CIVIL DEFENSE

RADIOLOGICAL MONITORING

CONTENTS PAGE

1. GENERAL

1.01 Radiation emitted from the fallout created by a nuclear detonation could cause many casualties, prevent carrying out post attack operations, lessen the survivors ability to work and deny access to some areas and facilities for a period of time.

1.02 Shelter personnel must be able to rapidly detect, measure and evaluate post attack fallout conditions in order to furnish information to the shelter manager and to higher levels of management within the company. This information will be necessary in order to make decisions concerning:

(a) The length of the shelter stay.

(b) Repair and maintenance of outside plant and auxiliary stations.

(c) Obtaining needed food, water and other supplies at the earliest possible time.

(d) Relocation of people.

(e) Decontamination.

(f) Control of radiation exposure of workers assigned to repair, maintenance and operation in fallout areas.

2. RADIOLOGICAL MONITORING PERSONNEL

A. Requirements

2.01 The Civil Defense Coordinator will appoint a minimum of two radiological monitors for each shelter area that is his responsibility.

B. Responsibilities

2.02 The duties and responsibilities of a radiological monitor are to:

(a) Keep the shelter manager informed of the radiological situation throughout the emergency period.

(b) Measure radiation levels in and around the shelter area and assist the shelter occupants in recording their individual exposures.

(c) Monitor to determine when it is safe to leave the shelter to obtain additional supplies and to perform service restoration.

(d) Monitor routes for personnel movement and transportation in general.

(e) Monitor in support of emergency operations to accomplish decontamination and recovery activity.

(f) Follow the standard monitoring procedures for Long Lines location as outlined in this practice.

(g) Know the types, uses and operation of all the radiological instruments and related equipment furnished in the shelter.

(h) Maintain the radiological equipment in the pre-emergency period.

C. Training

2.03 Each person appointed as a Radiological Monitor should receive the Radiological Monitors Course offered by the local Office of Civil Defense or equivalent training.

2.04 The Civil Defense Coordinator will make the arrangements for this training.

3. RADIOLOGICAL INSTRUMENTS

A. Instrument Description

3.01 Instruments should be provided for shelters in buildings that are on the Industrial Defense list maintained by the Area Plant or Operations Manager and the Headquarters General Security Manager, and other buildings as determined in BSP 002-501-907 LL par. 3.05. Instruments will be provided by the Office of Civil Defense for shelters established under the National Fallout Shelter Program as described in BSP 002-501-907 LL, Section 5.

3.02 Number required per location and description:

1 - Low level Beta - Gamma radiation survey meter with ranges from .5 to 50 milliroentgens per hour. Meters of this type are used for monitoring personnel, food and water and other low level radiation sources.

1 - High level radiation survey meter ranges from .5 to 500 roentgens per hour. This meter is used for monitoring high levels of gamma radiation.

Dosimeters with a range of 0-200 roentgens. These units are used for measuring the accumulated doses of gamma radiation an individual or area has received. (See Note).

Dosimeter charger that is used for resetting the dosimeters. One charger is required for each 25 dosimeters.

Note: Dosimeters are required for each person that will have the necessity to leave the protected area, each radiological monitor and at least two for the shelter.

3.03 Instruments other than those listed above may be found in some shelter locations. If they serve the same purpose and provide measurements within the same general ranges they should be retained. However, all new instruments should be of the type currently in use by the Office of Civil Defense. The Director-Network Operations will provide information on the instruments and where they can be obtained.

3.04 Instruments meeting the specifications of the Office of Civil Defense (OCD), referred to by CDV numbers, are suitable for our use and are the recommended types for shelter areas.

The current OCD recommended sets are:

a) CDV700 Low level survey meter

b) CDV715 High level survey meter

c) CDV742 Dosimeter

d) CDV750 Dosimeter Charger

B. Operation

3.05 Instructions on the operation of each type of radiological instrument in the shelter are required. In most cases, the manufacturers operating manual will contain this information and each shelter area will require a manual for each type of instrument that is stored there.

3.06 Local instructions should be written on the operation of the instruments if a manual is not available.

C. Routines

3.07 Operating tests are required on each instrument every six months following the procedure outlined in the manual for the set being tested.

3.08 The batteries that are required for the instruments are to be replaced annually.

Note: After performing routine checks on the instruments or after any use, always remove the batteries from the set.

D. Maintenance and Repair

3.09 Instruments that cannot be repaired locally should be returned to the manufacturer or the State Civil Defense Radiological Repair Center.

