

ADVANCED MEDICAL SYSTEMS OPERATING PROCEDURE

RESPIRATORY PROTECTION PROGRAM

ISP-30 Rev. 1/95

Page 1 of 9

1.0 PURPOSE: This procedure establishes guidelines for the use of respiratory protection at the Isotope Facility.

2.0 PRECAUTIONS AND LIMITATIONS:

- 2.1 Engineering and process controls (contamination control, use of contaminants, ventilation and other controls) shall be used to the extent practical to minimize airborne hazards. When these are not practical to control levels, AMS shall increase airborne monitoring and limit the intake by individuals by the control of access, limitation of exposure times and the use of respiratory protection equipment.
- 2.2 Respirators should be worn when directed by the RSO.
- 2.3 Respirators should not be worn continuously for periods greater than two (2) hours.
- 2.4 Respirator relief should be a minimum of one (1) hour between each two (2) hours of use.
- 2.5 Respirator users may seek relief in the event of a respirator malfunction, physical or psychological distress, procedural or communication failure, a significant deterioration of operating conditions or any other condition that may require relief.
- 2.6 Quantitative fit testing is not used at AMS, therefore, no protection factors are utilized during respiratory equipment use.

Prepared by: Robert Meschter

Approved by: *R Meschter*

Date: *1-24-95*

- 2.7 All respiratory protection equipment shall be certified by the National Institute for Occupational Safety and Health/Mine Safety and Health Administration (NIOSH/MSHA).

3.0 INSTRUCTIONS:

3.1 Medical Evaluation of Personnel

- 3.1.1 Prior to first use and annually thereafter, each respirator user shall receive a medical examination.
- 3.1.2 The examining physician will complete a respirator examination report indicating whether or not an individual is physically qualified to wear a respirator.
- 3.1.3 As a minimum, the medical examination should consist of a medical history, physical exam and spirometry screening.
- 3.1.4 The medical history should consider the following:
 - a. Chronic obstructive and restrictive lung disease; chronic bronchitis, emphysema, pneumoconiosis, fibrothorax, asthma, etc.
 - b. Ischemic heart disease; coronary insufficiency and myocardial infraction.
 - c. Benign and accelerated hypertension.
 - d. Hemorrhagic disorders; vascular hemophilia, hypersplenism, thrombocytopenia, purpura, etc.
 - e. Thyroid disorders or cystic fibrosis.
 - f. Epilepsy grand mal, focal, etc.
 - g. Diabetes mellitus.
 - h. Cerebrovascular accidents.
 - i. Facial abnormalities.
 - j. Kidney diseases.

- k. Conductive and sensorineural hearing loss.
- l. Serious defects in visual acuity.
- m. Ruptured ear drum.
- n. Skin sensitivities.
- o. Impaired or non-existent sense of smell.
- p. Alcoholism.
- q. Claustrophobia.
- r. Other disabilities which could render respirator use a hazard.

3.1.5 When exposure to airborne hazards in addition to radioactive contamination is involved, the medical examination will be augmented to screen for prior exposure history and include tests and examination for symptoms specific to that hazard.

3.2 Respiratory Equipment Training Program

3.2.1 Prior to first use of a respirator and annually thereafter, users shall have completed a Training Program consisting of the following:

- a. Discussion of the airborne contaminants against which the wearer is to be protected, including their physical properties, regulatory limits, physiological action, toxicity and means of detection.
- b. Discussion of the construction, operating principles and limitations of the respirator and the reasons the respirator is the proper type for the particular purpose.
- c. Instruction in procedures for ensuring that the respirator is in proper working condition.
- d. Instruction in fitting the respirator properly and checking for adequacy of fit.

- e. Instruction in the proper use and maintenance of the respirator.
- f. Discussion of the application of various cartridges and canisters available for air purifying respirators.
- g. Instruction in emergency action to be taken in the event of malfunction of the respiratory device.
- h. Review of radiation and contamination hazards, including the use of other protective equipment that may be used with respirators.
- i. Classroom and field training to recognize and cope with emergency situations.
- j. Any other special training as needed for special use.
- k. Hands on practice in donning and removal, as well as actions to be taken under emergency situations.

