



NATIONAL INSPECTION & CONSULTANTS

P.O. Box 10, Coraopolis, Pennsylvania 15108  
(412) 262-3092

Proc #:

N/A

Effective Date

4/8/81

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Rev #:

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SUBJECT:

APPLICABILITY:

RADIATION SAFETY MANUAL

(2nd Edition)

Issued to: \_\_\_\_\_

Date Issued: \_\_\_\_\_

Control #: \_\_\_\_\_

19012

Reviewed By:

*Charles R. Vigne*

Date:

4/8/81

Approved By

Date:

4/8/81



SUBJECT:

APPLICABILITY:

RSM

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GENERAL INFORMATION  
REVISION LISTING

Revision No.	Revision Date	Section	Page No.	Revision No.	Revision Date	Section	Page No.
2nd Edition Rev: #	5/19/80	ALL	ALL				
1	4/8/81	ALL	ALL				

I have reviewed and Approve the Revisions Listed, and Authorize their implementation.

CORP. R.S.O.

Date: 4/8/81

PRESIDENT

*Charles L. Vigne*

Date: 4/8/81





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STATEMENT OF POLICY & AUTHORITY

The Corporate Radiation Safety Officer is hereby directed to establish and maintain a Radiation Safety Program and Organization that meets the applicable requirements of: 10CFR, Parts 19, 20, 30, 34, 40 & 71, the applicable parts of 49CFR, and these requirements imposed by agreement states where NIC is licensed or performs Radiographic operations. The Program & Organization shall be implemented at each facility or job site that performs Radiographic operations within the scope of the 10CFR, this Radiation Safety Manual or as required by Agreement states, which will be identified by the Corp. R.S.O.

The Corporate R.S.O. is hereby given the authority and responsibility for the administration of the Radiation Safety Program and Organization. He shall have the authority and organizational freedom to identify operational, safety and/or quality problems directly to the Vice President of Engineering, to initiate, recommend or provide solutions, and to control further processing, delivery and/or use of deficient equipment, materials, safety/emergency procedures or unqualified personnel until proper disposition has been made. The President is hereby given the authority and responsibility to provide final resolution of conflicts between the Corp. R.S.O. and V.P. of Engineering, or other corporate staff that affect Radiation Safety/Quality.

Corporate Management is totally committed to support of this Radiation Safety Program and its effective implementation.

Charles R. Vigne  
President, NIC Inc.

4-8-81  
DATE



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SECTION I - RADIATION SAFETY MANUAL

APPLICABILITY GENERAL INFORMATION  
ORGANIZATION & RESPONSIBILITY

## 1.0 SCOPE

1.1 This Section describes the Radiation Safety Program as established by (NIC) to comply with established Federal, State and local Radiation Safety Requirements.

## 2.0 ORGANIZATION/QUALIFICATIONS

2.1 The Organizational Chart (Page 5 of 5) depicts the structure of the Radiation Safety and 10CFR71 Q.A. Program with reference to Management, Radiographers and Radiographer Assistants.

### 2.2 Corporate Radiation Safety Officer (R.S.O)

2.2.1 The Corporate Radiation Safety Officer is appointed by and reports to the President of NIC.

2.2.2 The Corporate R.S.O. will be appointed by virtue of a resume submitted to the President of NIC. He shall be thoroughly familiar with all phases of radiographic operations and applicable Federal, State and local regulations.

### 2.3 Division Radiation Safety Officer(s) (Div. R.S.O)

2.3.1 The Division Radiation Safety Officer (s) are appointed by the Corp. Radiation Safety Officer of NIC.

2.3.2 The Division R.S.O shall be thoroughly versed in all phases of radiographic operations, shall have had a minimum of two (2) years' experience as a Radiographer in Industrial Radiography, and must demonstrate a thorough understanding of applicable Federal, State and local regulations and this RSM.

### 2.4 Radiation Safety Supervisor (R.S.S)

2.4.1 The Radiographer Foreman or other qualified individual at a site or plant may serve as the Radiation Safety Supervisor. The R.S.S will be appointed by the Div. R.S.O. and approved by the R.S.O.

2.4.2 The R.S.S. shall be trained in NIC's Radiation Safety Program as required in NIC's RSM.



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ORGANIZATION & RESPONSIBILITY

## 3.0 RESPONSIBILITIES

### 3.1 Corp. Radiation Safety Officer

3.1.1 The Corp. R.S.O. is responsible for the administration of NIC's Radiation Safety Program as required by Federal, State and local regulations. His duties include, but are not limited to, the following:

- A. Preparation of, revisions to, and control of the Radiation Safety Manual (RSM).
- B. Administration of the Radiation Safety and 10CFR71 QA Program; including the maintenance and control of all applicable documentation, reports, etc.
- C. Serving as NIC's Liason Officer with the Nuclear Regulatory Commission and/or Agreement States on all Radiation Safety matters.
- D. Maintain control over the procurement of licensed material.
- E. Develop and maintain up-to-date Operating and Emergency Procedures.
- F. Establish and maintain a personnel radiation exposure monitoring program.
- G. Establish and maintain an internal inspection and QA Audit system.
- H. Establish and conduct a survey instrument calibration program.
- I. Assume control and institution of corrective action in emergency situations.
- J. Investigate causes of incidents and determine the necessary preventive recurrence action.
- K. Administration of the Radiation Safety Training Program.



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## 3.2 Division Radiation Safety Officer(s)

3.2.1 The Division R.S.O is directly responsible for radiation safety within his respective division, or as designated by the Corp. R.S.O. His duties include, but are not limited to, the following:

- A. Procure and maintain calibrated radiation survey instruments.
- B. Establish and maintain radio-isotope storage facilities.
- C. Maintain exposure devices, radiography facilities and associated equipment.
- D. Conduct quarterly inventories and maintain source utilization reports for his respective division.
- E. Maintain all reports, records and correspondence relating to radiation safety and quality assurance for his respective division.
- F. Forward copies of all reports, records and correspondence to the Corp. R.S.O.
- G. Report to the Corp. R.S.O. as required.
- H. Examine and determine the competency of Radiographers and Radiographer Assistants through testing and periodic performance reviews.
- I. Establish and maintain the Leak Test program for his division.

## 3.3 Radiation Safety Supervisor(s)

3.3.1 The R.S.S. is responsible for the implementation of the applicable procedures in the RSM. He is responsible for assuring all radiographic operations are conducted in a safe manner and in accordance with this RSM.



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3.4 Radiographer

3.4.1 A Radiographer is an employee who performs radiography and personally supervises radiographic operations. He is directly responsible for all sources and equipment assigned to him, and for implementing the operating procedures of NIC's RSM.

3.5 Radiographer Assistant

3.5.1 A Radiographer Assistant is an employee who, under the direct supervision of a Radiographer, uses radiographic exposure devices and radiation monitoring devices, and performs his assigned duties in accordance with NIC's RSM.



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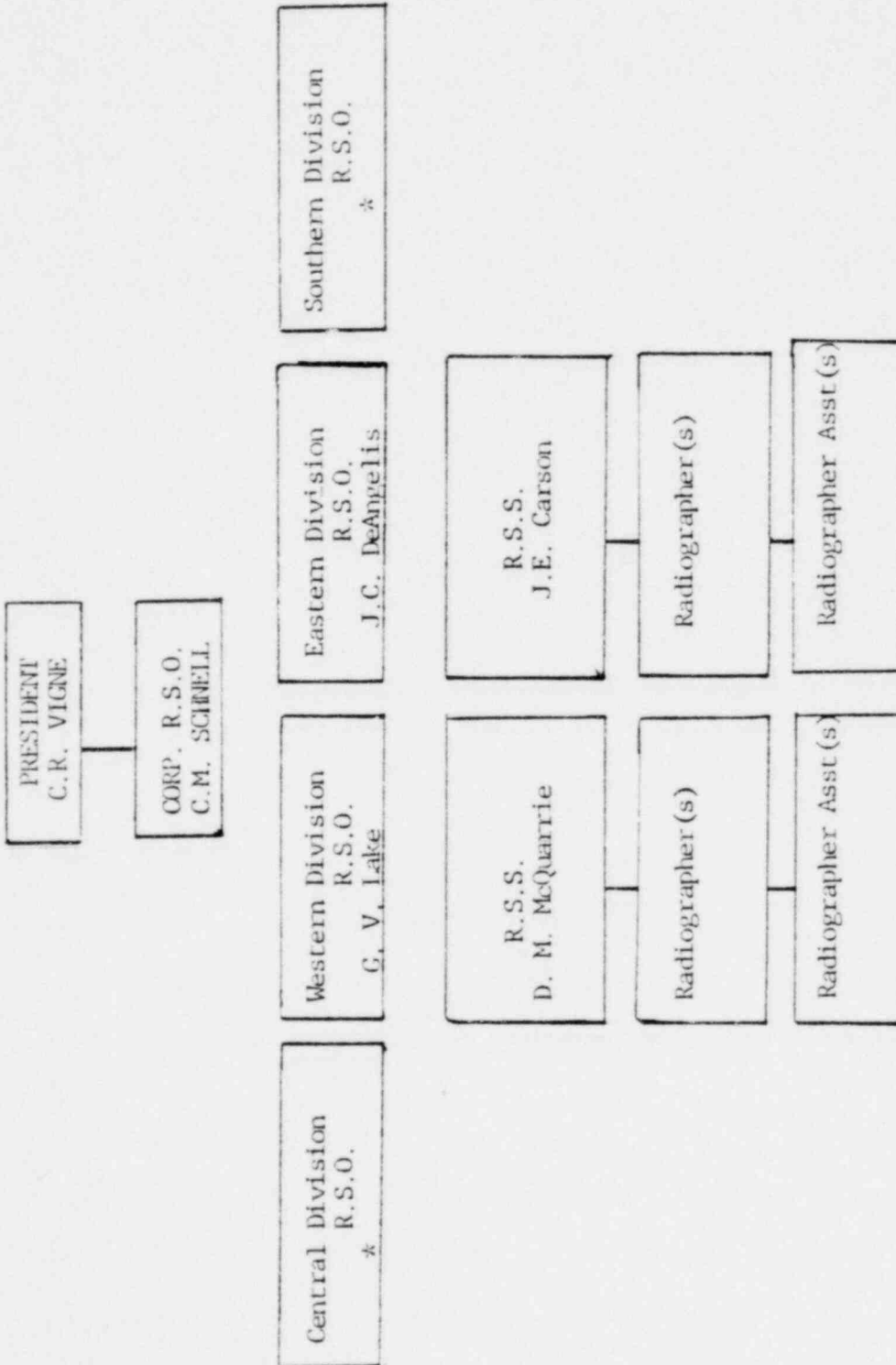
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APPLICABILITY: GENERAL INFORMATION ORGANIZATION & RESPONSIBILITY

## RADIATION SAFETY ORGANIZATION CHART



\* Future Planned Divisions





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APPLICABILITY: GENERAL INFORMATION  
DEFINITIONS

## 'DEFINITIONS'

AGREEMENT STATE.....	A STATE WHICH HAS ACCEPTED REGULATORY AUTHORITY OVER BY-PRODUCT MATERIAL FROM THE USNRC.
ALPHA PARTICLE.....	A POSITIVELY CHARGED PARTICLE EMITTED BY CERTAIN RADIOACTIVE MATERIALS.
DIVISION ASSISTANT RADIATION SAFETY OFFICER.....	AN INDIVIDUAL APPOINTED BY THE RADIATION SAFETY OFFICER RESPONSIBLE FOR THE ADMINISTRATION OF THE RADIATION SAFETY PROGRAM IN HIS RESPECTIVE DIVISION.
BACKSCATTER.....	RADIATION SCATTERED FROM THE FLOOR, WALLS, EQUIPMENT, AND OTHER ITEMS IN THE AREA OF A RADIATION SOURCE.
BETA PARTICLE (BETA RAY).....	AN ELEMENTARY PARTICLE EMITTED FROM A NUCLEUS DURING RADIOACTIVE DECAY. BETA RADIATION MAY CAUSE SKIN BURNS, AND BETA EMITTERS ARE HARMFUL IF INHALED OR INGESTED.
BY-PRODUCT MATERIAL.....	IN ATOMIC ENERGY LAW, ANY RADIOACTIVE MATERIAL (EXCEPT SOURCE OR FISSIONABLE MATERIAL) OBTAINED IN THE PROCESS OF PRODUCING OR USING SOURCE OR FISSIONABLE MATERIAL. INCLUDES FISSION PRODUCTS AND MANY OTHER RADIOISOTOPES PRODUCED IN NUCLEAR REACTORS.
CALIBRATION.....	THE VERIFICATION OF THE ACCURACY OF ELECTRONIC INSTRUMENTS AGAINST A KNOWN STANDARD, SUCH AS SURVEY METERS.
CESIUM-137.....	A RADIOISOTOPE OF THE ELEMENT CESIUM.
COBALT - 60.....	A RADIOISOTOPE OF THE ELEMENT COBALT.



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- COLLIMATOR.....A BEAM SHAPING DEVICE WHICH UTILIZES SHIELDING MATERIAL TO RESTRICT THE DIRECTION IN WHICH RADIATION IS EMITTED.
- CONTAMINATION.....THE PRESENCE OF UNWANTED RADIOACTIVE MATTER, OR THE 'SOILING' OF OBJECTS OR MATERIALS WITH 'RADIOACTIVE DIRT'.
- CURIE.....THE BASIC UNIT USED TO DESCRIBE THE INTENSITY OF RADIOACTIVITY IN A SAMPLE OF MATERIAL. ONE(1) CURIE EQUALS 37 BILLION DISINTEGRATIONS PER SECOND, OR APPROXIMATELY THE RADIOACTIVITY OF (1) GRAM OF RADIUM.
- DECAY.....THE SPONTANEOUS RADIOACTIVE TRANSFORMATION ON ONE(1) NUCLIDE INTO A DIFFERENT ENERGY STATE OF THE SAME NUCLIDE. EVERY DECAY PROCESS HAS A DEFINITE HALF-LIFE, (SEE ALSO HALF-LIFE).
- DECONTAMINATION.....THE REMOVAL OF RADIOACTIVE CONTAMINANTS FROM SURFACE, AS BY CLEANING AND WASHING WITH CHEMICALS.
- DOSE.....THE AMOUNT OF IONIZING RADIATION ENERGY ABSORBED PER UNIT MASS OF IRRADIATED MATERIAL AT A SPECIFIC LOCATION: SUCH AS, A PART OF THE HUMAN BODY. MEASURED ON REMS AND RADS.
- DOSE RATE.....THE RADIATION DOSE DELIVERED PER UNIT OF TIME AND MEASURED, FOR INSTANCE, IN REMS PER HOUR.
- DOSIMETER.....A IONIZATION CHAMBER THAT MEASURES DOSE RATE.
- DOSIMETER CHARGER.....A DEVICE USED TO CHARGE A DOSIMETER.





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- ELECTROMAGNETIC RADIATION.....RADIATION CONSISTING OF ELECTRIC AND MAGNETIC WAVES THAT TRAVEL AT THE 'SPEED OF LIGHT'. EXAMPLES: LIGHT, RADIO WAVES, GAMMA-RAYS, X-RAYS.
- EMERGENCY PROCEDURE.....THE PROCEDURE TO BE FOLLOWED BY RADIOGRAPHERS AND RADIOGRAPHER'S ASSISTANTS IN THE EVENT OF AN ACCIDENT, EQUIPMENT MALFUNCTION OR UNCONTROLLED CONDITION THAT OCCURS WHILE ENGAGING IN RADIOGRAPHIC OPERATIONS.
- ENCAPSULATION.....THE PROCESS OF SEALING RADIOACTIVE MATERIALS TO PREVENT CONTAMINATION.
- EXPOSURE.....RADIATION INTENSITY MULTIPLIED BY TIME.
- FILM BADGE.....A PHOTOGRAPHIC FILM WORN BY WORKERS IN THE NUCLEAR INDUSTRY TO MEASURE EXPOSURE TO IONIZING RADIATION.
- GAMMA RAYS.....HIGH-ENERGY, SHORT-WAVELENGTH PENETRATING ELECTROMAGNETIC RADIATION EMITTED BY A NUCLEUS. ENERGIES OF GAMMA RAYS ARE USUALLY BETWEEN 0.010 AND 10 MEV.
- GEIGER COUNTER.....A PORTABLE RADIATION DETECTION INSTRUMENT THAT MEASURES DOSE RATE.
- GOVERNMENT AGENCY.....MEANS ANY EXECUTIVE DEPARTMENT, COMMISSION, INDEPENDENT ESTABLISHMENT, CORPORATION, WHOLLY OR PARTLY OWNED BY THE UNITED STATES OF AMERICA, WHICH IS AN INSTRUMENTALITY OF THE UNITED STATES, OR ANY BOARD, BUREAU, DIVISION, SERVICE, OFFICE, OFFICER, AUTHORITY, ADMINISTRATION, OR OTHER ESTABLISHMENT IN THE EXECUTIVE BRANCH OF THE GOVERNMENT.



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- HALF-LIFE.....THE TIME IN WHICH HALF THE ATOMS IN A RADIOACTIVE SUBSTANCE DISINTEGRATE.
- HALF-LIFE, BIOLOGICAL.....THE TIME REQUIRED FOR A BIOLOGICAL SYSTEM, SUCH AS A MAN OR AN ANIMAL, TO ELIMINATE, BY NATURAL PROCESSES, HALF THE AMOUNT OF A SUBSTANCE WHICH HAS ENTERED IT.
- HALF-VALUE LAYER.....IS THAT THICKNESS OF A MATERIAL REQUIRED TO REDUCE THE RADIATION LEVEL AT A GIVEN DISTANCE BY ONE-HALF.
- HIGH RADIATION AREA.....MEANS ANY AREA IN WHICH RADIATION LEVEL IS IN EXCESS OF 100 MILLIREM/PH
- IONIZATION CHAMBER.....AN INSTRUMENT THAT DETECTS AND MEASURES IONIZING RADIATION BY OBSERVING THE ELECTRICAL CURRENT CREATED WHEN RADIATION IONIZES GAS IN THE CHAMBER, MAKING IT A CONDUCTOR OF ELECTRICITY.
- IONIZING RADIATION.....ANY RADIATION THAT DIRECTLY OR INDIRECTLY DISPLACES ELECTRONS FROM THE ORBITAL SHELL OF ATOMS. EXAMPLES: ALPHA, BETA, GAMMA RADIATION.
- IRIDIUM-192.....A RADIOISOTOPE OF THE ELEMENT IRIDIUM.
- LEAK TEST.....A TEST OF AN EXPOSURE DEVICE WHICH CONTAINS A SEALED SOURCE TO ASSURE THAT RADIOACTIVE MATERIAL IS NOT BEING RELEASED.
- LICENSED MATERIAL.....SOURCE MATERIAL, SPECIAL NUCLEAR MATERIAL, OR BYPRODUCT MATERIAL RECEIVED, POSSESSED, USED, OR TRANSFERRED UNDER A GENERAL OR SPECIAL LICENSE ISSUED BY THE NUCLEAR REGULATORY COMMISSION (NRC).



