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TITLE	QUALITY ASSURANCE PROGRAM RADIOA MATERIAL SHIPPING PACKAGES	ACTIVE
1. <u>SCOPE</u> 1.1 1.2	The Quality Assurance Program de applies to the use, maintenance, shipping packages for special for material. The program supplement Grinnell Radiation Safety Manual accordance with 10CFR30 and on f Division of Materials Licensing. the procedures, safety precautio surveys taken during handling, s shipping operations for shipping special form radioactive materia identifies the Quality Assurance methods and techniques for the e and assurance of radiological sa performance, and to ensure that radiation surveys, quarterly mai tests and equipment inspections This program is in accordance wi ments of Appendix E 10CFR Part 7 ITT Grinnell Corporation is a li does not perform any of the foll that apply to shipping packages: rication, Assembly and Testing. these items are not addressed. all radioactive material shippin designed, manufactured, assemble accordance with a Quality Assura accordance with 10CFR Part 71 Ap approved by the NRC, ITT Grinne shall obtain a certification fro to this effect.	escribed herein and repair of orm radioactive ats the ITT submitted in file with the It describes ons and radiation storage, and packages for 1. The program Organization, effective control fety and package all necessary ntenance, leak are performed. th the require- 1. cense-user and owing functions Design, Fab- Therefore, To assure that g packages are d and tested in nce Program in pendix E and 11 Corporation m the supplier

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TITLE:

- 2.5 Radiation Protection Officer: The Radiation Protection Officer assists the Manager of Nondestructive Testing in the operation of the Nondestructive Testing Section. He is directly responsible for all matters relating to the Radiation Safety Program. He maintains all records applicable to the Radiation Safety Program, prepares Radiation Safety procedures for approval by the Manager of Nondestructive Testing. He is responsible for personnel training and auditing radiographers and radiographer assistants for program compliance. Periodic inspection and maintenance of all radiation equipment, care of radioactive materials, audits, surveys, and complete compliance with safety requirements are within his jurisdiction.
- 2.6 <u>Field Site NDE Supervision (Radiographer)</u>: The Field Site NDE Supervisor acts for the Nondestructive Testing Manager at the Field Site. He supervises all activities of Field Site Nondestructive Examination. Maintains control of all radiation safety records and is responsible for distribution of all records to the Radiation Safety Officer on a weekly basis. He is responsible for the Radiation Safety Program at the Field Site.
- 2.7 <u>Senior Test Technician (Radiographer)</u>: The Senior Test Technician performs Nondestructive Examinations and reports to the Manager of Nondestructive Testing on the progress of trainees whom he observes and instructs. He also assists the Radiation Protection Officer in the care of radioactive materials and assuring compliance with safety requirements.
- 2.8 <u>Radiographer</u>: The Radiographer performs Nonestructive Examinations and reports to the Senior Test Technician (Radiographer) or to the Field Site NDE Supervisor (Radiographer) as appliable. He is responsible for supervision of radiographic operations in accordance with NRC regulations as specified in the Radiation Safety Specification I-SF-162-14 in Appendix A.
- 2.9 <u>Radiographer(s)</u> Assistant: The Radiographer(s) Assistant performs Nondestructive Examination under the personal supervision of a Radiographer in accordance with NRC Regulations as specified in the Radiation Safety Specification I-SF-162-14 in Appendix A.

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2.10 <u>Trainee</u>: The trainee handles radiation exposure devices for the purpose of instruction under the direct personal supervision of a Radiographer. The instruction is conducted in accordance with NRC Regulations as specificed in the Radiation Safety Specification I-SF-162-14 in Appendix A.



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3. QUALI	TY ASSURANCE PROGRAM	finos
3.1	The program as described herein de a. The methods for review, appro- tribution of quality assurance for demonstration of conformation requirements.	eiines: val and dis- e procedures nce to NRC
	b. The procedures for handling, shipping to attain effective assurance to radiological safe age performance.	storage, and control and ety and pack-
	c. The methods for conducting lear radiation surveys, quarterly and daily equipment checks to hazard of radiation exposure.	ak tests, maintenance, minimize the
	d. The system for maintaining re- cient to provide objective ev the required procedures, tests are performed, and the qualit- being adhered to.	cords suffi- idence that s, inspections y program is
3.2	Procedures: All radiation safety shall be written by the Radiation ficer and approved by the Manager tive Testing. The Radiation Prot- shall insure that all Q.A. functi- ducted in accordance with the lat- these procedures.	procedures Protection Of- of Nondestruc- ection Officer ons are con- est revision to
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	T	TT Grinnell	NO. QAP-RAD-1 REV. 0 PAGE 7 WRITTEN BY APP
	TITLE	QUALITY ASSURANCE PROGRAM RADIOA MATERIAL SHIPPING PACKAGES	ACT I VE
	4. DOCUME	ENT CONTROL	
	4.1	This procedure covers the markin and revisions of all radiation s and records.	ag, distribution afety procedures
*	4.2	<u>Marking</u> : All procedures shall b identified by a unique number an All procedures shall be included Safety Manual. Each manual shal sequentially and a record of the be maintained by the Radiation P	e individually d revision level. in the Radiation l be serialized holder shall rotection Officer.
	4.3	Distribution: The Radiation Saf ing applicable procedures shall the Radiation Protection Officer radiographers, radiographer assi trainees. Personnel terminating return all Radiation Safety Manu been assigned by the Radiation P	ety Manual includ- be distributed by to all qualified stants, and employment shall als which have rotection Officer.
	4.4	Procedure Preparation and Revisi and revision thereto shall be wr iation Protection Officer and ap Manager of Nondestructive Testin	on: All procedures itten by the Rad- proved by the g.
	4.5	Maintenance: Distribution of Re of transmittal including a copy shall be distributed by the Radia Officer to each holder of a cont Radiation Safety Manual and Qual Program. Each holder is respons and up dating his program, inclu- insertion of all new and revised when issued and destruction of a superseded pages or sections. Ex- return a completed copy of form (visions - A letter of the revision ation Protection rolled copy of the ity Assurance ible for maintaining ding the prompt pages or sections 11 obsolete or ach holder shall QAP4.5A (Figure 1)
		which shall de sent with the trai	nsmittal letter.

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FIGURE 1



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ITT Grinnell Corporation Executive Offices

260 West Exchange Street Providence, Rhode Island 02901 Telephone (401) 831-7000

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Research, Development and Engineering Division

FORM QAP4.5A

J. G. Kowalski

The revisions of the Research, Development and Engineering Division Nondestructive Examination Section Quality Assurance Program for Radioactive Material Shipping Packages forwarded by letter dated _______ have been placed in the program(s) listed below. Prior copies of these revisions have been destroyed.

NAME _____

LOCATION _____

DATE _____

MANUAL NUMBER(s)

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TITLE	QUALITY ASSURANCE PROGRAM RADIO MATERIAL SHIPPING PACKAGES	ACTIVE
5. <u>HAND</u> 5.1	LING, STORAGE AND SHIPPING All handling, storage, and ship active materials shall be perfo radiography personnel. This sh in accordance with Radiation Sa Specification I-SF-162-14 (Appe (Appendix B). No shipments sha all provisions of RDI-7 have be	ping of radio- rmed by qualified all be performed fety Practice ndix A) and RDI-7 ll be made until en accomplished.
	· · · · · · · · · · · · · · · · · · ·	

TITLEQUALITY ASSURANCE PROC MATERIAL SHIPPING6.INSPECTION, TEST, AND OPERATI6.1Inspections shall be p I-SF-162-14, (Appendix6.2Test: Leak Testing sh ance with I-SF-166 (App and once every six mon performed by the Radia6.3Operating Status: The containers and of Isot labelled or tagged as a	RAM RADIOACTIVE PACKAGES <u>NG STATUS</u> erformed in accordance wit A). all be performed in accord endix C) prior to shipment
 6. <u>INSPECTION, TEST, AND OPERATI</u> 6.1 Inspections shall be p I-SF-162-14, (Appendix 6.2 <u>Test</u>: Leak Testing sh ance with I-SF-166(App and once every six mon performed by the Radia 6.3 <u>Operating Status</u>: The containers and of Isot labelled or tagged as a 	NG STATUS erformed in accordance wit A). all be performed in accord endix C) prior to shipment
 6.1 Inspections shall be p I-SF-162-14, (Appendix 6.2 Test: Leak Testing sh ance with I-SF-166(App and once every six mon performed by the Radia 6.3 <u>Operating Status</u>: The containers and of Isot labelled or tagged as a 	erformed in accordance wit A). all be performed in accord endix C) prior to shipment
 6.2 <u>Test</u>: Leak Testing sh ance with I-SF-166(App and once every six mon performed by the Radia 6.3 <u>Operating Status</u>: The containers and of Isot labelled or tagged as a 	all be performed in accord endix C) prior to shipment
6.3 <u>Operating Status</u> : The containers and of Isot labelled or tagged as a	ths. Leak Testing shall b tion Protection Officer.
I-SF-162 (Appendix A) Package identification of the Radiation Prote Qualified Radiographer	operating status of stora ope Projectors shall be pplicable in accordance wi and RDI-7 (Appendix B). shall be the responsibili ction Officer or designate
6.4 Inspection and Mainten shall be performed in cedure and proper reco This inspection shall radiographers. The Ra- shall be responsible to as required in the wri formed.	ance of Isotope Projectors accordance with written pr rds and follow up maintain be performed by qualified diation Protection Officer b insure that the function tten procedures, are per-
6.5 The operating status o Isotope Projectors sha accordance with writte tification shall be pe and the Radiation Prot that it is performed a	f storage containers and o ll be labelled and tagged n procedures. Package ide rformed by the radiographe ection Officer shall insur s required.

