

MATERIALS LICENSE

Amendment No. 7

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

OFFICIAL RECORD COPY

Licensee		In accordance with the application dated December 26, 1994, 3. License Number 35-19993-01 is amended in its entirety to read as follows:	
1. Western X-Ray Company		4. Expiration Date June 30, 2007	
2. 3803 Branson Road Poteau, Oklahoma 74953		5. Docket or Reference No. 030-19640	
6. Byproduct, Source, and/or Special Nuclear Material	7. Chemical and/or Physical Form	8. Maximum Amount that Licensee May Possess at Any One Time Under This License	
A. Iridium 192	A. Sealed radiography source contained in a source assembly registered pursuant to 10 CFR 32.210 or an equivalent Agreement State Regulation	A. See Condition 13	
B. Cobalt 60	B. Sealed radiography source contained in a source assembly registered pursuant to 10 CFR 32.210 or an equivalent Agreement State Regulation	B. See Condition 13	
C. Cesium 137	C. Sealed sources (Gamma Industries Model VD-HP)	C. Not to exceed 225 millicuries per source and Condition 13	
D. Depleted Uranium	D. Metal	D. See Condition 13	
9. Authorized use			
A. and B. For use in a compatible radiographic exposure device registered pursuant to 10 CFR 32.210 or an equivalent Agreement State regulation for performing industrial radiography and in a compatible source changer registered pursuant to 10 CFR 32.210 or an equivalent Agreement State Regulation for source storage and exchange.			
C. For use in a Gamma Industries Master Mind Model 1 and 2 for providing signals to control pipeline crawler equipment or Gamma Industries Tattle-Tale Model 1 for locating pipeline crawler equipment.			
D. Shielding for radiographic equipment.			



**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number

35-19993-01

Docket or Reference Number

030-19640

Amendment No. 7

CONDITIONS

10. Licensed material may be stored at the licensee's facilities located at 3803 Branson Road, Poteau, Oklahoma and All Space Storage Building No. 33, Highway 270 and 4th Street, Seiling, Oklahoma and may be used only at temporary job sites of the licensee anywhere in the United States where the U.S. Nuclear Regulatory Commission maintains jurisdiction for regulating the use of licensed material.
11. Licensed material shall be used by, or under the supervision and in the physical presence of individuals who have been designated in writing by the Radiation Safety Officer and have been trained:
 - A. As specified in the application dated December 26, 1994; and
 - B. In accordance with the provisions of 10 CFR 34.31.
12. The Radiation Safety Officer for this license is James Peters.
13. In addition to the possession limits in Item 8, the licensee shall further restrict the possession of licensed material to quantities below the minimum limit specified in 10 CFR 30.35(d) and 40.36(b) for establishing financial assurance for decommissioning.
14.
 - A. Notwithstanding the periodic leak test required by 10 CFR 34.25(b), the requirement does not apply to radiography sources that are stored and not being used. The sources excepted from this test shall be tested for leakage before use or transfer to another person. No sealed source shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.
 - B. Sealed sources authorized for a use other than radiography shall be tested for leakage in accordance with 10 CFR 34.25.
15. Notwithstanding the requirements of 10 CFR 34.20(a), and pursuant to 10 CFR 34.51, radiographic equipment authorized for use in radiographic operations under this license need not comply with the torque criteria of Section 8.9.2(c) of American National Standard N432-1980.
16. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from source holders by the licensee.
17. The licensee is authorized to transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License number 35-19993-01
Docket or Reference number 030-19640

Amendment No. 7

18. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

- A. Application dated December 26, 1994
- B. Letter dated May 27, 1997



JUN - 5 1997

Date _____

For the U.S. Nuclear Regulatory Commission

**Original Signed By:
Duncan White**

By

Division of Nuclear Materials Safety
Region I
King of Prussia, Pennsylvania 19406

JUN - 5 1997

License No. 35-19993-01
Docket No. 030-19640
Control No. 465522

James Peters
Radiation Safety Officer
Western X-Ray Company
3803 Branson Road
Poteau, Oklahoma 74953

Dear Mr. Peters:

This refers to your license renewal request. Enclosed with this letter is the renewed license.

