

MINING EQUIPMENT TEST FACILITY
OPERATIONS PROCEDURE

METF OP-01

February 11, 1983

Supersedes
METF AP-005
Dated June 1, 1982

SUBJECT: RADIATION PROTECTION PROGRAM

AFFECTED ORGANIZATIONS:

Mining Equipment Test Facility
Pittsburgh Research Center


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Project Manager

1.0 PURPOSE

This document defines the objectives, responsibilities, hazards and procedures necessary to establish and maintain the subject program supplementary to the existing overall program of occupational safety and health at the METF.

2.0 SCOPE

This program applies to all Boeing Services International, Inc. (BSI/METF) employees working with the nuclear sources installed in the Hydraulic Transport Research Facility (HTRF).

3.0 OBJECTIVE

The basic objective of this program is to establish and ensure the safe use of any and all nuclear gaging devices now located in, or planned for installation at, the HTRF. By adherence to this procedure, BSI management and its safety function will maintain occupational radiation exposure as low as is reasonably achievable and will comply with all applicable federal, state, local and BOM regulations.

4.0 LOCATION AND DESCRIPTION OF SOURCES

1. Five each Kay-Ray, model No. 7050B, density gaging devices, 500 mC activity, Cesium 137 radioisotope.

<u>Serial No.</u>	<u>Location</u>
6481	12" horizontal pipeline, under access road
6482	6" horizontal pipeline, in upper pipe gallery
6483	12" pipeline, @ 45° bend
6484	6" horizontal pipeline, under access road
6485	12" horizontal pipeline, in upper pipe gallery

2. Three each Kay-Ray, model No. 7050B, density gaging devices, 1000 mC activity, Cesium 137 radioisotope.

<u>Serial No.</u>	<u>Location</u>
6486	18" horizontal pipeline, under access road
6487	18" pipeline, @ 45° bend
6488	18" horizontal pipeline, in upper pipe gallery

3. SAI prototype density gage, developed by Science Applications International under DOE contract, no model or serial number, located in the 6-inch vertical pipeline in the pipe gallery.

Neutron Sources: 2 ea. Cf-252, 2 μ g (1.074 mC)
1 ea. Cf-252, 5 μ g (2.658 mC)

Gamma Sources: 2 ea. Cs-137 1 mC
1 ea. Cs-137 3 mC

4. SAI prototype density gage, developed by Science Applications International, under DOE contract, no model or serial number, located in the 18-inch vertical pipe gallery.

Neutron Sources: 2 ea. Cf-252, 15 μ g (8.055 mC)
1 ea. Cf-252, 30 μ g (16.11 mC)

Gamma Sources: 2 ea. Cs-137 20 mC
1 ea. Cs-137 50 mC

5. A SAI gage is planned for future installation in the 12-inch pipeline. Details and specifications are to be determined.

5.0 RESPONSIBILITIES

5.1 Project Manager

1. Designate a radiation protection officer.
2. Ensure that the radiation protection officer and other users are qualified and receive proper training.
3. Ensure that all applicable regulations are followed.

5.2 Radiation Protection Officer

1. Coordinate the safe use of the licensed material and ensure compliance with the applicable parts of the Title 10, Code of Federal Regulations.
2. Ensure that a personnel-monitoring program is maintained, including the maintenance of personnel-exposure records, the notification to individuals and their supervisors of exposures approaching the maximum permissible levels, and recommended remedial action.
3. Ensure that personnel are instructed in the proper use of radiation monitoring devices.
4. Ensure that periodic or special radiation surveys of all radionuclide and radiation facilities are conducted, and that records of all such surveys are maintained.
5. Monitor the purchasing, receiving, storing, processing, and dispensing of all radionuclides and/or radiation-producing equipment and maintain pertinent records.
6. Ensure that facilities to be used in conjunction with radionuclides and/or radiation-producing equipment are inspected to determine that appropriate radiation safety features are present.
7. Furnish consulting services to personnel at all levels of responsibility on all aspects of radiation protection.
8. Supervise and coordinate the waste-disposal program, including the keeping of waste-storage and disposal records.
9. Ensure the proper storage of all radioactive materials not in use.
10. Ensure that leak tests on all sealed sources are performed and that records of such tests are kept.
11. Obtain and maintain current copies of all Federal Regulations pertaining to radiation safety and have copies available of all applicable Nuclear Regulatory Commission (NRC) licenses.

12. Upon request, supply data concerning the METF radiation safety program to the Nuclear Regulatory Commission or any other applicable governing or regulatory agency.
13. Ensure that a copy of each medical examination report and other pertinent individual health records are kept on file permanently in the individual's medical folder.
14. Review all written operating procedures involving the use of ionizing radiation material and/or radiation-producing equipment.
15. Notify management immediately in any case of personnel exposure above the permissible limit, or any radiation situation creating a hazard.
16. Revise the subject procedures whenever necessary.
17. Maintain and control keys for all source shutter locks and maintain a log of when shutters are opened.

5.3 Operations Manager

1. Ensure that employees who regularly work near the sources are provided film badges.
2. Ensure that the sources are closed and locked if work is being performed on the detector.
3. Ensure that the sources and source holders are not moved or altered without a licensed person being present.
4. Ensure that all personnel are aware of the source locations.