3.10 The State Repair Center will repair those instruments that were manufactured to meet OCD specifications. Any office that desires to have an instrument repaired in this manner should make the necessary arrangements through the State Office of Civil Defense.

3.11 Other defective instruments should be returned to the manufacturer.

E. Maintenance Records

3.12 Routine tests and maintenance should be recorded for each radiological instrument in the shelter area on form P2281. This form can be obtained from the Long Lines Stationery Stock Room in New York. An example is shown in Figure 1.

4. EXPOSURE LIMITS DURING EMERGENCIES

4.01 Every precaution must be taken to insure that personnel who are exposed to radiation do not receive accumulated whole body doses in excess of the following:

Period of Exposure	Total Roentgens
Single Exposure	50
Any one day	100
Three days	125
Week	150

4.02 If the total accumulated exposure is expected to exceed 200 roentgens during the fallout emergency, every effort should be made to transfer the individual to a location with more protection, and he should be assigned no further duties in contaminated areas.

4.03 All persons not engaged in emergency service or maintenance should remain in the protected area to limit their exposure.

4.04 The shelter Manager must maintain a close watch on the exposure of those assigned to emergency operations and distribute the work assignment outside the protected area in order to prevent excessive exposure to any one individual.

5. RADIATION DETECTION AND MEASUREMENT PROCEDURES

A. Office of Civil Defense Radiological Monitoring Network

5.01 The primary purpose for radiological monitoring is for the protection of personnel. To successfully do this, information concerning the time, location and size of the detonations, type of burst, expected radiation intensities and the arrival time of the fallout should be available to the shelter locations.

5.02 The Office of Civil Defense (OCD) has established an extensive network of radiological monitoring stations throughout the country, including selected stations of agencies such as the Weather Bureau, Federal Aviation Agency, the Agricultural Department and others. These stations, in addition to Fixed Monitoring Stations in the communities and cities, will function in a nuclear emergency to feed information to the local civil defense Emergency Operating Centers (EOC) and from there reports are made to their local EOC's, the state EOC's and to OCD Regional and National EOC's for evaluation. It will then be possible to determine the radiological situation in most parts of the country.

5.03 The District Emergency Relocation Center will obtain attack and post attack information from State civil defense sources through Associated Company representatives co-located at the District ERC. The Long Lines National Emergency Control Center (NECC) will obtain similar information from Federal sources.

5.04 Arrangements should be made at each shelter location by the Civil Defense Coordinator with the local Civil Defense Director to obtain radiological information concerning the maintenance area for which the Long Lines office is responsible. Since the maintenance territory may extend over several Civil Defense jurisdictions, similar arrangements should be made with each local Civil Defense Director.

5.05 Radiological information received from the local Civil Defense EOC should be recorded on a map of the territory in which the shelter location is situated. Each shelter location that will receive this information should use maps that are of the same type as those used by the local Civil Defense EOC.

5.06 The exchange of radiological information within Long Lines will be through the communication network established as a part of the National Emergency Control Center (NECC) operation as covered in BSP 002-501-101 LL.

B. Protection for Monitors

5.07 It is essential that monitoring squad members be protected as much as possible against radiation and other hazards to which they may be exposed in the course of their duties. This involves minimizing external exposures from contaminated objects and radioactive dust, and internal exposure from intake of radioactive material via inhalation of dust, eating, drinking or smoking, and absorption through abrasions in skin surfaces.

5.08 The following protective covering, or its equivalent should be available, or readily obtainable for use by monitoring squad members.

Clothing - Neoprene coated fabric jacket and trousers, or coveralls.

Gloves - Leather palm type.

Safety Goggles - Spectacle or coverall type.

Hat - Cotton cap or impact resistant hat or helmet.

Shoe Covering - Any type of cleanable or disposable covering.

C. Monitoring Techniques

5.09 The techniques of monitoring for radiation are covered in the "Handbook for Radiological Monitors" published by the Office of Civil Defense. Each shelter requires a copy of this manual. In addition, a copy should be available for each monitor assigned to that shelter. The "Handbook for Radiological Monitors" can be obtained from the local Civil Defense Director.

D. Alert Period

5.10 As soon as an indication is received that an attack is threatening, the radiological monitors should immediately make operational tests on all instruments and charge each dosimeter, following the instructions available for the type of instruments being used.

E. Attack Condition

5.11 Upon receipt of an attack warning or any other indication that fallout is beginning, the monitor will:

(a) Charge his personal dosimeter and keep it with him at all times.