Please review the enclosed document carefully and be sure that you understand all conditions. If there are any errors or questions, please notify the U.S. Nuclear Regulatory Commission, Region IV Office, Licensing Assistant, (817) 860-8120, so that we can provide appropriate corrections and answers.

Please be advised that your license expires at the end of the day, in the month, and year stated in the license. Until your license is terminated, you must conduct your program involving byproduct materials in accordance with the conditions of your NRC license, representations made in your license application, and NRC regulations. In particular, note that you must:

1. Operate in accordance with NRC regulations 10 CFR Part 19, "Notices, Instructions and Reports to Workers; Inspections," 10 CFR Part 20, "Standards for Protection Against Radiation," and other applicable regulations.
2. Notify NRC, in writing, within 30 days:
 - a. when an authorized user or Radiation Safety Officer, permanently discontinues performance of duties under the license or has a name change; or

OFFICIAL RECORD COPY **ML40**

- b. when the mailing address on the license changes (no fee is required if the location of byproduct material remains the same).
- 3. In accordance with 10 CFR 30.36(b) and/or license condition, notify NRC, promptly, in writing, and request termination of the license when you decide to terminate all activities involving materials authorized under the license.
- 4. Request and obtain a license amendment before you:
 - a. permit anyone to work as an authorized user under the license;
 - b. change Radiation Safety Officer;
 - c. order byproduct material in excess of the amount, or radionuclide, or form different than authorized on the license;
 - d. add or change the areas of use, or address or addresses of use identified in the license application or on the license; or
 - e. change ownership of your organization.
- 5. Submit a complete renewal application with proper fee or termination request at least 30 days before the expiration date of your license. You will receive a reminder notice approximately 90 days before the expiration date. Possession of byproduct material after your license expires is a violation of NRC regulations. A license will not normally be renewed, except on a case-by-case basis, in instances where licensed material has never been possessed or used.

In addition, please note that NRC Form 313 requires the applicant, by his/her signature, to verify that the applicant understands that all statements contained in the application are true and correct to the best of the applicant's knowledge. The signatory for the application should be the licensee or a certifying official of the licensee rather than the Radiation Safety Officer or a consultant.

You will be periodically inspected by the NRC. Failure to conduct your program in accordance with NRC regulations, license conditions, and representations made in your license application and supplemental correspondence with NRC will result in enforcement action against you. This could include issuance of a notice of violation, or imposition of a civil penalty, or an order suspending, modifying or revoking your license as specified in the "General Statement of Policy and Procedure for NRC Enforcement Actions," (Enforcement Policy), NUREG 1600.

James Peters
Western X-Ray Company

-3-

Since serious consequences to employees and the public can result from failure to comply with NRC requirements, prompt and vigorous enforcement action will be taken when dealing with licensees who do not achieve the necessary meticulous attention to detail and the high standard of compliance which NRC expects of its licensees.

Thank you for your cooperation.

Sincerely,

Original Signed By:
Duncan White
Duncan White
Division of Nuclear Materials Safety

License No. 35-19993-01
Docket No. 030-19640
Control No. 465522

Enclosures:

1. Amendment No. 07
2. 10 CFR Parts 2, 19, 20, 21, 30, 34, 150 and 170
3. NRC Forms 3 and 313
4. Section 206 of the Energy Reorganization Act of 1974

DOCUMENT NAME: R:\WPS\MLTR\L3519993.01

To receive a copy of this document, indicate in the box: "C" = Copy w/o attach/encl "E" = Copy w/ attach/encl "N" = No copy

OFFICE	DNMS/RI	N	DNMS/RI				
NAME	DWhite						
DATE	06/04/97	06/ /97	06/ /97	06/ /97	06/ /97		

OFFICIAL RECORD COPY

Western X-Ray Company

3803 Branson Road · Poteau, OK 74953 · 918-647-5044

MS 6
Q-4

May 27, 1997

United States Nuclear Regulatory Commission
Region I
475 Allendale Road
King Of Prussia, PA 19406-1415