3.2.2 Complete Form ISP-30A, Respiratory Protection Training Record.

3.3 Respiratory Equipment Selection

3.3.1 Air purifying respirators shall not be worn in atmospheres containing less than 19.5% oxygen or Immediately Dangerous to Life or Health (IDLH). Additionally, these respirators shall not be worn in radioactive gaseous atmospheres.

3.3.2 The RSO in consultation with the Isotope Committee, when appropriate, shall specify the type of respiratory protection required.

3.4 Issuance and Control of Respirators

- 3.4.1 Upon receipt, all new respirators should be inspected and cleaned.
- 3.4.2 All radiological work involving respiratory protection shall be indicated on the RWP.
- 3.4.3 All respiratory equipment shall be maintained and issued by the Radiation Protection Department.
- 3.4.4 A list of all individuals qualified to wear a respirator should be maintained by the Radiation Protection Department.
- 3.4.5 When a non-disposable respirator is issued for use, the respirator number should be assigned to the requesting individual for that period of use. Where feasible, individuals should have permanently assigned respirators which have been marked indicating to whom it has been assigned.
- 3.4.6 Only individuals that have been medically screened and properly trained, for a specific type of respirator, shall be issued a respirator for use.
- 3.4.7 Any person that has hair (stubble, moustache, sideburns, beard, low hairline, bangs, etc.) which passes between the face and the sealing surface of the facepiece of the respirator, shall not be permitted to wear such a respirator.
- 3.4.8 Any person who has hair which interferes with the function of a respirator valve shall not be permitted to wear such respirator.
- 3.4.9 At no time during use may other items (i.e., temple bars, straps to glasses, head covering, etc.) which interfere with the seal of a respirator to the wearer be allowed.
- 3.4.10 Contact lens should not be worn with a fullface respirator.

3.5 Use of Respirator

3.5.1 Inspect the respirator before and after each use for the following:

- a. Cracks in the straps and suspension.
- b. Cracks/dryrot of facepiece material.
- c. Cartridge mounts.
- d. Integrity of inhalation and exhalation valves and seals.
- e. Integrity of speaking diaphragms.
- f. Lens (minimal scratches and no cracks).
- g. Check filter radiation level - if greater than two (2) mR/hr, replace the filter.

3.5.2 Perform a Negative Pressure Test.

- a. Close off the inlet opening of the canister by covering it with the palm of the hand, gentle inhale so that the facepiece collapses slightly and hold breath for ten (10) seconds.
- b. If the facepiece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is satisfactory.

3.5.3 Perform a Positive Pressure Test.

- a. If necessary, remove the exhalation valve cover, close off the exhalation valve with the palm of the hand and exhale gently so that a slight positive pressure is built up in the facepiece.
- b. If no outward leakage of air is detected at the periphery of the facepiece, the face is satisfactory.

NOTE: Respirator is not to be used if the exhalation valve cover is not in place.

- 3.5.4 Radiation Protection personnel and crew supervisors shall be responsible for periodic observation of individuals who wear respiratory equipment while working. Any observed misuse, malfunctions, etc., shall be immediately reported to the RSO for corrective action.

3.6 Respirator Maintenance

- 3.6.1 The RSO will designate those individuals who may repair respirators or replace parts (other than filter replacement).
- 3.6.2 Respirators should be maintained daily, after use.
- 3.6.3 Sanitation and decontamination, if required, should be performed using alcohol pads.
- 3.6.4 Inspect valves (look for hair or lint affecting valve seal), elastic and rubber parts - replace or clean as required.
- 3.6.5 Survey the facepiece to ensure they do not exceed:
- a. Loose surface contamination in excess of 1000 dpm/100cm².
 - b. Fixed contamination in excess of 0.2mrem/hr at one (1) inch.
- 3.6.6 Respirators should be packed and stored so that they are not damaged by adjacent equipment or twisted out of their normal configuration by improper storage.
- 3.6.7 Parts acquisition and replacement.
- a. The RSO is responsible for acquiring and maintaining an inventory of spare replacement parts for respiratory equipment.
 - b. All parts shall be that specified by the manufacturer as being suitable replacements for that specific respirator.

