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In the Matter of
Philadelphia Electric Company
(Limerick Generating Station, Units 1 and 2)
Docket Nos. 50-352 and 50-353

Dear Board Members:

In accordance with our professional obligations as counsel to keep the Board and parties informed of recent developments, we are enclosing a recently generated draft of the basic procedures, a list of medical supplies and equipment, and a training outline for the handling and treatment of radioactively contaminated and injured patients who would be admitted by Montgomery Hospital.

This potentially relates to the denied contention appealed by the Graterford inmates as to utilization of Montgomery Hospital for the treatment of any contaminated and injured inmates.

Sincerely,

Troy B. Conner, Jr.
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Counsel for Philadelphia
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cc: Service List w/o enclosures
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Procedure No. M1-18
Revision 0, (December, 1985)

DECONTAMINATION AND TREATMENT
OF
THE RADIOACTIVELY CONTAMINATED PATIENT
AT
MONTGOMERY HOSPITAL

Approved by _____
Roger E. Linnemann, M.D.
President, RMC Medical Services Division

_____ Uncontrolled

_____ Controlled

DECONTAMINATION AND TREATMENT
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MONTGOMERY HOSPITAL

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REVISIONS PAGE

MONTGOMERY HOSPITAL

<u>Rev. No.</u>	<u>Date</u>
0	12/85

DECONTAMINATION & TREATMENT OF THE
RADIOACTIVELY CONTAMINATED PATIENT AT
MONTGOMERY HOSPITAL

A. PURPOSE AND SUMMARY

1. By agreement between Philadelphia Electric Company and Montgomery Hospital, personnel at Limerick Generating Station sustaining injuries from ionizing radiation or injuries complicated by radiation exposure or radioactive contamination will be provided care and treatment at Montgomery Hospital. Montgomery Hospital is a secondary support hospital facility for Pottstown Memorial Medical Center.
2. Most of these injury cases will present no hazard to hospital personnel and will be admitted and provided care and treatment in accordance with our standard operating procedures. However, in the event that an accident victim is radioactively contaminated, he will be admitted, decontaminated and treated in accordance with these procedures.
3. The purpose of these procedures is to assure the protection of the hospital staff, other patients and visitors during admission and treatment of the radioactively contaminated patient. The hospital's protection program starts at Limerick Generating Station with an alert or warning telephone call to the hospital with information that there has been a radiation accident, and one or more injured and contaminated persons may require treatment. On receipt of such a call, the staff will prepare to admit the patient(s) through the Radiation Emergency Area (REA) that has been established in Trauma Room 1 of the Emergency Department. The REA will be set up in accordance with the directions given in Section E, "Procedure".
4. Hospital personnel will utilize protective clothing and personnel radiation dosimeters in accordance with directions contained in Attachment D, "Procedure for the Use of Protective Clothing and Dosimeters". Decontamination of the patient(s) as may be required, and the collection of contamination samples will follow the directions given in Attachment E.

B. GENERAL INFORMATION

There are three major types of radiation exposure which may cause injury:

1. penetrating radiation exposure from a source external to the body (gamma rays, neutrons);
2. internal exposure to radionuclides by ingestion, inhalation, absorption, or through a skin break;
3. skin and superficial tissue exposure by contamination of the surface of the body with radioactive materials, including subcutaneous radioactive foreign objects.

A patient who has been excessively exposed to external radiation will not present a hazard to attending personnel. Radiation that has injured a patient will no more harm the attendant than heat that has injured a burn patient will harm the attendant.

A patient who has received an overdose of radionuclides by ingestion or inhalation is no more of a hazard than the patient who has been given diagnostic radioisotopes in a hospital nuclear medicine department.

Equally without hazard to others is the patient who has received an overdose of radionuclides by ingestion or inhalation. Internal contamination alone is no more hazardous than diagnostic radioisotopes administered to a patient in the hospital clinic. However, if internal contamination is present, external contamination may also be present.

An individual whose clothing, skin and/or wounds are contaminated with radioactive material may present a radiation hazard to attending personnel in the absence of adequate procedures to prevent the spread of the contaminant or control of the radiation exposure from the contamination.

Since radiation injuries are not immediately life-threatening, primary attention should always be directed to traumatic life-threatening injuries, e.g., severe bleeding, airway obstruction, shock. Concomitantly, or as soon as possible, the patient should be decontaminated.

C. PREREQUISITES

1. Alert/Notification

As soon as it has been established by Limerick Generating Station personnel that a patient will be transported to the hospital for treatment, an alert call to this effect will be given. The alert and notification calls will be directed to the Emergency Department Charge Nurse (215) 270-2060 (see E.1 below). The Charge Nurse will, in turn, notify Administration and the Nursing Supervisor.

C. PREREQUISITES (Continued)

2. Prior Action At Limerick Generating Station

Before sending the patient(s) to the hospital, Limerick Generating Station personnel will accomplish the following procedures:

- a. Administer first aid.
- b. Notify ambulance.
- c. Call the hospital and inform them of expected arrival time, description of apparent injuries and number of patients.
- d. Decontaminate the patient(s) to an extent compatible with injuries.
- e. Assign a radiation protection technician qualified in radiation protection procedures to accompany the patient(s).

D. LIMITATIONS AND ACTIONS

1. Montgomery Hospital is the secondary support treatment facility where radioactively contaminated accident casualties from Limerick Generating Station may be treated.
2. Should Pottstown Memorial Medical Center have to evacuate, contaminated and injured patients from Limerick will go to Montgomery Hospital.
3. All decontamination of hospital personnel, equipment and facilities shall be the responsibility of Limerick Generating Station personnel.

E. PROCEDURE

1. Notification/Emergency Department Charge Nurse

In accordance with paragraph C.1, Limerick Generating Station personnel will alert the hospital. It will be the responsibility of the Charge Nurse to notify Administration and the Nursing Supervisor and complete the Data Information Sheet seen under Attachment B of this manual.

Next, the Charge Nurse should place a return call to Limerick Generating Station (327-1200, Ext. 2125) to verify impending patient arrival. See E.2.B which follows for additional responsibilities.

E. PROCEDURE (Continued)

2. Nursing Supervisor's Duties

Prior to Patient Arrival

A. Notify the following personnel:

1. Emergency Department Physician.
2. Emergency Department Nursing Personnel.
3. Radiation Safety Officer.
4. Maintenance.
5. Security.
6. Laboratory.

B. With assistance from Charge Nurse, perform the following:

1. Assign nursing personnel to assist attending physician in treatment room.
2. Assign Control Point Attendant.
3. Assign Buffer Zone Nurse.
4. Assure that the REA is prepared to receive patient(s).
5. Assure that appropriate and sufficient medical supplies are brought to the REA.

Patient Arrival

Coordinate all activities in treatment room and buffer zone.

E. PROCEDURE (Continued)

3. Maintenance

- A. Upon notification from the Nursing Supervisor of impending patient(s) arrival, Maintenance personnel will prepare the REA as follows:

Prior to Patient Arrival

Step 1

Clear decontamination/treatment room of non-stationary supplies and equipment.

Step 2

Obtain radiation emergency supply cart from storage area.

Step 3

Lay floor covering (Herculite) throughout the REA. The pre-cut colored pieces are marked as to proper location.

- a. Yellow Herculite, to be placed as follows:
- (1) Treatment Room
 - (2) Ambulance Entrance and hallway to Treatment Room
- b. Green Herculite -- buffer zone
- c. White Herculite -- use for patient exit only.

Step 4

Lay yellow Herculite on outside ambulance docking area.

Step 5

Attach decontamination table top to gurney and place water receptacle under drain.

Place waste receptacles with plastic liners in decontamination/treatment room and buffer zone.

E. PROCEDURE (Continued)

3. Maintenance (Continued)

Step 6

Erect stanchions and attach warning rope and signs across hallway and buffer zone.

Step 7

Attach hose with showerhead to faucet and adjust water temperature (like warm).

Step 8

Place Decontamination and Sample-Taking Kits on counter in treatment room.