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APPLICABILITY: GENERAL INFORMATION DEFINITIONS

- MAXIMUM PERMISSIBLE DOSE (MPD)..... THAT DOSE OF IONIZING RADIATION WHICH COMPETENT AUTHORITIES HAVE ESTABLISHED AS THE MAXIMUM THAT CAN BE ABSORBED WITHOUT UNDUE RISK TO HUMAN HEALTH. 5(N-18).
- MEV..... MILLION ELECTRON VOLTS.
- MILLI..... A PREFIX THAT DIVIDES A BASIC UNIT BY ONE THOUSAND.
- OCCUPATIONAL DOSE..... INCLUDES EXPOSURE OF AN INDIVIDUAL TO RADIATION (1) IN A RESTRICTED AREA; OR (2) IN THE COURSE OF EMPLOYMENT IN WHICH THE INDIVIDUAL'S DUTIES INVOLVED EXPOSURE TO RADIATION PROVIDED THAT 'OCCUPATIONAL DOSE' SHALL NOT BE DEEMED TO INCLUDE ANY EXPOSURE OF AN INDIVIDUAL TO RADIATION FOR THE PURPOSE OF MEDICAL DIAGNOSIS OR MEDICAL THERAPY OF SUCH INDIVIDUAL.
- PERSONNEL MONITORING EQUIPMENT..... DEVICES TO BE WORN OR CARRIED BY AN INDIVIDUAL FOR THE PURPOSE OF MEASURING THE DOSE RECEIVED (E.G. FILM BADGES, POCKET CHAMBERS, POCKET DOSIMETERS, FILM RINGS, ETC.)
- PROJECTOR..... AS USED IN THIS PART - A RADIOGRAPHIC EXPOSURE DEVICE CONTAINING A LICENSED RADIOACTIVE ISOTOPE FOR INDUSTRIAL RADIOGRAPHY APPLICATIONS.
- RAD..... RADIATION ABSORBED DOSE: THE BASIC UNIT OF ABSORBED DOSE OF IONIZING RADIATION. ONE RAD IS EQUAL TO THE ABSORPTION OF 100 ERGS OF RADIATION ENERGY PER GRAM OF MATTER.
- RADIATION..... THE PROPAGATION OF ENERGY THROUGH MATTER OR SPACE IN THE FORM OF WAVES.



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DEFINITIONS

- RADIATION AREA.....AN AREA WITHIN WHICH THE RADIATION LEVEL EXCEEDS 2MR/HR
- RADIATION SAFETY SUPERVISOR.....AN INDIVIDUAL APPOINTED BY THE CORP. R.S.O. WHO IS RESPONSIBLE FOR IMPLEMENTATION OF HIS ASSIGNED DUTIES.
- CORPORATE RADIATION SAFETY OFFICER.....HE IS THE REPRESENTATIVE OF NIC FOR LIAISON WITH THE NUCLEAR REGULATORY COMMISSION AND RESPONSIBLE FOR THE OVERALL ADMINISTRATION OF THE RADIATION SAFETY PROGRAM.
- RADIATION SURVEY.....THE PROCESS OF USING A SURVEY METER TO MEASURE THE INTENSITY OF IONIZING RADIATION AT THE BOUNDRY OF A RADIATION AREA.
- RADIOGRAPHER.....AN INDIVIDUAL WHO PERFORMS AND SUPERVISES RADIOGRAPHIC OPERATIONS, AND IS RESPONSIBLE TO NIC FOR ASSURING COMPLIANCE WITH THIS RSM.
- RADIOGRAPHER'S ASSISTANT.....AN INDIVIDUAL WHO, UNDER THE PERSONAL SUPERVISION OF THE RADIOGRAPHER, USES RADIOGRAPHIC EXPOSURE DEVICES, SEALED SOURCES, OR RELATED HANDLING TOOLS, OR SURVEY INSTRUMENTS IN RADIOGRAPHY.
- RADIOGRAPHIC EXPOSURE DEVICE.....AN INSTRUMENT CONTAINING A SEALED SOURCE IN WHICH THE SEALED SOURCE OR SHIELDING THEREOF MAY BE MOVED, OR OTHERWISE CHANGED, FROM A SHIELDED TO UNSHIELDED POSITION FOR PURPOSES OF MAKING A RADIOGRAPHIC EXPOSURE.



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- RADIOGRAPHY.....THE EXAMINATION OF A STRUCTURE OR MATERIAL BY NONDESTRUCTIVE METHODS, UTILIZING SEALED SOURCES OF BY-PRODUCT MATERIAL AND OTHER SOURCES OF IONIZING RADIATION.
- RADIOISOTOPE.....AN UNSTABLE ISOTOPE OF AN ELEMENT THAT DECAYS OR DISINTEGRATES SPONTANEOUSLY, EMITTING RADIATION.
- REDUCTION FACTOR.....DOSE RATE WITHOUT A SHIELD, DIVIDED BY THE DOSE RATE WITH A SHIELD INTERPOSED BETWEEN A SOURCE AND A POINT AT WHICH RADIATION IS MEASURED.
- REGISTRATION STATES.....STATES THAT DO NOT HAVE JURISDICTIONAL LICENSING, CONTROL OF RADIOACTIVE MATERIAL BUT ARE GOVERNED BY THE USNRC REGULATORY STATES, REQUIRE THAT RADIATION PRODUCING DEVICES USED WITHIN THEIR STATE BE REGISTERED.
- REM.....ROENTGEN EQUIVALENT MAN, A UNIT OF ABSORBED RADIATION DOSE IN BIOLOGICAL MATTER. IT IS EQUAL TO THE ABSORBED DOSE IN RADS MULTIPLIED BY THE RELATIVE BIOLOGICAL EFFECTIVENESS OF THE RADIATION.
- RESTRICTED AREA.....MEANS ANY AREA TO WHICH ACCESS IS CONTROLLED BY THE LICENSEE.
- ROENTGEN.....A UNIT OF EXPOSURE DOSE OF IONIZING RADIATION. IT IS THAT AMOUNT OF GAMMA OR X-RAYS REQUIRED TO PRODUCE IONS CARRYING ONE(1) ELECTROSTATIC UNIT OF ELECTRICAL CHARGE IN ONE (1) CUBIC CENTIMETER OF DRY AIR UNDER STANDARD CONDITIONS.





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- SCATTERING.....A PROCESS THAT CHANGES A PARTICLE'S OR PHOTON'S TRAJECTORY. SCATTERING IS CAUSED BY COLLISIONS WITH ATOMS, NUCLEI, AND OTHER PARTICLES.
- SEALED SOURCE.....MEANS ANY BY-PRODUCT MATERIAL THAT IS ENCASED IN A CAPSULE DESIGNED TO PREVENT LEAKAGE OR ESCAPE OF THE BY-PRODUCT MATERIAL.
- SHIELD.....A LAYER OR MASS OF MATERIAL USED TO REDUCE THE PASSAGE OF IONIZING RADIATION.
- SOURCE.....A RADIOACTIVE MATERIAL PACKAGED SO AS TO PRODUCE RADIATION FOR EXPERIMENTAL OR INDUSTRIAL USE. IN THIS MANUAL, THE TERM 'SOURCE' ALSO REFERS TO THE 'TARGET' OF AN X-RAY TUBE.
- STORAGE CONTAINER.....MEANS A DEVICE IN WHICH SEALED SOURCES ARE TRANSPORTED OR STORED.
- SURVEY METER.....A PORTABLE INSTRUMENT WHICH MEASURES DOSE RATE OF EXPOSURE OR RADIATION INTENSITY.
- UNRESTRICTED AREA.....MEANS ANY AREA INTO WHICH ENTRY IS NOT CONTROLLED BY THE LICENSEE.
- USNRC.....UNITED STATES NUCLEAR REGULATORY COMMISSION.
- WASTE, RADIOACTIVE.....EQUIPMENT AND MATERIALS (FROM NUCLEAR OPERATIONS) WHICH ARE RADIOACTIVE AND FOR WHICH THERE IS NO FURTHER USE.
- X-RAY.....PENETRATING ELECTROMAGNETIC RADIATION EMITTED WHEN THE INNER ORBITAL ELECTRONS OF AN ATOM ARE EXCITED AND RELEASE ENERGY. THE RADIATION IS NOT NUCLEAR IN ORIGIN AND IS GENERATED BY BOMBARDING A METALLIC TARGET WITH HIGH-SPEED ELECTRONS.

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SECTION II - RADIATION SAFETY MANUAL

APPLICABILITY R.S. ADMINISTRATION

R.S.M. CONTROL

## 1.0 RSM Control and Assignment

- 1.1 All RSM's will be assigned a "Control Number". The control number and name of the individual to whom the manual is assigned will be identified on the cover page. A Document Control Record (DCR) will be maintained by the Corp. RSO.
- 1.2 A Document Transmittal Sheet, (DTS) shall accompany all initial issues and revisions to the RSM. It will be the responsibility of the manual holder to incorporate the changes in his manual. The Receipt acknowledgement shall be completed and returned to the Corp. RSO.
- 1.3 RSM Revisions
  - 1.3.1 When revisions are made to a page, the entire page shall be reissued.
  - 1.3.2 Revisions shall be indicated by an asterisk (\*) in the left hand margin adjacent to the revised paragraph.
  - 1.3.3 Revised pages shall be submitted, as required, to the Nuclear Regulatory Commission and/or Licensed Agreement State for approval prior to release to the manual holder.
  - 1.3.4 Appendice and/or procedural attachment revisions will be issued without USNRC and/or Licensed Agreement State approvals.
  - 1.3.5 Should Licensed Agreement State regulations differ from USNRC regulations, an Addendum will be issued to the affected operating procedure(s) to cover the specific requirements. Addenda will be revised, issued and controlled in the same manner as operating procedures as defined in paragraphs 3.1, 3.2 and 3.3



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SUBJECT:

SECTION II - RADIATION SAFETY MANUAL

APPLICABLE'S. ADMINISTRATION  
DOCUMENT CONTROL

## 1.0 Document Control

1.1 The RSM shall be controlled as described in RSP-1-1.

1.2 Purchasing Documents for Radiation Safety items that require special attention (i.e. sources, survey meters, standards, etc.) shall be controlled as described below.

1.2.1 The requisitioner of these items will complete a purchasing requisition (PR) with all the required data and have it approved by his supervisor.

1.2.2 The P.R. will then be forwarded to the Div/Corp. RSO for review of specific requirements (i.e. Certifications, Calibration Reports, etc.), and if complete and accurate, it will then be forwarded to the Purchasing Agent. (PA)

1.2.3 The PA will then issue a purchase order (PO), order the item(s) listed, utilizing Vendors on the AUL when required. Should the Vendor be out of stock etc, the Div/Corp. RSO will be contacted for an alternate supplier.

## 1.3 Radiation Records

1.3.1 Records such as NRC-4, NRC-5, Weekly Radiation Survey Reports, Source Decay Charts, Shipping Papers, Utilization Logs, etc. will be maintained and controlled by the designated R.S. management personnel.

1.3.2 The Corp. R.S.O will be responsible for maintaining completed documents at Corp. headquarters in the R.S. Files. When compiled by the Div. R.S.O outside the Corp. Facility, they will be transmitted utilizing a DTS to the Corp. RSO who will acknowledge receipt of such.





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SECTION II - RADIATION SAFETY MANUAL

APPLICABLE REGULATORY ADMINISTRATION  
EQUIPMENT CALIBRATION & CERTIFICATION

## 1.0 Equipment Calibration

1.1 The equipment listed in this Procedure will be calibrated at the intervals specified by personnel or calibration Facilities approved by the Corp. R.S.O., as designated on the AVL. The intervals designated are maximum entities, and more frequent calibration is authorized, when necessary.

1.2	<u>Description</u>	<u>Interval</u>
	Survey Meter	90 Days
	Desimeter	Annual

1.3 Should a piece of calibrated equipment be damaged, drift off scale or for any reason be suspect as to its accuracy, it shall be immediately taken out of service, turned over to RS management personnel, who will have the instrument checked. It shall remain out of service until its repaired or the accuracy is verified.

1.4 Equipment not in use during the designated interval need not be calibrated, but once its ready to be returned to service must then be calibrated.

## 2.0 Equipment Certification

2.1 Certification Records on the below listed items will be maintained at Corp. headquarters in the R.S. Files. Control of these documents will be as specified in RSP-1-2.

- 2.1.1 Initial Purchase Equipment Certification (i.e. Survey Meters)
- 2.1.2 Source Size Certifications
- 2.1.3 Exposure Device Certifications from the Manufacturer
- 2.1.4 Other Equipment as designated by the Corp. R.S.O.

3.0 The Calibration Certification Records will be maintained by the Corp. RSO for an indefinite period of time or until its determined by him that they are not an item subject to audit by the NRC.



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SUBJECT:

SECTION II - RADIATION SAFETY MANUAL

APPLICABILITY: PERSONNEL QUALIFICATION  
CERTIFICATION & PERFORMANCE REVIEWS

## 1.0. Personnel Qualification & Certification

- 1.1. The training, qualification & certification records of R.S. management personnel, radiographers, assistant radiographers & trainees will be maintained by the Corp. RSO at the Corp Hq., and are subject to audit by the NRC.
- 1.2. Previews training/education & work experience records, NIC training/education & work experience records, and objective evidence of such will be maintained in the Personnel Qualification Data Packages at the Corp. Hq., but will be considered part of the personnel Radiation Safety File, and subject to audit.
- 1.3. R.S. Management personnel will have the training & experience as designated in Section I of this RSM.
- 1.4. All new hires in radiography will as a minimum, receive the following training/orientation.
  - 1.4.1. A detailed review of NIC's RSM in its entirety.
  - 1.4.2. An orientation to all of NIC's radiographic equipment.
  - 1.4.3. A detailed review of all operating & emergency procedures.
  - 1.4.4. A controlled copy of the RSM with the current emergency notification letter.
  - 1.4.5. The new hire will then be given a two part examination.
    - 1.4.5.1. The first part will be a written examination of R.S. principles & NIC procedural requirements, consisting of at least 30 questions.
    - 1.4.5.2. The second part will consist of a demonstration of the use of specified equipment in radiographic operations. This should be done in conjunction with the RT Technician Practical Examination. A standard performance review will be performed by at least a R.S.S.
    - 1.4.5.3. No score of less than 80% on either part of the R.S. examination will be acceptable.



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APPLICABILITY: PERSONNEL QUALIFICATION  
CERTIFICATION & PERFORMANCE REVIEWS

1.5. All assistant radiographers will receive OJT in the specifics of all operations designated in the RSM. This may be conducted by a radiographer or R.S. management personnel.

1.6. Based upon the results of the quarterly performance reviews, periodic training of radiographers/assistant radiographers may be required, as identified by R.S. management personnel. As a minimum, all R.S. personnel will be written & practical examination. If required, further training will be performed.

### 2.0. Performance Reviews

2.1. Performance reviews shall be conducted by R.S. management personnel and/or unannounced basis at least every 3 months on all radiographers or assistant radiographers.

2.2. The elements to be audited are listed in the Radiation Safety Performance Review, RS-8, and shall be completed while observing actual radiographic operations.

### 3.0. Disqualification

3.1. If an individual cannot demonstrate thorough understanding of the items listed in the Radiation Safety Performance Review, he shall:

3.1.1. be disqualified from working with radioactive material until he shall:

3.1.1.1. complete additional training in the deficient areas

3.1.1.2. depending upon the severity of the deficiency, be disciplined.

3.1.1.3. successfully complete another performance review after training.

### 4.0. Records

4.1. A record of each Radiation Safety Performance Review shall be completed, a copy retained by the Div. RSO and the original sent to the Corp RSO for inclusion in the R.S. files.

4.2. All performance reviews shall be retained in the R.S. personnel files.

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SUBJECT  
SECTION II - RADIATION SAFETY MANUALAPPLICABILITY:  
R.S. RECORDS, R.S. ADMINISTRATION

## 1.0. R.S. Records

## 1.1. R.S. Records Completion/Files.

- 1.1.1. All personnel responsible for or involved in R.S. activities will be responsible for completion of the applicable records in this RSM in a neat, legible & accurate manner.
- 1.1.2. A copy of all applicable records/forms is contained in Section XIII of this RSM.
- 1.1.3. The actual completion of these records will be covered during an individuals initial orientation/training and then through OJT.
- 1.1.4. Each Div. RSO will maintain duplicate files of all completed records with the originals being forwarded to the Corp. RSO for the inclusion in the Corp. R.S. files.
- 1.1.5. Should an audit at the Div. level reveal a discrepancy in records, the Corp R.S.O. will be contacted for copies of original records. This original records retention in the Corp. R.S. files will facilitate the movement of equipment throughout the Corp. without loss of originals at the Corp. level.

## 2.0. R.S. Records Retention

- 2.1. All R.S. records designated in this RSM, correspondence regarding R.S. activities, Audit-Reports & any other applicable records designated by the Corp. R.S.O. will be retained for an indefinite period of time, but as a minimum, for those periods designated in the applicable parts of 10CRF.
- 2.2. They will be maintained in the Corp. R.S. files and retention beyond the minimum time designated, will be at the discretion of the Corp. R.S.O.

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**SUBJECT:**

SECTION II - RADIATION SAFETY MANUAL

**APPLICABILITY:**

R.S. ADMINISTRATION AUDITS

## 1.0 Audits

- 1.1 Audits will be conducted on all aspects of this RSM by personnel not having direct responsibility in the area being audited. Due to NIC's organizational structure, the Corp. RSO is authorized to audit all R.S. activities, with the exception of the Corp. R.S. Files and his involvement in said records (i.e. signoffs, etc.)
- 1.2 The Corp. R.S. Files shall be audited by a knowledgeable person designated by the Corp. RSO not having direct responsibility for those files.
- 1.3 As a minimum, the R.S. Program shall be audited at least once a year, using checklists designated by the Corp. RSO.
- 1.4 The results of the audits will be reported to NIC management.
- 1.5 Deficient areas will be identified with followup auditing for verification of compliance with the designated corrective action being performed.



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SUBJECT:  
SECTION III - RADIATION SAFETY MANUAL

APPLICABILITY:  
PERSONNEL MONITORING EQUIPMENT

## 1.0 SCOPE

1.1 This section shall govern the use of personnel monitoring equipment and shall be used in conjunction with the other applicable sections of this RSM.

## 2.0 EQUIPMENT

2.1 Dosimeter - direct reading from 0 to 200 MR.

2.2 Dosimeter charger

2.3 Film badge

2.4 Eberline Rad-Tad, or equivalent.

## 3.0 USE

### 3.1 Dosimeters

3.1.1 Dosimeters are to be zeroed at the beginning of each work shift by inserting the dosimeter into the socket on the dosimeter charger, and adjusting the knob until the indicator in the dosimeter reads "0".

3.1.2 All Radiographers and Assistants shall wear a calibrated pocket dosimeter at all times during radiographer operations. Dosimeters shall be worn on the clothing adjacent to the film badge in the chest area. Dosimeters shall have the response accuracy certified at least once a year in accordance with RSP-1-3.

3.1.3 Dosimeters shall be read at frequent intervals during the work day to maintain awareness of the exposure received during the course of radiographic activities.

3.1.4 Dosimeters shall be read at the end of each work shift and recorded on the RS-3.

3.1.5 Dosimeters are delicate instruments, and should be treated as such. Jarring or dropping the instrument may cause a high reading. If your dosimeter does not operate properly, notify your RSS immediately and have it replaced.





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SUBJECT:  
SECTION III - RADIATION SAFETY MANUAL

APPLICABILITY:  
PERSONNEL MONITORING EQUIPMENT

## 3.2 Film Badges

3.2.1 A film badge will be assigned to and worn by each individual performing radiographic operations.

3.2.2 A new film badge will be forwarded to all designated individuals by the Corp. RSO to assure possession at the beginning of each month.

3.2.3 Film badges shall be worn adjacent to the dosimeter in the chest area. Care should be taken to prevent the film badge from becoming wet or mutilated.