3.7 Evaluation of Program Effectiveness

3.7.1 Workers are encouraged to relate any observed problems with respiratory protective equipment such as:

- a. Inability to breathe without objectional effort.
- b. Inadequate visibility.
- c. Inability to communicate.
- d. Inability to perform all tasks without undue interference.
- e. Lack of confidence in the facepiece fit.

3.7.2 Supervisors are to monitor respiratory work in progress for any problems which might effect the reliability of the Respiratory Protection Program.

3.7.3 Evaluation of protection.

- a. Any bioassay results correlated to air sampling data, should be reviewed. Evidence of uptakes linked to inhalation should be investigated, even if within permissible exposure limits.
- b. Positive interior facepiece smear results should be investigated and may include bioassay analysis of the worker who last used the facepiece, when required.

3.7.4 Program evaluation.

- a. The overall Respiratory Protection Program should be evaluated by the RSO, or by an outside auditor, on an annual basis.

RESPIRATORY PROTECTION TRAINING RECORD

ISP-30A

Name: _____ Soc. Sec. No.: _____

Employer: _____

*I have been trained to Advanced Medical Systems Operating Procedure
"Respiratory Protection Program", ISP-30.*

Comments: _____

Physical exam satisfactorily completed.

Verified by RSO: _____ Date: _____

Signature of Trainee: _____ Date: _____

Signature of Trainer: _____ Date: _____

Reviewed by RSO: _____ Date: _____

ADVANCED MEDICAL SYSTEMS OPERATING PROCEDURE

ISOTOPE TECHNICIAN TRAINING PROGRAM

ISP-31 Rev. 01/95

Page 1 of 5

- 1.0 PURPOSE: To develop a staff of training individuals capable of assisting the RSO and Isotope Handler by performing routing radiation safety-related checks and measurements.
- 2.0 SCOPE: This program is applicable to all individuals who will work independently in restricted areas at the London Road Isotope Facility for the performance of specified tasks.
- 3.0 OBJECTIVE: Upon completion of training, the candidate will be able to perform the following tasks:
- A. Safety assurance checks specified in ISP-4 and Form 4A.
 - B. Receipt of radioisotope shipping containers.
 - C. Release of packaged radioactive materials for transportation.
 - D. Calibration of survey instruments and meters.
- 4.0 REQUIREMENTS:
- 4.1 The training program shall consist of (1) approximately 3 days of classroom instruction on basic radiation theory and safety practices; (2) approximately 2 days of training on the procedures, methods and precautions required to perform given tasks; and (3) approximately 1 month of on-the-job training.

Prepared by: Robert Meschter

Approved by: *A. G. Meschter*

Date: 1-24-95

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- 4.2 A trained health physicist and other qualified instructors, under the direction of the RSO, shall provide the classroom instructions. The job-specific training and the on-the-job training shall be coordinated by the RSO and supervised by the RSO or an approved Isotope Handler.
- 4.3 For the classroom instruction, a written examination(s) shall be administered to determine comprehension of the material presented. The examination(s) shall be prepared, administered and scored by the instructor. The minimum passing grade shall be 80%.
- 4.4 An oral (supported by quiz) walk-through, job performance exam will be administered after completion of the on-the-job training. The examination shall be prepared and administered by the RSO. The minimum passing grade shall be 80%.
- 4.5 A certificate shall be awarded to each candidate who successfully completes the training.
- 4.6 Candidates who do not successfully complete the primary training shall be given additional training and retested.
- 4.7 Refresher training shall be provided on an annual basis and whenever there is a change in duties, procedures or regulations.
- 4.8 Documentation of all training shall be maintained by the RSO.
- 4.9 Prior to assuming duties as an Isotope Technician, the candidate's qualifications must be reviewed and approved by the Isotope Committee.

5.0 PROGRAM OF INSTRUCTION

- 5.1 Basic Radiation Therapy and Safety Practices Course (24 Hours)
- 5.2 Job Specific Training
 - 5.2.1 Radiation Surveys (1.5 Hours)
Knowledge of unrestricted and restricted areas;

Proper selection and operation of portable survey instrumentation;

Notification procedures; proper documentation and posting of areas.