E. PROCEDURE (Continued)

4. Nursing Personnel Duties

Prior to Patient Arrival

- A. Don protective clothing and dosimeters in accordance with directions contained in Attachment D of this manual.
- B. Wait in treatment room for patient arrival.
- C. Request additional Nursing personnel for Emergency Department as needed.

Patient Arrival

- A. Assist attending physician in patient stabilization.
- B. Collect bioassay samples in accordance with directions contained in Attachment E of this manual.
- C. Perform decontamination of the patient in accordance with directions contained in Attachment E of this manual. Plant health physics personnel may be called upon for guidance if necessary.
- D. Assist in patient transfer and exit procedures.
- E. Remove protective clothing and dosimeters in accordance with directions contained in Attachment D of this manual.

E. PROCEDURE (Continued)

5. Attending Physician's Duties

Prior to Patient Arrival

- A. Assure that the Radiation Emergency Area is set up for admission of a radioactively contaminated patient.
- B. Assure that necessary medical supplies and equipment are brought to the REA.
- C. Don protective clothing and dosimeters in accordance with directions contained in Attachment D of this manual.
- D. Request additional physician assistance to cover Emergency Department.
- E. Notify appropriate medical specialist.

Patient Arrival

- A. In the event of multiple patients, assure that appropriate treatment priority is assigned. If the patient is not critically injured, he should remain in the ambulance and be admitted according to triage method.
- B. Question the accompanying Limerick Generating Station personnel concerning the patient's contamination status and precautions that should be taken by the hospital staff.
- C. Administer emergency treatment.
- D. Ensure that requested medical supplies are passed into decontamination/treatment room.
- E. Decontaminate the patient and collect samples of the contaminant in accordance with Attachment E of this procedure.
- F. Following decontamination and emergency treatment, direct the transfer of the patient from the REA to the appropriate section of the hospital for care or further treatment.
- G. Remove protective clothing and dosimeters in accordance with directions contained in Attachment D of this manual.

E. PROCEDURE (Continued)

6. Control Point Attendant's Duties

Prior to Patient Arrival

- A. Assure that the personnel entering the REA are wearing protective clothing, self-reading pocket dosimeters, film badges and ring TLDs.
- B. Don protective clothing and dosimeters in accordance with directions contained in Attachment D of this manual.
- C. Restrict access to only those personnel authorized entry by the attending physician or Nursing Supervisor.
- D. Maintain a record showing name and time of each person entering or exiting REA.
- E. Record serial numbers of dosimeters, film badges and TLDs, as well as person's name (see Attachment J, Personnel Dosimetry Log).

Patient Arrival

- A. Assure that yellow Herculite in hallway and outside area is rolled up and clean as soon as patient is brought into treatment room.
- B. Assure that no person or article is allowed to leave the REA (after the radioactively contaminated patient is admitted) until it has been monitored by Limerick Generating Station personnel and found to be "clean", i.e., free of detectable radioactive contamination.
- C. Record results of radiation surveys performed by plant health physics personnel on anatomical diagrams provided in the decontamination kits and Section J of this manual.
- D. Record dosimeter readings and collect dosimetry from all individuals exiting the REA.

E. PROCEDURE (Continued)

7. Buffer Zone Nurse's Duties

Prior to Patient Arrival

- A. Obtain medical supplies as requested by attending physician.
- B. Don protective clothing and dosimeters in accordance with directions contained in Attachment D of this manual.

Patient Arrival

- A. Pass medical supplies into treatment room as requested by attending physician DO NOT ENTER TREATMENT ROOM UNLESS SPECIFICALLY REQUESTED TO DO SO BY ATTENDING PHYSICIAN.
 - B. Following emergency treatment and decontamination, prepare for removal of the patient from the REA.
 - (1) Roll white Herculite from Buffer Zone into Treatment Room.
 - (2) Wheel in a "clean" stretcher across the white pathway to the location immediately adjacent to the patient.
- NOTE: It is important to remain on white Herculite while in REA to prevent cross-contamination.
- (3) Assist in the transfer of the patient from the decontamination table top to the clean stretcher.

E. PROCEDURE (Continued)

8. Security's Duties

Prior to Patient Arrival

Remain outside of ambulance entrance to REA to direct ambulance to proper entrance.

Patient Arrival

- A. Following ambulance arrival, erect radiation warning rope around ambulance.
- B. Restrict unauthorized personnel from access to (enclosed) ambulance area.
- C. Assure that ambulance remains at hospital until it has been monitored by Limerick Generating Station personnel.

E. PROCEDURE (Continued)

9. Administration Duties

- A. Assure that a responsible hospital representative is available to address any media concerns.
- B. Assure that a representative from Philadelphia Electric Company is available to address any media concerns.
- C. Provide support for additional personnel if required.

E. PROCEDURE (Continued)

10. Radiation Safety Officer (Or Designee) Duties

Perform duties outlined in E.11 (which follow) in absence of plant health physics technician #2.

E. PROCEDURE (Continued)

11. Plant Health Physics Technician's (HPT) Duties

Prior to Patient Arrival

A health physics technician (HPT #1) from Limerick Generating Station will accompany the patient(s) in the ambulance and bring appropriate instrumentation. A second health physics technician (HPT #2) will arrive at the hospital in a separate vehicle and assist in the duties outlined below.

Patient Arrival

HPT #1

- A. Provide advice and guidance to attending staff regarding radiation exposure and protective actions.
- B. Don protective clothing and dosimeters as provided by hospital staff.
- C. Perform frequent radiation surveys of patient and attendants.
- D. Maintain contamination control to treatment area.
- E. Provide advice and guidance to hospital staff regarding collection of samples and decontamination procedures in accordance with directions contained in Attachment E of this manual.
- F. Decontaminate REA and equipment following patient and attendant exit.

HPT #2

- A. Survey ambulance and attendants prior to departure. If contamination is found, ambulance should be returned to Limerick Generating Station for decontamination.
- B. Control patient and attendant exit procedures.
- C. Perform radiation surveys of patients and attendants upon exit from the REA.

E. PROCEDURE (Continued)

11. Plant Health Physics Technician's (HPT) Duties (Continued)

RPT #2 (Continued)

- D. Collect dosimetry from personnel exiting the REA at termination of emergency and return to Limerick Generating Station for processing.
- E. Decontaminate REA and equipment following patient and attendant exit.

F. RETURN OF REA TO NORMAL USE

Once the patient has been decontaminated, the REA and all equipment will be surveyed, decontaminated as required and released as soon as possible by Limerick Generating Station health physics personnel.

G. PATIENT TRANSFER TO DEFINITIVE CARE CENTER

1. If it is determined by the attending physician, Medical Director, Philadelphia Electric Company and Radiation Management Corporation that the patient should be transferred to a definitive care center for the evaluation, diagnosis and long-term care of the radiation injury, this patient can be transferred to RMC's definitive care center located at the Hospital of the University of Pennsylvania in Philadelphia.
2. Arrangements for transportation of the patient will be coordinated through Radiation Management Corporation (215) 243-2990 -- 24-hour emergency phone number.