## 3.3 In the event that:

- a. An individual's dosimeter is discharged off scale due to unknown circumstances in which the possibility exists that an excessive radiation exposure may have occurred; or
- b. An individual's film badge becomes lost, wet or mutilated; or
- c. An individual has reason to believe his badge may indicate an excessive dosage he may not have actually received;

3.3.1 The individual shall then notify his RSS, Div. RSO or Corp. RSO for disposition of the situation. In addition, an Incident Report - Form No. RS-9 shall be completed by the individual and forwarded to the Corp. RSO within twenty-four (24) of the occurrence. The individual shall not be permitted to engage in radiographic operations until the results of film badge processing are received and satisfactorily, and only then will he be issued another.

3.4 Control film badges are not to be worn by a Radiographer or any other person.

## 4.0 RECORDS

4.1 Dosimeter readings must be recorded daily on the RS-3

4.2 At the end of the work week, the RS-3 will be returned to the RSS for transmittal to the Corp. RSO.

SUBJECT: SECTION III - RADIATION SAFETY MANUAL	APPLICABILITY: PERSONNEL MONITORING EQUIPMENT
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- 4.3 At the end of each month, film badges will be returned to the RSS for transmittal to the Corp. RSO.
- 4.4 Every attempt will be made to forward new month film badges far enough ahead of time to facilitate a switch at the end of the month. Should film badges not be received by the first day of the new month, the old film badge will be used until receipt of the new ones, and Corp. RSO will be notified by inter-office memo of the extended dates of use.





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SUBJECT:  
SECTION IV - RADIATION SAFETY MANUAL

APPLICABILITY:  
RADIATION SURVEY INSTRUMENTS

## 1.0 SCOPE

1.1 This section shall govern the operation of survey instruments and shall be used in conjunction with the other applicable sections of this RSM.

## 2.0 EQUIPMENT

2.1 The survey instruments must be capable of measuring from 0 MR/hr through 1 R/hr.

2.1.1 Victoreen 492 & 592B

2.1.2 Eberline Model E-130G

## 3.0 CALIBRATION

3.1 No radiation survey instrument will be used without a current calibration sticker on the instrument. Calibration will be performed in accordance with RSP-1-3 of this RSM. Instruments with a current calibration sticker and showing no indication of malfunction, can be used for three(3) months from the date of calibration.

3.2 Calibration records (originals) will be maintained by the Corp. RSO, with Div. RSO's retaining copies.

## 4.0 GENERAL USE

4.1 Survey instruments, since they are delicate, must be handled and used with the utmost care to avoid damage. Precautionary measures must be taken to avoid exposure of the instrument to excessive moisture and/or dirt. Use of survey instruments in prolonged periods of excessive cold should be avoided since batteries may prove to be inefficient at colder temperatures. Batteries should be replaced when their condition becomes questionable. Turn off the meter when normal operations are completed to preserve the batteries.

4.2 Reading the meter - The meter reading must be multiplied by the scale factor to obtain the proper number. Minor fluctuation of the meter reading is normal and is caused by the random nature of radioactive decay.



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SECTION IV - RADIATION SAFETY MANUAL

APPLICABILITY:

RADIATION SURVEY INSTRUMENTS

5.0 STORAGE

5.1 After use, survey instruments are to be turned to the OFF position and stored in a clean, dry, controlled environment to preclude damage or tampering.



SUBJECT  
SECTION IV - RADIATION SAFETY MANUAL

APPLICABILITY RADIATION SURVEY INSTRUMENTS  
OPERATION OF VICTOREEN 492 & 592B

1.0 SCOPE

1.1 This procedure describes the specific operation of the Victoreen 492 & 592B survey meters to be used in conjunction with General Procedure RSP-3.

2.0 RANGE

2.1 The Victoreen 492 & 592B have three (3) scales covering the following ranges:

2.1.1	1 X SCALE	0 to 10 MR/hr
2.1.2	10 X SCALE	10 to 100 MR/hr
2.1.3	100 X SCALE	100 to 1000 MR/hr

3.0 OPERATIONS

3.1 Warm-up The instrument will have a two (2) minute warm-up period with the selector switch set at the 1X scale.

3.2 Zeroing

3.2.1 592-B Turn the selector switch to the Zero position. With the switch set at Zero, make an adjustment of the zeroing knob so the meter needle (MR/hr) indicates zero (0).

3.2.2 492 Turn the selector switch to Battery. Position or press battery. Check the button. The dial indicator must reach the area in the scale labeled Battery.

3.3 Use The meter should now be ready for use by turning the selector switch to the desired intensity range and reading the radiation intensity indicated by the meter.

3.4 Should these steps reveal a deficiency, do not use the meter and return it to the RSS immediately.



SUBJECT  
SECTION IV - RADIATION SAFETY MANUAL

APPLICABILITY RADIATION SURVEY INSTRUMENTS  
OPERATION OF EBERLINE E-130G

1.0 SCOPE

1.1 This procedure describes the operation of the Eberline Model E-130G, to be used in conjunction with General Procedure RSP-3.

2.0 RANGE

2.1 The Eberline Model E-130G has three (3) scales covering the following ranges:

- 2.1.1 1 X SCALE 0 to 10 MR/hr
- 2.1.2 10 X SCALE 10 to 100 MR/hr
- 2.1.3 100 X SCALE 100 to 1000 MR/hr

3.0 OPERATION

- 3.1 Starting - Turn the switch to the Battery check position. The meter should indicate within the "Batt OK" area.
- 3.2 Warm-up - The instrument has a two (2) minute warm-up period, with the selector switch set at the 1X scale.
- 3.3 Set up - Push the Reset button and the reading should drop to zero rapidly, then climb back to source reading when the Reset is released. The Response may be adjusted to get the most desirable compromise between speed of response and meter fluctuation.
- 3.4 Use - The meter should now be ready for use by turning the selector switch to the desired intensity range and reading the radiation intensity indicated by the meter.
- 3.5 Should these steps reveal a deficiency, do not use the meter and return it to the RSS immediately.



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SUBJECT:

SECTION V - RADIATION SAFETY MANUAL

APPLICABILITY RECEIPT, OPENING &  
STORAGE OF RADIOACTIVE MATERIAL

## 1.0 RECEIPT

- 1.1 When notified by the Carrier that radioactive material has been received and is ready for pick up, an authorized individual will proceed to the Carriers Facility in a vehicle prepared for transportation of radioactive material in accordance with RSP-8.
- 1.2 Upon receipt of the material, the individual shall monitor the external surfaces of the package. If radiation levels at the surface are in excess of 200  $\mu\text{r/hr}$ , or at 3' in excess of 10  $\mu\text{r/hr}$ , shall immediately notify the Div/Corp. RSO.
  - 1.2.1 The Div/Corp. RSO shall immediately notify the Dir. of the NRC Regional Office and the final delivering carrier.
  - 1.2.2 Any package in excess of the prescribed limits will be segregated, roped off, posted or otherwise stored in accordance with the requirements of this RSM to preclude exposure in excess of 2  $\mu\text{r/hr}$ .
  - 1.2.3 Monitoring shall be performed within three (3) hours of received during normal working hours, or within eighteen (18) hours if received after normal working hours.
- 1.3 After successful monitoring of the material it may be placed in an authorized storage area until its ready to be opened.

## 2.0 Opening packages containing radioactive materials

- 2.1 Radioactive materials will only be received in packages approved by the NRC in NIC's Materials License. (i.e exposure devices and source changers)
- 2.2 Exposure devices will require no special opening procedures other than those used for normal operation.
- 2.3 Source changers will be opened in accordance with the manufacturers operating instructions, a copy of which will be maintained on file by the RSS and Div. RSO.
- 2.4 No package will be opened without a calibrated survey meter, film badge and dosimeter being properly used.



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SUBJECT:

SECTION V - RADIATION SAFETY MANUAL

APPLICABILITY, OPENING &  
STORAGE OF RADIOACTIVE MATERIAL

## 3.0 STORAGE OF RADIOACTIVE MATERIAL

### 3.1 Permanent Storage Facility:

- 3.1.1 When available, a permanent storage facility will be used for the storage of radioactive material. It shall control the access to, and unauthorized removal of said material by the limited distribution of entry keys to authorized RS personnel only.
- 3.1.2 A permanent structure, trailer not ready for transport or other non-mobile facility shall be construed as a permanent storage facility by the Div/Corp. RSO.
- 3.1.3 The facility will be surveyed and posted in accordance with the requirements of RSP-9.

### 3.2 Temporary Storage Facility

- 3.2.1 A mobile RT unit (i.e. camper type) will meet all the requirements of 3.1 for permanent facilities with the following additional requirements.
- 3.2.2 A lockable storage container will be placed inside the RT unit which will be lead lined and capable of assuring a 2 mR/hr boundary.
- 3.2.3 The RT unit and storage container will both be locked when not under the direct surveillance of radiographic personnel.
- 3.2.4 The facility will be surveyed and posted in accordance with the requirements of RSP-9.



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SUBJECT:  
SECTION VI - RADIATION SAFETY MANUAL

APPLICABILITY:  
EXCHANGING SEALED SOURCES

## 1.0 SCOPE

1.1 This Section shall govern the exchange of sealed sources and shall be used in conjunction with the applicable sections of this RSM.

## 2.0 EQUIPMENT

2.1 Only source changers authorized for use by the NRC and/or applicable Agreement State(s)' License(s), may be used.

## 3.0 PERSONNEL QUALIFICATIONS

3.1 Only qualified personnel who have been instructed in the operation of source changers, and have demonstrated satisfactory performance of a source change to the cognizant procedure to the Div. RSO and/or the Corp. RSO as documented on NIC's Source Change Certification RS-12 may conduct source changes.

## 4.0 LEAK TEST

4.1 No sealed source will be put into a projector without evidence of a current valid leak test. New sources will show evidence of a leak test on the source decay chart. Sources that are more than six (6) months old will show evidence of a leak test on an Applied Health Physics, Inc. Test Record.

## 5.0 SURVEY METER

5.1 A calibrated and operable survey meter will be used during all source changes.





## SUBJECT:

SECTION VI - RADIATION SAFETY MANUAL

APPLICABILITY: EXCHANGING SEALED SOURCES  
GAMMA INDUSTRIES 2  
C12 & C13 SOURCE CHANGERS1.0 INSTRUCTIONS

- 1.1 Position the projector and the source changer in an area where the source can be safely exposed.
- 1.2 Place the projector and source changer in a relationship to minimize any bends in the source guide tube and control cable. Use a seven (7) foot section of guide tube.
- 1.3 Survey the container with a calibrated survey meter. Surface reading should not exceed 200Mr/hr.
- 1.4 Unlock the access door on the front of the changer and open. On the inside of the door, you will find the proper source exchange tube.
- 1.5 Connect the short exchange tube to the hole labeled "Old Source" and attach the other end to your camera.
- 1.6 Connect your control cable to the old pigtail in your camera.
- 1.7 Standing as far away as possible, crank the "Old Source" from your camera into the shipping container.
- 1.8 Survey the area.
- 1.9 Disconnect the source tube from the shipping container.
- 1.10 Disconnect the pigtail from the control cable.
- 1.11 Unscrew the protective tube from the "new source" and screw into the hold containing the "old source."
- 1.12 Connect the control cable to the "new source."
- 1.13 Connect the source exchange tube to the "new source" hole.
- 1.14 Standing as far away as possible, retract the control cable which will put the "new source" out of the shipping container and into the camera.
- 1.15 Survey the area and the camera.



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SECTION VI - RADIATION SAFETY MANUALAPPLICABILITY: EXCHANGING SEALED SOURCES  
GAMMA INDUSTRIES  
C12 & C13 SOURCE CHANGERS

- 1.16 Disconnect the control cable from the pigtail and lock the camera.
- 1.17 Unscrew the source exchanger tube from the camera and from the shipping container.
- 1.18 Using seal wire provided, seal the protective tube covering the "old source." Place and lock padlock on the door.
- 1.19 Survey the shipping container and do not ship if surface radiation levels exceed 200 MR/hr or 12 Mr/hr at one(1) meter.
- 1.20 Place the proper shipping labels (provided in return envelope) on the shipping container and return immediately to Gamma Industries.



SUBJECT: SECTION VI - RADIATION SAFETY MANUAL

APPLICABILITY: EXCHANGING SEALED SOURCES  
TECH OPS  
488/650 & 771 SOURCE CHANGERS

1.0 INSTRUCTIONS

- 1.1 Position the projector and source changer in an area where the source can be safely exposed.
- 1.2 Place the projector and source changer in a relationship to minimize any bends in the source guide tube and control cable. Use a seven (7) foot section of guide tube.
- 1.3 Set the projector as for an exposure and open the source changers. (To remove the cover, break the seal and unbolt, to remove the source, hold down cap, break the seal and unbolt.)  
  
NOTE: When the cap is removed, the source connection is exposed and special care must be taken to prevent dislodging a source when handling the changer in this condition.
- 1.4 Connect the source guide tube from the projector to the fitting above the empty chamber, avoiding any sharp bends.
- 1.5 Close and latch the source guides.
- 1.6 While monitoring with a calibrated survey meter, crank the source into the source changer. Insure that the source is completely transferred from the projector to the changer.
- 1.7 Make a radiation survey of the changer to assure the surface reading is less than 200 MR/hr.
- 1.8 Open the source guides and disconnect the cable from the source assembly. (Disconnection is accomplished in the same manner as disconnecting the drive control from the projector).
- 1.9 Disconnect the guide tube from the changer.
- 1.10 Connect the guide tube to the chamber containing the new source.
- 1.11 Crank the drive cable until the connector butts the source connector.
- 1.12 Connect the drive cable to the new source. Check the source connector for a proper fit with the drive cable.

WARNING: Do not move the source more than 1/2" from its stored position.



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SUBJECT:  
SECTION VI - RADIATION SAFETY MANUAL

APPLICABILITY: EXCHANGING SEALED SOURCES  
TECH OPS  
488/650 & 771 SOURCE CHANGERS

- 1.13 Close and latch the source guides.
- 1.14 While monitoring with a calibrated survey meter, crank the source to full retraction within the projector.
- 1.15 Make a radiation survey of the projector to assure the surface reading is less than 200 MR/hr.
- 1.16 Disconnect the source guide tube from the changers.
- 1.17 Affix the new source identification (ID) to the projector and the old source ID to the source changer hold down cap.
- 1.18 Bolt the hold down cap in place and seal with the material provided.
- 1.19 Insert the leak test evidence and old source decay chart along with a copy of the source changer instructions in the changer cover. Bolt the cover in place and seal with the material provided.
- 1.20 Place the proper shipping labels (provided in return envelope) on the shipping container and return immediately to Tech-Ops.



SUBJECT: SECTION VI - RADIATION SAFETY MANUAL

APPLICABILITY: EXCHANGING SEALED SOURCES  
TECH OPS  
414 SOURCE CHANGER1.0 INSTRUCTIONS

- 1.1 Position the source changer and projector in a place where the sources can be safely exposed.
- 1.2 Place the source changer and projector in a relationship to minimize any bends in the source guide tube and control cable. Use seven (7) foot section of guide tube.
- 1.3 Set the projector as for an exposure and remove the cover of the source changer.
- 1.4 Connect source guide tube from the projector to the fitting on the empty channel of the source changer and close the source guides.
- 1.5 At this point, survey the surface of the source changer with a calibrated survey meter. The radiation level should be no higher than 200 MR/hr.
- 1.6 While monitoring with a calibrated survey meter, crank the source from the projector into the source changer. Insure the source has been completely transferred.
- 1.7 Make a radiation survey of the changer to assure the radiation level does not exceed 200 Mr/hr.
- 1.8 Disconnect the source assembly from the drive cable.
- 1.9 Remove the source tube from the source changer and close the source guides and hold down rod.
- 1.10 Remove the cap and hold down rod from the channel containing the new source. Open the source guides.
- 1.11 Fasten the source tube to this channel and connect the drive cable to the new source assembly. Close the source guides.
- 1.12 While monitoring with a calibrated survey meter, crank the control to fully retract the new source into the projector.
- 1.13 Survey the projector to insure the radiation level at the surface does not exceed 200Mr/hr.



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SUBJECT: SECTION VI - RADIATION SAFETY MANUAL

APPLICABILITY: EXCHANGING SEALED SOURCES  
TECH OPS  
414 SOURCE CHANGER

- 1.14 Remove the guide tube from the source changer.
- 1.15 Install the cap and hold down rod into the channel.
- 1.16 Affix the new source ID to the projector and the old source ID to the source changer channel containing the old source with the wire provided.
- 1.17 Insert leak test evidence and old source decay chart, along with a copy of the source changer instructions in the cover. Bolt the changer cover in place and seal with the material provided.
- 1.18 Place the proper shipping labels (provided in return envelope) on the shipping container and return immediately to Tech-Ops.



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SUBJECT  
SECTION VII - RADIATION SAFETY MANUAL

APPLICABILITY: INSPECTION AND  
MAINTENANCE OF EQUIPMENT

## 1.0 SCOPE

- 1.1 This Section shall establish guidelines for inspection and maintain radiographic exposure devices under NIC's Radioactive Material, NRC and/or Agreement State Licenses and, shall be used in conjunction with the applicable sections of this RSM.

## 2.0 GENERAL

- 2.1 If any portion of an inspection or maintenance check reveals defective equipment, this equipment must be repaired and/or replaced before it is returned to service, and the Div/Corp. RSO notified of the deficiency.

## 3.0 EQUIPMENT INSPECTION AND MAINTENANCE - DAILY

- 3.1 The items designated in checklist CL-2 will be checked daily by the Radiographer/Assistant Radiographer to whom the equipment has been assigned:

3.1.1 Acknowledgement of this inspection will be by placing a check mark (✓) or OK, along with the CL # in the "Equipment checked" block of the weekly Radiation Safety Report.

3.1.2 Discrepancies will be noted on a DEMR and submitted to the Div/Corp RSO for disposition.

Note: that the Div/Corp RSO will use the Q.A. designated signoff blocks.

3.1.3 Deficient equipment will be placed on hold and taken out of service until repaired or dispositioned.

## 4.0 EQUIPMENT INSPECTION AND MAINTENANCE - MONTHLY

4.1 The RSS shall be responsible for inspecting and maintaining the radiographic exposure devices at intervals not to exceed one month in accordance with checklist CL-1.

4.2 The checklist will be completed in its entirety, deficiencies noted and a DEMR generated, and forwarded to the Div/Corp. RSO.

4.3 Deficiencies will be handled the same as with CL-1 inspections.





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SUBJECT:  
SECTION VIII - RADIATION SAFETY MANUAL

APPLICABILITY:  
LEAK TESTING

## 1.0 SCOPE

- 1.1 This Section will govern the method of performing a leak test of radioisotopes used by NIC and shall be used in conjunction with the applicable sections of this RSM.

## 2.0 GENERAL

- 2.1 Only those personnel certified to perform leak test as documented on NIC's Leak Test Certification RS-12 may perform such test.
- 2.2 The leak test kit designated below or its equivalent shall be used for leak testing sealed sources possessed by NIC.
- 2.3 Each sealed source shall be tested for leakage at intervals not to exceed six (6) months. However, sources exempted from this test during storage shall be tested for leakage prior to any use or transfer.

- 2.4 Applicable radiation safety precautions shall be maintained throughout the performance of the leak test.

- 2.4.1 Certain sealed sources of radioisotopes are not to be removed from shielding devices within which they are permanently mounted or stored. Radiographic exposure devices and other such devices shall be leak tested by conducting the test on accessible surfaces of the device upon which contamination might be expected to accumulate.