(b) Begin monitoring operations in the shelter following the procedure outlined in the "Handbook for Radiological Monitors".

F. Fallout Arrival

5.12 Fallout arrival is indicated by an unsheltered survey meter reading of .5 roentgens. All non-essential personnel, not already in sheltered areas should be moved to their assigned shelter space. Fallout arrival must be reported as outlined in Section 8.

5.13 The monitors will place charged dosimeters in the shelters and begin measuring the accumulated dosage in those areas.

5.14 Surveys of the building may be continued by the monitors so long as the unsheltered radiation levels are below 50 r/hr. While making the survey, each Monitor should check his dosimeter at regular intervals so that the exposure limits in Section 4 will not be exceeded.

G. Continuation of Essential Work Operations

5.15 In some sections of the building, radiation levels may be low enough to permit employees to handle service operations on a specified time basis.

5.16 Each person working outside the shelter must carry a dosimeter or, if the radiation levels are fairly constant throughout the area in which he will work, a dosimeter should be placed in a centralized location in the work area.

5.17 The amount of time each person spends in the exposed area must be carefully controlled by noting the dosimeter readings at regular intervals so that the exposure limits in Section 4 are not exceeded.

H. Marking Contaminated Areas

5.18 Any area of the building that has a radiation level of 50 r/hr or above is considered contaminated and is to be marked with appropriate warning signs.

5.19 For marking purposes use white cardboard, lettered in red and fastened to the wall in a prominent place. The card should show:

(a) The amount of radiation in r/hr

(b) The exact time (date, day, hour, minute) of reading.

(c) Name of the monitor who made the reading.

5.20 The Radiological Monitor will advise the Civil Defense Coordinator or the Shelter Manager of all the areas in the building that are contaminated. This information should be marked on a floor plan of the building for future reference.

5.21 Radiation readings above 2 r/hr in a shelter area indicate an undesirable situation. Monitors should attempt to find areas that are less contaminated and recommend to the Shelter Manager that the personnel be moved to the less hazardous areas.

6. OUTSIDE PLANT MAINTENANCE

6.01 Outside Plant maintenance and restoration should not be attempted until advice has been received from the local Civil Defense EOC that radiation intensities have decreased to a point where maintenance personnel may be safely dispatched.

6.02 Maintenance personnel should carry survey meters to check for radiation en route to the work site and wear dosimeters to record the accumulated dose.

6.03 During the work operation, attention should be given to protective covering for maintenance personnel. After the work, all personnel should be decontaminated before they are released to go home or re-entry into a shelter.

6.04 The exposure of maintenance personnel must not exceed the limits established in Section 4.

7. DECONTAMINATION

A. General

7.01 Decontamination is the reduction or removal of contaminating radioactive material from personnel, objects, areas and structures.

B. Personnel Decontamination

7.02 Personnel entering the shelter after the arrival of fallout or returning from recovery operations should be monitored for radioactive contamination.

7.03 Decontamination should be carried out in a space apart from uncontaminated shelter or work areas so that personnel, after being checked as uncontaminated, can pass into the shelter.

7.04 The checkpoint selected should have a background radiation level below 30 MR/HR.

7.05 Clothing - Decontamination of clothing can be accomplished with utensils normally used for removing dust:

(a) Whisk brooms

(b) Brushes

(c) Vacuum cleaners

(d) Laundry equipment

7.06 Using the low level survey meter and listening to the clicks, produced by the radiation, on the headset associated with the instrument:

(a) Brush or shake the clothing to remove dry dust.

(b) Monitor again with the survey meter

(c) Vacuum clothing if contamination is still indicated and vacuum equipment is available.

(d) Monitor again. If contamination is still indicated, the clothing must be discarded.

(e) Brush and wash clothing, if water is available. If contamination is still detected, place the clothing in a closed, suitably marked container and allow natural radiation decay to occur.

7.07 Personnel - Removal of contamination from person:

(1) Washing with soap and water, followed by adequate rinsing will usually remove most of the contamination.

(2) Avoid scrubbing with a brush to prevent breaking the skin and allowing the contamination to enter the blood stream.

(3) Particular attention should be given to hair brushing, and washing, cleaning skin folds and creases and cleaning under finger nails.

(4) Soap and rinse water should be kept clear of the eyes and other body openings.

(5) Decontamination showers should be used for this purpose in buildings so equipped, providing there is no shortage of water.

C. Area Decontamination

7.08 Building openings should be closed prior to the arrival of fallout, if possible, to minimize the requirement for decontamination.