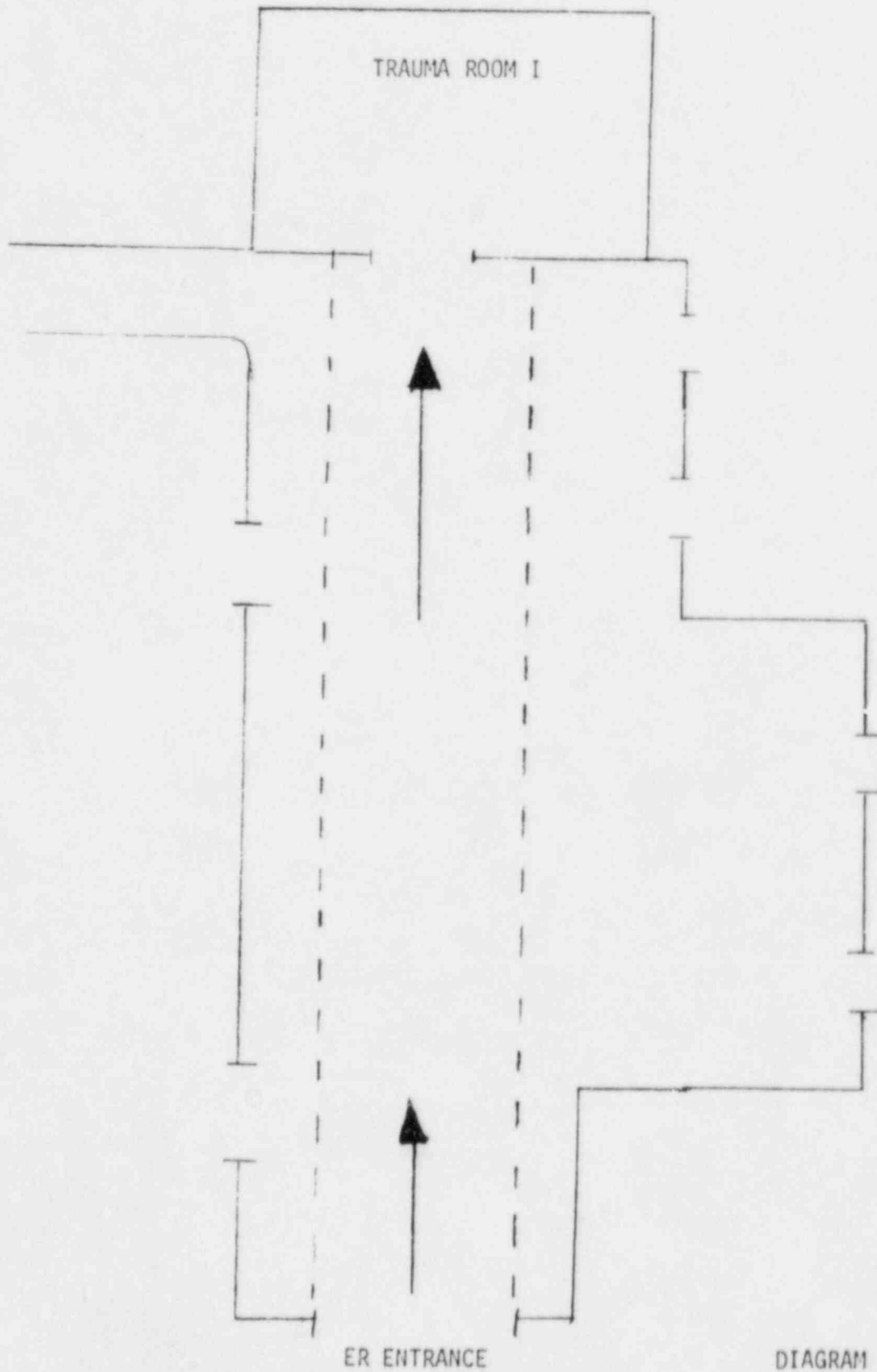
H. PROCEDURE FOR HANDLING MULTIPLE VICTIMS

1. Multiple injuries occurring at Limerick Generating Station would be managed by utilizing the principles of disaster planning. These include triage at all levels of care and primary attention to life-threatening injuries. Radiation exposure and contamination should receive secondary consideration. Upon notification from Limerick Generating Station that there has been an accident involving more than one patient, complete the form seen under Attachment B, Data Information Sheet. In addition, inquire as to the extent of medical assistance available on-site. The Data Information Sheet should be given to the Emergency Department physician.
2. On-site medical personnel with the assistance of ambulance attendants should institute triage principles with primary attention to life-threatening injuries. The most seriously injured should receive priority evacuation. Minimum decontamination should include the removal of contaminated clothing. If time, availability of transportation and patients' medical condition warrant, further decontamination (e.g., bathing with soap and water) can be accomplished. Each contaminated patient sent to the hospital should be accompanied by a trained health physics technician. Less seriously injured victims should be completely decontaminated

H. PROCEDURE FOR HANDLING MULTIPLE VICTIMS (Continued)

- at the plant and be transported to the hospital in a "clean" ambulance to the normal Emergency Department entrance.
3. The medical triage team should dress in protective clothing (see Attachment D). The present REA should be set up and ready to receive multiple contaminated and injured patients.
 4. Upon arrival of the ambulance the triage team should have the most seriously injured and contaminated brought into the decontamination/treatment room. The less seriously injured should remain in the ambulance. A decontamination team should be assigned to begin decontamination in the ambulance. Contaminated clothing can be removed and collected and contaminated areas can be wiped with a damp cloth. If decontamination cannot be completed, the areas should be covered with plastic or cloth.
 5. After the patients have been treated and decontaminated, the REA should be closed off; Limerick Generating Station personnel should survey and decontaminate hospital supplies, equipment, ambulances and the area prior to releasing it for routine usage.

MONTGOMERY HOSPITAL
PLAN VIEW OF REA



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ATTACHMENT A

QUICK SORT PROCEDURE FOR HANDLING ANY
RADIATION ACCIDENT VICTIM

ATTACHMENT A

Quick SORT Procedure for Handling Any
Radiation Accident Victim at the
Emergency Room Unloading Dock

1. Ascertain whether the patient is CONTAMINATED (Use GM Tube)
 - A. If so ... Admit the patient to REA Ambulance Entrance when set up as Radiation Emergency Area (REA).
 - B. If not ... Admit to normal Emergency Room.
 - C. If in doubt ... Admit patient to REA.
2. Treat traumatic injury.
3. If contaminated, decontaminate in REA.
4. Call for assistance.

- Attending Staff, Emergency Room.
- Radiation Management Corporation (RMC):

Philadelphia (215) 243-2990 / (215) 841-5141
Chicago (312) 310-8650

PROCEDURE FOR ADMISSION OF UNANNOUNCED ACCIDENT VICTIM(S)
BY EMERGENCY ROOM PERSONNEL

Admission

Guidance is provided for the unannounced arrival of accident patients under two circumstances: (1) Emergency Room personnel become aware of the patient's status as a "radiation accident patient" before the patient has been removed from the ambulance; and (2) the patient has been brought into the Emergency Room before his status as a "radiation accident patient" has been determined.

ATTACHMENT A (Continued)

Patient Still in Ambulance

If general medical condition warrants, sustain patient in ambulance, instruct driver, attendants, and Emergency Room personnel who have been in contact with the patient to stay in the vicinity of the ambulance (but not inside the ambulance).

Clear an area of about 8 feet around ambulance and keep unnecessary personnel and vehicles away. Attend to patient's medical condition as required. Use surgical gloves and mask. If immediate life-saving measures are not necessary, observe patient from a distance. All equipment and supplies used to attend to patient MUST stay in vicinity of the ambulance. DO NOT carry anything back to the Emergency Room. Then:

- Request of Emergency Room staff that the Ambulance Entrance at the REA be set up as a Radiation Emergency Area;
- Clear every person out of REA before bringing patient in;
- Instruct driver to stay with ambulance until a radiation survey has been made;
- Bring necessary equipment and supplies to treat patient from Emergency Room to REA. All equipment, supplies and personnel entering REA MUST stay there until arrival of radiation monitoring personnel. Establish a guard at the door. Pass Emergency Room supplies and equipment into REA; but DO NOT allow personnel and equipment to come out;
- Personnel attending patient in REA should stand next to patient only as long as necessary to perform life-saving measures. At all other times, stand about five to eight feet back and observe patient; and
- Only persons attending the patient should be in the room.

Radiation Status Discovered After Admission to Emergency Room

- Immediately secure the entire area through which the patient has passed or is located. Keep all personnel and equipment in the area. DO NOT allow anyone or anything to leave.

ATTACHMENT A (Continued)

Radiation Status Discovered After Admission to Emergency Room (Continued)

- Establish a control point through which necessary personnel and equipment pass into restricted area;
- Make arrangements to admit other patients to uninvolved area of Emergency Room through an alternate route;
- Attend to patient's emergency medical condition as required. Use surgical gloves, mask and gown when treating patient. If immediate life-saving measures are not necessary, observe the patient from a distance (five to eight feet). Immediately request assistance from Radiation Management Corporation or Limerick Generating Station (see Telephone Directory, Attachment I).