NOTE: When testing such devices, the sealed source must be in the OFF position. This must be confirmed by conducting a radiation survey of the device prior to performing the leak test.

- 2.4.2 The individual conducting the test shall comply with the requirements of RSP-2, Personnel Monitoring equipment.
- 2.4.3 The leak tester must monitor the test area and any adjacent areas with a calibrated survey meter, and comply with the required survey and posting requirements of RSP-9.
- 2.4.4 Only remote handling techniques should be allowed during the manipulation of "free" sealed sources. Sources must not be allowed to come into contact with the hands or other portions of the body. Full advantage should be taken of the inverse square law and minimizing exposure time.



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SUBJECT SECTION VIII - RADIATION SAFETY MANUAL

APPLICABILITY:  
LEAK TESTING

- 3.0 The operating procedures enclosed in the Mark V Leak Test Kit for leak testing sealed sources shall be used explicitly.
- 3.1 Monitor all external surfaces of the completed mailing box with a calibrated survey meter, prior to shipment. U.S. Post Office Department regulations require radiation levels at any surface of the box must be less than ten (10) milliroentgens for twenty-four, i.e., an average of approximately 0.4 milliroentgens per hour.
- 3.2 If results of the survey meet these requirements, proceed with mailing the Mark V Leak Test Kit to Applied Health Physics, Inc. Should the survey indicate any surface of the box has a dose-rate greater than 0.4 milliroentgens per hour, immediately notify Applied Health Physics, Inc. by telephone.
- 4.0 RECORDS
- 4.1 Records of leak test results shall be kept in units of microcuries and maintained for inspection of the USNRC or applicable Agreement State.



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SUBJECT:  
SECTION IX - RADIATION SAFETY MANUAL

APPLICABILITY:  
TRANSPORTATION REQUIREMENTS  
Q.A. PROGRAM

## 10 CFR PART 71 QA PROGRAM

### 1.0 ORGANIZATION

- 1.1 The QA Program organization is the same as that specified in Section I of this RSM.
- 1.2 The Corp. RSO has the responsibility for the maintenance and enforcement of this program as delegated by the President of NIC.
- 1.3 All other personnel associated with this Program (i.e. RSS, Radiographers, etc.) shall be responsible for properly performing the activities identified in this program and the RSM.

### 2.0 Q.A. PROGRAM

- 2.1 As identified in the Policy Statement of this RSM, this QA Program is incorporated as part of the RSM and interfaces with all aspects of it.
- 2.2 Revisions to this QA Program will be handled as outlined in RSP-1-1.

### 3.0 DESIGN CONTROL

- 3.1 The Corp. RSO shall maintain copies of the applicable shipping container USNRC Certificates of Compliance for those used by NIC, which shall serve as satisfying the design requirements of this Program.

### 4.0 DOCUMENT CONTROL

- 4.1 Documents will be completed as described in the applicable section of this RSM.
- 4.2 Document Control will be as prescribed in RSP-1-2 and any other applicable section of the RSM.

### 5.0 HANDLING, STORAGE AND SHIPPING

- 5.1 The handling, storage and shipping of radioactive materials will be as designated in RSP-4, -5, -8 and any other applicable sections of this RSM.



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## SUBJECT

SECTION IX - RADIATION SAFETY MANUAL

## APPLICABILITY:

TRANSPORTATION REQUIREMENTS  
OPERATING PROCEDURE

### 1.0 SCOPE

1.1 This Section describes the transportation requirements and conforms to Title 10-CFR Part 71 and Title 49-Part 171. They shall be used in conjunction with the applicable sections of the RSM.

### 2.0 PACKAGING

2.1 Projectors and source changers shall be packaged as described below:

#### PACKAGING REQUIREMENTS

EXPOSURE DEVICE OR SOURCE CHANGER	MAXIMUM ACTIVITY AND SOURCE TYPE	MINIMUM TYPE OF OVERPACK OR CONTAINER
GAMMA IND. PIPE-LINER EXPOSURE DEVICE	100 CURIES IR-192	BARREL 821-1005-006
T/O 533 EXPOSURE DEVICE	100 CURIES	715 SHIPPING BARRELL
ALL OTHER DEVICES IN NIC'S MATERIALS LICENSE	AS DESIGNATED	NONE REQUIRED

2.2 When shipping an exposure device or source changer containing a source, assure the source is in the properly stored position, and prepared for shipment as follows:

2.2.1 Exposure Device: Assure the shipping plug is securely in place, sealed and the device is locked.

2.2.2 Source Changer: Assure the source hold down device and cover are properly bolted and sealed.



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SUBJECT:  
SECTION IX - RADIATION SAFETY MANUAL

APPLICABILITY  
TRANSPORTATION REQUIREMENTS  
OPERATING PROCEDURE

### 3.0 MARKING

3.1 Each package of radioactive material prepared for transportation shall contain the following information marked on the exterior surface of the package:

#### PACKAGE CONTENTS

#### PROPER SHIPPING NAME

- |   |   |
|---|---|
| A. Contains a source                    | Radioactive material<br>Special form N.O.S. |
| B. Empty (except lead shielded devices) | Radioactive material<br>L.S.A., N.O.S.      |

3.1.1 NIC's complete mailing address and phone number

3.1.2 The NRC Compliance Number or type of package.

### 4.0 LABELING

4.1 Survey the package to determine the proper shipping label as described below:

#### Maximum radiation level

#### Required Label

- |   |  |
|---|--|
| A. Radiation level not exceeding 0.5 MR/hr at surface   | Radioactive White I<br>(see Attachment No. 1)      |
| B. (1) Radiation level greater than 0.5 MR/hr at the surface<br>(2) and not greater than 1.0 MR/hr at three (3) feet. | * Radioactive Yellow II<br>(see Attachment No. 2)  |
| C. (1) Radiation level greater than 50 MR/hr at the surface and (2) and not greater than 1.0 MR/hr at three (3) feet. | * Radioactive Yellow III<br>(see Attachment No. 3) |

NOTE: The transport index is the highest radiation level in millirem per hour at three (3) feet from any accessible external surface of the package. This number shall be expressed in the next highest tenth of MR/hr and written in the Transport Index box on Radioactive Yellow II and III labels, e.g., 1.01 millirem - 1.1 millirem. Enter 1.1 in Transport Index.



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SECTION IX - RADIATION SAFETY MANUAL

APPLICABILITY  
TRANSPORTATION REQUIREMENTS  
OPERATING PROCEDURE

4.2 Complete two (2) appropriate labels indicating the contents, Iridium 192, Cobalt 60, and the number of Curies. For Radioactive II and III labels, record the Transport Index in the box (see NOTE above). The label shall be attached to opposite sides of the package - one (1) being placed near the shipping labels.

4.3 Empty exposure devices or source changers do not require labeling if the following conditions exist:

4.3.1 The radiation level at the surface is less than 15 MR/hr.

4.3.2 There is no measurable radiation level at three (3) feet from the surface.

4.3.3 If the above conditions exist, the package shall be marked with the following statement:

EXEMPT FROM THE SPECIFICATION, PACKAGING, MARKING, LABELING AND EXEMPT FROM THE PROVISIONS OF 49-CFR-173, 391.

## 5.0 BILL OF LADING/AIR BILL

5.1 Shipments via commercial carrier:

5.1.1 A separate bill of lading or air bill shall be completed for each package of radioactive material.

5.1.2 The proper shipping name as described below shall be entered on the bill of lading or air bill:

### PACKAGE CONTENTS

### PROPER SHIPPING NAME

A. Containing a source

Radioactive material  
Special form N.O.S.

B. Empty device

Radioactive material  
L.S.A., N.O.S.

5.1.3 The bill of lading or air bill shall contain two (2) copies of shipping and certification documents described in Paragraph 6.



SUBJECT  
SECTION IX - RADIATION SAFETY MANUALAPPLICABILITY  
TRANSPORTATION REQUIREMENTS  
OPERATING PROCEDURE6.0 SHIPPING/CERTIFICATION DOCUMENTS

6.1 As a minimum, five (5) copies of the shipping/certification document shall be completed for each package of radioactive material. Distribution of the shipping/certification document shall be as follows:

6.1.1 Two (2) copies shall be attached to the bill of lading or air bill.

6.1.2 One (1) copy shall be forwarded to the Corp. RSO.

6.1.3 One (1) copy should remain in the respective Div. RSO file.

6.1.4 One (1) copy is to be placed in the shipping container.

## 6.2 Shipment via NIC private vehicle

6.2.1 For transportation via NIC private vehicle for the purpose of going to and from job sites to perform radiography, a standard shippers certification will be completed and kept in the transportation folder.

6.2.3 When the same radioisotope is identified for continued use on a specific job, the shippers certification shall remain in the transportation folder, until the job is completed or a different radioisotope is used. It will then be distributed as described in 6.1, and show all dates on transport.

## 7.0 Shipment via NIC's private vehicles

7.1 The requirements of Paragraphs 1.0, 2.0, 3.0, 4.0, and 6.0 shall apply with additional requirements as follows:

7.1.1 A currently calibrated survey meter shall be located in the vehicle near the driver.

7.1.2 A radiation survey shall be conducted to insure the radiation level at the external surface of the vehicle and by the driver is 2 MR/hr or less.



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APPLICABILITY  
TRANSPORTATION REQUIREMENTS  
OPERATING PROCEDURE

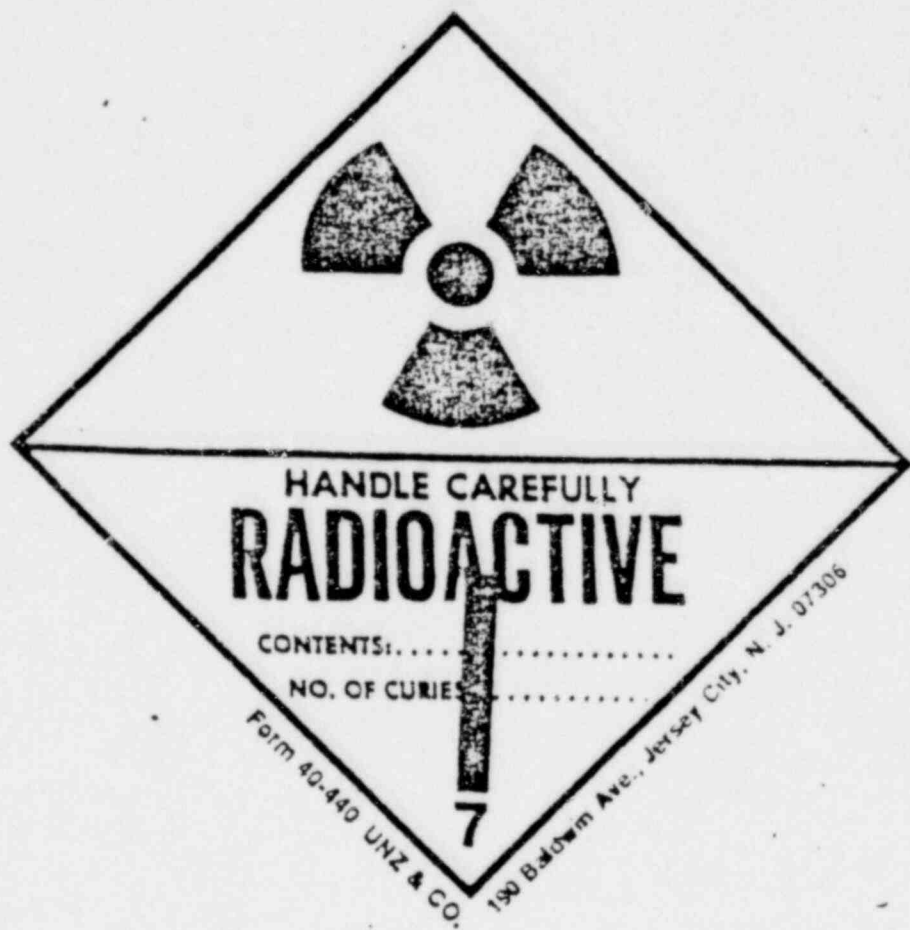
7.2 In addition, a copy of the Decay Chart and Emergency Notification letter will be maintained with the shippers certification in the Transportation Folder.

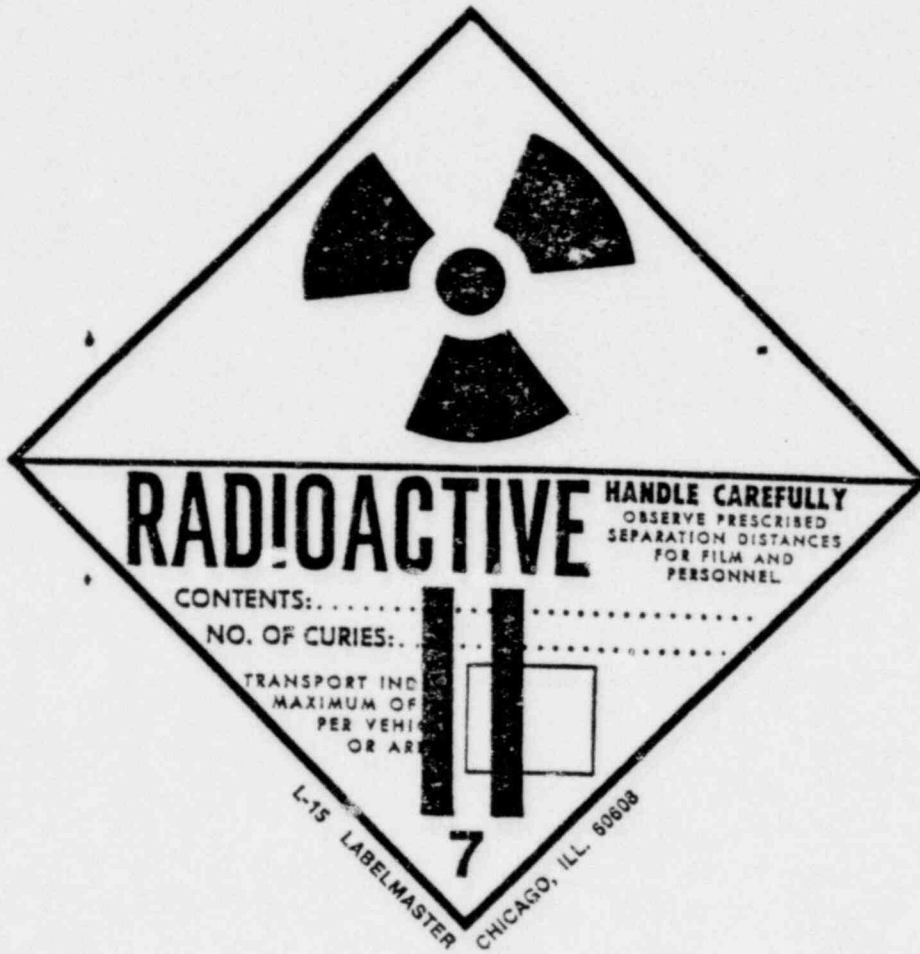
7.3 The Transportation Folder will be within the drivers reach or mounted on the drivers door. When the driver's out of the vehicle he shall leave the Transportation Folder either on the drivers seat or mounted on the drivers door.

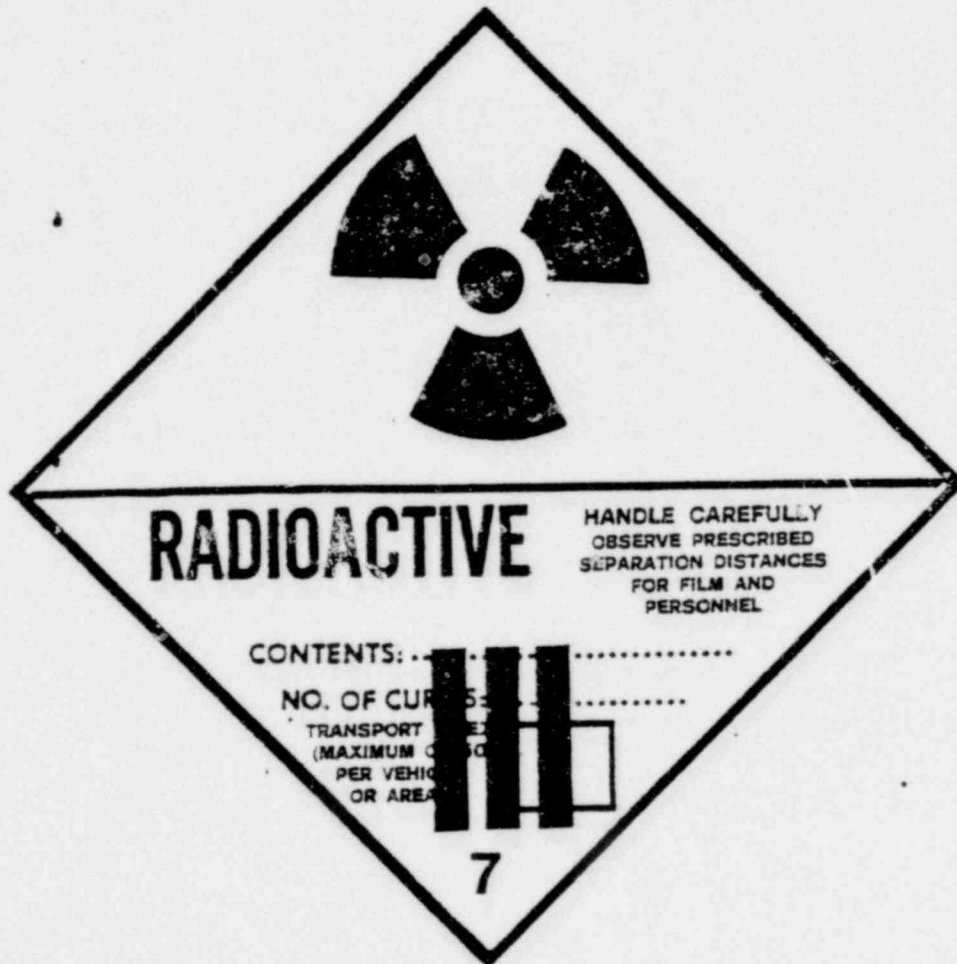
8.0 SHIPMENT BY CARGO AIRCRAFT

8.1 In addition to the requirements of Paragraphs 1.0 through 6.0, the following requirements shall also apply for shipment of radioactive material via cargo aircraft:

8.1.1 The package shall have a "Cargo Aircraft Only" label as shown on Attachment No. 4 affixed to the exterior surface.







DANGER

DO NOT LOAD ON  
PASSENGER AIRCRAFT







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SUBJECT  
SECTION X - RADIATION SAFETY MANUAL

APPLICABILITY:  
RADIATION SURVEY AND POSTING  
REQUIREMENTS

3.2.2 High Radiation Area - a survey need not be made to determine the High Radiation Area to preclude unnecessary exposure. Instead, the signs will be posted at the point where the calculated radiation level is in excess of 100 MR/hr. (Fig. 3)

3.3 The Radiographer and/or Radiographer Assistant will be in continuous surveillance of a Radiation Area to prevent unauthorized entry.

#### 4.0 REQUIRED RADIATION SURVEY

4.1 A physical radiation survey will be made to establish and post the Radiation Area, and the results of this survey will be recorded on the RS-3.

4.2 After each radiographic exposure, a physical radiation survey must be made to determine that the source has returned to the safe position in the projector.

• NOTE: This survey should be made at the same location relative to the projector for every survey and must include the area at the front of the projector near the port, and the entire length(s) of all source guide tube(s).