Attention: Duncan White
Senior Health Physicist
Division of Nuclear Materials Safety

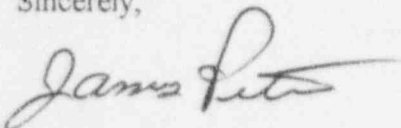
Reference: Mail Control No. 465522

Enclosed are duplicate sets of the additional information requested in your letter dated April 29, 1997 regarding our application for renewal of License No. 35-19993-01.

- Item 1. Refer to Section II, Paragraph 18.0
- Item 2. Refer to Section II, Paragraph 9.4
- Item 3. Refer to Section II, Paragraph 9.6
- Item 4. Refer to Section II, Paragraph 11.0
- Item 5. Refer to Section II, Attachment II-9
- Item 6. Refer to Section IV, Page 4
- Item 7. Refer to Section IV, Paragraph 1.2
- Item 8. Refer to Section VI
- Item 9. Refer to Section IV, Paragraph 3.8

Should you have any questions regarding this information, please contact me at (918) 647-5044.

Sincerely,



James Peters
Radiation Safety Officer

465522

OFFICIAL RECORD COPY

ML 40

MAY 30 1997

5-1-95

TABLE OF CONTENTS

i

<u>SECTION</u>	<u>TITLE</u>	<u>PARA.</u>	<u>EFFECTIVE PAGES</u>	<u>DATE</u>
i	Table of Contents		1-2	5-15-97
ii	Record of Revision		1	5-15-97
iii	NRC License and Amendments			
I	Organization and Responsibilities		1-8	12-1-94
	Radiation Safety Officer	1.0		
	Assistant RSO	2.0		
	Radiation Field Supervisor	3.0		
	Radiographer	4.0		
	Radiographer Assistant	5.0		
	Resumes	6.0		
II	General Operating Procedures		1-25	5-15-97
	Purpose and Scope	1.0		
	General Policy	2.0		
	Distribution	3.0		
	Personnel Monitoring	4.0		
	Survey Instruments	5.0		
	Collimator	6.0		
	Radioactive Source Security	7.0		
	Posting and Restricting Areas	8.0		
	Surveys	9.0		
	Utilization Log	10.0		
	Transportation of Material	11.0		
	Receipt and Disposal	12.0		
	Leak Testing of Sources	13.0		
	Internal Inspection Program	14.0		
	Inventory, Inspection, Maint.	15.0		
	Records Management	16.0		
	Records at Temporary Job Sites	17.0		
	Internal Audits	18.0		
III	Description of Facilities and Use Areas		1-7	12-1-94
	Purpose and Scope	1.0		
	Location	2.0		
	Description of Storage Facility	3.0		
	Posting of Storage Areas	4.0		
	Security of Storage Areas	5.0		
IV	Emergency Procedures		1-4	5-15-97
	Purpose and Scope	1.0		
	General Policy	2.0		

5-1-95

TABLE OF CONTENTS

i

<u>SECTION</u>	<u>TITLE</u>	<u>PARA.</u>	<u>EFFECTIVE PAGES</u>	<u>DATE</u>
	Equipment malfunctions	3.0		
	Lost or Stolen Devices	4.0		
	Vehicle Accidents	5.0		
	Accidents involving Non-Monitored Personnel	6.0		
	Emergencies due to fire	7.0		
	Emergency Telephone Numbers (page 4)			
V	Training		1-22	12-1-94
	Purpose and Scope	1.0		
	Responsibility	2.0		
	Radiographer Assistants	3.0		
	New Radiographers	4.0		
	Previous Trained Radiographers	5.0		
	Refresher Training	6.0		
	Examination Number 1			
	Examination Number 2			
	Examination Number 3			
VI	Equipment Handling Procedures		1-11	5-15-97
	Purpose and Scope	1.0		
	Daily Equipment Inspection	2.0		
	Quarterly Inspection & Maint.	3.0		
	Source Exchange Procedures	4.0		
	Operating Exposure Devices	5.0		
	Operating Master Minder	6.0		
	Operating Tattle Tale	7.0		
	Operating X-ray Devices	8.0		
VII	Q. A. Program for Radioactive Material Packages		1-6	5-1-95
VIII	NRC Regulations 10 CFR 19, 20 and 34			