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ATTACHMENT B

TELEPHONE PROCEDURE FOR RADIATION ACCIDENT EMERGENCIES
EMERGENCY DEPARTMENT CHARGE NURSE

ATTACHMENT B

DATA INFORMATION SHEET

The Charge Nurse should obtain the following information from the caller:

Date and Time of Call: _____

Person Calling:

Name of Caller: _____

Telephone Number: _____

Accident:

Number of Patients: _____

Extent of Injuries: _____

Contamination Status & Location of Contamination (if known):

Expected Time of Arrival:

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ATTACHMENT C

EMERGENCY TREATMENT OF
RADIATION ACCIDENTS

ATTACHMENT C

EMERGENCY TREATMENT OF RADIATION ACCIDENTS

GENERAL

Emergency treatment of radiation accidents may have to be given before contact with or arrival of specialists having expertise in evaluation and management of these accidents. In this case the management of the patient should take place in the following order:

- Resuscitation and Stabilization
- Initial Decontamination
- Evaluation of Radiation Status
- Initial Treatment of Radiation Injury

RESUSCITATION AND STABILIZATION

Since radiation injury is not immediately life-threatening, primary attention should always be directed to traumatic life-threatening injuries -- maintenance of airway, arrest of bleeding, treatment of shock and control of pain.

DECONTAMINATION

Concomitantly with the procedure above, or as soon as possible, the patient should be decontaminated. In the initial decontamination

- Remove all clothing;
- Obtain samples of contamination (skin smears, tissue, fluids, etc.);
- Survey with a G-M counter and note levels of contamination on Patient Data Sheets (see Attachment J);
- Remove obvious dirt and debris; bathe, if necessary while protecting wounds;
- Repeat surveying and sampling as necessary;
- Flush wounds with copious amounts of sterile water and/or saline;

ATTACHMENT C (Continued)

DECONTAMINATION (Continued)

- Flush orifices with water or saline. Do not allow patient to swallow;
- Stop with initial decontamination when activity levels are measured in the few thousand counts/minute;
- See Attachment E for details on decontamination and sample taking.

EVALUATION OF RADIATION EXPOSURE STATUS

Dose Evaluation: This will require the assistance of persons knowledgeable in radiation. This assistance can be by someone on location or by telephone. In any case, gather as much of the following information as possible:

- Dose rate (gamma, x-ray, neutrons, etc.) as measured by instruments in accident environment;
- Radiation exposure reading on patient's and others' dosimeters (TLD, film badge, direct reading dosimeter);
- Level of residual contaminant (beta, gamma) on patient using survey meter (mark area on Patient Data Sheets -- see Attachment J);
- Neutron exposure? Collect metal objects, hair or nails; and
- Calculation of dose to the patient and to attendants.

Clinical Picture: A good estimation of the severity of the patient's external total body exposure can be obtained by observing the following clinical symptoms and signs: (R = Rems, air exposure)

- | | |
|---------------------------|--------|
| - Nausea and vomiting ... | 100R |
| Beginning within 2 hours | - 400R |
| Beginning after 4 hours | - 200R |
| None within 24 hours | - 75R |

ATTACHMENT C (Continued)

Clinical Picture (Continued)

- Erythema ... 300R (total body); 600R (surface contact)
- Diarrhea ... 400R
- CNS symptoms ... 2000R to the head
- Serial lymphocyte count within 48 hours ...
 - 1200/mm³ ... good prognosis
 - 300-1200/mm³ ... guarded prognosis
 - 300/mm³ ... poor prognosis

INITIAL TREATMENT OF RADIATION INJURY

Detailed Decontamination: It is particularly important at this stage to remove high level contamination caused by penetrating missiles or splinters in wounds.

Overexposure: Since overexposure to radiation results in a slowly unfolding course over a long period of time, there is little in the way of specific treatment in the initial stage of the disease. Treatment is symptomatic and consists of making the patient comfortable and allaying his fears. He may require antiemetics, fluids, sedatives and analgesics. Order CBC with differential stat, at 4, 8 and 12 hours. Obtain blood sample (10 cc sterile heparinized blood) for chromosome analysis. Keep sample chilled in ice water.

Internal Contamination: Except in a few instances, there is also little to offer in the way of specific treatment in the initial stages. Generally, specific treatment to eliminate any absorbed radioactivity requires rather detailed and complex analyses of 24-hour urine collections and 72 hour continuous fecal collections. Arrange for whole body count as soon as patient's condition warrants. Arrange for thyroid uptake study for I-131.

If it has been determined that the patient absorbed considerable amounts of ...

Tritium (³H) force fluids.

Radioiodine give Lugol's solution or other thyroid-blocking agent immediately (reduces thyroid uptake of I-131 by 50% if given within 4 hours post exposure; probably not effective after 12 hours).

ATTACHMENT C (Continued)

PRINCIPLES OF RADIATION PROTECTION

Certain precautions to minimize exposure to attendants are necessary when dealing with a patient who has external contamination, specifically:

- Always wear two sets of disposable gowns, plastic aprons, shoe covers;
- As few attendants as necessary should be in the same room with patient;
- Only in the performance of emergency treatment and initial decontamination should attendants be next to patients. At all other times, e.g., while evaluating the patient, attendants should stand at least five to eight feet from the patient and observe him from a distance;
- Rope off and control the area in which the patient is being treated. ALL persons, equipment and supplies that enter this area MUST stay there until Radiation Emergency Teams arrive to assist in the monitoring and decontamination of people and equipment;
- Suggested permissible levels of attendant exposure in the course of treating a patient are:

to 5R routine treatment and decontamination
to 25R emergency treatment and decontamination
to 75R lifesaving treatment and decontamination

To estimate attendant exposure, pass the probe of the G-M survey meter or ion chamber with the beta window closed 6" above the patient. If the reading is 5R/hour, an estimate of attendant exposure would be 5R if treatment should take one hour. Experience shows that it is extremely unlikely that a contamination accident would be so severe that an attendant would receive an exposure of even 5R. In high radiation fields personnel may be rotated in order to minimize the exposure to any single individual. It is also suggested that anticipated exposures over 5R should be on a voluntary basis.

INITIAL BIOASSAY SAMPLES

Each of the following bioassay samples should be obtained as soon as possible and labeled with name, date, time and type of specimen. Avoid cross-contamination of samples from external sources of contamination or from other samples.

ATTACHMENT C (Continued)

INITIAL BIOASSAY SAMPLES (Continued)

Blood:

- (1) 10 cc for radiobioassay;
- (2) 10 cc (sterile heparinized) for chromosomes; keep samples chilled in a glass of ice;
- (3) 10 cc oxalated for hemogram and differential*
- (4) 10 cc for:
 - (a) chemistries;
 - (b) electrolytes

* differential - repeat t.i.d. for 3 days or more frequently if clinical condition warrants.

- Hair, nails, metals from neutron-exposed patient;
- Urine:
 - (1) first urine;
 - (2) 24 hour urine for several succeeding days
- Feces, total sample for several succeeding days;
- Sputum;
- Vomitus;
- Tissue and tissue exudates (note location);
- Irrigation fluids (note location); and
- Filter paper or cotton smears of orifices, wounds, skin areas (note locations).

Procedure No. M1-18
Revision 0, (December, 1985)

ATTACHMENT D

PROCEDURE FOR THE
USE OF PROTECTIVE CLOTHING AND DOSIMETERS

ATTACHMENT D

PROCEDURE FOR USE OF PROTECTIVE CLOTHING AND DOSIMETERS

All work past the Control Point requires protective clothing, independent of the degree of contamination present on the patient or his clothing. Be sure all female attendants assigned to the REA are wearing scrub pants in addition to protective clothing. All personnel should remove everything from the pockets of their uniform and scrub clothing, in case this clothing must be discarded.

Each person entering the REA should don two surgical gowns, two sets of surgical gloves, and two vinyl aprons, mask, cap and shoe covers, as well as dosimetry (see Diagram 1 for donning protective clothing and proper placement of attendant dosimetry). After gross decontamination is completed, the outer surgical gown, gloves and apron are removed. Wound care and decontamination will then be attended to.