7.09 In buildings damaged by the blast, certain precautions may be taken as soon as safety permits, to prevent the entrance of contamination.

(a) Openings caused by the blast, such as broken doors and windows, should be closed.

(b) All available material, which could be used as covering, should be sought out and secured over the opening - such as burlap, canvas, plastic, etc.

7.10 Basically, fallout contamination is in the form of visible dust and can be removed by a good housecleaning job, leaving the surface clean to the naked eye.

7.11 Decontamination can be best accomplished by:

(a) Brushing, sweeping and dusting, using dry mops, push brooms and dust cloths.

(b) Vacuum cleaning, using hand or floor vacuums or electric brooms.

(c) Scrubbing with soap or mild detergents and water.

7.12 Accumulated dust must be disposed of carefully in closed containers and suitably marked and protected for eventual removal.

7.13 Decontamination of large areas, where it is necessary to enter in order to perform emergency service operations and restoration, may require assistance from outside sources. In cases such as this, the District Emergency Relocation Center (ERC) should request the help of the Associated Company, the Civil Defense or other available agencies. If further assistance is required, the Area ERC or the National Emergency Control Center should be requested to provide the needed help.

8. REPORTING

8.01 Reporting on the radiological situation at a Long Lines shelter location is necessary in order to keep higher management informed of the radiation danger at Long Lines locations throughout the country.

8.02 Reports on the dose rate and the cumulative dose shall be made from each shelter area to the District ERC. The District will relay the reports to the Area ERC and the Area to the NECC as required. The reporting procedure to be used is outlined in Figure 2.

8.03 Form P2282 is to be used for recording the radiological information at each shelter area. The District ERC will use this form to record reports from the shelters in the District. Figure 3 is an example of the reporting log. Form P2282 can be obtained from the Long Lines Stationery Stockroom in New York, in pads of 25 each.

8.04 Damage assessment reports to the ERC's and the NECC, covered in BSP 002-501-101 LL may require information other than that listed in the guidelines of Figure 2. This information and any other pertaining to plant or service damage or restoration should be reported following procedures established in the NECC operational instructions.

9. EXPOSURE RECORDS

9.01 Records on personnel exposure must be maintained as accurately as possible. As each person enters the shelter, including

Monitors, they will be issued an Exposure Record Card, Form P2283. An example of this form is shown in Figure 4.

9.02 Persons receiving an exposure prior to entering the shelter should record this on their card, if known. If not known, an estimate should be made.

9.03 The Radiological Monitor will inform the shelter occupants of the daily accumulated dose taken from the dosimeter in the shelter and each person will be responsible for recording this information on the exposure record card.

9.04 Monitors and other persons that are assigned a dosimeter will record the accumulated dose reading on their exposure record card each 24 hours.

9.05 Form P2283 can be obtained from the Long Lines Stationery Stockroom in New York in pads of 25 each. Each shelter location should order a sufficient number of these forms.

FIG. 1

AT&T CO.
Long Lines Dept.
BSP 002-501-908

P2281
(3/71)

RETENTION CODE
A111P-000CG

INSPECTION, MAINTENANCE AND CALIBRATION LOG FOR RADIOLOGICAL INSTRUMENTS

TYPE OF INSTRUMENT: CDV –

SERIAL
NO. _____

DATE	ACTION	REMARKS	INIT.

DIRECTIONS – SEE REVERSE

(FRONT)

DIRECTIONS

1. Attach this Log to the Instrument or keep Inside of carton.

2. Enter CDV type of instrument and serial number on face of Log.

3. Inspect instrument and perform operational check as described in the Instruction and Maintenance Manual every 6 Months.

4. Enter on Log In appropriate column . . .

   a. DATE –
      Show date of Inspection.

   b. ACTION –
      Show action taken, as for example –
      "Inspected and Batteries Replaced"
      "Sent to _____ for Repair"
      "Recalibrated Locally"
      "Returned from _____ "

   c. REMARKS
      Enter results of Inspection or other action taken opposite appropriate entry as . . .
      "OK"
      "Can't Calibrate"
      "Repaired OK"

   d. INITIALS –
      Enter initials of person making inspection or taking action.