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7. <u>QUAL</u>	ITY ASSURANCE RECORDS	
7.1	The following Radiation Safety Remaintained for a period not less dicated below:	ecords shall be than that in-
	Record Title Min	n. Retention Period
	Daily Equipment Checklist Quarterly Inspection and Maintenance	2 years 2 years
	Leak Test Shipping Certificates Quarterly Inventory Daily Utilization Log Audit Reports	2 years 2 years 2 years 2 years 2 years 2 years
	Personnel Qualification and Training Records Shipping Records Dosimeter Reports	2 years after Termination 2 years Indefinite*
	Equipment Operating Instructions Survey Meter Calibration Records Quarterly Inventory Radioactive Sources	Indefinite* Indefinite* 2 years 2 years
	Over Exposure Reports Medical History Report	2 years 2 years after Termination
	*Indefinite - records kept on fil disposition authori the NRC	e until .zed by
7.1	The Radiation Protection Officer responsible for maintaining all r specified interval. A listing of with their storage location will for retrieval.	shall be ecords for the the records be maintained

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	TI Grinnell	NO. I-SF-162 REV. 15 PAGE 1 WRITTEN BY APP. AMULA DATE 3-4-78
TITLE SAI	STANDARD INSPECTION SPECIFIC RADIOGRAPHIC EXAMINATION ETY PRACTICE FOR GAMMA-RAY IN	ATION
I. <u>SCOPI</u> 1.	This Specification covers safety practice for all I poration personnel involv inspection.	the required TT Grinnell Cor- red in gamma-ray
11. <u>PERSO</u> 2.	ONNEL: Only personnel properly i qualified in accordance w Specification RDI-6D "Tra Radiographers and Assista mitted to operate gamma-r equipment. The specific duties of in strictly adhered to by de	Instructed and with ITT Grinnell lining Program for ents" shall be per- ay inspection adividuals shall be
	(a) Radiographer - Any i forms or who is in a site where the seale are being used, pers the radiographic ope responsible to the 1 ing compliance with NRC Regulations and license.	Individual who per- attendance at the ed source or sources sonally supervises eration, and who is licensee for assur- requirements of the conditions of the
	(b) Assistant Radiograph who under personal s Radiographer uses ra devices, sealed sour ing tools, or radiat ments in radiography	her - Any individual supervision of a adiation exposure rces, related handl- tion survey instru- V.
	(c) Trainee - Any indivi ing his training in RDI-6D Para. 9 throu vidual shall not be	idual who is receiv- accordance with 1gh 13. This indi- allowed to operate

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or handle any radiation exposure device, sealed source or related handling tools unless under direct personal observation of a Radiographer and for the purpose of instruction. The trainee shall be monitored by both film badge and dosimeter and records maintained thereof. The trainee will not act as a Radiographer's Assistant until he has completed at least 480 hours training with a Radiographer. The trainee may be allowed within a restricted area, provided he is in direct company of a radiographer, however, he may not perform any function related to the responsibilities of a radiographer or assistant.

- (d) Field Labor Individuals assigned to radiographers at field job site locations because of union requirements, and/or to provide radiographers with weld locations, and staging for accessibility to their work. Under no circumstances shall these individuals be allowed within restricted radiation areas or be allowed to handle or operate any radiation exposure devices sealed sources, or related handling tools.
- 3. Prior to employment, the individual shall complete a MEDICAL HISTORY REPORT on Form 162-MH (Fig. 4). The copy shall be retained in the Research, Development and Engineering Division in Providence, Rhode Island.

III. RADIATION DETECTION INSTRUMENTS:

- 4. Each trainee assistant and radiographer shall be supplied with an integrating pocket dosimeter and have available on all locations where radiographic inspection is performed, a dosimeter charger in accordance with Appendix A. The dosimeter shall be capable of measuring doses from zero to at least 200 milliroentgen.
- 5. Each shop or field location where radiographic exposure devices are being used shall have an operating rate survey instrument in accordance with Appendix A. The instrument shall have a range such that two milliroentgens per hour through one roentgen per hour can be measured.

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No radiographic operation shall be calibrated and operable radiation s is available and used.	conducted unless a survey instrument
6. Each radiographer shall be responsi operation of the radiation detection fore beginning any operation, the r confirm that the instrument is with dates, and that the instrument is or quirement shall be accomplished as	ible for the proper on instrument. Be- radiographer should hin calibration berating. This re- described below.
 (a) Each instrument shall be called not to exceed three months, the ment shall bear the date of cardine for recalibration. Radiog performed unless a radiation of ment within calibration is available to the instrument is past due, not be performed using this ment should be returned to the Reseand Engineering Division in Proland for calibration. 	brated at intervals ne survey instru- alibration and date graphy may not be detection instru- ailable for use. , radiography shall eter, and the meter earch, Development byidence, Rhode Is-
(b) To confirm the survey instrume it should be placed one foot to the projector and the measuren the previous one recorded on a meter sheet or utilization log is not in agreement with prev- instrument should not be used the Research, Development & En in Providence, Rhode Island.	ent is operating, from the front of ment compared to either the dosi- g. If this reading ious readings, the , but returned to mgineering Division
IV. INTEGRATING POCKET DOSIMETERS:	
7. The integrating dosimeters shall be trainee, assistant and radiographer or coverall pocket or leather belt the period involved in radiograph rezero prior to each working day.	e carried by each r in his top shirt carrying ease during Lc inspection, and
8. Throughout the working period, the be checked for radiation at frequen a normal daily safety precaution. distance are restricted, the dosime	dosimeter should at intervals as When shielding and eter should be

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checked at least once every half hour $(\frac{1}{2})$. If an off-scale reading is observed the individual should follow instructions outlined in Part XIII, Para. 37 of this specification.

At the end of each working day, the radiation dose shall be read and reported on Report Form 162A-RI (Fig. 7). At the completion of every work week, a copy of the report form shall be mailed to the Research, Development & Engineering Division in Providence, Rhode Island.

V. FILM BADGE MONITORING:

- 9. Each individual involved in the handling of radiographic exposure devices or allowed within a restricted radiation area, shall wear a film badge furnished by a commercial film badge monitoring service as specified in Appendix A through the Research, Development and Engineering Division in Providence, Rhode Island.
- 10. The film badge shall be supplied on a monthly basis through the Research, Development and Engineering Division in Providence, Rhode Island. The laboratory shall forward these badges to the monitoring service agency at the end of each wearing period. The results of this monitoring shall be maintained on a quarterly period basis on Form 162-FB (Fig. 2) and NRC-5 form in the Research, Development and Engineering Division.

VI. OVER-EXPOSURE:

11. Where the Radiation Dose Report 162-RI, and/or the Film Badge Monitoring Report 162-FB maintained in the Research, Development and Engineering Division indicates excessive exposure, Radiation Over-Exposure Report 162-RO (Fig. 5) shall be completed to determine the causes of the over-exposure. These reports shall be maintained in the Research, Development, and Engineering Division in Providence, Rhode Island.

VII. RADIATION SURVEYS:

12. Before moving or putting into operation any source projector or related equipment two steps shall be

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TITLE;	STANDARD INSPECTION RADIOGRAPHIC EXA SAFETY PRACTICE FOR GAMM	SPECIFICATION MINATION A-RAY INSPECTION		
	performed:			
	(a) <u>Survey Projec</u>	tor:		
	1. The projector shall be surveyed to insure that the source is in the projector and in its fully shielded condition. This survey will also insure that the projector is within allowed readings as indicated below.			
	2. Acceptable Radiation Limits:			
	a. Tech/Ops Model 533 and 660 Projector 50 Mr/Hr at 6" from any exterior.			
	b. Tech/Ops Model 489, 490, 525, 680, 684, 741 projectors and 414 and 650 source changers.			
	 200 Mr/Hr at any exterior surface 10 Mr/Hr at 1 meter from any ex- terior 			
	If the results of this survey are not within ac- ceptable limits specified above, the projector should not be used and the Radiation Protection Officer should be notified.			
	A second survey shall be made which consists of a measurement one foot from the front of the projector. The results of this survey will be used as a comparison for survey required in Para. 18d.			
	(b) Daily Maintenance Check:			
_	1. All equip diographe pleted. ment not immediate vice and notified.	ment shall be inspected and the ra- r check list (Fig. 8) shall be com- Defective or poor operating equip- within the maintenance period, must ly be tagged and removed from ser- the Radiation Protection Officer		
	*NOTE: If during any rad	iographic operation an equipment		

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> malfunction should occur the operation shall be stopped until the equipment has been replaced or repaired.

13. After the projector has been moved to its location of use, the restricted area shall be roped off and posted with radiation warning signs bearing the words "Caution High Radiation Area" with the standard radiation symbol. The printing shall be magenta on a yellow background.

The restricted area shall be established such that no unauthorized individual will be allowed in an area where he could receive, if continuously present in the area, a dose in excess of 2Mr. in any one hour or 100 Mr. in any seven consecutive days.

No unauthorized personnel will be allowed within the restricted area.

The boundaries of this area shall be confirmed by a survey, the results of which shall be recorded on Form RDI-12E (Fig. 6).

- 14. The high radiation area meaning any area where personnel could receive in any one hour a dose in excess of 100 Mr. shall be under direct surveillance by radiographer or assistant, to prevent the entry of unauthorized personnel. The radiographer or assistant shall not rely on the use of signs alone. If all entries to the high radiation areas cannot be under his direct observation, he must post authorized personnel to assist.
- 15. Steps to be followed prior to exposure:
 - 1. Tech/Ops Model 489, 490, 525, 680, 684, 741

Establish type of radiation area:

a. Use the inverse square law to calculate the distance required for restricted area. At 2 Mr/Hr level: post "Caution High Radiation" sign and rope off.