4.3 At the conclusion of each shift of radiographic operations and at the time of securing the source, a physical radiation survey must be made to determine that the source is in the safe position. This survey is to be made after the source guide tube(s) has been disconnected and the source is locked in the projector in preparation for storage. Results of this survey will be recorded on the RS-3.

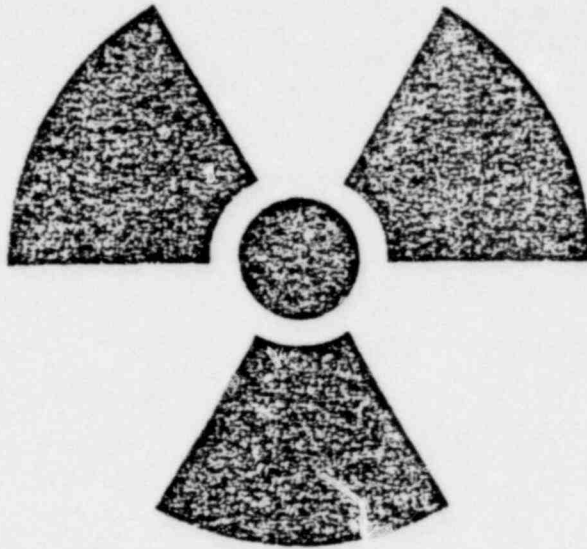
4.4 After the projector has been placed in the storage area, another survey is required at the surface of the storage container, box, building or mobile laboratory which must be posted "Caution - Radioactive Material" (Figure 1). The surface reading must indicate a 2 MR/hr reading or less. The results will be recorded on the RS-3.

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FIGURE 1

**CAUTION**



**RADIOACTIVE  
MATERIALS**

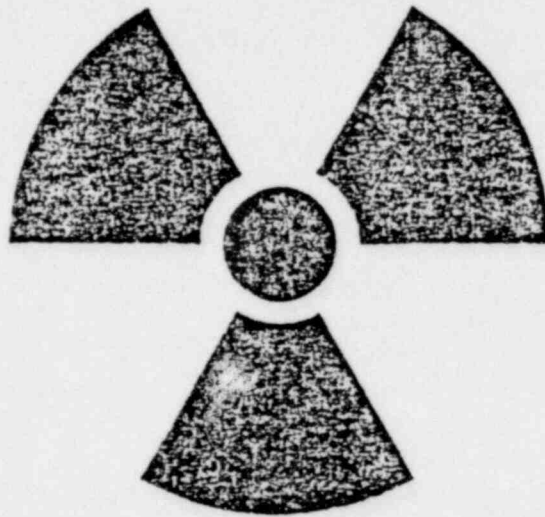
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FIGURE 2

**CAUTION**



**RADIATION  
AREA**

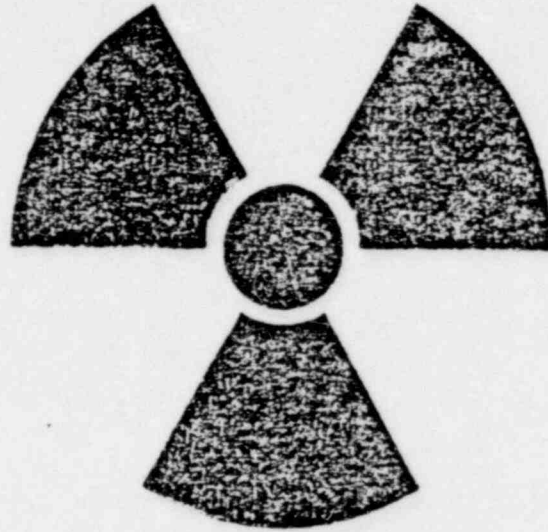
APPLIED HEALTH PHYSICS, INC.

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FIGURE 3

**CAUTION**



**HIGH  
RADIATION  
AREA**

APPLIED HEALTH PHYSICS, INC.

SUBJECT:  
SECTION XI - RADIATION SAFETY MANUALAPPLICABILITY  
OPERATING PROCEDURES -  
EXPOSURE DEVICES1.0 SCOPE

1.1 This Section provides instructions to Radiographers and Radiographers Assistants for the use of all licensed radiographer exposure devices, and shall be used in conjunction with the applicable procedure governing the exposure device being used.

2.0 EQUIPMENT

- 2.1 Only licensed exposure devices approved by the USNRC and/or applicable Agreement State(s)' Radioactive Material License(s) may be used.
- 2.2 At least one (1) currently calibrated and operable survey meter will be present and utilized during all radiographic operations.

3.0 QUALIFICATIONS OF PERSONNEL

3.1 Only personnel qualified as Radiographers and/or Assistant Radiographers shall be authorized to use exposure devices.

4.0 GENERAL PROCEDURES

- 4.1 The Radiographer and/or Assistant Radiographer shall perform the following steps prior to beginning any radiographic operations.
- 4.1.1 Conduct a daily inspection as required in RSP-6 and document it on the RS-3.
- 4.1.2 Establish the Restricted Area, as described in RSP-9.
- 4.1.3 Perform all the necessary radiographic setups.
- 4.2 Assemble the exposure device in accordance with the specific operating procedure.
- 4.3 Prior to exposing the source, check the Radiation Area to assure no one has entered.
- 4.4 Expose source for radiographic exposure.



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SUBJECT:  
SECTION XI - RADIATION SAFETY MANUAL

APPLICABILITY:  
OPERATING PROCEDURES -  
EXPOSURE DEVICES

- 4.5 If cranking becomes difficult at any time during the operation - stop, reverse the direction of cranking to return the source to the stored position in the projector. Monitor the area with a survey meter to insure the source is properly stored, then check the control and guide tubes for excessively small bend radii and repeat the step.
- 4.6 Conduct a physical radiation survey during the exposure to assure the radiation level at the established Radiation Area is not in excess of 2 MR/hr. The results of this survey shall be recorded on the RS-3.
- 4.7 Maintain direct surveillance during each exposure to preclude unauthorized entry into the Radiation Area.
- 4.8 A physical radiation survey of the projector and guide tube shall be conducted to assure the source is returned to its properly shielded position.
- 4.9 After conducting the physical radiation survey, lock and secure the projector.
- 4.10 At the completion of radiographic activities and prior to storing the projector, a final survey shall be made to assure that the source is in its properly shielded position.
- 4.11 The results of the survey shall be recorded on the RS-3 as described in RSP-9.





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SECTION XI - RADIATION SAFETY MANUAL

APPLICABILITY  
OPERATING PROCEDURE  
GAMMA PIPELINER

1.0 SCOPE

1.1 This procedure shall govern the specific operating instructions for Gamma Industries' Pipeliner I Exposure Device, and shall be used in conjunction with RSP-10.

2.0 OPERATING INSTRUCTIONS

2.1 Refer to RSP-10.

2.2 NOTE: Monitor all operations with a calibrated survey meter.

2.3 Locate the projector at the desired distance from the specimen to be radiographed.

2.4 Unlock the projector and rotate to ON-OFF knob to the ON position.

2.5 Move quickly to the boundary of the Restricted Area to minimize exposure to yourself.

2.6 Monitor the operation with a calibrated survey meter in accordance with RSP-9.

2.7 After the desired exposure time has elapsed, turn the ON-OFF knob to the OFF position.

2.8 Lock the projector.



## SUBJECT:

SECTION XI - RADIATION SAFETY MANUAL

## APPLICABILITY:

OPERATING PROCEDURE  
GAMMA-TRON 100A1.0 SCOPE

- 1.1 The procedure shall govern the specific operating instructions for Gamma Industries' Gammatron 100A Exposure Device, and shall be used in conjunction with RSP-10.

2.0 OPERATING INSTRUCTIONS

- 2.1 Refer to RSP-10
- 2.2 NOTE: Monitor all operations with a calibrated survey meter.
- 2.3 Locate projector at the desired distance from specimen to be radiographed.
- 2.4 Unlock and remove the lock box safety cap.
- 2.5 Unreel the control unit in a straight line from the projector to allow as great a distance as possible.
- 2.6 Attach the guide tube. Lay out the guide tube as straight as possible. Position the guide tube for making the radiographic exposure.

CAUTION

- 2.6.1 NEVER SUBJECT THE GUIDE TUBE TO SHARP BENDS WHICH WOULD RESTRICT THE MOVEMENT OF THE SOURCE IN THE GUIDE TUBE.
- 2.6.2 NEVER OPERATE THE SYSTEM WITH MORE THAN THREE (3) GUIDE TUBE SECTIONS (INCLUDING THE MASTER STOP).
- 2.7 Turn the crank to move the source out of the projector to the exposure position.
- 2.8 Monitor the operation with a calibrated survey meter in accordance with RSP-9.



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SECTION XI - RADIATION SAFETY MANUAL

APPLICABILITY  
OPERATING PROCEDURE  
GAMMA-TRON 100A

- 2.9 After the desired exposure time has elapsed, rapidly turn the hand crank in the retract direction. Rotate until the source has reached the properly stored position.
- 2.10 At the completion of radiographic activities, remove the guide tube from the projector and secure the projector by replacing safety plugs and locking.
- 2.11 Carefully coil the control cable for storage.



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SECTION XI - RADIATION SAFETY MANUAL

APPLICABILITY  
OPERATING PROCEDURES  
NUCLEAR ASSOC. #64-764

## 1.0 SCOPE

- 1.1 This procedure shall govern the specific operating instructions for Nuclear Associates, Inc., Calibrator #64-764, and shall be used in conjunction with RSP-10.

## 2.0 DESCRIPTION

- 2.1 The Gamma Survey Instrument Calibrator is a device for making calibrations in radiation fields from 2 to 800 MR/hr. It contains a non-removable Cs-137 sealed source. The unit radiation output of a Cs-137 source is 3100 R/hr per curie at a distance of 1 centimeter. The calibrator meets the requirements of the Agreement States.
- 2.2 It consists of heavy-duty brass housing that holds 100 mc of Cs-137 encapsulated at one end of a control rod. The brass housing is filled with approximately 48 lbs. of lead to provide the radioactive shielding required. Since Cs-137 has a long half-life of 29 years, there is no need to calculate factor for at least 1 or 2 years after the instrument has been received in the laboratory, or after the date on the nameplate, whichever is later.

## 3.0 WARNING

- 3.1 This unit contains a 100mc Cs-137 source, and all applicable precautions of the Agreement States must be observed. Do not remove the radioactive source or tamper with it in any way except as described under "Operation". Do not use the Calibrator except with the authorization of the RSO. Any calibrator malfunction, loss, theft or other emergency must be reported to the RSO immediately.
- 3.2 The outside surfaces of the calibrator should be tested every 6 months in accordance with the regulations of the Agreement States.

## 4.0 INSTALLATION

- 4.1 The Gamma Calibrator is a portable instrument and requires a minimum of set-up. The location for use should be selected carefully to prevent accidental radiation exposure. An area 15 feet in front of the cone should be clear at all times; this will also eliminate any appreciable scatter radiation. After the calibrator has been examined to determine if any damage has occurred during shipping, and the area has been cleared, open the padlock and follow the operating instructions.



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## SUBJECT

SECTION XI - RADIATION SAFETY MANUAL

## APPLICABILITY

OPERATING PROCEDURES

NUCLEAR ASSOC. #64-764

### 5.0 OPERATING INSTRUCTIONS

- 5.1 The source is kept in either of 2 positions: stored or exposed. In the fully-shielded "stored" position, radiation at the container's surface is less than 60 MR/hr; at 6 inches away it is less than 15 MR/hr. In the "exposed" position the source faces at 45 port at the side of the shield, and the field can vary from 2 to 600 MR/hr. The source is moved from "stored" to "exposed" merely by raising the control rod. For safety, the Cs-137 source can not be removed from its shield except by the manufacturer.
- 5.2 Included is a built-in tape measure which helps accurately determine the distance from the Cs-137 source to the instrument being calibrated. A keylock prevents any unauthorized use of the equipment. To activate the source, remove the padlock and swing the grip-handle on its pin hinge. The source cannot be raised unless the handle is swung away.
- 5.3 The timer on the gamma claibrator is a safety device and can also be used to set the length of time that the source remains in the exposed position. When the source is raised, the timer must be set to a time between one and 60 minutes (in one minute intervals) or the source will automatically drop back to the safe position. If the timer is set with the source raised, the source will remain in the exposed position for the time period selected and then drop to the safe position. To return the source to the safe storage position before the end of a pre-set time cycle, turn the timer knob to "zero". The source automatically drops into safe storage.
- 5.4 For momentary exposures of less than one minute, keep the timer at zero and lift the source handle. In this mode the source will automatically drop into the safe position when the handle is released. This feature offers two advantages:
- 5.4.1 The source cannot be left accidentally in the exposed position for a period longer than the time selected when it is raised.
- 5.4.2 The timer can be used for the automatic control of exposure time--a convenient preset time feature for calibrating dosimetry equipment.



SUBJECT  
SECTION XI - RADIATION SAFETY MANUAL

APPLICABILITY  
OPERATING PROCEDURE  
TECH-CPS 490

1.0 SCOPE

1.1 This procedure shall govern the specific operation of the Tech-Ops Model 490 Projector, and shall be used in conjunction with RSP-10.

2.0 OPERATING INSTRUCTIONS

2.1 Refer to RSP-10

2.2 NOTE: Monitoring all operations with a calibrated survey meter.

2.3 Locate the projector at the desired distance from the specimen to be radiographed.

2.4 Unreel the control cable as straight as possible to a place of maximum safety.

2.5 Remove the shipping plug from the exposure device and attach the guide tube. Lay out the guide tube as straight as possible. Position the source tip for radiographic exposure.

2.5.1 Do not subject the guide tube to any sharp bends which would restrict movement of the source in the guide tube.

CAUTION

NEVER OPERATE THE SYSTEM WITH MORE THAN THREE (3) GUIDE TUBE SECTIONS (INCLUDING THE MASTER OR STOP).

2.6 Rotate the hand crank in the expose direction to move the source out of the projector until it reaches the end of the snout.

2.7 Monitor the operation with a calibrated survey meter in accordance with RSP-9.

2.8 After the desired exposure time has elapsed, rapidly turn the crank until the source reaches the properly stored position.

2.9 After each exposure, monitor the container and guide tube with a calibrated survey meter as described in General Procedure RSP-9.





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SUBJECT:  
SECTION XI - RADIATION SAFETY MANUAL

APPLICABILITY:  
OPERATING PROCEDURE  
TECH-OPS 490

- 2.10 At the completion of radiographic activities, disassemble the projector as follows:
  - 2.11.1 Disconnect the source tube, install the plug in front of the unit, and lock.
  - 2.11.2 Roll up the guide tube and control cable and place in the cart with the unit.
- 2.11 Conduct a final radiation survey, and record the results as required in General Procedures RSP-9 and RS-3.
- 2.12 Return the projector to the storage area.



SUBJECT  
SECTION XI - RADIATION SAFETY MANUAL

APPLICABILITY  
OPERATING PROCEDURE  
TECH-OPS 533

1.0 SCOPE

1.1 This procedure shall govern the specific operation of the Tech-Ops Model 533 Projector, and shall be used in conjunction with RSP-10.

2.0 OPERATING INSTRUCTIONS

2.1 Refer to RSP-10.

2.2 NOTE: Monitor all operations with a calibrated survey meter.

2.3 Locate the projector at the desired distance from the specimen to be radiographed.

2.4 Remove the shipping plug from the front of the projector.

2.5 Attach the guide tube to the projector and position the guide tube for making the radiographic exposure.

2.5.1 Do not subject the guide tube to any sharp bends which would restrict movement of the source in the guide tube.

CAUTION

NEVER OPERATE THE SYSTEM WITH MORE THAN THREE (3) GUIDE TUBE SECTIONS (INCLUDING THE GUIDE TUBE WITH THE STOP). WHEN USING PIPE POSITIONER, NO MORE THAN TWO (2) GUIDE TUBE SECTIONS SHALL BE USED.

2.6 Arrange the control assembly as follows:

2.6.1 Determine the operating site of the control unit for maximum distance from the projector.

2.6.2 Lay out the control unit as straight as possible directing the connector end to the rear of the projector.

2.6.3 Do not subject the control cable to any sharp bends which may restrict free movement of drive cable.



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SUBJECT:  
SECTION XI - RADIATION SAFETY MANUAL

APPLICABILITY:  
OPERATING PROCEDURE  
TECH-OPS 533

- 2.7 Unlock the projector and rotate the selector ring on the control cable connector from the lock position to the connect position which will disengage the storage cover. Remove the storage cover and place it in the storage cover holder.
- 2.8 Engage the male and female portions of the swivel connector by depressing the spring loaded locking pin toward the projector with the thumbnail. Release the locking pin and test that the connection has been properly made.
- 2.9 Insert the cable plug into the projector control cable connector. Rotate the selector ring from the connect to the lock position.
- 2.10 Rotate the selector ring from the lock position to the operate position.
- 2.11 Rapidly, rotate the hand crank in the expose (counter-clockwise) direction to move the source out of the projector to the end of the guide tube stop.
- 2.12 Monitor the operation with a calibrated survey meter in accordance with RSP-9.
- 2.13 After the desired exposure time has elapsed, rapidly turn the hand crank in the retract (clockwise) direction. Continue to rotate until the source reaches the properly stored position.
- 2.14 At the completion of radiographic activities, disassemble the projector as follows:
  - 2.14.1 Remove the control cable plug by rotating the selector ring from the operate position to the connect position.
  - 2.14.2 Disconnect the drive cable from the projector in the same manner as described in paragraph 2.8 for engaging.
  - 2.14.3 Replace the storage cover in the control cable connector and rotate the selector ring from the connect position to the lock position. Engage and lock to secure the projector.
  - 2.14.4 Remove the guide tube from the source tube connector of the projector and install the shipping plug.

SUBJECT  
SECTION XI - RADIATION SAFETY MANUALAPPLICABILITY:  
OPERATING PROCEDURES  
TECH-OPS #660/6801.0 SCOPE

1.1 This procedure shall govern the specific operation of the Tech-Ops #660 and 680 Projectors, and shall be used in conjunction with RSP-10.

2.0 OPERATING INSTRUCTIONS

2.1 Refer to RSP-10.

2.2 NOTE: Monitor all operations with a calibrated survey meter.

2.3 Locate the projectors at the desired distance from the specimen to be radiographed.

2.4 Remove the shipping plug from the front of the projector.

2.5 Attach the guide tube to the projector and position the guide tube for making the radiographic exposure.

2.5.1 Do not subject the guide tube to any sharp bends which would restrict movement of the source in the guide tube.

CAUTION

NEVER OPERATE THE SYSTEM WITH MORE THAN THREE (3) GUIDE TUBE SECTIONS (INCLUDING THE GUIDE TUBE WITH THE STOP). WHEN USING PIPE POSITIONS, NO MORE THAN TWO (2) GUIDE TUBE SECTIONS SHALL BE USED.

2.6 Arrange the control assembly as follows:

2.6.1 Determine the operating site of the control unit for maximum distance from the projector.

2.6.2 Lay out the control unit as straight as possible directing the connector and to the rear of the projector.

2.6.3 Do not subject the control cable to any sharp bends which may restrict free movement of the drive cable.

2.7 Unlock the projector and rotate the selector ring on the control cable connector from the lock position which will disengage the storage cover. Remove the storage cover and place it in the storage cover holder.

