

TEXAS
EMERGENCY MANAGEMENT
PROCEDURES

PROCEDURE 6

AREA DECONTAMINATION METHODS

Radiological Emergency Procedures of the Radiation Control Program
Texas Department of State Health Services

PROCEDURE 6
AREA DECONTAMINATION METHODS

APPROVAL AND IMPLEMENTATION

This procedure is hereby approved for implementation and supersedes all previous editions.

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Date

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AREA DECONTAMINATION METHODS

I. Purpose

This procedure provides suggested methods for area decontamination.

II. Discussion

Any decontamination effort must be adapted to the specific conditions of each individual situation, but certain guides and techniques are usually applicable to any situation.

The goal of any decontamination effort is to reduce contamination to some acceptable level while keeping contamination spread, personnel exposure and waste volumes to a minimum.

III. References

- A. Procedure 3; Area Survey and Decontamination
- B. Radiological Health Handbook, U.S. Department of Health, Education, and Welfare, Revised 1970.

IV. Equipment Required

- A. Cleaning materials; such as rags, oil impregnated cloths (Masslin), brushes, mops, etc.
- B. Detergent
- C. Absolute filtered wet/dry vacuum cleaner
- D. High pressure water spray system
- E. Industrial floor scrubber

V. Precautions and Limitations

The compatibility of any detergents or chemicals with the waste disposal system must be checked prior to disposal in that system.

VI. Prerequisites

A contamination survey has been performed on the area being decontaminated using the techniques in Procedure 3 to identify contaminated locations and associated contamination levels.

VII. Procedure

A. General Recommendations

1. The selection of a decontamination method should be made after evaluating which of the available method(s) will be the simplest while still being effective in getting the job done and keeping contamination spread, personnel exposure, and waste volumes to a minimum. (See Attachment 1) Such factors such as type of surface, ambient exposure rates, contamination levels, and whether contamination is loose or fixed must be considered.
2. Decontamination of surfaces with varying contamination levels should begin in areas with lower levels and proceed toward areas with higher levels. An exception to this is when the higher contaminated areas are small and spotty, for which a more effective method might be decontamination of the spotty areas first and then the entire area.
3. Contamination surveys made in accordance with Procedure 3 are used to evaluate the effectiveness of the method being used and to determine when the acceptable contamination levels have been reached.
4. Greasy or oily items should first be degreased using a solvent, such as Stoddard's solvent, to make further decontamination more effective and to extend the life of cleaning solutions.

B. Dry Methods

1. An attempt should be made to pick up and contain dry, loose contamination when possible. A method for large areas would be to use an absolute filtered vacuum cleaner; for small areas, tape.
2. Tack cloths or oil-impregnated cloths (Masslin), either fixed to brooms or hand held, can be used to remove dry, loose contamination from relatively smooth surfaces.

C. Wet Methods

1. Solutions

- a. Cleaning solutions should normally consist of just water or water and a detergent. If common household type detergents are being used, about one ounce of detergent should be used per gallon of water. Other detergents should be used in accordance with manufacturer's recommendations.
- b. Solutions should be evaluated periodically to determine their ability to reduce contamination levels. A solution should be replaced when the radioactivity concentration creates a radiological hazard and/or when it becomes ineffective for its intended purpose.
- c. Chemical solutions should not be used unless other methods prove ineffective and only after being approved (usually on a case-by-case basis) by Radiation Control Program (RCP) supervision.

2. Wiping and Scrubbing

- a. Damp rags may be effective on fairly smooth surfaces and should be used, if possible, to reduce liquid waste volumes. Rags used to wipe items with low contamination levels can be used to gross decontamination of items with higher contamination levels.
- b. If mops are being used, separate buckets should be used for wringing mops rather than wringing them back in the cleaning solution. This will keep the cleaning solution relatively uncontaminated. For extremely high contamination levels, the initial pass should be made with a mop used only for gross decontamination. This will increase the effectiveness of subsequent passes with cleaner mops.
- c. If rags are being used in a solution, a rag should be dampened only once to prevent contaminating the solution. The surface being decontaminated should be wiped in one direction only (rather than back and forth) from lower toward higher levels of contamination. After the first clean surface of a rag has been used, the rag should be folded to a new unused surface, used, refolded, used, etc. until the rag has been completely used.
- d. Large, open floor areas may be cleaned using industrial type floor scrubbing machines that apply a cleaning solution to the floor, scrub the floor with brushes, and then vacuum up the solution.

- e. Stiff bristle brushes dipped in a cleaning solution may be effective for decontaminating porous surfaces or areas of stubborn contamination. The area will usually require rinsing with water.
- f. Porous surfaces and areas of stubborn contamination may be decontaminated with a high-pressure spray system if there are radioactive waste system drains in the area to handle the run-off.

3. Drying

After decontamination and prior to surveying, surfaces should be wiped dry or permitted to air dry.

D. Abrasive Methods

For stubborn contamination or porous surfaces such as concrete or cast iron, an abrasive method such as chipping or sandblasting may be effective for removing contamination.

AREA DECONTAMINATION METHODS

METHODS	ADVANTAGES	DISADVANTAGES
Absolute filtered vacuum cleaner	Minimizes contamination spread; minimizes airborne; almost no waste; large areas can be cleaned rapidly.	Contamination must be dry and loose; cleaner may need frequent emptying because of increasing exposure rates as waste accumulates.
Tape	Minimizes contamination spread; minimizes airborne; almost no waste.	Contamination must be dry and loose; good for very small areas only; surface must be smooth.
Tack or oil impregnated cloths	Minimizes contamination spread; minimizes airborne; large areas can be cleaned rapidly (when affixed to brooms).	Contamination must be dry and loose; cloths may need to be replaced frequently; surface must be smooth; a large volume of solid waste may be generated
Damp mops	Minimizes contamination spread; minimizes airborne, large areas can be cleaned fairly rapidly; floor surfaces with interferences can be cleaned.	Contamination must be loose; mop heads may need frequent changing; surface must be smooth; liquid and solid waste are generated.
Damp rags	Minimizes contamination spread; minimizes airborne.	Contamination must be loose; rags may have to be replaced frequently; surface must be smooth; liquid waste and a large volume of solid waste may be generated; a slow method.
Scrubbing, Rinsing, Drying	Minimizes airborne, can be used on porous surfaces; will remove lightly adhering fixed contamination; complex surfaces can be cleaned.	Large volumes of liquid waste may be generated; a slow method; there may be some spread of contamination from rinse.
Floor scrubbing machines	Almost no waste; can be used on porous surfaces; large areas can be done fairly rapidly by just one person; will remove lightly adhering fixed contamination.	May be some contamination spread; there may be some airborne; brushes may need frequent changing; the machine may need frequent maintenance.
High pressure spray system	Can be used on porous surfaces; large areas can be done fairly rapidly; will remove tightly adhering fixed contamination.	May cause contamination spread; may cause airborne; large volumes of liquid waste are generated; may be used only in areas with radioactive waste drains.
Chemicals	Cleans oily, greasy surfaces; effective for tightly adhering fixed contamination not removable by other non-abrasive methods.	Chemical may be hazardous; waste liquid may require solidification; airborne may be caused by the evaporation of chemicals such as alcohol and acetone.
Abrasive methods	Removes contamination not removable by other methods.	High airborne levels may be generated; may cause contamination of adjacent areas; causes large volumes of solid waste (depending on size of area to be cleaned).