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- b. Operations in #1 and #2 booths at the Providence facility shall be considered high radiation areas; shall be posted with "Caution High Radiation Area" signs. Entry to both booths is controlled by an Electric Eye System and by a Gamma Alarm System.
- c. Radiation levels from all surveys shall not exceed the following acceptable limits:

Tech/Ops Model 489, 490, 525, 680, 684, and 741 projectors

- a. 200 Mr/Hr at any exterior surface
 b. 10 Mr/Hr at 1 meter (39 inches) from any exterior.
- 2. Tech/Ops Model 533, 660

Establish type of radiation area.

- a. Use the inverse square law to calculate the distance required for restricted area. At 2 Mr/Hr level: post "Caution High Radiation" signs and rope off.
- b. Operations in #1 and #2 booths at the Providence facility shall be considered high radiation areas; shall be posted with "Caution High Radiation Area" signs. Entry to both booths is controlled by an Electric Eye System and by a Gamma Alarm System.
- c. Radiation levels from all surveys shall not exceed this acceptable radiation limit:

50 Mr/Hr at 6" (inches) from any exterior surface.

- 16. Steps to be followed during and after exposure:
 - a. Confirm that no unauthorized personnel are within boundaries of restricted area.
 - b. Survey boundaries of restricted area per paragraph 13. If exposure time is too short for a

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boundary survey, the radiographer shall confirm the radiation dose by calculation or by a test exposure with time in excess of that required for the radiograph.

- c. When the source is retracted after each exposure, the survey meter should be observed as the source leaves the source guide tube tip and a decrease in the reading should be observed as the source returns to its shielded condition.
- d. When the source has been returned, the radiographer or assistant shall approach the projector with a survey meter. Approaching the projector from the rear, he shall survey the side of the projector to insure the source is in the projector. Then he shall place the meter at the guide tube connector of the projector to insure the source is full retracted. Finally, he shall take a reading one (1) foot from the front of the projector, comparing the reading with the one obtained in Paragraph 12 of the fully secured source.
- e. With this survey complete, he shall place the selector ring to the lock position. (This step applies only to Tech/Ops Model 533, 681, 684, 741 Projectors.)
- f. The radiographer or assistant shall further survey the source tubes and source guide tube tip to confirm the safe storage of the source in its projector. At this point, the results of the survey required by Paragraph 16d, shall be recorded on RDI-12E (Fig. 6).
- g. On completion of the operation, or prior to moving the projector, the source tubes shall be disconnected and the projector plugged regardless of the distance the projector is moved.
- h. A source projector may be left unattended for a short period of time providing the projector is keylocked and the projector is physically secured

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	to prevent unauthorized remo be roped and posted with "Ca terial" signs and a restrict	val. The area must ution Radioactive Ma- ed area established.
	17. Upon completion of radiography p the projector, it shall be surve locked condition, and the result corded on RDI-12(E) (Fig. 6).	rior to storage of yed in its fully- s of this survey re-
	18. A second survey shall be conduct the projector to confirm that no subjected to a dose rate in exce gens per hour while the projecto survey shall be made of the stor sults and location recorded on b	ed upon storage of personnel could be ss of two milliroent- r is in storage. A age area and the re- DI-12(E) (Fig. 6).
VIII.	STORAGE OF SOURCES:	
;	19. When not in use, sources must be containers and be locked. The also be locked to prevent remova personnel.	kept in approved torage area shall 1 by unauthorized
	20. The secured area in which source surveyed to confirm no unauthor receive a radiation dose in exce gens in any one hour or if cont ceive a dose in excess of 100 M secutive days.	es are stored shall be zed personnel could ess of two milliroent- nuously present re- . in any seven con-
	21. The storage area shall be poster active Material" signs.	with "Caution Radio-
IX.	TRANSPORTATION OF SOURCES:	
	22. Transportation of radiation sour in the approved container accep tions 49 CFR Parts 173-179. The fied as Type B packaging and is tion number "USA-DOT-RAM-6-70".	ces must be made only able to DOT Regula- Model 660 is quali- assigned certifica-
	23. Specific Shipping Instructions:	

a. No radioactive material may be shipped in excess of the below specified limits applicable to specific manufacture and model of container.

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	SAFETY PRACTICE FOR GAMMA-RAY INSPECTION

Tech/Ops Tech/Ops Tech/Ops Tech/Ops Tech/Ops Tech/Ops Tech/Ops Tech/Ops Tech/Ops	533 490 489 525 414 650 660 680 684	(SC) (SC)	20 100 10 5 100 100 100 100	Curies Curies Curies Curies Curies Curies Curies Curies Curies	Ir Ir Co Ir Ir Co Co	192 192 192 60 192 192 192 60	
Tech/Ops Tech/Ops	684 741		10 30	Curies Curies	Co Co	60 60	

- All shipments made by air must be accompanied by b. a Shipper's Certification 162-SC Rev. 1 (Figure 3) completed in triplicate. The original (white) shipper's copy shall be retained and filed by the originator of the shipment. The (pink) carrier's copy and the (yellow) receiver's copy shall be retained by the airline. Upon delivery by the airline at a destination, the airline shall retain the carrier's copy and release the receiver's copy to the consignee. Survey of the radioactive material must be made by the consignee within three hours after receipt during normal working hours, or within eighteen hours of receipt after normal working hours. Readings shall be made at contact and at three (3) feet from the external surface and shall be recorded on the receiver's copy.
- Shipping containers and/or crates shall be clearly 24. posted with appropriate Radioactive shipping labels, which shall be determined from Figure 9.

25. Posting of Vehicles a.

Sources transported under ITT Grinnell supervision shall be transported in vehicles posted by four signs reading "RADIOACTIVE". These signs should be affixed to the vehicle in the front, rear, and both sides. The sign shall be black letters at least four inches high on a yellow background.

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b. Securing of Sources

The source shall be placed in the rear of the vehicle as far away from any individuals in the car as possible. The source or sources shall be secured so as to prevent shifting or movement causing damage to the car or storage container. This shall be achieved by tying and blocking the container to the vehicle.

c. Radiation Levels

- The vehicle shall be surveyed to insure that no unauthorized person could receive an excess of 2 Mr in any one hour or in excess of 100 mr/hr if continuously present for 7 consecutive days. If the resulting survey indicates radiation levels in excess of that above stated, additional shielding must be added. The results of the survey must be recorded on Form RDI-12(E) Daily Utilization Log (Fig. 6).
- 2. Radiation levels from all surveys of shipping containers shall not be in excess of these acceptable radiation limits:
 - a. 200 mr/hr at the external surface
 b. 10 mr/hr at 3 feet from the external surface.
- 3. The radiation level for survey of the vehicle at the outside surface shall not exceed a transport index of 10.
- 4. The radiation level for the survey of the driver's position shall not exceed 2 mr/hr.

X. MAXIMUM PERMISSIBLE RADIATION EXPOSURE:

26. The maximum permissible weekly radiation dose for whole body exposure shall not exceed 100 millirems. If the weekly dosimeter report exceeds this amount, explanation shall be furnished at the bottom of Form 162A-RI (Fig. 7).



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	DATE: 3-4-78

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- 27. Every effort must be made to avoid unnecessary exposure to radiation of authorized personnel. Collimators, and other shielding devices, shall be used wherever possible.
- 28. In accordance with U.S. NRC Part 19.13 (b), an employee may request to be shown his exposure record maintained by ITT Grinnell annually.

XI. <u>MANUALS</u>:

29. Each radiographer and assistant shall have in his possession and be familiar with NRC regulations Part 19, 20, 21, and Part 34, ITT Grinnell's U.S. NRC license and New York State license and ITT Grinnell's Operating Procedures pertaining to source handling meter calibrations, leak testing and training. The radiographer or assistant should also have with him and be familiar with the requirements of the New York State Industrial Code Rule 38 -Radiation Protection.

XII. <u>MAINTENANCE</u>:

30. A quarterly maintenance program shall be performed by Joseph G. Kowalski, the Radiation Protection Officer or by David V. Walshe as described in Appendix B of this specification. Training and experience of these two individuals is attached as Appendix C and D respectively.

XIII. EMERGENCY PROCEDURES:

31. In the event of an emergency such as:

- a. Source becoming disconnected
- b. Crushed cables or hoses
- c. Hung source
- d. Lost source
- e. Fire or other plant emergency
- f. Auto accident where the condition of source cannot be confirmed.