Removal of Contaminated Protective Clothing

Upon completion of their activities in the Radiation Emergency Treatment Room personnel will proceed to the Control Point between the Treatment Room and the Buffer Zone. They will remove their protective clothing and personnel dosimeter(s) in the following order:

- (1) self-reading dosimeters (read and recorded by Control Point Attendant);
- (2) headwear and mask;
- (3) apron and gown (turning them inside-out);
- (4) footwear and gloves (remove at Step-Off Pad).

Clearance Procedures

After having removed protective apparel, each person who occupied the Treatment Area will be monitored by Limerick Generating Station health physics technician prior to leaving the Buffer Zone. If contamination is found, personnel will remain in the Buffer Zone, away from the normal exit.* Limerick Generating Station health physics personnel will direct them through a decontamination process utilizing the water supply, soap and water collection system available in the treatment room. A final survey will be performed at the Control Point prior to entering the clean part of the hospital.

*If no contamination is found, personnel may proceed to the change area and put on their normal clothing.

ATTACHMENT D (Continued)

Use of Dosimeters

Dosimeters will be supplied by the Control Point Attendant to all personnel entering the Radiation Emergency Area.

Dosimeters are of three types:

- (1) Direct reading dosimeters ("pencil dosimeters") to monitor exposed dose on a continuing basis. These must be recharged to read "zero" before they are distributed to each attendant.
- (2) Badge (TLD) dosimeters - to form a permanent record of exposure.
- (3) Ring (TLD) dosimeters - to form a permanent record of finger exposure.

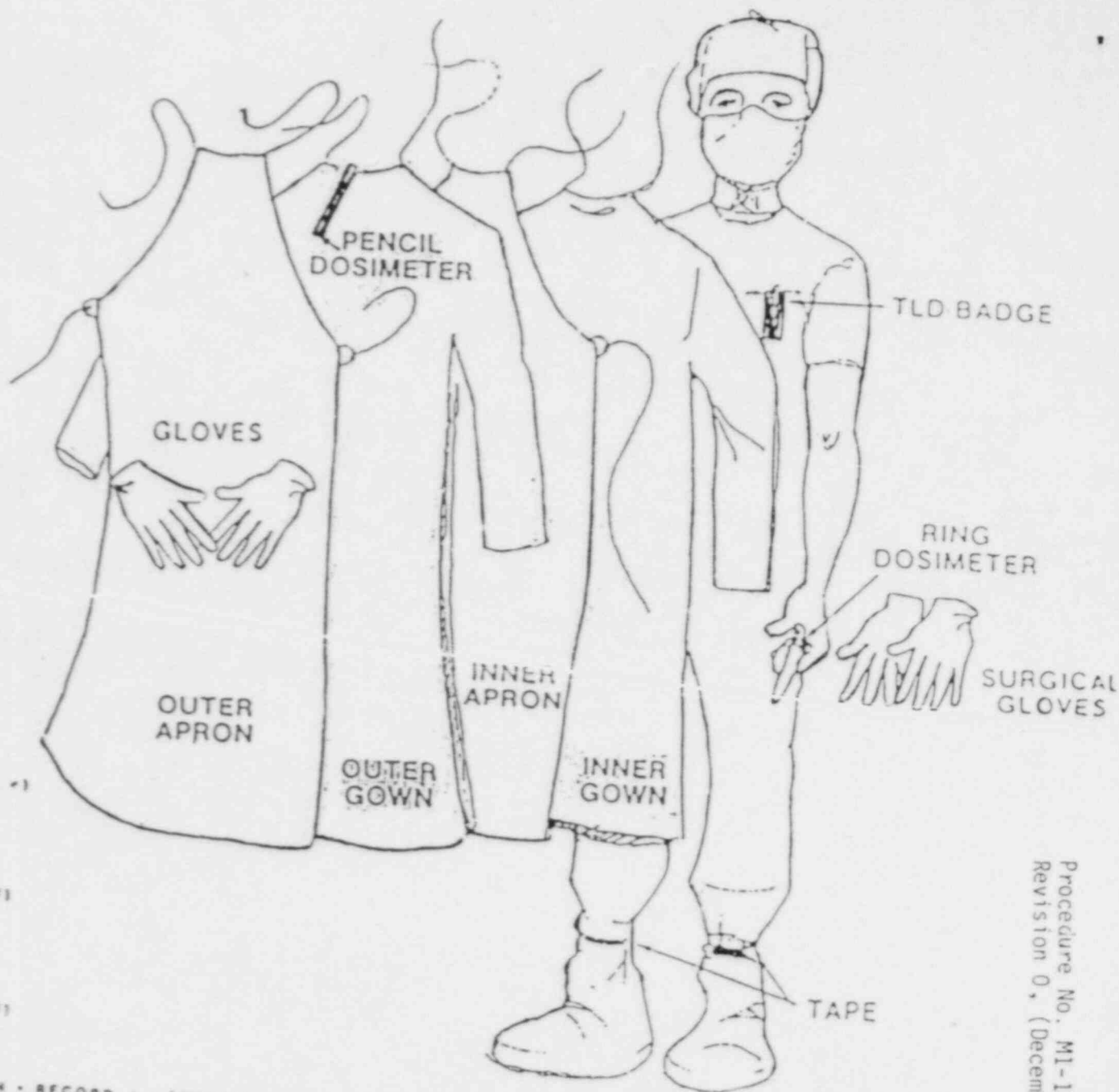
Dosimeters are to be worn in the following manner:

- (1) At the neck line, clipped under the protective clothing;
- (2) On the ring fingers of hands, under the gloves, with detecting element at palm surface.

Upon leaving the Radiation Emergency Area the wearer shall surrender his dosimeter to the Control Point Attendant, who will record the reading and number of the pen dosimeter and retain the badge and ring dosimeters for later processing. The Control Point Attendant must assure that the records clearly show the serial number of each dosimeter and period of time worn by each individual who occupied the Radiation Emergency Area. These are then given to the health physics technician for reading at the Limerick Generating Station site.



Radiation Management Corporation
3508 Market St.
P.O. Box 7940
Philadelphia, Pennsylvania 19101



ATTENDANT GARB DRESSING SEQUENCE

1. PROTECTIVE SHOE COVERS
2. RING TLD (RECORD #1)
3. BADGE TLD (ON SHIRT POCKET - RECORD #1)
4. 1ST GOWN
5. 1ST APRON
6. 1ST PAIR GLOVES (OVER 1ST GOWN CUFF)
7. 2ND GOWN
8. 2ND APRON
9. 2ND PAIR GLOVES (OVER 2ND GOWN CUFF)
10. CAP AND MASK
11. SELF READING DOSIMETER (ON 2ND GOWN - RECORD # - 'ZERO')

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Revision 0, (December, 1985)

ATTACHMENT E

PROCEDURE FOR
PATIENT DECONTAMINATION AND SAMPLE TAKING

ATTACHMENT E

PROCEDURE FOR PATIENT DECONTAMINATION AND SAMPLE TAKING

General

These procedures cover the use of the Decontamination and Sample Taking Kits. The kits provide all the necessary items for the decontamination of a radioactively contaminated patient and the collection of specimens of this contamination.

The collection of specimens is a prerequisite for a thorough evaluation of the medical and radiation status of the patient. It should be performed in conjunction with patient decontamination.

Attachment F provides a parts list for each of the two kits. There is also a parts list in each kit. Following use, the lists should be consulted for replenishment. The intended use of several of the items is indicated on the parts list.

Patient Decontamination Procedures

Principles

The objectives of decontamination are:

1. To prevent injury caused by the presence of radioactive substances on the body;
2. To prevent the spread of contamination over and into the patient; and
3. To prevent attending personnel from becoming contaminated themselves or (in extreme cases) from being exposed to a source of radiation.

Although decontamination should be started as soon as possible, primary attention should be given to the alleviation of life-threatening conditions created by traumatic injury.

Decontamination is essentially the physical removal of radioactive dirt from the skin, wounds, or body orifices. Most decontaminants contain detergents or other chemical agents to facilitate this removal. Therefore,

ATTACHMENT E (Continued)

Patient Decontamination Procedures (Continued)

most decontaminants are suitable for decontamination of the intact skin only, and are not appropriate for wound cleansing or irrigation of body orifices.