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SECTION XI - RADIATION SAFETY MANUALAPPLICABILITY:  
OPERATING PROCEDURE  
TECH-OPS #660/680

- 2.8 Slide the control cable collar back and open the jaws of the control connector to expose the male portion of swivel connector. Engage the male and female portions of the swivel connector by depressing the spring loaded locking pin toward the projector with the thumbnail. Release the locking pin and test that the connection has been properly made. Close the jaws over the swivel-type connection.
- 2.9 Slide the control cable collar over the connector jaws and insert the control cable plug into the projector cable connector. Rotate the selector ring from the connect to the lock position.
- 2.10 Rotate the selector ring from the lock position to the operate position.
- 2.11 Rapidly, rotate the hand crank in the expose (counter-clockwise) direction to move the source out of the projector to the end of the guide tube stop.
- 2.12 Monitor the operation with a calibrated survey meter in accordance with RSP-9.
- 2.13 After the desired exposure time has elapsed, rapidly turn the hand crank in the retract (clockwise) direction. Continue to rotate until the source reaches the properly stored position.
- 2.14 At the completion of the radiographic activities, disassemble the projector as follows:
  - 2.14.1 Remove the control cable plug by rotating the selector ring from the operate position to the connect position.
  - 2.14.2 Disconnect the drive cable from the projector in the same manner as described in Paragraph 2.8 for engaging.
  - 2.14.3 Replace the storage cover in the control cable connector and rotate the selector ring from the connect position to the lock position. Engage and lock to secure the projector.
  - 2.14.4 Remove the guide tube from the source tube connector of the projector and install the shipping plug.



# NATIONAL INSPECTION & CONSULTANTS

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SUBJECT:  
SECTION XII - RADIATION SAFETY MANUAL

APPLICABILITY:  
EMERGENCY PROCEDURES

## 1.0 SCOPE

1.1 The Section shall govern the steps to be taken by the Radiographer and/or Assistant Radiographer in the event of an emergency situation concerning radioactive material/equipment.

## 2.0 RESPONSIBILITIES

2.1 It is the Radiographer/Assistant Radiographer's responsibility to notify the designated personnel of any situation wherein he feels an emergency situation exists or could exist, whether it be in the transportation, use and/or storage of radioactive material.

2.2 The designated personnel at NIC to be notified via telephone (collect) are: as listed in the emergency notification letter, RS-18, in this RSM.

## 3.0 EMERGENCY SITUATION

3.1 Emergency situations are defined but not limited to the following:

- A. Dosimeter goes off scale. (over 200mr)
- B. Radioactive source becomes stuck in source guide tube.
- C. Source projector is dropped in rigging at work locations
- D. Radiation survey instrument does not function properly.
- E. Accident in transportation of radioactive material via NIC mobile laboratory of private vehicle.

NOTE: IN THE EVENT A RADIOGRAPHER BECOMES INCAPACITATED DURING AN ACCIDENT, PLACARDS SHOULD BE IN PLACE ON THE VEHICLE TO INFORM LOCAL, STATE AND/OR CIVIL AUTHORITIES WHOM THEY SHOULD CONTACT, AND THE TRANSPORTATION FOLDER AVAILABLE IN THE DRIVERS COMPARTMENT. NEVER LEAVE THE SCENE OF AN ACCIDENT UNTIL YOU ARE SURE OF THE SECURITY OF SOURCE MATERIAL, UNLESS YOU NEED MEDICAL ATTENTION.





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SUBJECT:  
SECTION XII - RADIATION SAFETY MANUAL

APPLICABILITY:  
EMERGENCY PROCEDURES

- F. Fire in a storage building where sources are temporarily stored at construction sites. You, as a Radiographer, shall post the telephone number where you can be reached by site management personnel and/or the local fire department, as well as NIC's Emergency Notification, RS-18.
- G. Break in the connector of source material to drive the cable, preventing retracting of the source to its shielded position.
- H. Lost or stolen source material.
- I. Any situation wherein you, as a Radiographer, have reason to believe an overexposure to radiation has occurred to radiation workers and/or non-radiation workers, or of any damage occurring to radioactive material or equipment.



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SUBJECT  
SECTION XII - RADIATION SAFETY MANUAL

APPLICABILITY  
EMERGENCY PROCEDURES

## 4.0 EMERGENCY SITUATION ASSESSMENT

- 4.1 In the event of an emergency situation, the Radiographer/Assistant Radiographer shall assess the situation as follows:
- A. Restrict and post the radiation/suspected radiation area to a 2 MR/hr level. This will be done with a calibrated survey meter
  - B. Calmly review and assess the situation -- for example:
    - 1. You have reason to believe an individual has received an over exposure (over 100 MR) - calculate the exposure based on time-distance and the source activity.
    - 2. Damage to radioactive material projector controls due to accident. They can become damaged by cranes, etc.
    - 3. Crushed source material guide tubes (something fell on them)
- 4.2 After assessment, immediately notify - via telephone (collect) - the designated personnel on RS-18 for direction and resolution of the situation. If they are unobtainable, then contact responsible NIC Management personnel.

## 5.0 REPORTING/NOTIFICATION

- 5.1 It shall be the responsibility of the Div/Corp RSO to file with the appropriate regulatory body the reports required for reporting emergency situations.
- 5.2 In the event the Radiographer/Assistant Radiographer cannot locate the designated personnel on RS-18, or NIC Management personnel, he shall be required to notify the appropriate Federal and/or State Radiation Control Board by telephone. The telephone number of the USNRC Compliance Region can be found on USNRC Form 3 and/or the equivalent for respective Agreement States which shall be posted in the laboratory or field locations. Phone numbers for Licensed Agreement States will be recorded on the applicable State Notice to Employees Form.
- 5.3 After any emergency situation involving radioactive material or equipment, you shall complete an Incident Data Report (RS-9) giving detailed information as required concerning the emergency situation.



SUBJECT  
RADIATION SAFETY MANUAL

APPLICABILITY:

FORMS LISTING

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L111	Document Transmittal Sheet	2 of 24
NRC-3	Notice to Employees	3 of 24
NRC-4	Occupational External Radiation Exposure History	4 of 24
NRC-5	Current Occupational External Radiation Exposure	5 of 24
RS-2	Record of Medical Examination of Radiation Workers	6 of 24
RS-3	Weekly Radiation Survey Report	7 of 24
RS-4	Radioisotope Utilization Log	8 of 24
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RS-8	Radiation Safety Performance Review	12 of 24
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1110	Discrepant Equipment/Material Report (DEMR)	15 of 24
FEC-S-0149	Shipper's Certification for Material Classified as Radioactive Material	16 of 24
RS-12	Source Change Certification	17 of 24



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APPLICABILITY:

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RS-17	Annual Report of Radiation Exposure	21 of 24
RS-18	Notice of Accident Involving Radioactive Material	22 of 24
CL-1	Radiographic Equipment/Maintenance	23 of 24
CL-2	Radiographic Equipment/Maintenance Record Daily Inspection Checklist	24 of 24

# NIC DOCUMENT CONTROL RECORD

CLIENT:	Project:	PO #:	Contract #:	Originator:	DOCUMENT DESCRIPTION																			
DISTRIBUTED TO: Name _____ Cont/Co. # _____ Dept/Co. _____																								

Form #: 1107  
 Rev: 0  
 Date: 4/22/80

1. # of Copies distributed to person  
 2. Date Transmitted  
 3. R.A. Required (Yes/No)  
 4. Date R.A. Received  
 R.A. = Receipt Acknowledgement

# NIC DOCUMENT TRANSMITTAL SHEET

TO: \_\_\_\_\_

DATE: \_\_\_\_\_

FROM: \_\_\_\_\_

CLIENT: \_\_\_\_\_

CONTRACT NO: \_\_\_\_\_

The below listed documents are transmitted to you this date for use on the above contract. See below for disposition of superseded documents.

Type Doc.	Doc. I.D./ Control No.	Document Title	Rev. Level	Superseded Document Disposition

RECEIPT ACKNOWLEDGEMENT: Acknowledge receipt of the preceding list of documents this date and have complied with the superseded document disposition as instructed.

- YES
- NO

Signature: \_\_\_\_\_ Date: \_\_\_\_\_



# NOTICE TO EMPLOYEES

## STANDARDS FOR PROTECTION AGAINST RADIATION (PART 20), NOTICES, INSTRUCTIONS AND REPORTS TO WORKERS, INSPECTIONS (PART 19)

In Part 20 of its Rules and Regulations the Nuclear Regulatory Commission has established standards for your protection against radiation hazards from radioactive material under license issued by the Nuclear Regulatory Commission. In Part 19 of its Rules and Regulations the Nuclear Regulatory Commission has established certain provisions for the protection of workers engaged in NRC licensed activities.

### YOUR EMPLOYER'S RESPONSIBILITY

- Your employer is required to—
1. Advise those NRC registrants and the conditions of his NRC license to do work under the license.
  2. Not let anyone work unless you have a copy of the NRC regulations, notices, and operating procedures which apply to work you are engaged in and explain these provisions to you.
  3. Post notices of violation involving radiological working conditions, proposed imposition of civil penalties and orders.

### YOUR RESPONSIBILITY AS A WORKER

You should familiarize yourself with those provisions of the NRC regulations and the operating procedures which apply to the work you are engaged in. You should observe their provisions for your own protection and protection of your co-workers.

### WHAT IS COVERED BY THESE NRC REGULATIONS

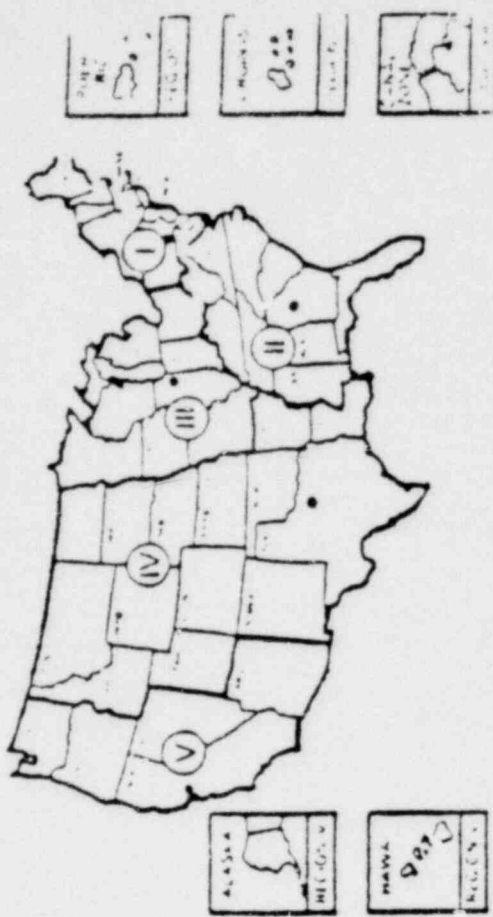
1. Limits on exposure to radiation and related materials in residential and unlicensed areas.
2. Measures to be taken after accidental exposures.
3. Personnel monitoring surveys and equipment.
4. Certain signs, labels, and safety instructions.
5. Exposure records and reports.
6. Options for workers regarding NRC inspections and related matters.

### REPORTS ON YOUR RADIATION EXPOSURE HISTORY

1. The NRC regulations require that your employer give you a written report of your radiation exposure history.

### POSTING REQUIREMENTS

Copies of the notice must be posted in a sufficient number of places in every establishment where activities licensed by the NRC are conducted to permit employees working in or frequenting any portion of a restricted area to observe a copy on the way in or from their place of employment.



## UNITED STATES NUCLEAR REGULATORY COMMISSION

### Regional Offices

REGION	ADDRESS	DAYTIME	TOLL-FREE NUMBER	TELEPHONE NUMBER
I	Region I Office of Inspection and Enforcement, USNRC 431 Park Avenue New York, New York 10022	212 512 1200	800 368 1200	212 512 1200
II	Region II Office of Inspection and Enforcement, USNRC 226 Franklin Street, N.W., Suite 818 Atlanta, Georgia 30303	404 526 4000	800 526 4000	404 526 4000
III	Region III Office of Inspection and Enforcement, USNRC 700 Pennsylvania Plaza Chestnut, Pennsylvania 19381	215 263 2000	800 263 2000	215 263 2000
IV	Region IV Office of Inspection and Enforcement, USNRC 411 Park Plaza Drive, Suite 1000 Arlington, Texas 76010	817 334 2611	800 334 2611	817 334 2611
V	Region V Office of Inspection and Enforcement, USNRC 1900 N. California Boulevard, Suite 302, Walnut Creek, California 94596	415 938 3141	800 938 3141	415 938 3141





**NATIONAL INSPECTION & CONSULTANTS, INC.**  
 P.O. Box 10, Coraopolls, Pennsylvania 15108  
 (412) 262-3092

**CURRENT OCCUPATIONAL EXTERNAL RADIATION EXPOSURE  
 NRC-5**

IDENTIFICATION

1. NAME (PRINT - Last, first, and middle)		2. SOCIAL SECURITY NO.			
3. DATE OF BIRTH (Month, day, year)		4. NAME OF LICENSEE NATIONAL INSPECTION & CONSULTANTS INC.			
5. DOSE RECORDED FOR (Specify: Whole body, skin of whole body; or hands and forearms, feet and ankles.) WHOLE BODY		6. WHOLE BODY DOSE STATUS (rem)		7. METHOD OF MONITORING (e.g. Film Badge — FS Pocket Chamber — MC Calculations — Calc.) X OR GAMMA _____ BETA _____ NEUTRONS _____	
8. PERIOD OF EXPOSURE (From — To)	DOSE FOR THE PERIOD (rem)				13. RUNNING TOTAL FOR CALENDAR QUARTER (rem)
	9. X OR GAMMA	10. BETA	11. NEUTRON	12. TOTAL	
1st Quarter					
2nd Quarter					
3rd Quarter					
4th Quarter					
LIFETIME ACCUMULATED DOSE					
14. PREVIOUS TOTAL (rem)	15. TOTAL QUARTERLY DOSE (rem)	16. TOTAL ACCUMULATED DOSE (rem)	17. PERM ACC DOSE 5 (mR) (rem)	18. UNUSED PART OF PERMISSIBLE ACCUMULATED DOSE (rem)	
1st Quarter					
2nd Quarter					
3rd Quarter					
4th Quarter					

I certify that the exposures listed above are correct and complete to the best of my knowledge.

I Certify that the exposure doses listed above are correct and complete to the best of NIC's knowledge.

\_\_\_\_\_  
Employee's Signature                      Date

\_\_\_\_\_  
Employer's Signature                      Date



# NATIONAL INSPECTION & CONSULTANTS

P.O. Box 10, Coraopolis, Pennsylvania 15108

(412) 262-3032

## RECORD OF MEDICAL EXAMINATION OF RADIATION WORKERS

FORM #: RS-2

Branch: \_\_\_\_\_ Date: \_\_\_\_\_

Employee's Full Name \_\_\_\_\_ SEX: Male  Female   
(LAST) (FIRST NAME) (MIDDLE INITIAL)

Social Security Number \_\_\_\_\_ Date of Birth \_\_\_\_\_

### MEDICAL HISTORY

(TO BE COMPLETED BY EMPLOYEE)

Have you ever had or do you now have any of the following? If so, please mark an "x" in the "yes" column and indicate the approximate year or age you had condition.

CONDITION	NO		YES		YR AGE	CONDITION	NO		YES		YR AGE	CONDITION	NO		YES		YR AGE
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Rheumatic fever	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	Bone or joint deformity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	Depression	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Frequent severe headaches	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	Painful or "frock" shoulder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	Severe emotional disturbance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Dizziness or fainting spells	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	Painful or "frock" elbow	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	Ulcer of stomach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Severe eye trouble or injury	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	Paralysis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	Skin disease	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Pain or pressure in chest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	Fits or epilepsy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	T.B.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
High blood pressure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	Loss of memory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	X-ray or radium treatments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Have you ever been rejected or rated up for insurance, rejected for employment or by the armed forces because of your physical condition, or any disabled in any way? \_\_\_\_\_ Yes  No

Have you any knowledge of having any blood diseases? \_\_\_\_\_ Yes  No

Do you have any reason to believe that you are sterile (unable to produce offspring) or afflicted by impaired fertility? \_\_\_\_\_ Yes  No

Do you believe there is any reason why you should not work with radiation or radioactive materials? \_\_\_\_\_ Yes  No

### PART B

### COMPLETE RADIATION EXPOSURE HISTORY

(TO BE COMPLETED BY EMPLOYEE)

HAVE YOU EVER ENGAGED IN THE HANDLING OF USE OF:

MATERIAL	CHECK		WHAT ISOTOPES?	WHERE USED?	WERE EXPOSURE RECORDS KEPT?	INCL DATES
	YES	NO				
Plutonium, Uranium, or Radioactive Rare Earths?	<input type="checkbox"/>	<input type="checkbox"/>				
Radium Salts or Compounds Not Hermetically Sealed?	<input type="checkbox"/>	<input type="checkbox"/>				
Other Radioactive Isotopes? (including radium salts or compounds)	<input type="checkbox"/>	<input type="checkbox"/>				

HAVE YOU EVER BEEN EXPOSED TO:

CONDITION	CHECK		WHAT DOSE?	GIVE DATES	TYPE RADIATION	WHERE DID IT OCCUR?	PHYSICAL REACTION
	YES	NO					
External Ionizing Radiation in excess of 300 milliroentgens in any 7-day period?	<input type="checkbox"/>	<input type="checkbox"/>					
Radioactive Aerosols that may have entered and deposited within the body?	<input type="checkbox"/>	<input type="checkbox"/>					

HAVE YOU EVER RECEIVED X-RAY THERAPY TREATMENTS: \_\_\_\_\_ Yes  No

DATE	PART OF BODY TREATED	PLACE OF TREATMENT	PHYSICAL REACTION, IF ANY (BLISTERING, REDDENING OF SKIN, NAUSEA, FATIGUE, ETC.)

LIST ALL DIAGNOSTIC X-RAY EXAMINATIONS YOU HAVE HAD WITHIN THE PAST FIVE YEARS (INCLUDE PHYSICAL EXAMS, DENTAL X-RAYS, ETC.)

DATE	PART OF BODY TREATED	PLACE OF EXAMINATION	PHYSICAL REACTION, IF ANY (BLISTERING, REDDENING OF SKIN, NAUSEA, FATIGUE, ETC.)

LIST ALL FLUOROSCOPIC EXAMINATIONS YOU HAVE HAD WITHIN THE PAST FIVE YEARS (SHOE FITTING EXAMINATIONS, CHEST FLUOROSCOPES, ETC.)

DATE	PART OF BODY EXAMINED	PLACE OF EXAMINATION	PHYSICAL REACTION, IF ANY

The foregoing statements are complete and accurate to the best of my knowledge and belief.