5.4 Instrumentation Technicians

1. Wear film badges when working on gage instrumentation.
2. Immediately notify the HTRF operations engineer if there is any incident involving possible damage to the source housing or personnel exposure to radiation.

5.5 HTRF Employees

1. Notify the HTRF operations engineer immediately if there is any incident involving possible damage to the source housing or personnel exposure to radiation.
2. Never work in the vicinity of the sources without notifying the HTRF operations engineer.

6.0 FILM BADGE PROGRAM

1. All employees who regularly work in the vicinity of the sources will wear film badges.
2. The radiation protection officer will determine and originate the film badge services and maintain applicable records.
3. Gamma- and neutron-sensitive film badges will be worn.
4. Film badges will be exchanged on a monthly basis.

7.0 INSPECTIONS

1. The radiation protection officer will use the portable survey meter to verify acceptable radiation levels before any personnel work in the vicinity of the sources, and if any damage to the source housing is suspected.
2. Wipe tests will be conducted by a certified subcontractor at no longer than six-month intervals. The radiation protection officer will determine and originate the wipe test services and maintain applicable records.

8.0 CONTROL MEASURES

1. All sources are permanently installed in the HTRF pipe gallery. The HTRF is located in a fenced-in, limited-access government research center.
2. No BSI employee will modify, or in any way handle, sources or source housings. Only licensed manufacturers or subcontractors will perform those operations.
3. Shutters on sources will be closed and locked when the gages are not being used.

9.0 EMERGENCY PROCEDURE

1. In the event of an accident involving radiation, the BSI radiation officer will notify the BOM radiation protection officer, who will notify the NRC. In the event the BOM radiation officer cannot be reached, the BSI radiation protection officer will notify the NRC directly.
2. Rope off a 15-foot-diameter area around the suspected source head.
3. Post warning signs prohibiting access to the area.
4. Inform BOM radiation officer and BSI management of the situation and its present status.
5. Verbally inform all HTRF employees that they are to remain clear of the source areas, and if need be evacuate the building.

FORMAL TRAINING IN RADIATION SAFETY

Henry J. Owoc - Supervisor, Hydraulic Transport Research Facility

- o Kay-Ray Safety Seminar, 1981
- o METF Safety Seminar, scheduled for March, 1983

Raymond W. Vereneck - User, Instrumentation Technician

- o Kay-Ray Safety Seminar, 1981
- o METF Safety Seminar, scheduled for March, 1983

A. Wayne Himler - User, Instrumentation Technician

- o Kay-Ray Safety Seminar, 1983
- o METF Safety Seminar, scheduled for March, 1983

L.F. Miller - Radiation Protection Officer

- o Kay-Ray Safety Seminar, 1981
- o Training course in control of ionizing and nonionizing radiation, scheduled for 14-18 March, sponsored by Applied Health Physics. (See Attachment G for course description.)

Seminar Descriptions

Kay-Ray Safety Seminar, 1981

This seminar was conducted by Michael R. O'Brien, a Kay-Ray service engineer. Topics included radiation principles as related to Cesium-137 density gages, licensing limitation, permissible and actual exposure levels, and lockout procedures.

METF Safety Seminar, 1983

After the Radiation Protection Officer completes the Applied Health Physics Training course, he will conduct a local training course for all users and engineering personnel. This course will relate to specific METF sources. Topics to be covered will include:

- o principles and practices of radiation protection;
- o use of survey instrumentation and film badge results interpretation;
- o mathematics and calculations basic to the use and measurement of radioactivity;
- o biological effects of radiation.

EXPERIENCE

Henry J. Owoc - B.S. Chemical Engineering, University of Pittsburgh, April, 1968

- o BSI HTRF Supervisor - Supervised the use of all currently installed sources under the direction of the DOE Radiation Protection Officer.
- o Previous experience - Chemical plant project engineer - 3 yrs.
Nuclear plant process design engineer - 5 yrs.
Research operation and safety engineer - 2 yrs.
Nuclear plant design engineer - 5 yrs.

Raymond W. Vereneck - Four years of training and active duty in the U.S. Air Force in instrumentation and data acquisition/reduction

- o BSI Instrumentation Technician - Two years of on-the-job training in calibration and maintenance of existing Kay-Ray detector instrumentation.

A. Wayne Himler - Two years of instrumentation training at Penn Technical Institute. Additional courses in technical math and computers.

- o BSI Instrumentation Technician - Two years of on-the-job training in calibration and maintenance of existing Kay-Ray detector instrumentation
- o Previous experience - U.S. Air Force radar technician
Electronic technician
Power generation technician

Lawrence F. Miller - B.S. Electrical Engineering, Carnegie-Mellon University, 1972

- o BSI HTRF Senior Electrical Engineer - Two years on job training in use of existing Kay-Ray instrumentation, under the direction of the DOE Radiation Protection Officer
- o Previous experience - Electrical Engineer, U.S. Army Corps of Engineers - 7 yrs.
Electrical Test Engineer, nuclear powered aircraft carrier at Newport News Ship Building and Drydock Company - 1 yr.