Decontamination is performed in the following manner:

1. From the highest level of contamination to the lowest;
2. Starting with the simplest procedure (e.g., soap and water) to more complicated procedures;
3. With due regard to contamination of wounds, body orifices, etc. (see below for specific guidelines).

Usually, the effect of decontamination is greatest in the earliest stages, i.e., most of the radioactive material is removed during the first decontamination effort. Continued decontamination may show diminishing effectiveness. At some point a decision has to be made to either accept some residual contamination, or proceed with the use of more potent decontaminants (more specific guidelines are seen below).

Decontamination Procedures

In some cases, decontamination may have been started before the patient arrives at Montgomery Hospital. It can be expected that the residual contamination is minor and/or that serious contamination is localized, e.g., around and in a wound.

A. General

Two general rules apply to the performance of decontamination:

1. Check the effectiveness of the technique applied by monitoring periodically; and
2. Avoid the spread of radioactive materials from the area being decontaminated to areas of lesser contamination by covering the adjacent area.

ATTACHMENT E (Continued)

Decontamination Procedures (Continued)

Except when prohibitive degrees of contamination are present on/in any of the locations listed below, decontamination is performed in the following order:

1. High level intact skin;
2. Body orifices and adjacent skin;
3. Wounds and adjacent skin;
4. Low-level skin areas.

B. Steps To Be Taken For Decontamination and Sample Taking

1. Judge whether the patient's medical condition requires immediate intervention; stabilize wound, if necessary, and redress for later decontamination;
2. Obtain a briefing from the attending health physics personnel as to the contamination status of the patient, the exposure of the patient, and as to the specific measures to be taken by attending personnel with regard to their protection;
3. Remove all clothing and monitor the patient with the radiation survey instrument by scanning the entire body (holding the probe about two inches from the skin), and record the findings on the Patient Data Sheets;
4. Obtain patient samples in accordance with Procedures for Sample Taking, which follow. COLLECTION OF SAMPLES SHOULD BE PERFORMED PRIOR TO DECONTAMINATION;
5. Perform a gross decontamination (see Decontamination of Skin and Body Orifices which follow);
6. Clean up room and remove outer garments from attendants;

ATTACHMENT E (Continued)

Decontamination Procedures (Continued)

B. Steps To Be Taken For Decontamination and Sample Taking (Continued)

7. Proceed with wound survey and decontamination (see Procedures for Decontamination of Wounds);
8. Complete detailed decontamination of patient;
9. Transfer patient to "clean" area of hospital (see Diagram IV).

Waste material will be appropriately collected and returned to Limerick Generating Station for disposal.

C. Decontamination of Skin

1. Take smear sample of area (See "Sample Taking Techniques and Indications");
2. Protect adjacent area if indicated by covering with towels;
3. Cleanse skin area; wash thoroughly with Turco soap and tepid water, using either cotton balls, preop sponges or surgical brushes, cover area with a good lather; rinse off after two to three minutes with copious amounts of running water; monitor; record results;
4. If contamination persists, repeat step (3) once;
5. If contamination still persists, try gentle application of clorox or hydrogen peroxide. NOTE: Avoid any of these entering wound or body openings. Repeat a few times using new cotton balls; remove decontaminants with water; monitor; record results;
6. After complete decontamination, dry skin and apply Nivea cream to abraded or injured areas;

ATTACHMENT E (Continued)

C. Decontamination of Skin (Continued)

7. If residual contamination is present, consult with radiation specialists to decide whether further efforts are indicated; if it is decided to accept residual contamination, dry skin and apply colloidin, mark the area involved and record;
8. Collect all materials used and place in separate labeled containers.

NOTE: In case of serious contamination around a wound, rapid removal of the bulk of radioactivity can be obtained by shaving. In case of serious contamination of hair or under nails, clip nails, remove hair and scrub thoroughly and repeatedly with intermittent surveying.

D. Decontamination of Body Orifices

1. Take samples of activity in nostrils, ear canals, and other orifices as indicated (see "Sample Taking Techniques and Indications");
2. Decontaminate area surrounding orifices;
3. Gently clean orifices using wetted swabs;
4. If nose swab indicates significant radioactivity in nasal cavity, use nasal blows and nasal irrigation;
5. Collect all materials used and label containers.

E. Decontamination of Wounds

1. Use aperature drape to isolate the contaminated wound;
2. Survey and take samples of wound (see "Procedures for Sample Taking");
3. Decontaminate skin adjacent to wound;

ATTACHMENT E (Continued)

E. Decontamination of Wounds (Continued)

4. Depending on surface and depth of wound, irrigate wound with sterile saline, dab with gauze pads soaked in sterile saline to cleanse wound; collect all materials used and place in separate labeled containers;
5. Remove obviously necrotic and devitalized tissue surgically; keep all tissue specimens removed;
6. Repeatedly monitor wound; record results on patient record sheet;
7. If contamination persists, consult with RMC to determine further course of action;
8. If wound is clean, treat wound as necessary.

Procedures for Sample Taking

Principles

The objectives of collecting specimens from a radioactively contaminated patient are as follows:

1. To evaluate the amount and composition of the radioactive contaminants on and in the body;
2. To obtain data with regard to the patient's exposure to external radiation; and
3. To supply information on the biological injury inflicted by the radiation.

To meet these objectives, the following types of specimens are collected routinely:

1. Materials containing the external contaminant (swabs, smears, tissue samples, contaminated cleansing fluids, etc.);
2. Specimens containing internal contaminant (feces, urine, sputum, etc.);

ATTACHMENT E (Continued)

Procedures for Sample Taking (Continued)

3. In case of neutron irradiation ... materials in which neutron induced radioactivity may be present (gold rings, buttons, hair, nail clippings);
4. Hematological specimens (whole blood in heparinized, oxalated and uncoated tubes; blood smears).

As the analysis of radioactive samples with regard to their composition is only possible in samples with a relatively high radioactivity, care should be taken to collect and store these samples separately from the usually bulky samples with rather low radioactivity (such as cleansing fluids, drapes, towels, etc.).

A sample which is not identifiable as to its source (location, time taken) may be practically worthless; therefore, take care to properly collect, store and mark all samples.

Sample Taking Techniques and Indications

External Contamination:

Before decontamination, the following samples shall be obtained:

1. Skin Smears: use Nucon smear pads, moisten with a few drops of water, and smear a skin area of about 100 cm² (4" X 4"), if possible, by allowing sticky side of the smear to adhere to gloves and rubbing the smear pad over the surface to be sampled; place smear on record paper, record location and time and area smeared, if other than 100 cm² and place in envelope. Alternatively, tape may be used to remove contaminants for later examination.
2. Take samples of nails, hair and collect metallic objects (rings, watches, glasses, belt buckles, etc.).

ATTACHMENT E (Continued)

Sample Taking Techniques and Indications (Continued)

External Contamination (Continued)

3. Wound Samples: use either one of the following methods:
 - for large wounds with visible blood or wound fluid -- obtain a few cc using an eye dropper or syringe; transfer to bottle and label;
 - for superficial wounds -- rub gently with cotton swabs; return to tube and label;
 - for wounds with visible dirt or debris -- remove with cotton tip or use tweezers; transfer sample to small glass vial and label.

Internal Contamination

1. Body Orifices: wet Q-tip with a few drops of water; swab and store in waterproof envelope and label;
2. In all cases where internal contamination is expected: collect urine and feces in containers supplied, and record time of voiding.

External Exposure:

In all cases where a total body exposure is suspected:

1. Obtain 10 cc of oxalated blood for complete blood count and differential;
2. Obtain 10 cc of sterile heparinized blood for chromosome analysis;
3. Obtain 10 cc blood for electrolytes and chemistries.

