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CC 4

PROGRAM OF INSTRUCTION
PROJECT MONITORS

404552

A. General

1. The plan of instruction for radiological safety monitors will be practical in nature and, primarily, consist of field exercises and problems of monitoring in radiologically contaminated areas. These exercises and problems will be conducted over a 3 day period at the Nevada Proving Ground or the Los Alamos Scientific Laboratory. A prerequisite for monitors attending the course will be a reading knowledge of the fundamentals of radiological safety.

2. These fundamentals should include:

   a. Radioactivity

      1) Concept of radioactivity resulting from atomic detonations
      2) Definition of terms: radiation, alpha particle, beta particle, gamma radiation, decay, fission, curie, roentgen, mr/hr, radiation intensity, attenuation
      3) Range and energy relationships of fission product radiations

   b. Biological effects

      1) Concept of ionization
      2) External and internal radiation hazards
      3) Radiation dosages

         a) Lethal (acute and chronic)
         b) Probable early effects of acute radiation dosage over whole body
         c) Local effects, beta ray burns
         d) Symptoms of radiation sickness

   c. Recognition of radiation hazards

      1) Methods of detection of nuclear radiation: film, crystal, ionization, heat
      2) Survey meters
      3) Pocket dosimeters
      4) Photographic film badges

   d. Protection of personnel from radiation hazards

      1) Shielding characteristics of materials
      2) Control of radiation dosage
      3) Clothing and equipment
      4) Decontamination facilities
      5) Safety indoctrination

3. Sources of information for this fundamental knowledge will be found in Appendix 1 of this program.

4. An informational quiz on the fundamental knowledge of the monitors will be held just prior to the practical exercises of the instructional program.

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B. Training Period Scope of Instruction

1. General nature of operations - This period will be a presentation of the salient features of the forward area operations. Concept of operations to include number, location, and type of nuclear detonations. Pertinent items of Task Force and Task Group operations plans will be discussed along with the general plans for evacuation and re-entry. Safety responsibilities of project officers and monitors will be defined.

2. Techniques of monitoring

   a. Instruments of monitoring

      1) Ionization chamber (AN/PDR T-1B)
      2) Geiger-Mueller counter (MX-5)

   b. General procedures for operations in contaminated areas: surveying, marking areas, and controlling operations

   c. Radiological surveying, air and ground

   d. Evaluation of survey

   e. Control measures

   f. Field decontamination

   g. Responsibilities of monitors

3. Practical exercises

   a. Instrument calibration - This exercise will consist of a review of the operational characteristics of the ionization chamber survey meter; a demonstration of the methods of calibration and the calculations involved in the use of radiation standards. The demonstration will be followed by individual applicatory exercises in which the students will calibrate ionization chamber meters.

   b. Radiological monitoring - These exercises will consist of a review of monitoring procedures; a demonstration of the methods of radiation monitoring and calculations of exposure times. The demonstration will be followed by practical exercises in which each individual will use a portable ionization chamber and a G-M counter in location of radioactive areas and will calculate exposure times at definite points in the areas of radioactivity. Actual recovery missions will be simula ed with maximum realism.

   c. Radiation problems - These problems will act as a final review of the radiological safety instruction and will be of a practical nature so as to emphasize the salient features of the responsibilities of monitors. Situations that will probably be encountered in the field will be written into the problems to test students' individual initiative.

4. Review - This period will be utilized to review fundamental deficiencies that may have become apparent from the results of the radiation problems.

C. Standards of Proficiency

It is expected that project members selected for monitor training will have the confidence and respect of the personnel of the task units and projects of which they are members. Satisfactory completion of the radiological safety monitors' course will provide the Task Unit Commander and Project Leader with trained monitors of limited experience who can recognize radiation hazards and who can prescribe means of minimizing radiation exposure and methods of field decontamination.

APPENDIX 1

REFERENCE MATERIAL
FUNDAMENTALS OF RADIOLOGICAL SAFETY

1. Radioactivity

   a. "The Effects of Atomic Weapons", Los Alamos Scientific Laboratory (U.S. Govt. Printing Office, 1950)
   Chapter 1, Principles of an Atomic Explosion
   Chapter 7, Initial Nuclear Radiations
   Chapter 8, Residual Nuclear Radiation and Contamination

   b. "Radiological Defense", Volume II, Armed Forces Special Weapons Project (Restricted Security Information)
   Chapter 2, The Atomic Explosion
   Chapter 4, Characteristics of Subsurface and Surface Bursts

2. Biological Effects

   a. "The Effects of Atomic Weapons", Los Alamos Scientific Laboratory (U.S. Govt. Printing Office, 1950)
   Chapter 11, Effects on Personnel

   b. "Radiological Defense", Vol. II, Armed Forces Special Weapons Project
   Chapter 7, Effects of Atomic Explosions on Personnel

3. Recognition of Radiation Hazards

   a. "The Effects of Atomic Weapons", Los Alamos Scientific Laboratory, (U.S. Govt. Printing Office, 1950)
   Chapter 9, Measurement of Nuclear Radiations

   b. "Radiological Defense", Vol. II, Armed Forces Special Weapons Project
   Chapter 8, Recognition of Radiation Hazards

4. Protection of Personnel from Radiation Hazards

   a. "The Effects of Atomic Weapons", Los Alamos Scientific Laboratory (U.S. Govt. Printing Office, 1950)
   Sections A and D
   Chapter 12, Protection of Personnel
   Chapter 10, Decontamination

   b. "Radiological Defense", Vol. II, Armed Forces Special Weapons Project
   Sections 10.05 - 10.20, 10.61 - 10.89, Chapter 10, Protection of Personnel
   Sections 11.11 - 11.49, Chapter 11, Decontamination

ADDITIONAL REFERENCES

1. "Radiological Defense", Vol. I, Armed Forces Special Weapons Project (Official Use Only)
   Vol. III, Armed Forces Special Weapons Project (Unclassified)
   Vol. IV, Armed Forces Special Weapons Project (Restricted)

2. "Handbook of Atomic Weapons for Medical Officers", Dept. of Army Pam. 8-11, (1951)

3. "Assuring Public Safety in Continental Weapons Tests" USAEC, January, 1953 (U.S. Govt. Printing Office, 1953)