LESSON PLAN

PART I
COVER SHEET

LESSON TITLE: CDV 715 and CDV 717 Survey Meter

TRAINING METHOD: Demonstration - Performance

REFERENCES: FEMA, SM 5.1, Handbook for Radiological Monitors
CDV 715 and CDV 717 Instruction and Maintenance Manual
FEMA Handbook, CPG 2-6.4, Radiation Safety in Shelters

AIDS AND HANDOUTS: CDV 715 Survey Meter
CDV 717 Survey Meter
Attachment 1 - Illustration of CDV 715 Survey Meters
FEMA, SM 5.1, Handbook for Radiological Monitors

LESSON OBJECTIVE: Given an explanation and a demonstration of the CDV 715/717 Survey Meters, the student must properly perform all of the task steps listed. The student, during the final course exam, must also correctly answer questions that demonstrate mastery of three samples of behaviors listed below:

TASK STEPS:

1. Identify the components of the CDV 715/717 Survey Meters.

2. Perform an operational check of the CDV 715/717 Survey Meters.

3. Demonstrate how to read a CDV 715/717 Survey Meters.

SAMPLES OF BEHAVIOR:

1. State the purpose of the CDV 715/717 Survey Meters.

2. State the types of radiation the CDV 715/717 Survey Meters measures and detects.

3. Identify the components of the CDV 715/717 Survey Meters.

4. Identify the operational differences of the CDV 715/717 Survey Meters.

5. Identify the proper steps for using and reading the CDV 715/717 Survey Meters.

ORGANIZATIONAL PATTERN: Topical

SUGGESTED COURSE(S) OF INSTRUCTION: Disaster Preparedness Support Team
Shelter Management Team

STRATEGY: Explain cautions, warnings, and the purpose of the CDV 715/717 Survey Meters upon issuing the instruments to the students. During the student's performance, stress the samples of behaviors (i.e., purpose, type of radiation measured and detected, components, limitations, etc.)

LESSON OUTLINE:

MAIN POINT 1. PURPOSE AND DESCRIPTION OF THE CDV 715/717 SURVEY METERS
A. Purpose
B. Description

MAIN POINT 2. INSTRUMENT FAMILIARIZATION
A. Control Selector Switch
B. Zero Control

MAIN POINT 3. OPERATIONAL CHECK

MAIN POINT 4. MODIFICATION (CDV 717 Survey Meter)

MAIN POINT 5. USING THE CDV 715/717 SURVEY METERS
A. CDV 715
B. CDV 717

PART II
TEACHING PLAN
INTRODUCTION

ATTENTION: Radiological monitoring is an indispensable service during nuclear attacks are radiological accidents.

MOTIVATION: Monitoring is required shortly after a nuclear attack or accident until the hazard from radiological contamination diminishes to the point that normal operation may be resumed without significant danger.

OVERVIEW: Today's class will cover:

⇒ the purpose and description of the CDV 715/717 Survey Meters.
⇒ familiarization with the instruments.
⇒ how to perform an operational check on the CDV 715/717 Survey Meters.
⇒ modification of the CDV 715 Survey Meter (CDV 717 Survey Meter).
⇒ using the instruments

TRANSITION: Let's start by looking at the purpose of the CDV 715/717 Survey Meters.

BODY

MAIN POINT 1. PURPOSE AND DESCRIPTION OF THE CDV 715/717 SURVEY METERS.	
A. PURPOSE	A. The CDV 715/717 Survey Meters are portable monitoring instruments which measure gamma radiation dose rates as high as 500 roentgens per hour (R/hr). It is designed to be used in determining radioactive contamination levels that may result from an enemy attack or other nuclear disasters.
B. DESCRIPTION	B. Gamma rays pass through the metal case of these instruments and also through the walls of a metal can called an ionization chamber. The ionization chamber is sealed to keep out moisture and dust and to maintain a constant pressure. Some of the gamma rays produce charged particles inside the ionization chamber, and these charged particles are collected to make a tine electric circuit.

This electric circuit is amplified to make a much stronger current which moves the needle. If the survey meter is moved to a location where there is negligible gamma radiation, the needle will return to the zero position.

INSTRUCTOR'S NOTE: For Main Point 2, show the students the CDV 715/717 Survey Meters and identify the major components for them.

MAIN POINT 2. INSTRUMENT FAMILIARIZATION

Two controls are provided on the CDV 715/717 Survey Meters:
⇒ a control selector switch.
⇒ zero control

A. CONTROL SELECTOR SWITCH

A. The first, a selector switch with seven positions:
⇒ CIRCUIT CHECK
⇒ OFF
⇒ ZERO
⇒ x100
⇒ x10
⇒ x1
⇒ x0.1

On the x1 range, the measured exposure rate is read directly from the meter. On the x0.1, x10, x100 ranges the meter reading is multiplied by a factor of 0.1, 10, and 100 respectively in order to obtain the correct exposure rate.