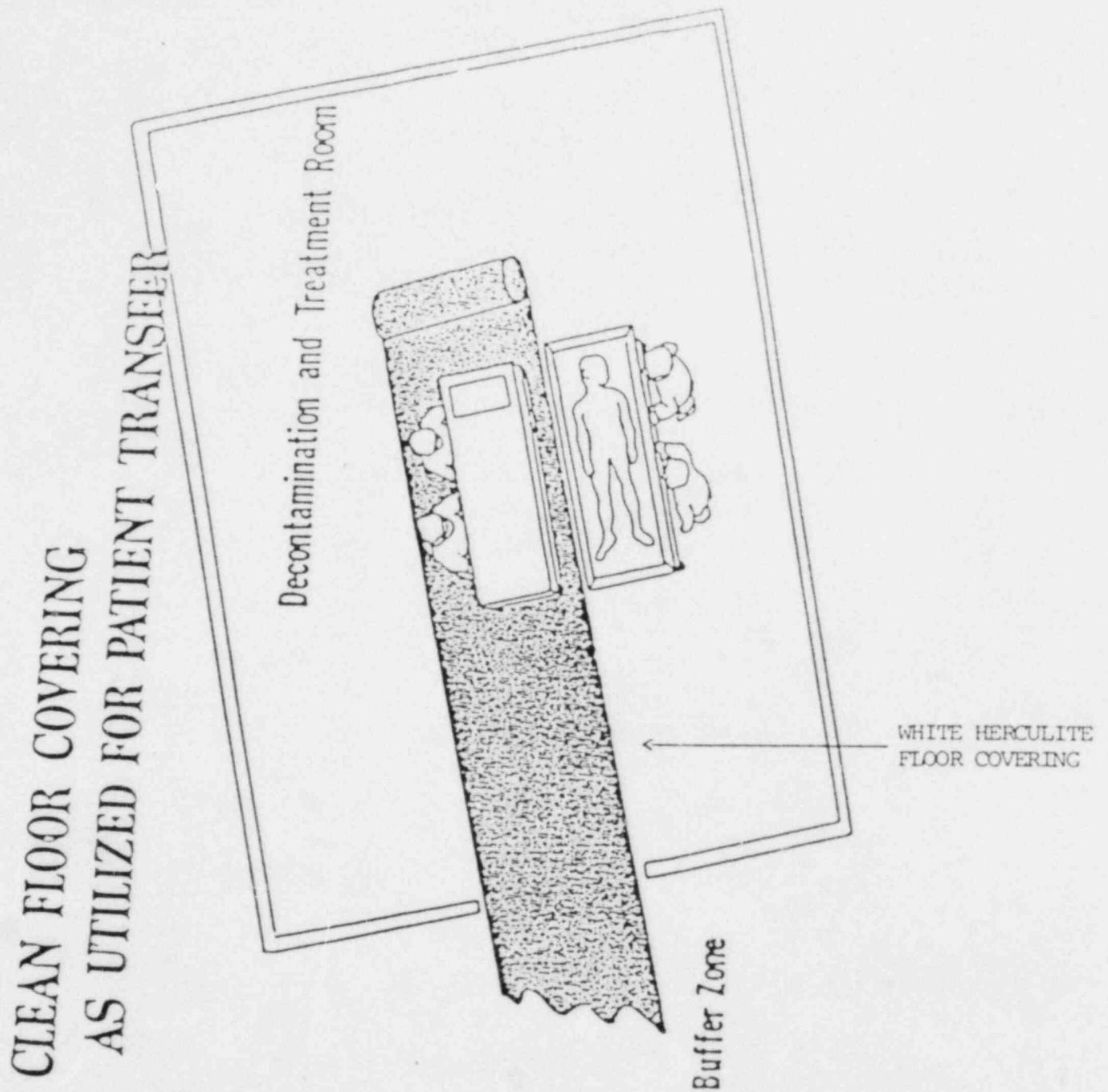
Record time these samples were taken.

ATTACHMENT E (Continued)

Sample Taking Techniques and Indications (Continued)

External Exposure (Continued)

NOTE: Return bioassay samples to kit. With any specimens necessary to the emergency medical treatment of the patient which are obtained prior to completion of decontamination and are to be processed in the hospital laboratory, be sure to clean the outside of the specimen container (test tube, etc.) and have it surveyed before handing it out to the Buffer Zone Attendant.



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ATTACHMENT F

PARTS LIST FOR DECONTAMINATION AND SAMPLE TAKING KITS

ATTACHMENT F

DECONTAMINATION KIT CONTENTS

<u>Skin Decontaminants</u>	<u>Quantity</u>
Betadine	1
Turco	1
PhisoHex	1
Clorox	1
Corn Meal	1
Tide	1
Shampoo	1
<u>Wound (Or Skin) Decontaminants</u>	
Saline	2
E-Z Preps	10
Hydrogen Peroxide	1
<u>Materials for Decontamination</u>	
E-Z Scrubs	10
Towels	10
Gauze Pads	15
Q-Tips	15
Surgical Gloves	10
Solution Bowls	2
Irrigation Syringe	1
Shave Prep Kit	1

ATTACHMENT F (Continued)

DECONTAMINATION KIT CONTENTS (Continued)

<u>Miscellaneous Items</u>	<u>Quantity</u>
Procedure for Decontamination	1
Skin Cream	1
Colloidin	1
Steri Drape	1
Marker	1
Pen	1
Clipper	1
Surgical Tape	1
Plastic Bags	10

ATTACHMENT F (Continued)

SAMPLE TAKING KIT CONTENTS

<u>Sample Type</u>	<u>Sampling Instrument</u>	<u>Quantity</u>
Nasal	swabs	4
Aural	swabs	4
Oral	swabs	4
Skin Folds	swabs	4
Swipes	swabs	4
Swipes	Nucon Smear	25 slots
Hair	small container	4
Nails	small container	4
Metallic Objects	medium container/ plastic bags	2 small 2 large
Blood	10 cc vacutainers	2 heparinized (green) 1 oxalated (gray) 1 sterile (red)
Urine (24 hour)	2000 cc plastic container	1
Feces	fecal container	2
Wound Exudate	swabs eyedropper & bottle	4 2
Tissue	containers	2 small 2 medium
Vomit	fecal container	2
Irrigation Fluids	100 cc plastic bottle	2

ATTACHMENT F (Continued)

SAMPLE TAKING KIT CONTENTS (Continued)

<u>Miscellaneous Items</u>	<u>Quantity</u>
Envelopes	10
Labels	50
Pens	1 grease 1 writing
Scissors	1
Tweezers	1
Clippers	1

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ATTACHMENT G

REA STORED SUPPLIES & EQUIPMENT

ATTACHMENT G

REA STORED SUPPLIES & EQUIPMENT

MONTGOMERY HOSPITAL

<u>QUANTITY</u>	<u>ITEM</u>
1	Decontamination Table Top w/splash guard, stretcher splash guard, stretcher insert (2) 15-gallon poly vinyl water containers
2	Contaminated waste container 35-gallon with mobile base
1	Decontamination Kit
1	Bioassay Sample Kit
1	Mobile Storage Cart, with worktop and storage bin built to contain items listed
1	Lead container, for high activity specimens
10	Masking tape, 2" width
1	Radiation warning rope, cut to fit REA
10	Radiation warning signs
10	Plastic trash can liners, 35-gallon with warning sign
30	Radiation sign inserts
1	Flexible with Adjustable showerhead
2	Step off pads, laminated (30' x 48')
2	Laminated Accident Poster
1	Clipboard with Body Charts

ATTACHMENT G (Continued)

REA STORED SUPPLIES & EQUIPMENT

<u>QUANTITY</u>	<u>ITEM</u>
4	Stanchions, metal
10	Magnetic holders for warning rope/signs
25	Protective clothing packs
100 sq yd	Herculite (pre-cut to fit REA) Yellow, White
15 sets	Dosimetry, 0-500 m/R
1	Count Rate Meter, Eberline Model E-140N
1	Geiger Counter, Victoreen

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Revision 0, (December, 1985)

ATTACHMENT H

RADIATION EMERGENCY TELEPHONE DIRECTORY

ATTACHMENT H

RADIATION EMERGENCY TELEPHONE DIRECTORY

Montgomery Hospital

Main Switchboard

(215) 270-2000

TO BE PROVIDED

Philadelphia Electric Company - Limerick Generating Station

Switchboard

(215) 327-1200

Shift Clerk - Control Room

(215) 327-1200, Ext. 2126

Security Leader

(215) 327-1200, Ext. 2622

Verification Number

(215) 327-2918

Radiation Management Corporation

EMERGENCIES

(215) 243-2990 (24 hrs.)