•	ITT GRINNELL	NO.: I-SF-162			
	STANDARD INSPECTION	PAGE: 13			
т.,	SPECIFICATION	REV.: 15 APP.			
- ری		DATE: 3-4-78			
TITLE:	STANDARD INSPECTION SPECIFIC RADIOGRAPHIC EXAMINATION SAFETY PRACTICE FOR GAMMA-RAY IN	ATION SPECTION			
	g. Any other unusual site	uation.			
	32. Secure area to prevent per area should be established roped and posted; direct a maintained.	rsonnel exposure. Restricted d, and boundaries should be surveillance of area must be			
	33. Notify plant or job-site	supervisors. (Figure 1)			
	34. Contact ITT Grinnell Radia this time, an evaluation steps to be followed. At or assistant proceed any source and securing the re- sulting ITT Grinnell's Radi	ation Safety Officer. At will be made as to the next no time shall a radiographer further than locating the estricted area without con- diation Protection Officer.			
35. ITT Grinnell's Radiation Protection Officer, after a evaluation may recommend any of the following steps:					
	a. A safe method of retuintion.	rning source shielded condi-			
	b. Further steps to be t addition of shielding	aken to secure area, such as material at source location.			
	c. Notify equipment manu	facturer for assistance.			
	36. In case of fire, the radi firefighting authorities in the building.	ographer should notify the that radioactive material is			
	37. If during a radiographic ter should go off scale, continue working. The ra forward his film badge fo man shall not participate until the film badge resu ough survey shall be made cation and that it is in shielded condition.	operation any man's dosime- the man involved shall not diation safety officer should r emergency processing. The in a radiographic operation lts are returned. A thor- to insure the source's lo- proper operating and			
xIV.	ENFORCEMENT:	. · · · · ·			
	38. As outlined in ITT Grinne Program, radiographic ope	ll's Radiographic Training rations shall be inspected			

ITT GRINNEL	Ъ
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STANDARD INSPECTION

SPECIFICATION

NO.:	I-SF	-162
PAGE:	14	
REV.:	15	APP.

DATE: 3-4-78

TITLE: STANDARD INSPECTION SPECIFICATION RADIOGRAPHIC EXAMINATION SAFETY PRACTICE FOR GAMMA-RAY INSPECTION

> on an announced and unannounced basis quarterly to confirm the complete compliance of radiographers and assistants to the rules and regulations of the U.S. Nuclear Regulatory Commission as set forth in 10 CFR20 and 10 CFR34 together with ITT Grinnell's Operating Procedures. The willful violation of these procedures could mean termination of employment.

Figure 1

ITT GRINNELL CORPORATION

Information Sheet

Radiation Safety

I. GENERAL OFFICE

Address: ITT GRINNELL CORPORATION Research & Development Engineering Division Nondestructive Testing 294 West Exchange Street Providence, Rhode Island

Phone:	AC 401	831-7000			
	AC 401	831-7014	Night		
	AC 401	831-7010	Night	(RD&E	Office)

. . .

II. RADIATION PROTECTION OFFICER

Mr. Joseph G. Kowalski Home Phone: AC 401 461-8676

- 1. <u>Alternate</u> Mr. David V. Walshe Home Phone: AC 401 397-9521
- 2. <u>Alternate</u> Mr. Helmut Thielsch Home Phone: AC 401 467-5330

Figure 2

TTT Grinnell

YEARLY SUMMARY OF RADIATION EXPOSURE

1. NAME_____2. SOCIAL SECURITY NO.____

3. DATE OF BIRTH_____4. AGE FULL IN YEARS_____

5. DOSE RECORD FOR WHOLE BODY

6. METHOD OF MONITORING FILM BADGE

7.	PERIOD OF EXPOSURE CALENDAR QUARTER YEAR:	8. DOSE FOR PERIOD GAMMA (rem)	9. RUNNING TOTAL (rem)
	JAN - MAR	•	· · · · ·
-	APR - JUN	•	
	JUL - SEPT		
	OCT - DEC		
		ACCUMULATED DOSE	

10. PREVIOUS TOTAL_______11. TOTAL ACCUMULATED DOSE____

12. PERMISSABLE DOSE 5 (N-18)______ REM

13. DATE OF MONITORING BEGINNING____

162 FB

Figure 3-S

162-6C Rev. 1



ITT Grinnell Corporation

Executive Offices 260 West Exchange Street Providence, Rhode Island 02901 Telephone (401) 831-7000

Shipper's Certification for Radioactive Materials

This is to certify that the contents of the consignment are properly described by name and are packed, marked, and labeled and are in proper condition for carriage by air according to all applicable carrier and governmental regulations. This consignment is within the limitations prescribed for freight carrying aircraft.

Shipper:	ITT GRINNELL CORPORATION 260 West Exchange St. Providence, Rhode Island			
.B y	Date	9		
To	•			
Name of principal con	tent	Special Form_	Yes	
Activity	Curies, Category	III Yellow		
Transport IndexRead	ing at 1 Meter		nr/hr	
Type DOT -	Spec 7A Container			
Source Serial Number_				
Projector/Source Chan	ger	Serial Number		
Carrier		Waybill Number		

(USA-DOT-55B)

SHIPPER (ORIGINATOR) COPY

Figure 3-C

162SC - Rev. 1

.

ITT Grinnell Corporation

Executive Offices

260 West Exchange Street Providence, Rhode Island 02901 Telephane (401) 831-7000

Shipper's Certification for Radioactive Materials

This is to certify that the contents of the consignment are properly described by name and are packed, marked, and labeled and are in proper condition for carriage by air according to all applicable carrier and governmental regulations. This consignment is within the limitations prescribed for freight carrying aircraft.

Shipper:	ITT GRINNELL 260 West Exch Providence, R	CORPORATION ange St. hode Island	•
By	D:	ste	
To	•		
Name of principal cont	ent	Special For	TE Yes
Activity	Curies, Categor	yIII Yellow	
Transport IndexReadi	ng at 1 Meter		ur/hr
Type <u>- B -</u> DOT -	Spec 7A Container	F	
Source Serial Number	· .	-	· .
Projector/Source Changer		Serial Number	·
Carrier		Waybill Number	

(USA-DOT-55B)

CARRIER (AIRLINE) COPY

Figure 3-R

1628C-Rev. 1



ITT Grinnell Corporation

Executive Offices 260 West Exchange Street Providence, Rhode Island 02901 Telephone (401) 831-7000

12599

Shipper's Certification for Radioactive Materials

This is to certify that the contents of the consignment are properly described by name and are packed, marked, and labeled and are in proper condition for carriage by air according to all applicable carrier and governmental regulations. This consignment is within the limitations prescribed for freight carrying aircraft.

Shipper:	ITT GRINNELL CORP 260 West Exchange Providence, Rhode	ORATION St. Island	• •
Ву	Date		
To	•	• .	
Name of principal cont	ent	Special Form	Yes
Activity	_Curies, Category	III Yellow	
Transport IndexReading	ng at 1 Meter		hr
Type DOT	Spec 7A Container		
Source Serial Number			
Projector/Source Change	er	Serial Number	
Carrier		_Waybill Number	
•	(USA-DOT-55B)		
Survey of projector/sou 1. At contact	rce changer with radia	cactive material:	
. (limit 200 mr/hr) 2. At three (3) feet fr	om the external surface	mr/hr.	
(Limit 10 mr/hr)	Paddamer's	mr/hr.	
	Date		
RECEIV	ER COPY (To Receiver (Jpon Delivery)	

Figure 4

162-MH

MEDICAL HISTORY REPORT

1. (First Name)	(Middle Initial)	(Last) 2	. Date of Birth	3. Sex
• .• .	· .	•	•	Male
	· · · · ·		•	Female

4. Address

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	Year Age	#	Condition	No	Yes	Year Age
1. 2. 4. 5. 6. 7. 8. 9. 10.	Rheumatic fever Frequent severe headaches Dizziness or fainting spells Severe eye trouble or injury Pain or pressure in chest High blood pressure Bone or joint deformity Painful or "trick" shoulder Painful or "trick" elbow Paralysis	•		·	11. 12. 13. 14. 15. 16. 17 18.	Fits or epilepsy Loss of memory Depression Severe emotional disturbance Ulcer of stomach Skin disease T. B. X-Ray or radium treatments			•

19. If you have not had or do not have any of the above conditions please state "none" here:

Please answer the following questions "yes" or "no".

- 20. Have you ever been rejected or rated up for insurance, rejected for employment, or by the armed forces because of your physical condition or are you partially disabled in any way?
- 21. Has your work ever had to be limited or restricted on account of your health?
- 22. Please state details on reverse side of form if answers to "20" or "21" are "yes".
- 23. Have you worked with radioactive materials or radiation producing equipment before? _____ For what period of time? ______

(monthly, years)

Answer

Yes - No

- 24. Please state details on reverse side if answer to "23" is "yes".
- 25. Do you believe there is any reason why you should not work with radiation or radioactive materials? _____ If so, describe:

.

(yes - no)

Signature.



ITT Grinnell Corporation

Executive Offices

the

260 West Exchange Street Providence, Rhode Island 02901 Telephone (401) 831-7000

RADIATION OVEREXPOSURE REPORT

To: Y

The objective of personnel radiation monitoring is to measure occupational radiation exposures and to aid in the detection of unnecessary radiation dosages. The prompt investigation of any above average exposure will be useful in determining methods of preventing unnecessary radiation exposures from re-occurring.

During the period

For: Helmut Thielsch

Research Development & Engineering

Providence, Rhode Island

an exposure of	radiation monitoring devices indicated
The current maximum permissible expo	sure for X and gama radiation is 100 mr/week.
Please have Mr. and return this statement as quickly properly evaluated.	answer the following questions as possible so that our records may be
1. How did the exposure occur?	·
2. Why did the exposure occur?	
3. What has been done to prevent re-	-occurrance of such an exposure?
4. Comments	
Signed	Date
Radiographer	
Forwarded Supervisor or Superintendent	Date

Supervisor or Superintendent

FIGURE 6

ITT GRINNELL CORPORATION RESEARCH, DEVELOPMENT & ENGINEERING RDI-12(E) DAILY UTILIZATION LOG

.