5.2.2 Contamination Surveys (2.5 Hours)

Proper technique for sample collection;

Proper selection of counting equipment;

Smear counting and analysis procedures;

Isolation and proper tagging;

Procedures for performing personnel body contamination checks;

Notification procedures

5.2.3 Instrumentation (2 Hours)

Knowledge in procedures for operation and calibration of survey meters, counting equipment, air monitors;

Inspecting and tagging out inoperative instruments.

5.2.4 Air Monitoring (2 Hours)

Knowledge of operation and proper functioning of the permanent air monitoring system;

Location of sampling lines, use and operation of portable air samplers, inspection of air monitor chart and alarms;

Notification procedures.

5.2.5 Radiation Work Permit Coverage (1.5 Hours)

Obtain adequate information about the job;

Identifying, monitoring, mitigating and controlling direct radiation hazards;

Proper methods for locating and controlling contamination hazards;

Demonstrating proficiency in the use of anti-contamination clothing and respiratory equipment.

5.2.6 Waste Management (1 Hour)

Solid waste generation, handling, packaging for disposal;

Liquid waste management;

Designated waste handling and storage areas;

Notification procedures.

5.2.7 Radioactive Material Receipt/Shipping Procedures (1.5 Hours)

Survey and contamination requirements;

Documentation requirements - inventory control;

Handling and storage procedures, storage areas;

Notification procedures.

5.2.8 Emergency Action Plan (4 Hours)

Familiarization with facility alarm system and response activities of civil agencies;

Knowledge of Emergency Pre-Plan;

Maintenance and testing of emergency generator, fire pump;

Location of potential chemical and radiation hazards.

5.3 On-the-Job Training

5.3.1 Performance of each task as outlined in 3.0 a minimum of two times under supervision.

5.4 Copies of written quizzes, exams and evaluation forms are attached.

5.5 Documentation forms for job specific and on-the-job training are attached.

- 5.6 A certificate of training issued to Isotope Technician candidates who successfully complete the training program is attached.

ISOTOPE TECHNICIAN JOB PERFORMANCE EVALUATION

85 Points

Candidate: _____

Date: _____

RSO: _____

	<u>SATISFACTORY</u>	<u>UNSATISFACTORY</u>
1. Daily Checks	_____	_____
2. Use of Survey Instruments	_____	_____
3. Use of Well Counter	_____	_____
4. Analysis of Wipes	_____	_____
5. Knowledge of Hazards	_____	_____
6. Generator Test	_____	_____
7. Air Monitor Calibration	_____	_____
8. Analysis of Air Samples	_____	_____
9. Gamma Alarm Settings	_____	_____
10. Air Monitor Calibration	_____	_____
11. Receiving Radioactive Material	_____	_____
12. Shipping Radioactive Material	_____	_____
13. Survey and Wipes	_____	_____
14. Calibration of Instruments	_____	_____
15. Application of RWP	_____	_____
16. Emergency Plans	_____	_____
17. Use of Anti-C Clothing	_____	_____
18. Personal Contamination	_____	_____
19. Methods for Reducing Exposure	_____	_____
20. Surface Contamination Limits	_____	_____
21. Decontamination Methods	_____	_____

Comments:

ON-THE-JOB TRAINING RECORD FOR ISOTOPE TECHNICIANS

STUDENT NAME: _____

UNIT #	COURSE IDENTIFICATION	# HOURS	STUDY AIDE	LOCATION/DATE ATTENDED	TESTING RESULTS	STUDENT SIGNATURE	INSTRUCTOR SIGNATURE
ISP 4	Daily Checks						
ISP 2	Unrestricted Area Surveys						
ISP 2	Unrestricted Area Wipes						
ISP 5.1	Emergency Generator Test						
ISP 10	Generator Battery Check						
ISP 7	Air Monitor System						
ISP 6	Gamma Alarm Function						
ISP 6	Contaminated Water Level						
ISP 8	Air Monitor Calibration						
ISP 23	Survey Meter & Dosimeter Calibration						
ISP 13	Receipt of Rad. Material						
	Release of Rad. Material to Carrier						
ISP 2	Restricted Area Surveys						
ISP 2	Restricted Area Wipes						

Isotope Committee Review Date: _____

Comments: _____

Member Officer Signature: _____

STUDENT NAME:

Isotope Committee Review Date:

Member Officer Signature:

Advanced Medical Systems, Inc.