B. ZERO CONTROL

B. The second control, the zero control, is used to adjust the meter reading to zero during the operational check and to adjust for "zero drift" during long periods of operation.

MAIN POINT 3. OPERATIONAL CHECK

Perform an operational check of the CDV 715/717 Survey Meters in a radiation-free area prior to use. Use the following steps to perform an operational check of your instruments:

⇒ Turn the selector switch to the zero position and allow at least two minutes for warm up.

⇒ Adjust the zero control to make the meter read zero.

⇒ Turn the selector switch to the CIRCUIT CHECK position and the needle should read within the red circuit check window. In some instruments, it may register higher. This is not considered a defect.

⇒Recheck the zero setting as the selector switch is turned to the four ranges: x100, x10, x1, and x.01. When only normal background radiation is present, the meter should read no more than two scale division upscale on any range except the x0.1 range. On the x0.1 scale, it can read up to five scale divisions.

NOTE: Use of the check source does not replace the need for calibrating the instrument. Also, the presence of external radiation may prohibit you from performing the operational check.

MAIN POINT 4. MODIFICATION (CDV 717 SURVEY METER)

Some of the CDV 715s are equipped with a removable ionization chamber attached to 25 feet of cable. This modification, called the CDV 717, will provide remote monitoring. The operating characteristics are identical to the CDV 715, except that the removable ionization chamber may be placed outside the shelter.

MAIN POINT 5. USING THE CDV 715/717 SURVEY METERS

After the operational check has been made, the survey meter can be used to measure the gamma radiation exposure rate as follows:

A. CDV 715

A. Hold the meter steadily in one location at about waist high off the floor and about two feet away from your body. Holding the meter away from your body will reduce the effect of shielding gamma radiation with your body.

Turn the range-selector switch clockwise (from x100 to x10 to x1 etc.) until you find the range position that results in the highest reading of the needle on the dial (NOT OVER 5!). Pause a moment or two at each range position to see how fast the needle climbs.

With the range-selector switch in the x0.1 position, it will take 10-15 seconds for the needle to stop moving. It will take less time for the needle to reach a steady reading on higher scales. The exposure rates is obtained by multiplying the dial reading by the scale.

When the dial reading is 0.5 or less, the range-selector switch should be switched one position clockwise to get a more accurate reading. If the needle climbs past 5, the range-selector switch should be switched to a higher scale.

B. CDV 717	B. All of the procedures for reading the CDV 717 are identical to those of the CDV 715. The only difference is the CDV 717 is designed for remote monitoring. The removable ionization chamber should be placed in a location three feet above the ground in a reasonable flat area at least 20 feet from the shelter.

CONCLUSION

SUMMARY: We have just covered the CDV 715/717 Survey Meters. Specifically we talked about:

- ⇒ the purpose and description of the CDV 715/717 Survey Meters.
- ⇒ familiarization with the instrument.
- ⇒ how to perform an operational check on the CDV 715/717 Survey Meters.
- ⇒ modifications of the CDV 715 Survey Meters.
- ⇒ using the instruments

REMOTIVATION: In the event of a nuclear attack or accident you will be required to use the CDV 715/717 Survey Meters or other radiation monitoring instruments. Be familiar with your equipment.

CLOSURE: This concludes this lesson.

TRANSITION: (Develop locally to transition to the next topic.)

PART III
EVALUATION
STUDENT PERFORMANCE STANDARDS

The following steps were completed by the student: **(* Must be done without error)**	**Yes**	**No**
1. Identify the components of the CDV 715/717 Survey Meters. *		
2. Perform an operational check of the CDV 715/717 Survey Meters. *		
3. Demonstrate how to read a CDV 715/717 Survey Meters. *		

TEST ITEMS

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1. LESSON OBJECTIVE: State the purpose of the CDV 715/717 Survey Meters.

QUESTION: (Multiple Choice)

Which of the following statement(s) DOES NOT correctly identify the purpose of the CDV 715/717 Survey Meters.

a. The CDV 715/717 Survey Meters are for ground surveys.
b. The CDV 715/717 Survey Meters are for monitoring stations.
c. The CDV 715/717 Survey Meters are used for community shelters.
d. The CDV 715/717 Survey Meters are used for general pre-attack operations.