JOB NAME		CONTR	ACT NO.		DATE :	
LOCATION			_RAD IOC	RAPHER		
SOURCE	SERIAL	NO		STREN	GTH	CURIES.
PROJECTOR MO	DEL NO			SERIA	L NÖ	
WELD NO.	SIZE & WALL THICKNESS	NO.OF EXP.	EXP. TIME	ORIG. REPAIR RE-RT	RADIATION SURVEY OUT- SIDE RE- STRICTED AREA (mr/br)	RADIATION SURVEY AFTER EXP- 1'FROM FRONT OF PROJECTOR (mr/hr)
					· · · ·	

SURVEY METER MODEL NO	SERIAL NO			
FINAL SOURCE SURVEY:	_mr/hr	TIME:		_
STORAGE AREA SURVEY:	_mr/hr	STORAGE	LOCATION :	· · · · · · · · · · · · · · · · · · ·
SURVEY OF TRANSPORTATION VEHICLE (I:	f appli	cable)	*********	mr/hr
LOCATION OF SOURCE IN VEHICLE:		• •		
COMMENTS :				

Signature:____

WEEKLY DOSIMETER REPORT

Radiographer:_____

Week Begining:_

	Date (when shift started)		· ·		
		Start	Finish	Total	
Monday		•			mr/hr
Tuesday				******	ar/hr
Wednesday					mr/hr
Thursday					mr/hr
Friday					mr/hr
Saturday			•		mr/hr
Sunday					mr/hr
Total for Week	XXXX	XXXX	XXXX		mr/hr
Pocket Dos	imeter Model No:		_ Serial No	•	
Charging D	evice Model No:		_ Serial No	·	
Comments:					·
			· · · · · · · · · · · · · · · · · · ·		
			:		
			Signature_		

.

inspection Shop-Field Check List

Α.

٩.

С.

D.

Figure 8

RADIOGRAPHER CHECK LIST PRIOR TO

.

EQUIPMENT USE

LOCA	TION			•
PROJ	ECTOR MODEL	SERI	AL'NO.:	
REEL	MODEL	SERI	AL NO.:	
		·		
PROJ	ECTOR			
1.	Check Lock			
2.	Unlock and check operatio	n of selector	ring	
3	moving from lock to conne	ct	-	
J.	A Spring fastener energy			
4.	Unscrew shipping plug ch	tes ireely ack for damage	4	
	threads (Replace Plug)	CCN TOT GAMAKE	4	
5.	Check general appearance damage to container	of projector fo	or	
6.	Check service label to in inspection has not exceed	sure maintenand ed 3 month inte	ce and erval.	
REEL	•			
1.	Unreel control cables che	cking for dama		
	(Such as dents or kinks)	ourue tor damai	20	
2	Hand crank operates freely	y	· ·	
3.	Check that connecting bal	l is straight a	and	-
4	Cable hardware is secured	tightly to con	ntrol	
	lousing			
SOUR	CE GUIDE TUBES			
1	Source tubes are free of 1	kinks and dents		
2.	Tubes are free of foreign	material	2	
3.	Threads are not damaged as	nd connection t	o one	····
4	Check to incure			•
x .	cessive dents and/or bar	be tip is free	of ex-	
5.	Source tube tip threads an	is . To free of dama	an and	
	connect securely to guide	tubes	ige and	
SURVE	<u>Y</u>			
1.	Survey projector to insure	readings are	not in ex-	
	cess of those set forth in	1-SF-162-14;	Safety	
	practice for Gamma-Ray Ins para.12.2) (a) (b).	spection (page	5, Sec VII,	
REMAR	KS	·		-

,

FIGURE 9

SHIPMENT OF RADIOACTIVE SOURCES RADIOACTIVE SHIPPING LABELS

	Surface	3 Feet
RADIOACTIVE-WHITE 1 RADIOACTIVE	0.5mR/hr	None
RADIOACTIVE-YELLOW II	50mR/hr	l.OmR/hr
RADIOACTIVE-YELLOW III	200mR/hr	10mR/hr

- NOTE: (1) <u>A Radioactive White</u> I Label must be affixed to each package measuring 0.5 millirem or less per hour at each point on the external surface of the package.
 - (2) <u>A Radioactive Yellow II Label must be affixed</u> to each package measuring more than 0.5 but not more than 50 millirem per hour at each point, and not exceeding one (1.0) millirem per hour at three feet from each point on the external surface of the package.
 - (3) <u>A Radioactive Yellow III</u> Label must be affixed to each package which measures more than 50 millirem per hour at each point or exceeds one (1.0) millirem per hour at three feet from each point on the external surface.

APPENDIX A

ACCEPTABLE RADIATION MONITORING EQUIPMENT

1. Film Badge Service:

ICN Tracerlab 26201 Miles Avenue Cleveland, Ohio 44128

Period - Monthly

2. Dosimeter:

 \sim

Manufacturer	Mode 1	Range
Picker Nuclear	655010	0-200 mr
Picker Nuclear	866	0-1R
Landsverk	L50	0-200 mr
Victoreen	541/A	0-200 mr
Picker Nuclear	862	0-200 mr

3. Dosimeter Chargers:

Manufacturer	Model
Picker Nuclear	906 [·]
Victoreen	2000A
Landsverk	L-136
Landsverk	L-24

4. Survey Meters:

Manufacturer Mode 1 Ranges 0-10 mr/hr Eberline E-510-G 0-100 " 0-1000 " Eberline E-130-G 0-10 mr/hr 0-100 " 0-1000 " Victoreen 592B 0-10 mr/hr 0-100 " 0-1000 " Eberline 0-1000 mr/hr PIC-3 Total KG Foerstner & Company (Atometer 0-150 mr/hr 6122). 0-15 r/hr

5. Personal Monitor Manufacturer Victoreen

Tattler 882A

APPENDIX B

PREVENTIVE INSPECTION AND MAINTENANCE

RADIOGRAPHIC EQUIPMENT

- SCOPE: To insure safety and avoid malfunctions of radiographic equipment a quarterly inspection and maintenance as outlined herein shall be enacted and the results recorded.
 - 1. The inspection and maintenance shall be performed either in the shop or field by the Radiation Protection Officer or by his representative.
 - 2. The results of inspection shall be recorded on form 162IM and be kept on file in the Research, Development & Engineering Division, Providence, Rhode Island.
 - 3. The equipment shall be tagged as to the inspection date and the date it is due for reinspection. No radiographic equipment shall be placed in service if it is not within the inspection period or in safe operating condition.

A. PROJECTOR TECH/OPS MODEL 533; 660

7.

Tapitor And

- 1. Transfer source from projector to 414 or 650 source changer. Refer to I-SF-171-2 Section V for radiation limits.
- 2. Check source pigtail connector with Tech/Ops 550 connector gauge, Position 4.
- 3. Check locking assembly for proper operation and lubricate.
- 4. Check operation of selector ring moving from lock to connect.
- 5. Check shipping plug and projector for damaged threads.
- 6. *Remove stainless cover and inspect interior of projector to insure shielding has not become detached from the control cable connector and no damage has occurred elsewhere.
 - Check general appearance of projector for damage to container and that information on the decal is easily read.

- 8. Check if female drive connector protective cap, is secured to projector properly with chain.
- 9. Check that all fasteners (bolts, nuts, screws) are secure.
- 10. Connect control cables and source guide tubes to projector and install <u>dummy</u> source. Operate machine several times to be sure of proper function.

*For 533 Projectors only. The 660 is sealed and inspection cannot be made.

11. Check operation of the locking sleeve by pushing operating pin back. Sleeve should return when released.

B. PROJECTOR TECH/OPS MODEL 489

- 1. Transfer source from projector to 414 or 650 source changer. Refer to I-SF-171-2 Section V for radiation limits.
- 2. Check source pigtail connector with Tech/Ops 550 connector gauge, position 4.
- 3. Examine shipping plug and projector locking assembly.
- 4. Check control cable housing connection for damage and secure connection.
- 5. Remove cover and inspect interior of projector to insure shielding has not been damaged and is aligned properly.
- 6. Check general appearance of projector for damage to container and that information on decal is easily read.
- 7. Check that all fasteners (bolts, nuts, screws) are secure.
- 8. Install <u>dummy</u> source and operate machine several times to be sure of proper function.
- 9. Check operation of the locking sleeve by pushing operating pin back. Sleeve should return when released.

C. PROJECTOR TECH/OPS MODEL 490

1. Transfer source from projector to 650 or 414 source changer. Refer to I-SF-171-2 Section V for radiation limits.

- 2. Check source pigtail connector with Tech/Ops 550 connector gauge, position 4.
- 3. Examine shipping plug and projector locking assembly.
- 4. Check control cable housing connection for damage and secure connection.
- 5. Remove cover and inspect interior of projector to insure shielding has not been damaged and is aligned properly.
- 6. Check general appearance of projector for damage to container and that information on decal is easily read.
- 7. Check that all fasteners (bolts, nuts, screws) are secure.
- 8. Install <u>dummy</u> source and operate machine several times to be sure of proper function.
- 9. Check operation of the locking sleeve by pushing operating pin back. Sleeve should return when released.
- D. PROJECTOR TECH/OPS MODEL 525, 680, 684, 741
 - 1. Facilities for transfering the Cobalt 60 source to a source changer are not available. The requirement for checking the source connector is waived since the model 525 is not a connect-disconnect type.
 - 2. The source connector will be checked once each year by the manufacturer.
 - 3. Examine the shipping plug and projector locking assembly.
 - 4. Check control cable housing connection for damage and secure connection.
 - 5. Check general appearance of projector for damage to container and that information on decal is easily read.
 - 6. Check that all fasteners (bolts, nuts, screws) are secure.
 - 7. *Check operation of the locking sleeve by pushing operation pin back. Sleeve should return when released.

