

Appendix E

NBC Operations

Section 1. General
Section 2. React to a Nuclear Attack
Section 3. React to a Chemical/Biological Attack
Section 4. Decontamination
Section 5. Unmasking Procedures

Section 1. General.

Planning is critical to the success of any operation; therefore, all staff sections must make NBC an integral part of their operational planning process. One major factor that must be considered is the effects on individuals and operations once the unit enters a MOPP posture. The operational tempo will slow, Marines will require more rest and hydration to recover from physical exertion, and the possibility of heat casualties will increase. Proper planning will include all of the following:

Threat Analysis. A threat analysis focuses on the enemy's capabilities and willingness to use NBC weapons and includes the following:

- History of NBC weapons use.
- Availability of NBC weapons and support equipment.
- Production and stockpile of NBC weapons.
- Delivery systems.
- Doctrine and training.

Vulnerability Analysis. A vulnerability analysis focuses on U.S. forces and our weaknesses and includes the following:

- Effects of weapons on personnel and equipment.
- Type and size of weapons within range.
- Detection/warning systems available.
- Unit protection available.
- Personnel training levels.
- Unit location in relationship to the battlefield.
- Weather, climate, terrain.
- Medical supplies and services available.

MOPP Analysis. A MOPP analysis focuses on the effects of placing the unit into mission oriented protective posture and includes the following:

- The mission.
- Likelihood of a follow-on mission.
- Commander's acceptable degree of risk/percent of casualties.
- Likelihood and types of agents to be employed.
- Additional protection afforded/required.
- Expected warning time.
- Mental demands of work.
- Physical demands of work.
- Duration of mission.

Decontamination Site. The battalion scout platoon can be tasked to locate a decontamination site. The following are characteristics of a good decontamination site:

- Easy to find.
- Located on or along a hard stance road network.
- Access to a potable water source.
- Removed from the main battle area.
- Good cover and concealment.
- Access to a clean route out for decontaminated units.

Section 2. React to a Nuclear Attack

When a tank crew observes a brilliant flash of light and a mushroom-shaped cloud, crewmen must act quickly to minimize the effects of a nuclear detonation. This drill involves four steps:

Step 1. Take immediate protective actions, including the following:

- If mounted, button up and close the breech and ballistic doors. If time permits, position the vehicle behind a protective terrain feature and turn off the master power until the effects of the blast have passed.
- Dismounted crewmen drop to the ground and cover exposed skin until blast effects have passed.

Step 2. Implement SOPs and accomplish related actions in the following areas:

- Reestablish communications.
- Prepare and forward an NBC-1 report.
- Implement continuous monitoring.
- Submit a SITREP to the commander.

Step 3. Reorganize the platoon:

- Evacuate casualties and fatalities.
- Redistribute personnel as needed.
- Conduct essential maintenance.

Step 4. Continue the mission.

Section 3. React to a Chemical/Biological Attack

The tank crew initiates this drill during an operation whenever an automatic masking event occurs, the chemical agent alarm sounds, M8 detection paper indicates the presence of chemical agents, or a Marine suspects the presence of chemical or biological agents. This drill involves four steps:

Step 1. Crewmen recognize and react to the hazard:

- Put on protective mask (and hood) within 15 seconds.
- Alert remainder of the platoon and company.
- Within 8 minutes, assume MOPP 4, then button up and/or activate the tank overpressurization system.

Step 2. Implement SOPs in these areas:

- Administer self-aid and buddy-aid to platoon members with symptoms of chemical/biological agent poisoning.
- Ensure individuals decontaminate their skin.
- Conduct operator's spray-down and decontamination of equipment as necessary.
- Initiate continuous monitoring with M256 detection kits; submit NBC-1 and follow-up reports as needed.

Step 3. Continue the mission.

Step 4. Monitor for chemical/biological agents; as the situation warrants, initiate actions to reduce MOPP levels and discontinue agent monitoring.

NOTE: If the M256 detection kit records a negative reading inside an overpressurized M1A1 tank, the crew can initiate unmasking procedures.