KEY: d

REFERENCE: Main Point 1

2. LESSON OBJECTIVE: State the types of radiation the CDV 715/717 Survey Meters measures and detects.

QUESTION: (True or False)

The CDV 715/717 Survey Meters will measure gamma and detect beta radiation.

a. True
b. False

KEY: b

REFERENCE: Main Point 1

3. LESSON OBJECTIVE: Identify the components of the CDV 715/717 Survey Meters.

QUESTION: (Multiple Choice)

The CDV 715/717 Survey Meters have two controls. One is a zero control and the other is a selector switch with seven positions. The seven positions are:

a. ON, OFF, ZERO, x100, x10, x1, and x0.1
b. ON, OFF, ZERO, x1000, x100, x10, and x1.
c. CIRCUIT CHECK, OFF, ZERO, x100, x10, x1, and x0.1.
d. CIRCUIT CHECK, OFF, ZERO, x1000, x100, x10, and x1.

KEY: c

REFERENCE: Main Point 2

4. LESSON OBJECTIVE: Identify the operational differences of the CDV 715/717 Survey Meters.

QUESTION: (True or False)

The CDV 717 Survey Meter is designed for remote monitoring operations.

a. True
b. False

KEY: a

REFERENCE: Main Point 4

5. LESSON OBJECTIVE: Identify the proper steps for using and reading the CDV 715/717 Survey Meters.

QUESTION: (Multiple Choice)

To use the CDV 715 Survey Meter, hold the instrument waist high and two feet away from you. When you are monitoring switch to the next scale when:

a. The dial reading is 0.5 or less, the range-selector switch should be switched one position clockwise. If the needle climbs past 5, the range-selector switch should be switched to a higher scale.
b. The dial reading is 5 or less, the range-selector switch should be switched one position clockwise. If the needle climbs past 50, the range-selector switch should be switched to a higher scale.
c. The dial reading is 0.1 or less, the range-selector switch should be switched one position clockwise. If the needle climbs past 10, the range-selector switch should be switched to a higher scale.
d. The dial reading is 10 or less, the range-selector switch should be switched one position clockwise. If the needle climbs past 100, the range-selector switch should be switched to a higher scale.

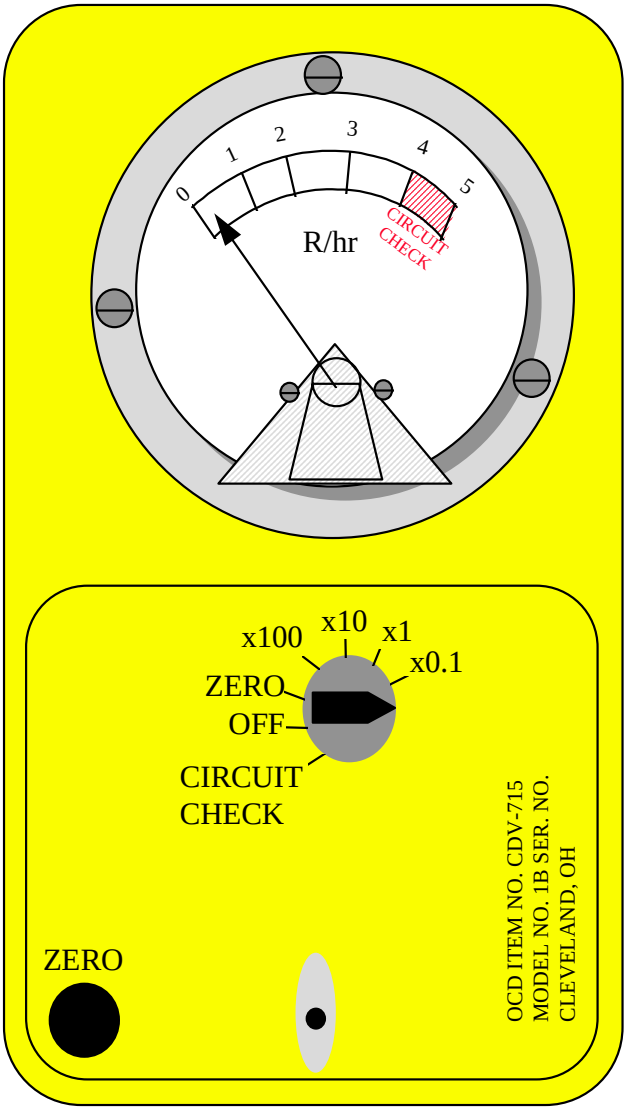
KEY: a

REFERENCE: Main Point 5

PART IV
RELATED MATERIALS

RTP F11 - Dosimeters and Chargers
RTP F12 - CDV 700 Survey Meter
RTP F14 - ADM-300A Multifunction Survey Meter

CDV 715 Survey Meter



Attachment 1 - Illustration of CDV 715 Survey Meters

TRAINING PACKAGE COMMENT REPORT

RTP #	RTP DATE

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