5-15-97

RECORD OF REVISION

ii

Revision

Date

Original Issue

12/1/94

1

5-1-95

2

5-15-97

1.0 Purpose and Scope

This section establishes procedures to assure that the radiation safety program operates effectively. Except as otherwise specifically provided, this section applies to all individuals involved in radiographic operations.

2.0 General Policy

The objective of this procedure is to protect the health of the general public and the employees of the company. The company is committed to and supports the (ALARA) philosophy described in Regulatory Guide 8.10, "Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As Is Reasonably Achievable".

3.0 Distribution

A copy of these procedures shall be available to all employees that work with radioactive material. Each involved employee will sign a statement confirming that they have read and understand these instructions and the regulations (Title 10 Code of Federal Regulations.) of the Nuclear Regulatory Commission prior to performing any radiographic operations. If any doubt exists concerning these instructions, or the safety conditions in the performance of radiographic operations, the RSO should be contacted immediately.

4.0 Personnel Monitoring

All Western X-ray Company personnel shall be required to wear the following monitoring equipment when performing radiographic work.

- * Film badge or TLD
- * Direct reading pocket dosimeter - range 0 to 200 milliroentgen
- * Alarm ratemeter

4.1 Film Badge or TLDs

Radiographic personnel shall wear film badges or TLD badges. These devices shall be supplied by Atomic Energy Laboratory, Houston, TX, or other processor accredited by NVLAP of the U. S. Department of Commerce as having the competence to perform specified tests in accordance with prescribed test methods and accreditation criteria. Personnel monitoring devices shall be exchanged at monthly intervals.

- 4.1.1 Film badges or TLDs will be assigned by name and number to each employee involved in radiographic operations. UNDER NO CIRCUMSTANCES will an employee be permitted to use a film or TLD badge other than his own.
- 4.1.2 The Radiation Safety Officer will be responsible for distribution of film or TLD badges, and the procedures governing their use. Film or TLD badges are to be

returned to the Radiation Safety Officer promptly at the end of each control period.

- 4.1.3 Film or TLD badges are to be worn in a manner most likely to receive a representative whole body exposure, during all operations which involve potential for exposure to radiation.
- 4.1.4 Care should be taken to prevent exposure of the film or TLD badge to environmental conditions which involve excessive heat or moisture such exposure may impair the ability of the badge to measure radiation doses accurately.

4.2 Pocket Dosimeters

Radiographic personnel shall wear pocket dosimeters with a range from 0 to 200 milliroentgen. Dosimeters will be manufactured by Victoreen, Dosimeter Corporation of America or Landsverk. The Radiation Safety Officer or his assistants may wear pocket dosimeters that read from 0 to 1000 Milliroentgen for recovery operations. This dosimeter shall be Dosimeter Corporation Model 862 or equivalent.

- 4.2.1 Pocket dosimeters are to be worn in a manner most likely to receive a representative whole body exposure during all operations which involve potential for exposure to radiation.
- 4.2.2 All dosimeters must be recharged at the start of each shift.
- 4.2.3 Dosimeter readings shall be recorded on the Daily Radiation Job Sheet (Attachment II-3, or equivalent)
- 4.2.4 Care should be taken to ensure that dosimeters are not dropped or jarred as they are delicate instruments and can be easily damaged. If a dosimeter is damaged, the Radiation Safety Officer shall be contacted immediately.
- 4.2.5 Pocket dosimeters response to radiation will be checked for accuracy by calibration at least once each year. Dosimeters that are accurate within plus or minus 30% of the actual radiation exposure shall be considered acceptably calibrated. Calibrations shall be performed by the manufacturer, the RSO, or his assistant, using Victoreen/Nuclear Associates, Multi-Dosimeter Calibrator, Model 06-201, or Victoreen, Dosimeter Calibrator, Model 541-205. Results of the Calibration shall be recorded on the Dosimeter Calibration Form. (Attachment II-1, or equivalent)
- 4.2.6 Any individual whose pocket dosimeter goes off scale while using a source of radiation, shall immediately stop work, recharge his dosimeter and make a complete radiation survey of the area and immediately proceed with one of the following:

- (1) If the source of radiation is in the shielded position, immediately notify the Radiation Safety Officer about the condition of the dosimeter.
- (2) If the source is in the exposed position, make certain the area is restricted and access is controlled. Then notify the Radiation Safety Officer about the condition of the source and the dosimeter.

In both of the above cases, regardless of which steps are taken, the individual's film or TLD badge shall be processed immediately and he shall not be allowed to receive additional exposure until the results show that his total is not in excess of the allowable limits.

4.3 Operating Procedures for Dosimeter Chargers

The following procedures are to ensure that dosimeters are recharged properly.

- 4.3.1 Place the end of the dosimeter containing the charging electrode onto the charging contact of the charger.
- 4.3.2 Press down firmly on dosimeter and look into eyepiece to view scale and movable hairline.
- 4.3.3 Turn adjusting knob on dosimeter charger until the hairline is set on zero.
- 4.3.4 Remove dosimeter from charger and look into the eyepiece while pointing the dosimeter toward a light source.
- 4.3.5 If the hairline has moved from the zero position the above procedures must be repeated until the hairline remains on zero when the dosimeter is removed from the charger.

4.4 Alarm Ratemeter

Radiographic personnel shall wear alarm ratemeters. Alarm ratemeters will be either Model 18C manufactured by Dosimeter Corporation of America, Cincinnati, Ohio, Model RA-500 manufactured by NDS Products, Pasadena, Texas, or equivalent.

- 4.4.1 Alarm ratemeters shall be checked at the beginning of each shift to confirm that the alarm is operable.
- 4.4.2 Alarm ratemeters shall be set to give a continuous alarm when exposed to dose rates of 500 mR/hr or greater.
- 4.4.3 Radiographic personnel are not to attempt adjustment of the alarm settings on alarm ratemeters.

4.4.4 Alarm ratemeters will be calibrated at least once each year and following repairs. (Note: For the purpose of this procedure changing batteries does not constitute a repair) Alarm ratemeters must alarm within plus or minus 20 percent of the actual radiation dose rate. Alarm ratemeters shall be considered to be acceptably calibrated when:

- a. The alarm makes an intermittent "chirp" sound when placed in a 450 mr/hr radiation field.
- b. The alarm tone becomes continuous when the unit is moved toward the radiation field.
- c. The alarm stops sounding within a few seconds when removed from the radiation field.

4.4.5 The following companies may be used for calibrations and repair of alarm ratemeters:

- a. Venture Technical Sales and Service, Inc.
Tulsa, Oklahoma
NRC license #35-23196-01
- b. Source Production & Equipment Co., Inc.
St. Rose, Louisiana
Louisiana license #LA-2966-L01
- c. W. H. Henken Industries, Inc.
Arlington, Texas
Texas license #L00967
- c. The manufacturer of the alarm ratemeter

5.0 Survey Instruments

5.1 Radiographic personnel will use operable and calibrated survey instruments to perform all surveys outlined in these procedures.

