control flow through the CCS.
One security guard	Monitor for unauthorized or unprocessed access and/or egress.
Eight assistants	Accomplish activities as directed by the CCS supervisor.
One RADIAC repair person	Repair any RADIAC equipment from the CCS.
One TLD and/or dosimeter monitor	Issue dosimetry, log out and log in personnel that go to and from site.

d. Procedures for Personnel Entering the Contaminated Area.

- (1) Don procedures:
 - (a) Don personal protective suits or coveralls.
 - (b) Using masking tape, write the individual's name and team name or function on the front and back of each suit.
 - (c) Put on shoe covers.
 - (d) Using masking tape, tape the bottom of the suit legs over the top of the shoe covers.
 - (e) Don and adjust mask; then remove.
 - (f) Ensure that all equipment has been functionally checked before donning gloves.
 - (g) Don gloves.
 - (h) Using masking tape, tape the end of sleeves over the gloves.
 - (i) Put on mask.
 - (j) Don hood and tape the bottom of the hood to the coveralls. For masks without an integral hood, tape the opening of the protective garment hood to the edge of the mask.

e. CCS Processing. If an accident occurs near a populated area and several hundred people are potentially contaminated, available radiation detection instruments and monitoring personnel may be inadequate to process the people fully and quickly. The assumption is that the potentially contaminated people are not response personnel. If only a few radiation detection instruments are available, use of an abbreviated monitoring procedure may be considered to speed processing. The hands, seat, and shoes or lower legs may be contaminated by handling contaminated objects or moving and sitting in contaminated areas. Contamination of the upper chest or neck and head area is indicative of exposure to airborne contamination. Contamination around the nose or mouth is an indicator of potential internal contamination. Nasal swipes should be used to follow up on individuals with positive indications of contamination around the nose and mouth. In order for a nasal swab to provide meaningful data, the sample must be collected within one hour of the termination of exposure. There is no such thing as a pre-exposure or baseline nasal swab. If radiation detection instruments are unavailable to monitor the people involved, procedures to decontaminate all people coming from the contaminated area should be used immediately. Provisions should be made to monitor them later when instruments are available. Such a procedure should require provisions to: collect and distribute receipts for clothing, shower and shampoo the people, and issue replacement clothing. Each article of clothing should be bagged separately, if possible, and all clothing placed in a single large bag for which a receipt is issued. Watches, jewelry, and the contents of pockets and pocketbooks should not be highly contaminated, if at all, and should be kept by the individual. If those items are highly contaminated they should be inventoried, bagged, and an itemized receipt issued. Although the contamination may be kept with the clothing, an overriding need exists to assure the people they

are being cared for; therefore, a gym or other facility with dressing rooms and high capacity showers may be appropriate for processing people. Soap, shampoo, towels, and stocks of replacement clothing must be obtained. People processed in this manner, and their collected clothing, should be monitored as soon as possible. Uncontaminated clothing should be returned at the earliest possible time.

3. VEHICLE MONITORING

Vehicles used by the response force in the contaminated area shall stay there for future use and not require immediate monitoring or decontamination. After the initial response, focus decontamination efforts on fire trucks and ambulances to reduce the possibility of contamination spread if these vehicles must respond to other incidents outside of the contaminated area. If members of the public in the contaminated area are sent, or go, to the CCS or other processing points using their own vehicles, the vehicle should be monitored before being moved away from the area. All outer surfaces and the air filter may have been contaminated by airborne contamination, while wheel wells, tires, and the rear end may be contaminated from driving across contaminated areas. Unless the windows were down, or ventilators open, detectable contamination of the interior is most likely on those surfaces in contact with the vehicle occupants, for example, floorboards and seats. If only external surfaces of a vehicle are contaminated, decontamination should be relatively easy to perform, if done before bonding between the contaminant and the vehicle paint occurs. Also, rapid decontamination and return of private vehicles may reassure the public that their interests and property are being considered. Monitoring and decontaminating vehicles is time consuming and may not yield a “clean” vehicle. Recommend individuals drive to multiple collection sites, park, and transfer to commuter buses for transport to CCS areas. The vehicles may be monitored, time permitting, without spreading contamination.

Figure 2. Vehicle CCS (Example)