121 North Eagle Street • Geneva, Ohio 44041

(313) 466-4671 FAX (216) 466-0186

CERTIFICATE OF TRAINING

ISOTOPE TECHNICIAN

This is to certify that _____ has successfully completed the Isotope Technician Training Program offered by Advanced Medical Systems, Inc.

The above-named individual has demonstrated to the Advanced Medical Systems, Inc. Isotope Committee that he/she can safely and competently perform the routine radiation safety procedures at the London Road Isotope Facility under U.S. Nuclear Regulatory Commission License No. 34-19089-01.

Signed,

RADIATION SAFETY OFFICER

Date

ADVANCED MEDICAL SYSTEMS OPERATING PROCEDURE

ISOTOPE HANDLER TRAINING PROGRAM

ISP-32 Rev. 01/95

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- 1.0 PURPOSE: To develop a staff of trained individuals capable of handling sealed and unsealed sources of radioactive material at the London Road facility.
- 2.0 SCOPE: This program is applicable to all individuals who will work independently and/or who can supervise others in restricted areas at the London Road Facility.
- 3.0 OBJECTIVE: Upon completion of training, the candidate will be approved by the USNRC as a qualified Isotope Handler and will be able to safely perform the following tasks:
- A. Operate the hot cell equipment.
 - B. Operate the source storage garden and related equipment.
 - C. Leak test and calibrate sources.
 - D. Install and remove sealed sources from machine heads and source exchange containers.
 - E. Maintain hot cell and related equipment.
 - F. Handle and package radioactive waste.
 - G. Prepare machine head and source exchange container shipping packages.

Prepared by: Robert Meschter

Approved by: *R Meschter*

Date: *1-24-95*

9702070067 *app*

4.0 REQUIREMENTS:

- 4.1 A prerequisite for the job classification is the successful completion of the Isotope Technician Program (see separate program for content).
- 4.2 The training program shall consist of (1) approximately 13 days of job-specific training on the procedures and equipment; and (2) approximately 3 months of on-the-job training.
- 4.3 Both the job specific and on-the-job training shall be coordinated by the RSO and supervised by a qualified Isotope Handler.
- 4.4 Oral and written examinations will be prepared and administered by the RSO. The minimum passing grade shall be 80%.
- 4.5 For on-the-job training, the performance of the candidate will be evaluated and documented by either the RSO or an approved Isotope Handler.
- 4.6 Candidates who are approved by the NRC will be awarded a Certificate of Training.
- 4.7 Candidates will continue their training until all of the above criteria has been met.
- 4.8 Refresher training shall be provided on an annual basis and whenever there is a change in procedures, regulations or the License.

5.0 PROGRAM OF INSTRUCTION

5.1 Prerequisites (15 Hours)

- (1) Successful completion of Isotope Technician Training Program.
- (2) Parts 5.2.1 - 5.2.3 of the Job Specific Training Program for Class 1 Service Engineers.

5.2 Job Specific Training

5.2.1 Isotope Facility Safety Procedures (6 Hours)

Review of ISP-1 Manual

5.2.2 LAB - Hot Cell Equipment (4 Hours)

Familiarization with manipulators and ancillary fixtures, etc.

5.2.3 LAB - Source Processing and Transfer (8 Hours)

Transfer out of cell;

Calibration;

Transfer out of Isotope Shop for shipment;

Contamination checks.

5.2.4 LAB - Storage Garden Operation (6 Hours)

Equipment;

Radiation hazards and safety.

5.2.5 LAB - Decontamination of Areas and Equipment (2 Hours)

Action levels and techniques.

5.2.6 Solid Waste Management (2 Hours)

Collection, packaging;

Processing for shipment, storage;

Documentation requirements.

5.2.7 Hot Cell Entry (1 Hour)

Review of procedure ISP-11.

5.2.8 Hot Cell Equipment Room (1 Hour)

HEPA Filter System;

Filter change procedure - ISP-12.

5.2.9 London Road Facility Security System (8 Hours)

Supervisory system - alarms, equipment;

Proper response - troubleshooting;

HVAC System;

Fire System.