(DATE)

(EMPLOYEE SIGNATURE)

PART C (REVERSE SIDE) TO BE COMPLETED BY EXAMING PHYSICIAN

**PART - C**

**PHYSICAL EXAMINATION RECORD  
(TO BE COMPLETED BY EXAMINING PHYSICIAN)**

EYES: A. Distant vision (Snellen): without glasses: Right (20) \_\_\_\_\_ Left (20) \_\_\_\_\_ with glasses, if worn: Right (20) \_\_\_\_\_ Left (20) \_\_\_\_\_  
B. Evidence of cataracts disease or injury: Right \_\_\_\_\_ Left \_\_\_\_\_ Yes  No   
C. Color vision: Is color vision normal when Ishihara or equivalent color test is used? \_\_\_\_\_ Yes  No

EARS: (Consider denominators indicated here as normal. Record as numerators the greatest distance heard.) Ordinary conversation -  
Right ear (20") \_\_\_\_\_ Left ear (20") \_\_\_\_\_ Evidence of disease or injury: Right ear \_\_\_\_\_ Left ear \_\_\_\_\_  
GASTRO-INTESTINAL: History of Peptic Ulcer \_\_\_\_\_ Yes  No

If "Yes" is ulcers:  Active  Quiescent  Healed  
How long \_\_\_\_\_ Date of last X-ray \_\_\_\_\_

HEART AND BLOOD VESSELS: (A) Blood pressure: MM. \_\_\_\_\_ HG. \_\_\_\_\_ Systolic \_\_\_\_\_ Diastolic \_\_\_\_\_  
(B) Is organic heart disease present? \_\_\_\_\_ Yes  No   
(C) If organic heart disease is present, is it fully compensated? \_\_\_\_\_ Yes  No   
(D) Pulse rate: Sitting \_\_\_\_\_ immediately after exercise \_\_\_\_\_  
Two minutes after exercise \_\_\_\_\_ Cardiac reserve \_\_\_\_\_ (Good, Fair or Poor) \_\_\_\_\_

CHEST X-RAY: Have X-ray made and give report: \_\_\_\_\_  
History of tuberculosis? \_\_\_\_\_ Yes  No   
If "Yes", how long has the disease been arrested: \_\_\_\_\_

NERVOUS SYSTEM: (A) Include symptoms and full history of any mental, nervous or emotional abnormality (use additional sheets if necessary):  
\_\_\_\_\_  
(B) Has applicant ever been hospitalized or treated for a mental illness? \_\_\_\_\_ Yes  No   
(C) Where (name and location of hospital): \_\_\_\_\_  
(D) Date or dates of hospitalization: \_\_\_\_\_  
(E) Any history of epilepsy or fainting spells or drug addiction (including alcoholism)? \_\_\_\_\_ Yes  No   
If so, give details. \_\_\_\_\_  
(F) Are there any signs of nervous disease \_\_\_\_\_ Yes  No   
If so, give details. \_\_\_\_\_

BLOOD TEST RESULTS WERE AS FOLLOWS:  
RBC: \_\_\_\_\_ million per mm<sup>3</sup> WBC: \_\_\_\_\_ per mm<sup>3</sup>  
Hb: \_\_\_\_\_ % No. of Platelets: \_\_\_\_\_  
Differential: \_\_\_\_\_ % Polymorphonuclears \_\_\_\_\_ % Lymphocytes \_\_\_\_\_ % Monocytes  
\_\_\_\_\_ % Eosinophiles \_\_\_\_\_ % Basophiles

URINE ANALYSIS: Ph \_\_\_\_\_ Albumin \_\_\_\_\_ Sugar \_\_\_\_\_ Sp. Gr. \_\_\_\_\_  
Microscopic \_\_\_\_\_

DEFORMITIES, ASROPHIES, AND OTHER ABNORMALITIES, DISEASE NOT INCLUDED ABOVE: \_\_\_\_\_

REMARKS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date: \_\_\_\_\_ Signature of Examining Physician \_\_\_\_\_ M.D.

**PART - D**

**RADIOLOGICAL-PHYSICAL EXAMINATION RESULTS  
(TO BE COMPLETED BY NIC RSO/ASST)**

- 1. Medical History (by employee) \_\_\_\_\_ Approved  Not Approved
- 2. Complete Radiation Exposure History (by employee) \_\_\_\_\_ Approved  Not Approved
- 3. Medical Examination (by Physician) \_\_\_\_\_ Approved  Not Approved
- 4. Chest X-Ray \_\_\_\_\_ Approved  Not Approved

REMARKS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Examination reveals (employee) \_\_\_\_\_  
(LAST NAME) (FIRST) (MIDDLE INITIAL)  
is  is not  considered qualified from the health standpoint to engage in duties involving potential exposure to ionizing radiation.

Date \_\_\_\_\_ Physician \_\_\_\_\_





## WEEKLY RADIATION SURVEY REPORT

NAME \_\_\_\_\_

**MONDAY:** Date \_\_\_\_\_ Dosimeter Reading at end of day \_\_\_\_\_ mR.  
Location: Customer \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_  
Camera: Make \_\_\_\_\_ Model \_\_\_\_\_ Serial No. \_\_\_\_\_ Source No. \_\_\_\_\_ Curies \_\_\_\_\_  
Survey Meter: Make \_\_\_\_\_ Model \_\_\_\_\_ Serial No. \_\_\_\_\_ Calibration Due \_\_\_\_\_  
Radiation Levels: Top surface of camera at start of day \_\_\_\_\_ mR/hr; midday \_\_\_\_\_ mR/hr.  
End of day \_\_\_\_\_ mR/hr; Exterior of Vehicle/Storage \_\_\_\_\_ mR/hr; Driver compartment \_\_\_\_\_ mR/hr.  
Equipment checked \_\_\_\_\_ Film Badge No. \_\_\_\_\_ Month \_\_\_\_\_ Dosimeter No. \_\_\_\_\_  
Number of exposures \_\_\_\_\_ exp. time \_\_\_\_\_ Storage Area \_\_\_\_\_  
Is documentation of Physical Radiation Survey recorded on reverse side? Yes \_\_\_\_\_ No \_\_\_\_\_

**TUESDAY:** Date \_\_\_\_\_ Dosimeter Reading at end of day \_\_\_\_\_ mR.  
Location: Customer \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_  
Camera: Make \_\_\_\_\_ Model \_\_\_\_\_ Serial No. \_\_\_\_\_ Source No. \_\_\_\_\_ Curies \_\_\_\_\_  
Survey Meter: Make \_\_\_\_\_ Model \_\_\_\_\_ Serial No. \_\_\_\_\_ Calibration Due \_\_\_\_\_  
Radiation Levels: Top surface of camera at start of day \_\_\_\_\_ mR/hr; midday \_\_\_\_\_ mR/hr.  
End of day \_\_\_\_\_ mR/hr; Exterior of Vehicle/Storage \_\_\_\_\_ mR/hr; Driver compartment \_\_\_\_\_ mR/hr.  
Equipment checked \_\_\_\_\_ Film Badge No. \_\_\_\_\_ Month \_\_\_\_\_ Dosimeter No. \_\_\_\_\_  
Number of exposures \_\_\_\_\_ exp. time \_\_\_\_\_ Storage Area \_\_\_\_\_  
Is documentation of Physical Radiation Survey recorded on reverse side? Yes \_\_\_\_\_ No \_\_\_\_\_

**WEDNESDAY:** Date \_\_\_\_\_ Dosimeter Reading at end of day \_\_\_\_\_ mR.  
Location: Customer \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_  
Camera: Make \_\_\_\_\_ Model \_\_\_\_\_ Serial No. \_\_\_\_\_ Source No. \_\_\_\_\_ Curies \_\_\_\_\_  
Survey Meter: Make \_\_\_\_\_ Model \_\_\_\_\_ Serial No. \_\_\_\_\_ Calibration Due \_\_\_\_\_  
Radiation Levels: Top surface of camera at start of day \_\_\_\_\_ mR/hr; midday \_\_\_\_\_ mR/hr.  
End of day \_\_\_\_\_ mR/hr; Exterior of Vehicle/Storage \_\_\_\_\_ mR/hr; Driver compartment \_\_\_\_\_ mR/hr.  
Equipment checked \_\_\_\_\_ Film Badge No. \_\_\_\_\_ Month \_\_\_\_\_ Dosimeter No. \_\_\_\_\_  
Number of exposures \_\_\_\_\_ exp. time \_\_\_\_\_ Storage Area \_\_\_\_\_  
Is documentation of Physical Radiation Survey recorded on reverse side? Yes \_\_\_\_\_ No \_\_\_\_\_

**THURSDAY:** Date \_\_\_\_\_ Dosimeter Reading at end of day \_\_\_\_\_ mR.  
Location: Customer \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_  
Camera: Make \_\_\_\_\_ Model \_\_\_\_\_ Serial No. \_\_\_\_\_ Source No. \_\_\_\_\_ Curies \_\_\_\_\_  
Survey Meter: Make \_\_\_\_\_ Model \_\_\_\_\_ Serial No. \_\_\_\_\_ Calibration Due \_\_\_\_\_  
Radiation Levels: Top surface of camera at start of day \_\_\_\_\_ mR/hr; midday \_\_\_\_\_ mR/hr.  
End of day \_\_\_\_\_ mR/hr; Exterior of Vehicle/Storage \_\_\_\_\_ mR/hr; Driver compartment \_\_\_\_\_ mR/hr.  
Equipment checked \_\_\_\_\_ Film Badge No. \_\_\_\_\_ Month \_\_\_\_\_ Dosimeter No. \_\_\_\_\_  
Number of exposures \_\_\_\_\_ exp. time \_\_\_\_\_ Storage Area \_\_\_\_\_  
Is documentation of Physical Radiation Survey recorded on reverse side? Yes \_\_\_\_\_ No \_\_\_\_\_

**FRIDAY:** Date \_\_\_\_\_ Dosimeter Reading at end of day \_\_\_\_\_ mR.  
Location: Customer \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_  
Camera: Make \_\_\_\_\_ Model \_\_\_\_\_ Serial No. \_\_\_\_\_ Source No. \_\_\_\_\_ Curies \_\_\_\_\_  
Survey Meter: Make \_\_\_\_\_ Model \_\_\_\_\_ Serial No. \_\_\_\_\_ Calibration Due \_\_\_\_\_  
Radiation Levels: Top surface of camera at start of day \_\_\_\_\_ mR/hr; midday \_\_\_\_\_ mR/hr.  
End of day \_\_\_\_\_ mR/hr; Exterior of Vehicle/Storage \_\_\_\_\_ mR/hr; Driver compartment \_\_\_\_\_ mR/hr.





**NATIONAL INSPECTION & CONSULTANTS, INC.**  
 P.O. Box 10, Coraopolis, Pennsylvania 15108  
 (412) 262-3092

Cont. Type  
 Model #  
 Ser. #  
 Isotope  
 Ser. #

### RADIOISOTOPE UTILIZATION LOG

DATE OUT	TIME OUT	DATE IN	TIME IN	STORAGE LOCATION	RADIATION SURVEY OF DEVICE AFTER SECURING		TRANSPORTATION VIA	LOCATION UTILIZED	CURIES	USERS INITIALS	REMARKS
					CONTACT	1 M.					



ANNUAL STATISTICAL PERSONNEL MONITORING  
INFORMATION SUMMARY REPORT  
FOR THE YEAR OF \_\_\_\_\_

**NATIONAL INSPECTION & CONSULTANTS INC.**

4621 Royal Avenue • P.O. Box 10 • Coraopolis, Pennsylvania 15108 • 412-262-3192

This report is submitted in accordance with the requirements  
of 10CFR 20.407 (a)(2).

Estimated Whole Body Exposure Range (REMS) <sup>1</sup>	Number of Individuals in Each Range
No Measurable exposure	_____
Measurable exposure less than 0.1	_____
0.1 to 0.25	_____
0.25 to 0.5	_____
0.5 to 0.75	_____
0.75 to 1	_____
1 to 2	_____
2 to 3	_____
3 to 4	_____
4 to 5	_____
5 to 6	_____
6 to 7	_____
7 to 8	_____
8 to 9	_____
9 to 10	_____
10 to 11	_____
11 to 12	_____
12+	_____

<sup>1</sup>Individual values exactly equal to the values separating  
exposure ranges shall be reported in the higher range.

\_\_\_\_\_  
Radiation Safety Officer

\_\_\_\_\_  
Date



Form #RS-6  
Rev: 0  
Date: 11/20/80

**NATIONAL INSPECTION & CONSULTANTS INC.**

4621 Royal Avenue • P.O. Box 10 • Coraopolis, Pennsylvania 15108 • 412-262-3092

Director of Management & Program Analysis  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Subject: Individual Termination Records

Reference: (1) USNRC Title 10 CFR Part 20, para. 20.408  
(2) USNRC License No. 37-18346-01

Gentlemen:

In accordance with para. 20.408, we are submitting herewith  
\_\_\_\_\_ record of radiation exposure  
incurred during his employment with National Inspection and  
Consultants, Inc.

Social Security No:  
Date of Birth:

By copy of this letter and attachment, \_\_\_\_\_  
is advised of the same.

Respectfully submitted,

NATIONAL INSPECTION & CONSULTANTS, INC.

Christopher M. Schnell  
Corp. Radiation Safety Officer



Form #: RS-7  
Rev: 1  
Date: 11/20/80

## NIC RADIATION SAFETY NOTICE

### NATIONAL INSPECTION & CONSULTANTS INC.

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The following documents are available for review at the job site, mobile laboratory or in NIC's Corporate Office, Coraopolis, Pa.

1. USMRC RULES AND REGULATIONS

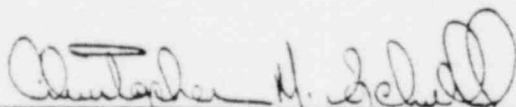
- 1.1 10 CFR-19
- 1.2 10 CFR-20
- 1.3 10 CFR-30
- 1.4 10 CFR-34
- 1.5 10 CFR-40
- 1.6 10 CFR-71
- 1.7 NRC-3

2. APPLICABLE STATE REGULATIONS, AS REQUIRED.


3. NATIONAL INSPECTION AND CONSULTANTS RADIATION SAFETY MANUAL (RSM) WHICH INCLUDES:

- 3.1 Operating and Emergency Procedures.
- 3.2 USMRC and/or applicable State License and Amendments.

4. NOTICE OF ANY APPLICABLE VIOLATION PER 10 CFR 19 (19.11(A)(4)).



Corp. Radiation Safety Officer

  
Date



Form #: RS-3  
Rev: 1  
Date: 11/20/90

RADIATION SAFETY PERFORMANCE REVIEW

NATIONAL INSPECTION & CONSULTANTS INC.

4621 Royal Avenue • P.O. Box 10 • Coraopolis, Pennsylvania 15108 • 412-261-3092

Announced ( )  
Unannounced ( )

NAME: \_\_\_\_\_ SSAN: \_\_\_\_\_  
TITLE: \_\_\_\_\_ DATE OF REVIEW: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_  
USNRC REGION: I II III IV V STATE: \_\_\_\_\_  
PROJECTOR SERIAL NO. \_\_\_\_\_ RADIOACTIVE CONTENT \_\_\_\_\_

SURVEY CHECKLIST

1. Dosimeter used: S/N: \_\_\_\_\_
2. Worn in proper location? \_\_\_\_\_
3. Survey Meter used: S/N: \_\_\_\_\_
4. Calibration Date: \_\_\_\_\_
5. Calibration Due Date: \_\_\_\_\_
6. Scale Used: Area Survey: \_\_\_\_\_ Proj. Survey: \_\_\_\_\_
7. Film Badge # Used: \_\_\_\_\_
8. Film Badge Month: \_\_\_\_\_
9. Film Badge properly worn? \_\_\_\_\_
10. Controlled Copy of RSM on hand in work area & complete? \_\_\_\_\_
11. USNRC-3 Properly Posted? \_\_\_\_\_
12. NIC R.S. Notice Properly Posted? \_\_\_\_\_
13. Emergency Notification Posted? \_\_\_\_\_
14. Are Radiation Areas Properly Posted? \_\_\_\_\_
15. Are High Radiation Areas Properly Posted? \_\_\_\_\_
16. Is a Radiation Survey Conducted? \_\_\_\_\_
17. Is the RS-3 properly filled in at the end of each shift? \_\_\_\_\_
18. Is the RS-4 properly completed? \_\_\_\_\_
19. Is the CL-1 used & on hand? \_\_\_\_\_
20. Is there a record of CL-2 completion within 1 month? \_\_\_\_\_
21. Is all equipment in good operating condition? \_\_\_\_\_
22. Is the storage area properly posted & secured? \_\_\_\_\_
23. Proper record of vehicle survey? \_\_\_\_\_
24. Using the appropriate operating procedure for the applicable equipment in the RSM, observe a complete operation, step by step and note any deficiencies. The individual is permitted to reference the operating procedure. \_\_\_\_\_

REMARKS:  Satisfactory  
 Unsatisfactory

Reviewers Signature \_\_\_\_\_

Date \_\_\_\_\_



**NATIONAL INSPECTION & CONSULTANTS INC.**

4621 Royal Avenue • P.O. Box 10 • Coraopolis, Pennsylvania 15108 • 412-262-3092

INCIDENT DATA REPORT

In the event that any of the following occur, this report is to be completed and forwarded to the Corp. R.S.O. within 24 hours.

- (A) Your dosimeter is discharged beyond 200 MR due to unknown circumstances in which the possibility of an excessive exposure to radiation exists.
- (B) Your film badge becomes wet, mutilated or lost.
- (C) You have reason to believe your film badge may indicate an excessive exposure that you may have received.

SECTION 1 - COMPLETE ALL ITEMS

1. Name: \_\_\_\_\_ SSAN: \_\_\_\_\_ DOB: \_\_\_\_\_
2. Work Location: \_\_\_\_\_
3. Did you stop radiographic operations immediately?  
Yes \_\_\_\_\_ No \_\_\_\_\_
4. Did you notify your Radiation Safety Supervisor? \_\_\_\_\_  
Assistant Radiation Safety Officer? \_\_\_\_\_
5. When: Date: \_\_\_\_\_ Time: \_\_\_\_\_
6. Which of the items listed above occurred?  
A. \_\_\_\_\_ (Complete Section 2)  
B. \_\_\_\_\_ (Complete Section 3)  
C. \_\_\_\_\_ (Complete Section 4)

SECTION 2 - TO BE COMPLETED IN THE EVENT THAT ITEM A ABOVE OCCURRED

1. When were you aware that your dosimeter went off scale?  
Date: \_\_\_\_\_ Time: \_\_\_\_\_
2. If possible over-exposure may have occurred, at what distance (closest) were you from the source? \_\_\_\_\_  
For what length of time? \_\_\_\_\_
3. Projector device employed - Make: \_\_\_\_\_ Model: \_\_\_\_\_  
S/N: \_\_\_\_\_
4. Source Type: IR-192 \_\_\_\_\_ CO-60 \_\_\_\_\_ Source S/N \_\_\_\_\_  
Curies \_\_\_\_\_
5. Survey Meter: Make: \_\_\_\_\_ Model: \_\_\_\_\_ S/N \_\_\_\_\_
6. Explain in detail exactly everything that occurred:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



SECTION 3 - TO BE COMPLETED IN THE EVENT THAT ITEM B ABOVE OCCURRED.

1. Explain in detail how your film badge became wet, mutilated or lost. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

SECTION 4 - TO BE COMPLETED IN THE EVENT THAT ITEM C ABOVE OCCURRED.

1. Where was your film badge when over exposed to radiation? \_\_\_\_\_
2. How much radiation do you believe your film badge rec'd?  
20 to 100 MR \_\_\_\_\_ 100 to 300 MR \_\_\_\_\_  
300 to 600 MR \_\_\_\_\_ Above 600 MR \_\_\_\_\_  
Unknown \_\_\_\_\_
3. Why were you not wearing your film badge? \_\_\_\_\_  
\_\_\_\_\_

REMARKS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Individual's Signature \_\_\_\_\_ Date \_\_\_\_\_

RSO Review: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Proposed Corrective Action: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
RSO Signature \_\_\_\_\_ Date \_\_\_\_\_





RADIOACTIVE MATERIAL RECEIVING REPORT

**NATIONAL INSPECTION & CONSULTANTS INC.**

4621 Royal Avenue • P.O. Box 10 • Coraopolis, Pennsylvania 15108 • 412-262-3092

- I. RECEIPT DATE: \_\_\_\_\_ RECEIPT TIME: \_\_\_\_\_
- II. LOCATION: \_\_\_\_\_
- III. RECEIVED FROM: \_\_\_\_\_
- IV. CARRIER: \_\_\_\_\_
- V. ISOTOPE SOURCE DATA: \_\_\_\_\_ IR 192 \_\_\_\_\_ CO60 \_\_\_\_\_ OTHER \_\_\_\_\_  
SOURCE S/N: \_\_\_\_\_ ACTIVITY: \_\_\_\_\_ CURIES \_\_\_\_\_  
DECAY CHART: \_\_\_\_\_ YES \_\_\_\_\_ NO. SOURCE SIZE CERTIFICATION: \_\_\_\_\_ YES \_\_\_\_\_ NO.  
EVIDENCE OF LEAK TEST: \_\_\_\_\_ YES \_\_\_\_\_ NO. SHIPPING PAPERS: \_\_\_\_\_ YES \_\_\_\_\_ NO.