Section 4. Decontamination

Successful avoidance and protection may prevent the need for decontamination, however, due to the large area of coverage of NBC weapons, the unit must be prepared to conduct decontamination operations. The primary purpose of decontamination is to restore the unit's combat power and reduce the number of casualties caused by NBC weapons. When planning decontamination operations, the following considerations should be taken into account:

- *Decontamination Principles.* The decontamination principles will be the controlling factors when planning and conducting decontamination operations.
- *Decontamination as soon as possible.* This will limit the effects of NBC agents by reducing exposure time and concentration on personnel and equipment.
- *Decontamination as far forward as possible.* This will limit the spread of contamination, thus reducing the possibility of contaminating units and personnel that have not been affected previously.
- *Decontamination only what is necessary.* Decontaminate only those items, or areas of equipment, that is considered essential for mission accomplishment. Do not attempt to decontaminate personal items or equipment that is not normally used.
- *Decontamination by priority.* Set priorities for decontamination according to the units' mission and the threat.

Detailed Equipment Decontamination

Battalion and Company Decontamination teams are responsible for the setup, operation (See note below), and closure of the DED portion of the thorough decontamination operation. The DED for chemical and biological contamination is comprised of five stations. For radiological contamination, the DED uses all but station 2, DS Application. Actions at each of the stations are described below.

NOTE: The crew of a contaminated M1A1 should remain buttoned up, inside the vehicle until the tank has completed every station of a Detailed Equipment Decontamination site.

Station 1, Initial Wash.

The objective of this station is to remove the gross contamination and dirt from the vehicle. The vehicle is sprayed for two to three minutes with hot, soapy water. The vehicle is then scrubbed to help remove caked-on dirt. The mechanical action of scrubbing also helps remove thickened chemical agents. Although the undersurfaces are difficult to reach, try to remove as much dirt as possible. After scrubbing the vehicle, spray again for two to three minutes to remove loosened dirt and contamination. This station will use approximately 250 gallons of water per vehicle. Vehicles with large quantities of dirt will use more water. The runoff from this station is contaminated and must be treated as hazardous. This station requires high water pressure systems (M12A1 PDDA, M17 LDS) rather than high water volume systems (65-gpm pumps). The effectiveness of the wash depends upon on the type of wash (hot soapy water, hot water, cold water, and steam).

b. Station 2, DS2 Application.

The objective of this station is to apply decontaminant to the entire vehicle. The vehicle is divided in four parts and a member of the scrubbing team is assigned that part of the vehicle. This limits the workload of each member of the scrubbing team and avoids duplication of work. DS2 is applied starting at the top of the vehicle and working towards the undercarriage. Every effort is made to apply DS2 to the undercarriage, especially if the vehicle has crossed a contaminated area. The mop is the least tiring method of applying DS2. Using a mop to apply DS2 creates a large amount of spillage. However, continual use of the M13 DAP requires the scrub team to exert more energy than using the mop. The M13 DAP can be used to apply DS2 in hard-to-reach areas.

Prior to the start of the decontamination operation, the scrub team pours 5-gallon cans of DS2 into 30-gallon trashcans if mops are going to be used instead of M13 DAPs. Each member of the scrub team will wear TAP aprons or wet weather gear to protect them from the DS2. Water adversely affects DS2's ability to react with chemical agents.

There must be sufficient DS2 on the item being decontaminated for complete neutralization to occur. The DS2-to-agent ratio needs to be 55 to 1 for H agents and 25 to

1 for G agents. For a vehicle the size of an M1A1 tank, this corresponds to 15 and 7 gallons, respectively.

The battalion decontamination crew should maintain a basic load of liquid all-purpose detergent, sufficient to decontaminate 30 percent of the battalion's organic vehicles.

DS2 should be applied with scrubbing. Scrubbing increases the mixing of the agent with DS2, especially when thickened chemical agents are present.

c. Station 3, Wait/Interior Decontamination.

The objective of this station is to allow the DS2 to completely neutralize the chemical agent and to decontaminate the interior of the vehicle. Vehicles are moved to concealed position. Vehicles will remain in station 3 for no less than 30 minutes. While the vehicle is held in this station for the DS2 to completely react, it can be attempted to get the crew M8 paper and decontamination gear to begin decontamination of the interior, if required.

NOTE: Because of the M1A1's overpressurization system, the interior will most likely not be contaminated and the crew should remain in the vehicle until the entire Detailed Equipment Decontamination process is complete.

The best decontamination solution for use in the interior of vehicles is a 5 percent solution of HTH or STB. The driver wipes all reasonably accessible surfaces with a rag or sponge soaked in the HTH solution. Do not attempt to decontaminate areas where there is little likelihood of contamination (electrical assemblies, beneath the turret floor, and so forth).

Once interior decontamination is completed and 30 minutes has passed, the driver moves the vehicle to the next station. Drivers must exercise caution when entering or exiting the vehicle.

