FILE Training Prog-W.P.

719975

December 8, 1949

U. S. Atomic Energy Commission
P. O. Box E
Oak Ridge, Tennessee

Attention: Dr. A. H. Holland, Jr.

Subject: Training of Personnel for Civilian Defense Program

Gentlemen:

Dr. John Bowers, ARC, Washington, has requested information regarding our willingness to participate in the training of personnel in connection with the Civilian Defense Program. He has also requested an outline of a proposed curriculum to serve as a guide in conducting the course.

In response to his request there are enclosed copies of a memorandum outlining our position with regard to this matter and copies of the proposed curriculum for transmittal to Dr. Bowers. He has requested that this information be made available to him as soon as possible.

Very truly yours,

OAK RIDGE NATIONAL LABORATORY

Original Signed By
C. N. Rucker

C. E. Rucker
Director

EMurphy/eor

Encs. (2)
(In Triplicate)

cc: C. E. Center
K. Z. Morgan
F. C. Vonderlage

COPY

Dr. A. M. Weinberg

December 6, 1949

Dr. Karl Z. Morgan

CIVILIAN DEFENSE PROGRAM

At the conclusion of the meeting held in Oak Ridge on November 11, at which time a civilian defense program was discussed, it was agreed that each area, Brookhaven, University of Southern California, Los Angeles, and Oak Ridge, would submit a curriculum for the training of Ph. D. physicists, who in turn will train other people for those civilian defense tasks particularly associated with atomic war.

The enclosure is an outline of a five to six week training program based on the assumption that Oak Ridge National Laboratory will be asked to train Ph. D. Physicists or equivalent University staff members as specified in the above-mentioned discussion. The outline is subject to possible revision as plans become more firmly formulated.

It is my belief that Oak Ridge National Laboratory is in a strong position to carry out the training of high level personnel in the civil defense program as conceived in the above-mentioned meeting. My reasons for believing this may be briefly summarized as follows:

1. The Health Physics Division has the experience of six years of educating and training persons in the field of radiation protection and could well undertake such a training program with a minimum of additional expense. The staff members of the Division are eminently qualified to work out in detail and to teach such a program. This is of particular advantage in the laboratory work where radioactive materials will be handled and radiation surveys conducted.

2. The Laboratory has a large survey section in Health Physics, skilled in the detection of radio-contamination which would serve to furnish the few necessary personnel to give applied field training in radiation protection. It may also be that the problem of procurement of very specialized equipment would be simplified by loan of existing equipment at Oak Ridge National Laboratory.

3. The question was raised at the above meeting regarding the necessity for adequate security and contamination control. It would appear that a limited area in which to work would be required (not an exclusion area. Preliminary inquiry reveals that adequate space is readily available at Y-12 which will not require any appreciable cost for alteration.

Assuming that Oak Ridge National Laboratory had full responsibility for planning and carrying out the instruction of the trainees, it is felt that the Oak Ridge Institute of Nuclear Studies could contribute significantly by making contact with the proposed trainees, and making necessary arrangements for travel and living accommodations during their stay in Oak Ridge, similar to the part the Institute so effectively played in last summer's Physics Symposium.

Karl Z. Morgan, Director
Health Physics Division

KZM:mcf
Enclosure

cc: E. E. Anderson
C. E. Mucker
F. Western
P. C. VonderLage
E. J. Murphy

CURRICULUM

For: Physicists or Teachers of Physics at the University Level

Time: Five or Six Weeks

Assumptions: Atomic and Nuclear Physics satisfactorily known.
Theory of ion chambers, counters, etc., satisfactorily known.

First Week: Orientation and Introduction to Health Physics

Orientation:

Purpose of the course
Summary of characteristics and effects of bombs dropped to date
A brief survey of the problems of radiological defense and their relations to other defense problems, supplemented by the showing of films.

Suggested Films: Operation Crossroads #1323
Atomic Power, "Army & Navy Screen", Magazine #86
Tale of Two Cities, "Army & Navy Screen", Magazine #74
Crossroads - Radiological Safety #1396

Class Work:

A. Review of those parts of Nuclear Physics which are specific to health or radiological physics to include:

1. Radioactivity - natural and induced
2. Interaction of radiation and matter (ionization, shielding, absorption, attenuation, etc.)
3. Fission process; characteristics of fission products

B. Review of methods and instruments for detecting radiation
General types of instruments
Limitations of each

Laboratory Work:

A. Calibration of instruments (both fiber and electronic)

Second Week: Health Physics and the Biological Effects of Radiation

Class Work:

A. Biological Effects of radiation to include:

1. Units for measuring radiation
2. Exposure from external sources of radiation

Curriculum Cont'd.

3. Hazards from sources taken into the body by inhalation, by ingestion, and through the skin.
4. Maximum permissible exposures (to whole body, to portions of the body); (industrial vs. emergency exposure)
5. Factors effecting tissue damage (tissue sensitivity, specific ionization, dose rate)
6. Lethal and mid-lethal doses
7. Acute radiation sickness
8. Chronic low level effects
9. Therapy and diagnosis
10. Showing of slides and films exhibiting effects of radiation on cells, etc.

Laboratory Work:

A. Use of survey meters - field work under both normal and adverse conditions (humidity, drafts, and temperatures)

B. Use of counters

Third Week: Atomic Bomb Phenomena

Class Work:

A. Bomb phenomena to include:

1. Destruction - blast and fire
2. Radiological effects (particles and energy emanations resulting from an atomic explosion; external and internal exposure)
3. Psychological effects
4. Types of explosions and specific effects of each - air burst, ground burst, under water burst
5. Medical aspects of atomic explosion - Japan studies
6. Range of different types of damage
7. Calculation of time for intensity of radiation to drop to certain value (i.e., estimate duration of hazard)
8. Calculation of total dose - to determine how long to keep teams in area, etc.
9. Means by which radiation sources are propagated

Laboratory Work:

A. Personnel monitoring (pocket meters, film badges)

B. Air monitoring (emphasize order of magnitude)

Fourth Week: Other Disaster Phenomena Associated with Atomic Warfare

Curriculum Cont'd.

Class Work:

A. Continuation of disaster phenomena to include:

1. Fall out problem - meteorological survey before bomb drop and survey after bomb drop
2. R. W., B. W., C. W., N. E.
3. Decontamination problem - gamma, beta, fission products, induced radioactivity
4. Survey of food, water, air, and supplies for contamination

Laboratory Work:

A. Contamination and decontamination of personnel, buildings, areas

Fifth and Sixth Week: Atomic Warfare Defense Problems

Class Work:

A. Working out defense plans for various types of localities, considering such problems as:

1. Organization needed - before explosion, at time of explosion, and after explosion
2. Personnel to be trained - medical, policemen, firemen, and monitors
3. Supplies needed
4. Types of surveys to be made - area, air, food and water
5. Plans for evacuation from hazardous area
6. Decontamination plans (identification of contaminant, best decontamination method)
7. Integration of radiological defense problem with other civilian defense problems

B. Civilian Defense Training:

1. Method of training non-technical persons
2. Visual aids
3. Psychological problems
4. Training of monitors so they will be:

a. Aware of true nature of hazard
b. Good salesmen
c. Careful to avoid disseminating <u>false</u> information
d. Able to survey area with reasonable accuracy; determine type of survey to be made; select instrument to do job (scan vs. measure); handle instruments under adverse conditions and to avoid contamination
e. Able to monitor people
f. Aware of need for protective clothing

5. Special instructions for all civilians (need for and nature of such instruction)