(215) 841-5141 (24 hrs.)

GENERAL BUSINESS (Philadelphia)

(215) 243-2950

GENERAL BUSINESS (Chicago)

(312) 310-8650

Procedure No. M1-18
Revision 0, (December, 1985)

ATTACHMENT I

LOCATION OF MANUALS

ATTACHMENT I

LOCATION OF MANUALS

Copy Number

Location

1

Radiation Management Corporation

Philadelphia Office

Montgomery Hospital

TO BE PROVIDED

Limerick Generating Station

Site EP Coordinator
Technical Support Center
Control Room

Philadelphia Electric Company

Emergency Off-Site Facility
Medical Director
Director, Emergency Planning
Electric Production QA Superintendent
Director, Radiation Protection

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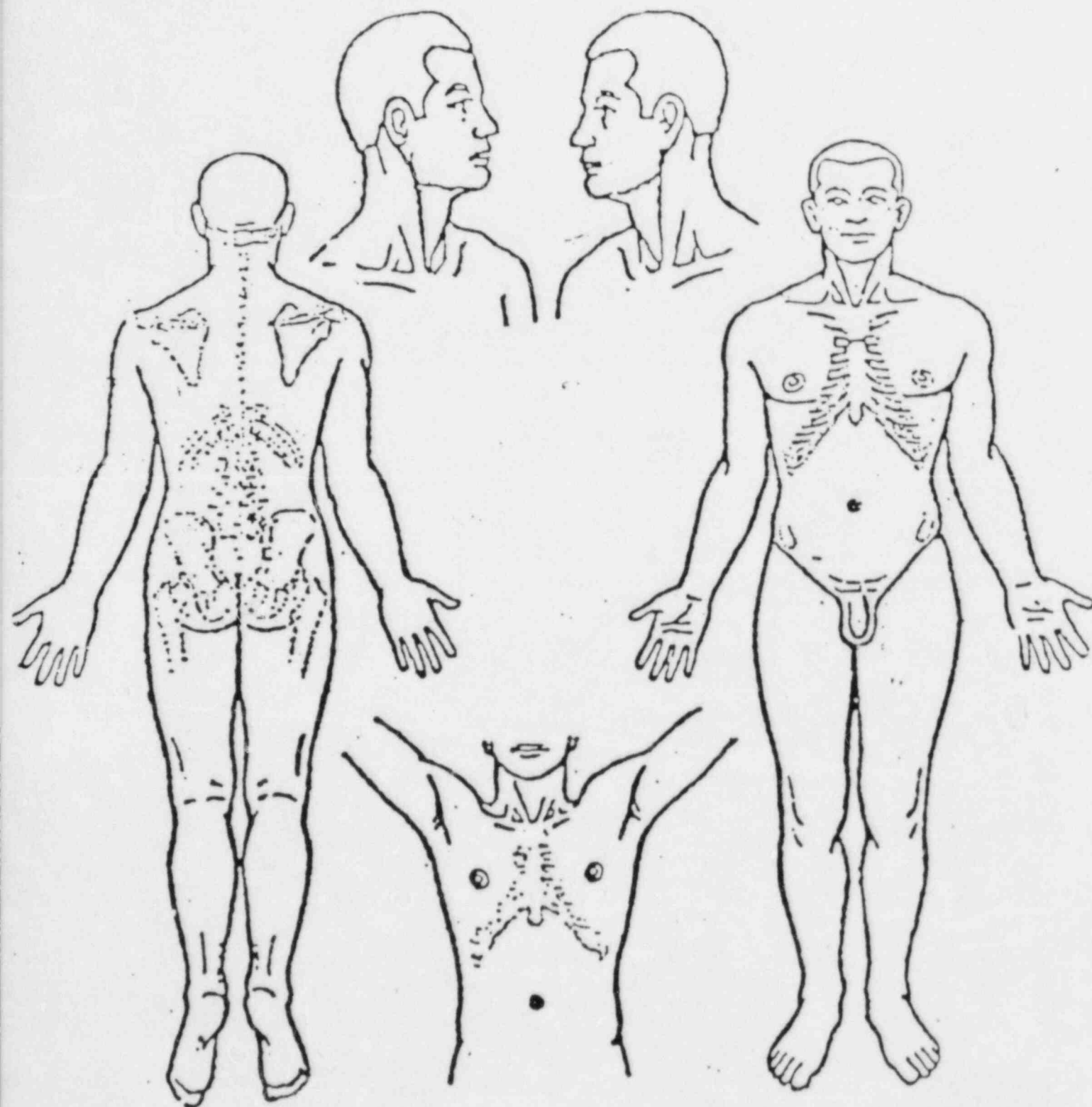
ATTACHMENT J

PERSONNEL DOSIMETRY LOG
AND
PATIENT DATA SHEETS

PATIENT NAME _____ DATE _____ TIME _____ SURVEY # _____

Directions: Indicate levels of
contamination on
the corresponding body part.

Procedure No. M1-18
Revision 0, (December, 1985)



Surveyed by: _____
Reviewed by: _____

Survey Inst./Serial # _____ / _____
Calibration Date: _____

THE HANDLING AND TREATMENT OF A
RADIOACTIVELY CONTAMINATED AND INJURED PATIENT
BY EMERGENCY DEPARTMENT PHYSICIANS AND NURSES

PLAN OF INSTRUCTION

<u>TOPIC</u>	<u>TIME</u>	<u>PURPOSE</u>	<u>METHOD</u>
INTRODUCTION	15 minutes	To introduce Radiation Management Corporation, provide an overview of the course and explain the need for special procedures when dealing with an injured and contaminated patient.	o Slide and Lecture Presentation
IONIZING RADIATION BIOLOGY	60 minutes	To define ionizing radiation, terminology, background radiation, protective actions and the detection and measurement of radiation.	o Slide and Lecture Presentation
BREAK	15 minutes		
CLASSIFICATION OF RADIATION ACCIDENTS AND THE MEDICAL SIGNIFICANCE OF RADIATION EXPOSURE	45 minutes	To discuss the biological effects of radiation exposure, to present the types of radiation injuries and the medical aspects of each type of injury.	o Slide and Lecture Presentation
BREAK	15 minutes		
HOSPITAL RESPONSE TO THE RADIATION ACCIDENT VICTIM	30 minutes	To present an overview of requirements and to review types of radiation injuries.	o Videotape

PLAN OF INSTRUCTION (Continued)

<u>TOPIC</u>	<u>TIME</u>	<u>PURPOSE</u>	<u>METHOD</u>
SPECIFIC ELEMENTS OF RESPONSE: ASSESSMENT AND DECONTAMINATION	30 minutes	To introduce the techniques used in biological and radiological assessment of the radiation accident victim and to explain procedures for decontamination of wounds and intact skin.	o Slide, lecture presentation
MONTGOMERY HOSPITAL PROCEDURES	60 minutes	To demonstrate the procedures that will be used at Montgomery Hospital including REA set up, the use of protective clothing and dosimetry and the sequence of steps in the management of contaminated patients.	o Participatory Demonstration

MONTGOMERY HOSPITAL

RADIATION EMERGENCY MEDICAL SUPPLIES AND EQUIPMENT

<u>QUANTITY</u>	<u>ITEM</u>
1	Decontamination Table Top w/splash guard, stretcher splash guard, stretcher insert (2) 15-gallon poly vinyl water containers
2	Contaminated waste container 35-gallon with mobile base
1	Decontamination Kit
1	Bioassay Sample Kit
1	Mobile Storage Cart, with worktop and storage bin built to contain items listed
1	Lead Container, for high activity specimens
10	Masking tape, 2" width
1	Radiation warning rope, cut to fit REA
10	Radiation warning signs
10	Plastic trash can liners, 35-gallon with warning sign
30	Radiation sign inserts
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2	Step off pads, laminated (30' x 48')
2	Laminated Accident Poster
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4	Stanchions, metal
10	Magnetic holders for warning rope/signs
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100 sq yd	Herculite (pre-cut to fit REA) Yellow, White
15 sets	Dosimetry, 0-500 m/R
1	Count Rate Meter, Eberline Model E-140N
1	Geiger Counter, Victoreen