*For Models 680, 684, and 741 only

E. GAMMA-RAY PROJECTOR CONTROLS

- 1. Crank out source drive cable into suitable container and clean with solvent by soaking and washings.
- 2. Examine cable for kink, fraying, broken wires or rust.
- 3. Examine the drive cable connector with Tech/Ops 550 connector should not pass thru gauge.
- 4. Prior to reassembly the drive cable shall be lubricated with Texaco "Unitemp" grease.
- 5. Detach control cable housings from equipment and squirt or pour solvent into the housings to clean. To dry blow out cable housings with low pressure air (15 to 20 psi).
- 6. Examine cable housings for damage such as cuts, flattened spots, or any indication of internal damage.
- 7. Remove crank unit from reel, disassemble and wash parts in solvent.
- 8. Check inside of housing for evidence of wear, where the cable contacts the inner wall the housing should not be scored more than .020 deep.
- 9. Check clearance between hubs of crank wheel and the bushings, a maximum of .005 clearance is acceptable.
- 10. Examine teeth of wheel for damage.
- 11. Lubricate and reassemble crank.
- 12. Reassemble carefully as not to introduce any foreign material into control cable housings.
- F. SOURCE GUIDE TUBES
 - 1. Check for cuts, burns or crushed tubes.
 - 2. Check for damaged threads and that connection to one another is secure.
 - 3. Clean bore of tube with solvent and dry with air (not more than 15 lbs.). Do not place tube it-self in solvent.
 - 4. Check to insure source tube tips are free of excessive dents and/or bends.

- 5. Check source tube tip threads for damage and connection to guide tubes.
- 6. Check source tube tip and guide tubes for free passage with <u>dummy</u> source.

G. RADIATION SURVEY

1. Return source to projector and survey for excessive levels of radiation in accordance with VII 12 a and b.

	1999 - 1999 -			· · · · · · · · · · · · · · · · · · ·	
(.		(-	• • • •		(
· · ·	• •••• .		,	··· · ·	
· ·	: :	FORM AEC-313R-S Supplement to United States Atomic Application for Byproduct Mate Use of Scaled Sources in N	Energy Commission ' rial License -	APPENDIX C	•
		use of scaled sources in Ra	adlography		•
THIS FORM SHOULD B DESCRIEED IN SECTION Additional pages ma	E USED ONLY BY DH I.D. OF THE by be attached.	PERSONS MIO WISH TO PERFORM RADIO AEC INDUSTRIAL RADIOGRAPHY LICENS: See reverse side for additional	CRAMIY UNDER A "LIMITE NG GUIDE. Use separa instructions.	D RADIOCRAPHY LICENSE te form for each indi	." AS vidual.
It is hereby reques	sted that	J. Kowalski be lister	l on Theorem No. 00.000	· · · · · · · · · · · · · · · · · · ·	
(2) Radiographer's	Assistant. (C	(name) Sircle (1) or (2)) The training an	nd experience of this i	<u>139-01</u> as a (1) Individual consists o	Radiographer f:
(3)			·· · ·		
OR EXPERIENCE (From) (To)	(4) POSITION HELD (1) (2)	(5) TYPE OF EQUIPMENT USED (Make & Model Number)	(6) TYPE AND AMOUNT OF ACTIVITY	(7) NAME OF ENPLOYER OR AGREEMENT STATE 1	AMD USAEC
No Str. Ale Str.	$() () \cdot$		•		
<u>12-69</u> <u>3-70</u>	(1) (.)	Tech/Ops 533, 490, 489, 525	100 Curies Ir 192 5 Curies Cobalt 60	Grinnell Corporat: 38-02839-01	lon
3-70 6-72	() (2)	Tech/Ops 533, 490, 489, 525, 660	. 100 Curies Ir 192 5 Curies Cobalt 60	Grinnell Corporati 38-02839-01	lon
-72 .Present	() (<u>2)</u>	Tech/Ops 533, 490, 489, 525, 660	100 Curies Ir 192 5 Curies Cobalt 60	Grinnell Corporati 38-02839-01	lon
	· () · () · _			•	
	O O O			· · · · · · · · · · · · · · · · · · ·	
 Additional trai "Isotopes for In Light Power and Power Plants. 	ning and exper dustrial Radio Georgia Power	ience description or comment: Succ graphy". Participarted in radiogra Nuclear Power Plants and at Taunto	cessfully completed Pic aphy at Virginia Electr on Municipal Light & Po	ker Industrial Course ic, Quad-Cities, Miss wer and Boston Edison	in issippi rossil:
(Briefly descri	be test, on-th	mined compliance with 10 CFR 34.31 e-job evaluation, etc. Written to	l for the person named est copy may be attached	above by: ed.)	
lias · Radi	successfully c ographers and	ompleted all requirements set forth Assistants RDI-6C and is considered	in Grinnell Training qualified as a Radiog	Program for rapher.	
	•	•		1/ the day	Jurh
ATTACIMENT:			(10) 51gned		<u> </u>

12599

Attachment to Form AEC-313R-S

In addition to his duties as Radiographer, Joseph Kowalski has the responsibility to maintain:

- 1. The records for all aspects of radiation monitoring, which included Dosimeter and Film Badge Records.
- 2. Source receipts and transfers to Technical Operations.
- 3. Source inventories.
- 4. Dosimeter Records, Daily Utilization Logs and Radiographers Check Lists and review for complete and correct entries.
- 5. Quarterly Inspection and Maintenance Records and conduct the Inspection and Maintenance as required for Radiographic equipment.
- 6. Meter calibration records and perform meter calibration procedure.
- 7. Leak Test Records for sources and perform Leak Test Procedure.
- 8. Submit changes to the Safety Standards and Instructions.
- 9. Prepare Termination Reports and Annual Whole Body Report for submission to the AEC.

In conjunction with the Quality Control Manager, participated in the investigation of several incidents.

It should be noted that during AEC Audit conducted in 1972, no discrepancies were reported. Also, during the most recent AEC Audit conducted on March 27, 1974, no discrepancies were reported.

Isotopes for Industrial Radiography at the Bicker Industrial Radiography Laboratory, Clebeland, Shio das successfully completed a course in the use of APPENDIX C NDUSTRIA INE KOMALSKI A PICKER CORFORATION DIVISION

FERRINARY 6, 1970 Olce President. Instructor Date.

FORM AEC-313R-S

Supplement to United States Atomic Energy Commission Application for Byproduct Material License -Use of Sealed Sources in Radiography

THIS FORM SHOULD BE USED ONLY BE PERSONS WHO WISH TO PERFORM RADIOGRAPHY UNDER A "LIMITED RADIOGRAPHY LICENSE" AS DESCRIBED IN SECTION I.D. OF THE AEC INDUSTRIAL RADIOGRAPHY LICENSING GUIDE. Use separate form for each individual. Additional pages may be attached. See reverse side for additional instructions.

It is hereby requested that		David Walshe be liste	d on License No. 38-0	02839-01 as a (1) Radiographer
(2) Radiographer's	Assistant	(name) (Circle (1) or (2)). The trainin	g and experience of (this individual consists of:
(3)				
PERIOD OF TRAINING	(4)	(5)	(6)	(7)
OR EXPERIENCE	POSITION	IELD TYPE OF EQUIPMENT USED	TYPE AND AMOUNT	NAME OF EMPLOYER AND USAEC
(From) (To)	(1) ((Make & Model Number)	OF ACTIVITY	OR AGREEMENT STATE LICENSE NO.
<u>6-63</u> <u>6-24-68</u>	(1) () <u>Tech/Ops 533, 578, 490</u>	Ir 192 - 100 Ci Co 60 - 50 Ci	Electric Boat, Groton, Conn.
(no.art) (no.ait)		Picker Cyclops	°Co 60 - 900Ci	
<u>ć-24-68</u> Present	() (2) Tech/Ops 533, 578, 490, 489	<u>co 60 - 50 ci</u>	Electric Boat, Groton, Conn.
	() ()	Co 60 - 900C1	Grinnell Corporation
	() () :		
	() ()	••••	
	() ()		

(3) Additional training and experience description or comment: Course of instruction in Radiological Control. Worked with open air Co 60 source for use in Gamma Probing Lead. Meets all requirements set forth in RDI-6. Participated in radiography at these Nuclear Power Plants: Toledo Edison, Virginia Electric, Georgia Power, Vermont Yankee, Quad-Cities Yankee Atomic, Connecticut Yankee and Duke Power and also at Fossil Power Plants Blackstone Valley

(9) <u>Emil Johnson</u> determined compliance with 10 CFR 34.31 for the person named above by: Taunton Muncipal (Briefly describe test, on-the-job evaluation, etc. Written test copy may be attached.) Light & Power and

Light & Power and Narragansett Electric

(10) Signed



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APPENDIX D

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•		IT Grinnell	NO. RDI-7 REV.F PAG WRITTEN BY APP DATE 1/17/2
TITLE	S	SHIPPING RADIOACTIVE MATERIAL	
All a be shipped	radic d by	active material unless otherwise air freight by an appropriate ai	specified, shall
I.	<u>Sh i</u>	pment of Radioactive Sources	
	1.	Insure that the source is secur shielded storage position in th tainer.	ed in the proper as shipping con-
•	2.	Attach a security seal with an identification mark of double b package closure. (49CFR 173.39	ITT Grinnell ox design, to th 3(b)).
	3.	Place the shipping container in and insure sufficient blocking outer container to prevent shif portation.	an outer packag is placed in the ting during tran
	4.	Survey the package at the surfa feet from the surface to determ radioactive shipping labels (at or C) to be applied to the packs with Table I below:	ce and at three line the proper tachment 3A, B, age in accordance
		TABLE I (49CFR17	2.403)
	•	Radioactive White ISURFARadioactive Yellow II50mr/Radioactive Yellow III200mr	CE3 FEET/hrNonehr1.0mr/h/hr10mr/h
	5.	Properly complete two shipping the contents (Iridium 192, Coba of curies and the Transport Ind tion level measured at three fe of the package; used on Yellow labels only) (49CFR172.403(g)) 3C)	labels indicatin lt 60), the numb ex (maximum radi et from the surf II and Yellow II (Attachment 3B a