- VI. CONTAINER DATA:
- A. SOURCE CHANGER MAKE: \_\_\_\_\_ MODEL #: \_\_\_\_\_ SERIAL #: \_\_\_\_\_
- B. EXPOSURE DEVICE MAKE: \_\_\_\_\_ MODEL #: \_\_\_\_\_ SERIAL #: \_\_\_\_\_

- VII. PHYSICAL RADIATION SURVEY OF CONTAINER: \*
- A. RADIATION LEVEL @ CONTACT WITH CONTAINER: \_\_\_\_\_ MR/hr. (\*1)
- B. RADIATION LEVEL @ 6" FROM EXTERNAL SURFACE: \_\_\_\_\_ MR/hr.
- C. RADIATION LEVEL @ 3' FROM EXTERNAL SURFACE: \_\_\_\_\_ MR/hr. (\*2)
- D. TYPE RADIOACTIVE YELLOW LABEL ATTACHED: \_\_\_\_\_

NOTES: The Container will be surveyed within three (3) hours of receipt during normal working hours, or within eighteen (18) hours of receipt after normal working hours.

(1) Radiation Level shall not exceed 200 MR/hr @ contact.

(2) Radiation Level shall not exceed 10 MR/hr @ 3'.

Should the Radiation Levels exceed those specified in (1) or (2) above, Immediately notify the Radiation Safety Supervisor/Officer.

- VIII. SOURCE CHANGE INFORMATION:
- A. FROM CONTAINER: MAKE: \_\_\_\_\_ MODEL: \_\_\_\_\_ S/N: \_\_\_\_\_ TO  
MAKE: \_\_\_\_\_ MODEL: \_\_\_\_\_ S/N: \_\_\_\_\_
- B. DATE OF TRANSFER: \_\_\_\_\_

\_\_\_\_\_  
RECEIPT INSPECTORS SIGNATURE

\_\_\_\_\_  
DATE

- IX. CORP. RADIATION SAFETY OFFICER REVIEW:

\_\_\_\_\_  
CORP. RADIATION SAFETY OFFICER

\_\_\_\_\_  
DATE



**FEDERAL EXPRESS CORPORATION**  
**SHIPPER'S CERTIFICATION FOR MATERIALS CLASSIFIED AS RADIOACTIVE MATERIAL**

Two completed and signed copies of this certification shall be handed to the carrier.  
 (Use block letters)

**WARNING:** Failure to comply in all respects with the applicable regulations of the Department of Transportation, 49-CFR, CAB 82 and, for international shipments, the IATA Restricted Articles Regulations may be a breach of the applicable law, subject to legal penalties. This certification shall in no circumstance be signed by an IATA Cargo Agent or a consolidator for international shipments.

This shipment is within the limitations prescribed for: (mark one)  
 passenger aircraft \*See special handling information below

cargo-only aircraft

NATURE AND QUANTITY OF CONTENT					PACKAGE			
PROPER SHIPPING NAME	RADIOISOTOPE	GROUP	FORM	ACTIVITY		CATEGORY	TRANSPORT INDEX	TYPE
FOR U.S. SHIPMENTS SEE SECTION 172.101 49CFR	NAME OR SYMBOL OF PRINCIPAL RADIOACTIVE CONTENT	GROUP NUMBER OF GROUPS I TO VII	CHEMICAL FORM AND PHYSICAL STATE (GAS/ LIQUID/SOLID), or SPECIAL FORM, or SPECIAL ENCAPSULATION	NUMBER OF CURIES, or MILLI-CURIES	NUMBER of Packages	I-WHITE or II-YELLOW or III-YELLOW LABEL	FOR YELLOW LABEL CATEGORIES ONLY	INDUSTRIAL or TYPE A, or TYPE B

**ADDITIONAL INFORMATION REQUIRED FOR FISSILE MATERIALS ONLY**

EXEMPTED FROM THE ADDITIONAL REQUIREMENTS FOR FISSILE MATERIALS SPECIFIED IN 7.1 OF PART 2 OF THE IATA RESTRICTED ARTICLES REGULATION   
 NAMES, PLUS QUANTITY IN GRAMS, OR CONCENTRATION OR ENRICHMENT IN U235:

NOT EXEMPTED: FISSILE CLASS I  FISSILE CLASS II  FISSILE CLASS III

Additional certificates obtained by the Shipper when necessary:

Special Form Encapsulation Certificates)   
 Type "B" Packaging Certificates)   
 Certificates for Fissile Material)

Certificates) for Large Radioactive Source   
 Government Approvals/Permits

Special Handling Information - "This shipment is to be used in medical research having direct application to human medical welfare."

I hereby certify that the contents of this consignment are fully and accurately described above by Proper Shipping Name and are classified, packed, marked, and labelled, and in proper condition for carriage by air according to applicable national government regulations.

Name and full address of Shipper	Name and title of person signing Certification
	Emergency telephone no.
Date	Signature of the Shipper (see WARNING above)

Federal Express Airbill No.	Origin Station	Destination Station
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PERSONNEL CERTIFICATION

**NATIONAL INSPECTION & CONSULTANTS INC.**

4621 Royal Avenue • P.O. Box 10 • Coraopolis, Pennsylvania 15108 • 412-262-3092

SOURCE CHANGE CERTIFICATION

THIS IS TO CERTIFY THAT \_\_\_\_\_  
SSAN: \_\_\_\_\_, WAS GIVEN SUFFICIENT TRAINING/ORIENTATION OF  
SOURCE CHANGE PROCEDURES USING THE FOLLOWING AUTHORIZED SOURCE CHANGERS ON \_\_\_\_\_:

1. RSP 8-1 for Gamma Industries C12 & C13 Changers-Capacities 100 Ci Co60.
2. RSP 8-2 for Tech Ops 650 Changer-Capacity 200 Ci Ir 192.
3. RSP 8-2 for Tech Ops 480/771 Changer-Capacity 100 Ci Co60.
4. RSP 8-3 for Tech Ops 414 Changer-Capacity 100 Ci Ir 192.

~~THE ABOVE MENTIONED EMPLOYEE HAS DEMONSTRATED COMPETENCE IN THE USE OF THESE SOURCE~~  
CHANGERS USING THE APPLICABLE NIC PROCEDURE LISTED ABOVE FROM THE RSM. THE TRAINING  
OR ORIENTATION WAS CONDUCTED BY: \_\_\_\_\_

\_\_\_\_\_  
CORP. RADIATION SAFETY OFFICER

\_\_\_\_\_  
DATE

-----  
LEAK TEST CERTIFICATION

THIS IS TO CERTIFY THAT \_\_\_\_\_  
SSAN: \_\_\_\_\_, WAS GIVEN SUFFICIENT TRAINING/ORIENTATION IN THE  
PERFORMANCE OF LEAK TESTS USING A.H.P.'s MARK V. LEAK TEST KIT ON \_\_\_\_\_  
THIS TRAINING/ORIENTATION WAS PERFORMED UNDER THE PROVISIONS OF NIC'S RSM, RSP-11.  
THE TRAINING OR ORIENTATION WAS CONDUCTED BY: \_\_\_\_\_

\_\_\_\_\_  
CORP. RADIATION SAFETY OFFICER

\_\_\_\_\_  
DATE



SOURCE TRANSFER RECORD

Form #: RS-13  
Rev. : 1  
Date: 12/10/80

CONTAINER #: \_\_\_\_\_

Date: \_\_\_\_\_  
NRC License \_\_\_\_\_  
Expires \_\_\_\_\_

**NATIONAL INSPECTION & CONSULTANTS INC.**

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TYPE: \_\_\_\_\_ Ir 192 OLD SOURCE Co 60 Mfg: \_\_\_\_\_  
MODEL #: \_\_\_\_\_ SERIAL #: \_\_\_\_\_ CURIES: \_\_\_\_\_

TYPE: Mfg: \_\_\_\_\_ OLD CONTAINER MODEL #: \_\_\_\_\_ SERIAL #: \_\_\_\_\_  
LAST LEAK TEST DATE: \_\_\_\_\_

TYPE: CONTAINER Mfg: \_\_\_\_\_ TRANSFERRED TO MODEL #: \_\_\_\_\_ SERIAL #: \_\_\_\_\_  
(1) MR/hr reading @ Contact with Container: \_\_\_\_\_  
(2) MR/hr reading @ 1 Meter (39") from Container: \_\_\_\_\_  
(3) Survey Meter Used: Make: \_\_\_\_\_ Model #: \_\_\_\_\_ S/N: \_\_\_\_\_  
Calibration Date: \_\_\_\_\_

SENT TO: \_\_\_\_\_

- A. TYPE RADIOACTIVE YELLOW LABEL ATTACHED: \_\_\_\_\_
- B. IS SHIPPING CONTAINER PROPERLY SEALED? \_\_\_\_\_
- C. ARE ALL NECESSARY DOCUMENTS COMPLETED & INCLUDED? \_\_\_\_\_

TYPE: \_\_\_\_\_ Ir 192 NEW SOURCE Co 60 Mfg: \_\_\_\_\_  
MODEL #: \_\_\_\_\_ SERIAL #: \_\_\_\_\_ CURIES: \_\_\_\_\_  
CHANGER Mfg: \_\_\_\_\_ MODEL #: \_\_\_\_\_ SERIAL #: \_\_\_\_\_  
LEAK TEST DATE: \_\_\_\_\_

- (1) MR/hr reading @ Contact with Container: \_\_\_\_\_
- (2) Radioactive Material Receiving Report Completed? \_\_\_\_\_

TYPE: CONTAINER Mfg: \_\_\_\_\_ TRANSFERRED TO MODEL #: \_\_\_\_\_ SERIAL #: \_\_\_\_\_  
(1) MR/hr reading @ Contact with Container: \_\_\_\_\_  
(2) MR/hr reading @ 1 Meter (39") from Container: \_\_\_\_\_  
(3) Survey Meter Used: Make: \_\_\_\_\_ Model #: \_\_\_\_\_ S/N: \_\_\_\_\_  
Calibration Date: \_\_\_\_\_

REMARKS: \_\_\_\_\_  
\_\_\_\_\_

Signature: Certified Individual \_\_\_\_\_ Date \_\_\_\_\_

Corp. R.S.O. Review \_\_\_\_\_ Date \_\_\_\_\_





LEAK TEST RECORD

**NATIONAL INSPECTION & CONSULTANTS INC.**

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I. THIS IS TO CERTIFY THAT THE SOURCE INDICATED BELOW WAS LEAK TESTED USING AHP'S MARK V LEAK TEST KIT. THE LEAK TEST WAS PERFORMED BY \_\_\_\_\_ ON \_\_\_\_\_ IN ACCORDANCE WITH NIC'S RSM.

A. SOURCE DESCRIPTION:

RADIOISOTOPE      ACTIVITY      MODEL #      SERIAL #      MFG.

B. INSTALLED IN:

EXPOSURE DEVICE      MODEL #      SERIAL #      MFG.

C. LOCATION LEAK TEST WAS PERFORMED:

COMPANY      COMPANY ADDRESS

II. ANALYSIS OF THE LEAK TEST SPECIMEN, NO. \_\_\_\_\_ BY APPLIED HEALTH PHYSICS, INC. INDICATED THE PRESENCE OF \_\_\_\_\_ MICROCURIE OF \_\_\_\_\_ ACTIVITY ON \_\_\_\_\_

III. PURSUANT TO THE RESULTS OF THIS LEAK TEST, THE FOLLOWING ACTION IS RECOMMENDED:

- A.  ANALYSIS INDICATED THE EXCESSIVE AMOUNT OF RADIOACTIVITY LISTED ABOVE ON THE LEAK TEST SPECIMEN. IMMEDIATELY WITHDRAW THE SOURCE FROM USE AND NOTIFY THE CORP. R.S.O.
- B.  ANALYSIS INDICATED LESS THAN 0.005 MICROCURIE OF RADIOACTIVITY ON THE LEAK TEST SPECIMEN. THE SEALED SOURCE MAY BE USED AS AUTHORIZED. THIS SOURCE MUST BE LEAK TESTED AGAIN, ON OR BEFORE \_\_\_\_\_ OR WITHIN ANY OTHER SUCH TIME PERIOD REQUIRED BY THE REGULATORY AGENCY.

IV. APPLIED HEALTH PHYSICS, INC. \_\_\_\_\_

Date

BY, NAME: \_\_\_\_\_ TITLE: \_\_\_\_\_

V. CORP. R.S.O. REVIEW & DISPOSITION:

- A.  ACCEPTABLE FOR CONTINUED USE
- B.  PERFORM CORRECTIVE ACTION

\_\_\_\_\_  
CORP. R.S.O.

\_\_\_\_\_  
DATE



Form #: RS-16  
Rev: 0  
Date: 12/10/80

QUARTERLY SOURCE INVENTORY  
REPORT

**NATIONAL INSPECTION & CONSULTANTS INC.**

4621 Royal Avenue • P.O. Box 10 • Coraopolis, Pennsylvania 15108 • 412-262-3092

During the \_\_\_\_\_ Quarter of \_\_\_\_\_ to \_\_\_\_\_, 19\_\_\_\_,  
the following sources were utilized by NIC as indicated on the  
Radioisotope Utilization Logs. The Current Status of the source is  
indicated in the disposition column.

Source Type/w	Container #	Main Area of Use	Disposition

All records pertinent to these sources are maintained on file at  
NIC's Corp. offices in Coraopolis, Pa.

\_\_\_\_\_  
Corp. R.S.O. Signature

\_\_\_\_\_  
Date



**NATIONAL INSPECTION & CONSULTANTS INC.**

4621 Royal Avenue • P.O. Box 10 • Coraopolis, Pennsylvania 15108 • 412-262-3092

FROM: Christopher M. Schnell  
Corp. Radiation Safety Officer

SUBJECT: Annual Report of Radiation Exposure

TO:

Pursuant with the requirements of 10CFR 20.409(b), this letter serves as an Annual Report of Radiation Exposure to you for the year of \_\_\_\_\_. This report is only inclusive of radiation you received while working for National Inspection & Consultants, Inc. during the period of this year indicated below. Records of lifetime exposure are maintained on file in the Corp. Offices, and are available upon receipt of a written and signed request.

From \_\_\_\_\_ to \_\_\_\_\_ you received \_\_\_\_\_ millirem, according to the records on file. Should you have any further questions, feel free to call me at 412-262-3092.

Sincerely

Christopher M. Schnell  
Corp. Radiation Safety Officer



Form #: RS-18  
Rev: 1  
Date: 12/10/80

**NATIONAL INSPECTION & CONSULTANTS INC.**

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N O T I C E

IN CASE OF AN ACCIDENT INVOLVING RADIOACTIVE MATERIAL

IMMEDIATELY NOTIFY

NATIONAL INSPECTION & CONSULTANTS, INC.

4621 ROYAL AVENUE

CORAOPOLIS, PA. 15108

CHRISTOPHER M. SCHNELL CORP. R.S.O.	412-262-3092 - Business 412-264-9516 - Residence
JAMES DeANGELIS ASST. R.S.O.	412-262-3092 - Business 412-859-6572 - Residence
JAMES E. CARSON R.S.S.	412-262-3092 - Business 412-348-7507 - Residence
CHARLES R. VIGNE PRESIDENT	412-262-3092 - Business 412-771-3284 - Residence



4.
  - a) Inspect the source tubes for crimps, foreign matter, ease of connecting and disconnecting from exposure device.
  - b) Preventative Maintenance - Flush source tubes out with a solvent and blow through with compressed air.
5.
  - a) Inspect the control conduit and inner core for wear, rusty sections, kinks, etc.
  - b) Preventative Maintenance - Remove the inner core from the control conduit and clean by brushing with a solvent such as varsol, diesel fuel or some other solvent that will not dry out. This is done to remove foreign matter that will cause abrasions in the exposure device and gear box drive mechanism. Rusty inner core should be replaced. After the inner core is thoroughly clean, oil with a light oil such as 3-in-1. It is recommended that graphite NOT BE USED because it tends to build up, causing excessive wear and difficulty in movement.
6.
  - a) Inspect the control assembly which consists of the gear box assembly and the crank handle. The bushings in the gear housing and the plate are the most likely places to find wear. When the bushings are worn, they permit the gear to wobble and wear out quickly.
  - b) Preventative Maintenance - Apply a light oil on the bushings.

SAT	UNSAT

STORAGE CONTAINERS

Storage containers will be inspected each time as follows:

1.
  - a) Check for possible shielding defects using a calibrated survey meter.
  - b) Visually inspect the container for damage which may impair its use.
  - c) Check visually and by radiation survey to assure proper position of the source.
  - d) Check for possible damage to the source connector as instructed in part 1.a.
  - e) Check for proper labeling.





RECORDS - Each inspection and repair will be documented.

Remarks/Maintenance Performed to Correct Unsatisfactory Conditions:

Radiographer: \_\_\_\_\_ Date: \_\_\_\_\_

1. Explain unsatisfactory conditions under "Remarks".
2. Do not leave any spaces blank.
3. Major Inspections are required on monthly basis for all devices and containers.
4. A signature is required on this form.
5. If a space does not apply, insert N/A and explain under "Remarks".





**NATIONAL INSPECTION & CONSULTANTS INC.**

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**RADIOGRAPHIC EQUIPMENT/MAINTENANCE RECORD  
DAILY INSPECTION CHECKLIST CL-2**

**I. PRIOR TO USE:**

- a) Examine operating control handle for damage.
- b) Turn crank to and fro to assure freedom of movement.
- c) Examine control cables along their length for possible kinks.
- d) Assure that all connections are tightened.
- e) Check connectors on the drive cable for breaks and bends.
- f) When connecting, pull back on drive cable to assure some measure of strength.
- g) Assure that outer drive cable is connected securely to the exposure device.
- h) Examine source tube for possible kinks and that connectors of source tip to tube and tube to device are secure.
- i) Check freedom of movement of the lock on the exposure device.
- j) Overall condition of equipment.

**II. DURING USE:**

- a) Observe operation of device.
- b) Perform required survey.

NOTE: SHOULD THERE BE ANY DIFFICULTY ENCOUNTERED IN EITHER THE SMOOTH OPERATION OF THE DEVICE OR ABNORMAL RADIATION OR READINGS, CEASE OPERATIONS IMMEDIATELY AND REPORT THE DISCREPANCY TO THE LEVEL II RADIOGRAPHER OR RSO.

**III. AFTER USE:**

- a) Examine operating control handle for damage.
- b) Examine control cables along their length for possible kinks.
- c) Assure that all connectors are tightened.
- d) Check connectors on the drive cable for breaks and bends.
- e) Examine source tube for possible kinks.
- f) Upon disconnecting source tube from device, insert shipping plug. Place dust covers on the end of the source tube.
- g) Overall condition of equipment.

IV. SURVEYS INSTRUMENTS are within calibration, and operational.

19013