(BACK)

RADIOLOGICAL REPORTING SCHEDULE

Period	Measurement And Time Of Measurement	Shelter To Dist. ERC	Dist. ERC To Area ERC	Area ERC To NECC
(A) Between the Attack Warning and Fallout Arrival	When dose rate is less than .5 r/hr observe instruments regularly at least every 10 mins. Report "No Fallout at 1000 and 2200 EST	10 Mins. after the hour of measurement	No Report Required	No Report Required
(B) Arrival of Fallout (F)	When dose rate is .5 r/hr or greater report immediately	Immediately after measurement	Upon receipt	Upon receipt of representative reports from the Districts Note 1
(C) F thru F+12	Dose Rate Hourly on the hour Dose Twice daily at 1000 and 2200 EST	10 mins. after the hour of the measurement	NOTE 3	Note 2
(D) F+13 thru F+24 hours	Dose Rate Every three hours at 0100, 0400, 0700, 1000, 1300, 1600, 1900 & 2200 EST Dose Twice daily at 1000 and 2200 EST	10 mins. after the hour of the measurement		
(E) F+25 thru F+48 hours	Dose Rate Every six hours at 0400, 1000, 1600, 2200 EST Dose Twice daily at 1000 and 2200 EST	10 mins. after the hour of the measurement		
(F) After F+48	Dose Rate and Dose Twice daily 1000 and 2200 EST	10 mins. after the hour of measurement		

Note 1 Reports to the NECC by the Area ERC's shall be made to indicate when Fallout has arrived at sheltered locations.

Note 2 Reports to the NECC by the Areas, after the arrival of Fallout has been reported, shall be made only if the dose rate within the shelter rises above 10 r/hr or total accumulative dose rises above 75 r/hr.

Note 3 Reports to the Area by the Districts after reporting the arrival of fallout shall be made only if the dose rate within the shelter rises above 10 r/hr or the total accumulative dose rises above 75 r/hr.

FIGURE 2

ISS A, SECTION 002-501-908 LL

A.T.&T. Co.
Long Lines Dept.
BSP 002-501-908 LL

P 2282
(3-71)

RETENTION CODE
A111P-02000

FIGURE 3

RADIOLOGICAL REPORTING LOG

OFFICE _____

SHELTER
LOCATION _____

FLASH REPORT (0.5 R/HR. OR MORE)
ARRIVAL OF FALLOUT (F)

DATE _____
TIME _____
DOSE RATE _____ r/hr
TIME SENT TO THE
DISTRICT ERC _____

NOTE: REPORT OF FALLOUT WILL BE MADE AS SOON AS THE DOSE RATE REACHES 0.5 R/HR.

F+1 THRU F+12 (HOURLY ON THE HOUR)

DATE _____

TIME	DOSE RATE
1. _____	_____ r/hr
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. _____	_____
7. _____	_____
8. _____	_____
9. _____	_____
10. _____	_____
11. _____	_____
12. _____	_____

ACCUMULATED DOSE
TIME
1000 EST _____ r
2200 EST _____ r

F+13 THRU F+24 (EVERY 3 HOURS)

DATE _____

TIME	DOSE RATE
1. 0100	_____ r/hr
2. 0400	_____
3. 0700	_____
4. 1000	_____
5. 1300	_____
6. 1600	_____
7. 1900	_____
8. 2200	_____

ACCUMULATED DOSE

TIME
1000 EST _____ r
2200 EST _____ r

F+25 THRU F+48 (EVERY 6 HOURS)

DATE _____

TIME	DOSE RATE
1. 0400	_____ r/hr
2. 1000	_____
3. 1600	_____
4. 2400	_____

ACCUMULATED DOSE

TIME
1000 EST _____ r
2200 EST _____ r

AFTER F+48 (TWICE DAILY AT 1000 AND 2200 EST)

DATE TIME	DOSE RATE	ACCUM. DOSE
	_____ r/hr	_____ r

NOTES:
1. ALL TIMES EST (OR EDST)
2. IF THERE IS A SIGNIFICANT INCREASE IN THE RADIATION AFTER F+12, INCREASE THE FREQUENCY OF THE READINGS.
3. ALL REPORTS OF DOSE READINGS WILL BE CUMULATIVE FROM ARRIVAL OF FALLOUT.

FIG. 4

AT&T
LL Dept.
SECT 002-501-908

RETENTION CODE
10R-100KC

P2283
(3/71)

PERSONNEL RADIATION EXPOSURE RECORD

Name _____

Shelter Loc. _____

I. D. Card No. _____

Date(s) of Exposure(s)	Daily Dose	Total Dose to Date	Initials

(FRONT)

Date(s) of Exposure(s)	Daily Dose	Total Dose to Date	Initials

UPON COMPLETION – FORWARD TO AREA MEDICAL DEPT.

(BACK)