5.3 On-the-Job Training

- 5.3.1 Performance of each task as outlined in 3.0 a minimum of two times under supervision.
- 5.3.2 Performance of source transfer procedures a minimum of six times.
- 5.4 Copies of written quizzes, exams and evaluation forms are attached.
- 5.5 Documentation forms for job specific and on-the-job training are attached.
- 5.6 A Certificate of Training issued to Isotope Handler candidates who successfully complete the training program is attached.

JOB SPECIFIC TRAINING RECORD FOR ISOTOPE HANDLERS

STUDENT NAME: _____

UNIT #	COURSE IDENTIFICATION	# HOURS	STUDY AIDE	LOCATION/DATE ATTENDED	TESTING RESULTS	STUDENT SIGNATURE	INSTRUCTOR SIGNATURE
1	ISP-1 Manual Review						
2	Solid Waste Management						
3	Hot Cell Entry						
4	Hot Cell Equipment Room						
5	Facility Systems						
LAB 1	Hot Cell Equipment						
LAB 2	Source Processing & Transfer						
LAB 3	Storage Garden Operation						
LAB 4	Decontamination						

Isotope Committee Review Date: _____

Comments: _____

Member Officer Signature: _____

ISOTOPE HANDLER TRAINING RECORD

CANDIDATE _____

OUTLINE OF TECHNICAL TRAINING AND INSTRUCTION	INSTRUCTOR INITIALS	DATE PERFORMED
1. Work Authorization and Radiation Work Permit Requirements		
2. Use of Radiation Monitoring Equipment		
3. Familiarization with Hot Cell Ventilation System and Safety Interlock System		
4. Transfer of Inert Materials Into Hot Cell		
5. Slave Manipulator System - Use and Dexterity		
6. Purpose and Use of Hot Cell Ancillary Equipment a) Crane and Electromagnets b) Beam Scales c) Miscellaneous Tools and Fixtures		

Advanced Medical Systems, Inc.

121 North Eagle Street • Geneva, Ohio 44041
(466-4671 FAX (216) 466-0186

CERTIFICATE OF TRAINING

ISOTOPE HANDLER

This is to certify that _____ has successfully completed the Isotope Handler Training Program offered by Advanced Medical Systems, Inc.

The above-named individual has demonstrated to the Advanced Medical Systems, Inc. Isotope Committee that he/she can safely and competently perform the duties necessary in full compliance with the procedures and conditions of U.S. Nuclear Regulatory Commission License No. 34-19089-01.

Signed,

RADIATION SAFETY OFFICER

Date

CANDIDATE _____

OUTLINE OF TECHNICAL TRAINING AND INSTRUCTION	INSTRUCTOR INITIALS	DATE PERFORMED
19. Source Transfer Between Machine Head and Exchange Container		
20. Packing/Unpacking of Machine Head and Source Exchange Shipping Container		
21. Operation of Source Storage Garden		
22. Hot Cell Machinery Maintenance		
23. Solid Waste Packaging		

CANDIDATE _____

OUTLINE OF TECHNICAL TRAINING AND INSTRUCTION	INSTRUCTOR INITIALS	DATE PERFORMED
13. Securing Hot Cell Equipment		
14. Transfer of Source to Transfer Monster from Cell Wall		
15. Source Transfer Between Transfer Monster and Source Exchange Container		
16. Source Transfer Between Exchange Container and Calibration Head		
17. Source Calibration and Documentation		
18. Source Surface Contamination Inspection		

CANDIDATE _____

OUTLINE OF TECHNICAL TRAINING AND INSTRUCTION	INSTRUCTOR INITIALS	DATE PERFORMED
7. Raising Hot Cell Floor Plug and Accessing Isotopes a) Floor Plug Removal b) Storage Capsule Identification c) Storage Capsule Removal		
8. Bulk Isotopes Storage and Floor Plug Insertion		
9. Decontamination of Cell Deck		
10. Source Receptacle Loading a) Use of Source Holder b) Application of Retaining Ring c) Inspection of Retaining Ring		
11. Transfer of source Into Cell Wall		
12. Hot Cell Decontamination and Waste Disposal		