For radiological contamination, use an AN/PDR27-series or AN/VDR2 radiac meter to determine the extent and location of contamination inside the vehicle. If there is contamination, determine the intensity of the contamination inside of the vehicle. If the contamination has an intensity greater than 0.33cGy (the negligible risk), the interior of vehicle must be decontaminated. Use hot, soapy water to wash the contaminated areas. Use a sponge to mop up the water and the contamination.

d. Station 4, Rinse.

The objective of this station is to remove the DS2 from the vehicle. The vehicle is sprayed with water from top to bottom. Take care to rinse the undercarriage. This station uses approximately 200 gallons of water. Failure to remove all DS2 from the vehicle may cause false positive readings at station 5. If high water pressure systems (M12A1 PDDA, M17 LDS) are not available, large volume water pumps (65-gpm pumps) should be used at this station.

e. Station 5, Check.

The objective of this station is to check the completeness of the decontamination. This station determines whether the vehicle has a negligible risk or still has significant contamination remaining. Detection procedures will vary depending on the type of contamination. If significant contamination is found on the vehicle, the vehicle will be recycled to station 2 for chemical contamination or station 1 for radiological contamination.

Hasty Equipment Decontamination.

a. Step 1. Interior Decontamination.

The crew should attempt to hastily decontaminate the interior of the tank with M291 and M258A1 personal decontamination wipes, if required and if time permits.

b. Step 2. Exterior Decontamination.

The crew of a decontaminated M1A1 should remain buttoned up in their vehicle until their tank has been thoroughly cleaned at a Detailed Equipment Decontamination site. However, if the crew should need to exit the vehicle or use equipment located on the exterior of the vehicle, the following procedures should be followed:

- While in MOPP-4, carefully open the loader's hatch, attempting to not allow chemical agents to leak into the interior of the tank.
- Using either the M11 or M13, DS2 decontamination apparatus decontaminate the hatch and immediate area around the opening.
- Use either the M11 or M13 decontamination apparatus to create paths from the loader's hatch to areas that need to be reached. Also a path should be made for the crew to be able to dismount the tank.
- Ensure that all weapons, hand holds and any exposed part of the vehicle that will need to be touched is decontaminated. However, conserve your supply of DS2, as you may need to execute the process again until your vehicle can be thoroughly cleaned at a Detailed Equipment Decontamination site.

M1A1 tanks are authorized an on-board decontamination apparatus. The operator's spraydown technique uses the M11 or M13 decontamination apparatus. The M11 is filled with 1-1/3 quarts of DS2 before use. DS2 comes in 1-1/3 quart cans (two authorized per M11 according to CTA 50-970) and in 5 gallon pails (two authorized per company-size element according to CTA 50-970).

Section 5. Unmasking Procedures.

Once the unit goes into MOPP level IV, unmasking will not be conducted unless approved by the Battalion commander. Once approved, the below listed procedures will be followed:

Selective Unmasking with a Chemical Detector

- Complete at least two (2) separate detection samples taken at different locations within unit position. All results must be negative.
- The senior man present selects two/three Marines of different size/weight/ethnic background and checks their physical condition.
- Disarm the Marines and place them in a shaded area. Ensure there is a corpsman present if available.
- Have the Marines remove their mask for five (5) minutes. Keep a close and constant watch for chemical agent symptoms while Marines are unmasked.
- After five minutes, have the Marines don and clear their mask. Monitor them for ten (10) minutes.
- After ten minutes, if no symptoms appear, begin selective unmasking within the unit.
- If at any time symptoms appear, stop the unmasking process and treat as appropriate.

Selective Unmasking Without a Chemical Detector

- The senior man present will select two/three Marines of different size/weight/ethnic background.
- Disarm Marines and place them in a shaded area. Ensure a corpsman is present if available.
- Have the Marines break the seal of their mask for 15 seconds, keeping their eyes open and holding their breath.
- After 15 seconds, have the Marine don and clear their mask. Monitor these Marines for ten (10) minutes. If no symptoms appear, continue. If symptoms appear, stop selective unmasking.
- Have the Marines break the seal of their mask once again and take four or five normal breaths.
- After taking four or five breaths, they will don and clear their mask. Monitor these Marines for ten (10) minutes. If no symptoms appear, continue. If symptoms appear, stop selective unmasking.
- Have the Marines remove their mask for five (5) minutes.
- After five (5) minutes they will don and clear their mask. Monitor these Marines for ten (10) minutes. If no symptoms appear, continue. If symptoms appear, stop selective unmasking.
- Begin selective unmasking within the unit.