	ITT GRINNELL NO.: RDI-7 STANDARD INSPECTION PAGE: 2 SPECIFICATION REV.: F APP. DATE: 1/17/78
TITLE:	SHIPPING RADIOACTIVE MATERIAL
	6. Insure all old shipping labels are removed from the package. Apply the two properly completed radioactive shipping labels to two opposite sides of the package.
	7. Mark the outside container, "Inside container in accord- ance with " fill in the blank space with the appropriate Certificate of Compliance; for Tech Ops Model 650 (USA/9032/B); and for Tech Ops Model 660 (USA/9033/8). (10CFR71.12(b))
	8. Perform a radioactive contamination wipe test of the shipping package and insure that the wipe test does not exceed 0.001 microcuries per 100 square centimeters.
	9. Properly complete the shipper's certificate (attachment 1) in accordance with instructions in Appendix B.
<u>)</u> . 11.	Shipment of Empty Depleted Uranium Shielded Containers and Collimators
	10. Insure that the container does not have a radioactive source.
	11. Insure container is securely closed or contains no radioactive contamination.
	12. Insure all old labels have been removed from the package, attach an "EMPTY" label to the package.
	13. Place the shipping container in the outer package and place sufficient blocking to prevent shifting during transportation.
	14. Mark the outside of the outer shipping package "Radio- active Material - Low Specific Activity."
	15. Perform a radioactive contamination wipe test of the shipping package and insure the wipe test does not exceed 0.001 microcuries per 100 square centimeters.
	16. Survey the package at the surface and at three feet from the surface to determine the proper radioactive shipping labels to be applied to the package.

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	<>>	ITT GRINNELL NO.: RDI-7 STANDARD INSPECTION PAGE: 3 SPECIFICATION REV.: F APP. HT DATE: 1/17/78
and a second	TITLE:	SHIPPING RADIOACTIVE MATERIAL
		 a. If the surface radiation level is less than 0.5 milliroentgens per hour and there is no measurable radiation level at three feet from the surface, no label is required. Mark the outside of the package with the statement; "Exempt from specification packaging, marking and labeling, and exempt from provisions of 49CRR173.393 per 49CFR173.391(€). Exempt from the requirements of 49CFR Part 175 per 49CFR175.10 (a)6." Complete shipper's certificate (attachment 1) in accordance with instructions in Appendix B. b. If the surface radiation level exceeds 0.5 milliroentgens per hour, or if there is a measurable radiation level at three feet from the surface, use the criteria of Table I in Paragraph I.4 to determine the proper radioactive shipping labels (attachment 3) to be applied to the package.
		certificate (attachment 1) in accordance with in- structions in Appendix B. Waybill Information
		17. Company name. If shipment is airport to airport, note "HOLD FOR PICK-UP BY(individual's name)."
definition of the second state of the second s		18. If shipment is to be advanced by a trucking firm from the airport of final destination to the job site, specify "Advance by (Firm) Trucking." Call(Telephone Number). Waybill should indicate the appropriate job site location.
i kanalari		19. No value should be declared since all RD&E equipment is covered by company insurance.
		20. All shipment must be sent signature service.
	IV.	Specific Shipping Instructions
		21. No radioactive material may be shipped in excess of the limits applicable to specific manufacture and model of container specified on the following pages.
)) a	

		ITT GRINNELL STANDARD INSPECTION	NO.: RDI-7 PAGE: 4
 -*		SPECIFICATION	REV.: F APP.
			DATE: 1/17/78
TITLE:		SHIPPING RADIOACTIVE MATERIAL	· ·
		Tech/Ops. 533 20 Cu Tech/Ops. 490 100 Cu Tech/Ops. 489 10 Cu Tech/Ops. 525 5 Cu Tech/Ops. 650 (SC) 100 Cu Tech/Ops. 660 100 Cu Tech/Ops. 680 100 Cu Tech/Ops. 684 100 Cu Tech/Ops. 741 30 Cu	ries Ir 192 ries Ir 192 ries Ir 192 ries Co 60 ries Ir 192 ries Ir 192 ries Ir 192 ries Co 60 ries Co 60 ries Co 60
	22.	Sources transported under ITT Grinne transported in vehicles posted as re carrying radioactive material. The and the results recorded on Attachme	ll supervision shall be quired and identified as vehicle shall be surveyed nt 2 RDI-12(E).
	23.	When shipping Cobalt 60 in a 525 pro wired to frame to prevent damage.	jector, the reel shall be
٧.	Tran	sporting Radioactive Material Under I	TT Grinnell Supervision
	24 .	Insure that the container is properl labeled.	y packaged, marked and
	25.	Secure the container against movemen	t in the vehicle.
	26.	Survey the driver's compartment to i level does not exceed 2 milliroentge	nsure that the radiation ns per hour.
	27.	Survey the radioactive material cont required when the following conditio	ainer. Vehicle posting is ns exist:
		a. Radiation level exceeds 50 mil each point on the external sur	liroentgens per hour at face or,
		b. Radiation level exceeds 1 mill feet from each point on the ex	iroentgen per hour at 3 ternal surface.
		The vehicle must be placarded "RADIOACTIVE" placard.	on all four sides with a
	28.	Record the results of the survey of radioactive material container on At Prior to departure, a copy of this s submitted to the Radiation Safety Of	the vehicle and the tachment 2 - RDI-12(E). urvey report shall be ficer.
	29	Log the source out on the Inventory (Control of Sources - in

and a second second

2		SI	ITT GRINNELL CANDARD INSPECTION SPECIFICATION	NO.: RDI-7 PAGE: 5 REV.: F APP. H DATE: 1/17/78
TITLE:			SHIPPING RADIOACTIVE MATERIAL	``````````````````````````````````````
	30.	Shou the by a vehic	d the vehicle become disabled ovehicle unattended. A message passing motorist or the police site.	on the road, do not leave for assistance may be sent may be used to guard the
	31.	Shoul be po surve all : from relea TRIEN Offic	d an accident occur, an immedia erformed to determine safe radia by reveals an abnormal radiation individuals from approaching the police, if possible. If a radiased from the container - DO NOT WE THE SOURCE BY YOURSELF. Not er.	ate radiation survey shall ation levels. If the n level, you must prevent e area and request assistance ioactive source has been F MAKE ANY ATTEMPT TO RE- ify the Radiation Safety
2	32.	Reconnames licen Radia forma source	d all the information concerning of witnesses, names of people use numbers, circumstances of the tion Safety Officer promptly give tion available regarding the co-	ng the accident; such as, involved, names of police, he accident. Call the iving him all of the in- ondition of the radioactive
	33.	If th vehic follo	e vehicle is used for storage, le should be considered an unre wing steps must be taken:	the area outside the estricted area, and the
		a <i>.</i>	The vehicle shall be surveyed surface of the vehicle and the exceed 2 milliroentgens per ho	at 18 inches from the e radiation level shall not our.
		b.	The vehicle shall be posted wi MATERIAL" signs.	ith "CAUTION RADIOACTIVE
	:			
			,	

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ATTACHMENT 1

Figure 3-S

162-SC Rev. 1



ITT Grinnell Corporation

Executive Offices

260 West Exchange Street Providance, Rhode Island 02901 Telephone (401) 831-7000

Shipper's Certification for Radioactive Materials

This is to certify that the contents of the consignment are properly described by name and are packed, marked, and labeled and are in proper condition for carriage by air according to all applicable carrier and governmental regulations. This consignment is within the limitations prescribed for freight carrying aircraft.

Shipper:	ITT GRINNELL 260 West Exch Providence, F	CORPORA lange St Shode Is	TION • land	
.By	I)ate		
To		•		
Name of principal co	atent		Special Form	Yes
Activity	Curies, Catego	ry	III Yellow	
Transport IndexRea	ding at 1 Meter			mr/hr
Type DOT -	Spec 7A Contain	er		
Source Serial Number	·			
Projector/Source Cha	nger			
Carrier		·	Naybill Number	<u></u>

(USA-DOT-55B)

SHIPPER (ORIGINATOR) COPY

Figure 3-C



ITT Grinnell Corporation

Executive Offices

260 West Exchange Street Providence, Rhode Island 02901 Telephone (401) 831-7000

Shipper's Certification for Radioactive Materials

This is to certify that the contents of the consignment are properly described by name and are packed, marked, and labeled and are in proper condition for carriage by air according to all applicable carrier and governmental regulations. This consignment is within the limitations prescribed for freight carrying aircraft.

Shipper:	ITT GRINNELL COF 260 West Exchang Providence, Rhod	PORATION ge St. He Island	•
By	Date		
To	•	· · · ·	
Name of principal content		Special Form_	Yes
Activity(Curies, Category_	III Yellow	
Transport IndexReading	at 1 Meter		mr/hr
Type DOT - Spe	ec 7A Container		
Source Serial Number	······································		·· ·
Projector/Source Changer		Serial Number	
Carrier		Weybill Number	
			•

(USA-DOT-55B)

CARRIER (AIRLINE) COPY

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Figure 3-R

162SC-Rev. 1

ITT Grinnell Corporation

Executive Offices

260 West Exchange Street Providence, Rhode Island 02901 Telephone (401) 831-7000

Shipper's Certification for Radioactive Materials

This is to certify that the contents of the consignment are properly described by name and are packed, marked, and labeled and are in proper condition for carriage by air according to all applicable carrier and governmental regulations. This consignment is within the limitations prescribed for freight carrying aircraft.

Shipper:	ITT GRINNELL 260 West Exc Providence,	CORPORA hange St Rhode Is	ATION S. sland	· · ·	
By		Date		•	
To		•			· · · · ·
Name of principal co	ntent		Speci	al Form_	Yes
Activity	Curies, Catego	ory	III Yel	low	
Transport IndexRea	ling at 1 Meter				mr/hz
Type DOT -	Spec 7A Contain	ner			
Source Serial Number	•				
Projector/Source Cha	nger		Serial	Number	
Carrier		1	Waybill Nu	mber	
•	(USA-DOT-5)	5B)			• •
Survey of projector/ 1. At contact . (limit 200 mr/hr	source changer wit	h radios	ective mate	erial: mr/hr.	
(Limit 10 mr/hr)	from the external	surface	2	mr/hr.	
	Radio Date	grapher			
REC	EIVER COPY (To Red	eiver Up	on Deliver	гу) -	
		•.		425	99

A	TT.	A	CHMENT	2
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ITT GRINNELL CORPORATION RESEARCH, DEVELOPMENT & ENGINEERING

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RDI-12(E) DAILY UTILIZATION LOG

JOB NAME		CONTR	ACT NO.		DATE :	
LOCATION						
SOURCE	SERIAL 1	NO		STREN	GTH	CURIES.
PROJECTOR MOI	DEL NO		L NO			
WELD NO.	SIZE & WALL THICKNESS	NO.OF EXP.	EXP. TIME	ORIG. REPAIR RE-RT	RADIATION SURVEY OUT- SIDE RE- STRICTED AREA (mr/hr)	RADIATION SURVEY AFTER EXP- 1'FROM FRONT OF PROJECTOR (mr/hr)
				· .		
URVEY METER	MODEL NO		_ SERIA	l NO	·····	
INAL SOURCE	SURVEY:		mr/hr	TIME:		
TORAGE AREA	SURVEY :		_mr/hr	STORAGE	LOCATION:	· · · · · · · · · · · · · · · · · · ·
URVEY OF TRA	ANSPORTATION VI	EHICLE (I:	f appli	cable)		mr/
CATION OF S	SOURCE IN VEHIC	CLE :			•	

Signature:_____







Inspecti Shop-Fie Leak Tes Procedur 10/10/74	on ld ting e	TI Grinnell	NO. I-SF-166 REV. 3 PAGE WRITTEN BY APP.
TIT	LE	STANDARD INSPECTION PROCEDUP LEAK TESTING OF RADIOACTIVE SEALED SOURCE	RE
I.	SCOPE:	. ·	
	l.	This Specification defines the proceed Testing of radioactive sealed sources of sealed radioisotope sources is req performed at least once every six mon	ure for Leak . Leak Testing uired to be ths.
II.	SAFETY:		
	2.	Wipe test sampling shall only be done radiographers. Because the wipe test tain radioactive material, it should or handled except by the handle end, kept in the plastic envelope at all t	e by qualified swab may con- not be touched and shall be imes.
	3.	Where the radioactivity on the swab a logical assay is greater than .005 mi the swab shall be forwarded to Techni Inc. for disposal.	fter radio- crocuries, cal Operation,
	ц.	Where the radioactivity on the swab i .005 microcuries, arrangements shall Manager of Research, Development and Section for the handling and shipment and projector for decontamination.	s greater than be made by the Engineering of the source
	5.	The Nuclear Regulatory Commission she ITT Grinnell Corporation, Research, D Engineering Division of all leaks tha than .005 microcuries on the swab.	all be notified by evelopment and t produce more
III.	EQUIPMEN	<u>T:</u>	
	6.	The following instrumentation shall b logical assaying:	e used for radio-
	•	 a. Pitker Scaler 5810 b. Picker Scintillation Detector 58 c. Calibrated source of Cs 137 d. Lead Shielded Counting Chamber 	16

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	IT	r grinnell	NO. I-SF-166
	STAN	DARD INSPECTION	PAGE: 2
	S	PECIFICATION	REV.: 3 APP.
ръ. 1		· · · · · · · · · · · · · · · · · · ·	DATE: 10/10/74
TITLE:	STANDAR OF RADI	D INSPECTION PROCEDURE LEAK TESTING DACTIVE SEALED SOURCES	
IV.	MATERIAL:		
	7. Th	e following material shall be supplied	for sampling:
	a.	12" long swab holder with an 1/16"	X 3/8" eye in
	b.	Filter paper Whatman 200 cm. dia.	
	d.	Plastic envelope	
	e.	Identification sheet	
V.	SAMPLING PROC	EDURE:	·
	8. Sau	mpling shall be done as follows:	
	1.	Insure source is fully retracted in Survey meter shall be used to insur limits are within those specified i Section V.	to projector. •e radiation .n I-SF-171-2
	2.	Remove source tube from face of shi shipping plug.	eld or remove
	3.	Wet the swab with EDTA solution. S cess and insert the swab into the h shield. Wipe the interior of the h by rotating swab holder.	hake off ex- ole in the ole thoroughly
	<u>ب</u>	Withdraw swab and place in plastic	envelope.
	5.	The swab should now be monitored by survey meter to its most sensitive the meter in a low background area swab in its plastic envelope to the the meter to the swab.	turning the range. Place and move the meter, not
	6.	If there is no indication on the me indication is <u>no more</u> than 0.2 MR p background, put the plastic envelop in the mailing box and mail to ITT Corporation, Research, Development Division, Providence, Rhode Island. <u>cation Sheet (Fig. 2) shall be comp</u> with the swab.	ter, or if the ber hour above be with the swab Grinnell and Engineering <u>The Identifi-</u> pleted and sent

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		ITT GRINNELL	NO.	I-SF-166
		STANDARD INSPECTION	PAGE:	3
		SPECIFICATION	REV.:	3 APP.
TITLE:		STANDARD INSPECTION PROCEDURE LEAK TEST OF RADIOACTIVE SEALED SOURCES	[DATE:	10/_10/ /4
		7. If the swab should show more than hour, <u>do not mail</u> . Contact the R Development and Engineering Divis specific instructions. NOTE: If meter available does not have the of detecting as little as 0.2 MR ship the wipe-test swab to the Re Development and Engineering Divis press. Do not ship if the radiat swab exceeds 2MR per hour and con search, Development and Engineeri for specific instructions. The w will be subjected to a precise ra when received by the Research, De Engineering Division, and a leak- cate will be completed.	a 0.2 MR per esearch, ion for the survey capability per hour, search, ion via ex- ion from th tact the Re ng Division ipe-test su dio assay velopment a test certin	r y y - ne e- n wab and fi-
VI.	DETERMII 9.	<u>NATION:</u> The calibrated Cesium 137 source shall	be put int	tothe
		counting chamber. After adjusting the count shall be take for a known time.	instrument	;, a
	10.	The wipe test swab on the probe in the be placed in the counting chamber after calibrated source and a count taken for for the calibrated source.	plastic ba r removing r the same	ag shall the time as
	11.	The amount of radioactivity on the swa the radioactivity of the calibrated so ratio of the count from the swab divid from the calibrated source.	b will be e urce times ed by the c	equal to the count
VII.	SAMPLE 1	LEAK TEST PROCEDURE:		
	12.	Set voltage on scaler (voltage obtained in Fig. 1) 950 volts.	i from grap	h shown
	13.	Take background count (cpm) - average of intervals.	of three-3	minute
	14.	Take counts from Cs137 Source (cpm).		
	15.	Put in swab - take counts from it (cpm)).	
	ló.	Subtract the background from the counts the swab.	s obtained	from

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	ITT GRINNELL	NO	T
		NO.	, T-91-700
	STANDARD INSPECTION	PAGE:	4
	SPECIFICATION	REV.:	3 APP.
		DATE:	10/10/74
TITLE:	STANDARD INSPECTION PROCEDURE LEAK TEST OF RADIOACTIVE SEALED SOURCES		
17	7. The activity of the swab can be determin counts from the swab minus the backgroun from known source.	led by div d by the	viding the counts
	Voltage 950		
	Background 650 cpm		-
	Source Cs137 .54 uc as of 5-63		
	Counts from source 75,000 cpm		
	Counts from swab 670 cpm		
	Activity of swab =	. .	- `
	Strength of Source (Counts from swad - Counts from s	ource)
	Activity of swab = $\frac{.54 \text{ uc } (670 \text{ cpm} - 65)}{75,000}$	0 cpm	
	Activity of swab = 20 75,000		
	$= \frac{10.80}{75,000}$		
	Activity of swab = .0001 uc or less that	n .001 u	2.
·			

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3 2 2 2 2		
	Z PER MINUTE (X IAMA)	1 11 1

FIG 1

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FIGURE 2

IDENTIFICATION SHEET

RESEARCH, DEVELOPMENT AND ENGINEERING DIVISION

ITT GRINNELL CORPORATION

LEAK TEST

GAMMA RAY PROJECTOR		
MODEL NO.	SERIAL NO	
SOURCE SERIAL NO.	CURIES	
ISOTOPE	COBALT 60	
(CHECK WHICH)	Ir 192	
	OTHER	
- ጋልጣዊ	שע	

PLEASE FILL OUT AND RETURN THIS SHEET TO ITT GRINNELL CORPORATION, WITH TEST KIT FOR RADIO ASSAY.

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