5.1.1 The following G-M type survey instruments will be used:

- a. Ludlum, Model 6
- b. G.E. Smith & Assoc., Model GS1000A, GS2000A or M1000
- c. Victoreen, Model 492, 592B, 400 or 410
- d. Eberline Instruments, E120G or E130G
- e. NDS Products, Model 2000
- f. Bicon, Radiographer Model
- g. NDS Products, Model 500P

5.1.2 As a minimum survey instruments will be capable of measuring dose rates from 0-1000 mR/hr. Survey instruments will be calibrated at intervals not to exceed 90 days and following any repairs. (Note: for the purpose of this procedure changing batteries does not constitute a repair) The following companies may be utilized to repair and or calibrate survey instruments:

- a. Venture Technical Sales and Service, Inc.
Tulsa, Oklahoma
NRC license #35-23196-01
- b. Source Production & Equipment Co., Inc.
St. Rose, Louisiana
Louisiana license #LA-2966-L01
- c. W. H. Henken Industries, Inc.
Arlington, Texas
Texas license #L00967
- d. The manufacturer of the survey instrument

5.2 Operation

The following steps must be taken to assure that survey instruments are operating properly.

- 5.2.1 The calibration label on the instrument must be checked to ensure the calibration is current. **IF THE CALIBRATION HAS EXPIRED, DO NOT USE THE INSTRUMENT** until it has been properly calibrated.
- 5.2.2 The batteries condition must be checked. Some instruments have a battery check position on the range selector switch. Turn selector switch to this position and observe the meters indication. Some instruments have a battery test button. Turn the selector switch to the appropriate position, depress the test button and observe the meter indication. **BATTERIES THAT ARE NOT PROPERLY CHARGED MUST BE REPLACED** before using the instrument.
- 5.2.3 The survey instrument must be exposed to a source of radiation to assure that it detects radiation. This is best accomplished by setting the selector switch to the "X10" position and holding the instrument adjacent to the surface of an exposure device containing a radioactive source. **IF THE METER DOES NOT RESPOND TO RADIATION IT MUST NOT BE USED.**
- 5.2.4 Exposure rates are determined by multiplying the reading of the meter times the selector switch position. (Example: Meter reading is 4, selector switch setting is "X10"; the dose rate is 40 mR/hr)

5.2.5 If a survey instrument fails to meet any of the above criteria, the Radiation Safety Officer shall be contacted immediately.

5.2.6 Survey instrument limitation (SATURATION) - It is a well known phenomenon that all Geiger-Mueller tube instruments saturate or overload at some point (this may also be called flooding or jamming). Saturation occurs when an instrument has been subjected to an excessive dose rate. To reduce the potential for saturation survey instruments should not be subjected to dose rates in excess of 20 R/hr. When an instrument reaches saturation one of the following events take place, THE INSTRUMENT READS FULL SCALE "PEGGED" or THE INSTRUMENT WILL NOT REACT TO RADIATION. WARNING - IF A PROPERLY SERVICED SURVEY INSTRUMENT READS ZERO IN A KNOWN RADIATION FIELD, the problem may be saturation.

5.3 General Use of Instruments

The following listed steps are included to assure that all personnel involved in the radiographic operations are aware of the proper use of survey instruments.

5.3.1 Do not commence any radiographic operation without at least one properly operating survey instrument.

5.3.2 If a survey instrument fails during radiographic operations, all radiographic work involving radioactive material must STOP until an operable and properly calibrated survey instrument is available.

5.3.3 Under no circumstances should a survey instrument be placed adjacent to an exposure device and left there during an exposure.

5.3.4 If it rains during a radiographic operation the survey instrument should be protected. Clear plastic bags do not appreciably affect the dose rate and allow for the instrument and controls to be read.

5.3.5 If at any time it is suspected that a survey instrument is not operating properly, the Radiation Safety Officer shall be contacted immediately.

5.3.6 Methods and occasions for utilizing the survey instrument to perform surveys is discussed in part 9.0 of the section.

5.3.7 Instruments operated in close proximity to electric generators may give erroneous readings due to the magnetic fields produced. If an erroneous reading is suspected, turn off the generator and perform another survey.

6.0 Collimator

A directional or panoramic collimator should be used to reduce exposure from sources whenever practical.

7.0 Radioactive Source Security

The following procedures are designed to ensure maximum security of radioactive sources at all times.

- 7.1 Each exposure device shall have at least one label attached to it which reads "Caution-Radioactive Materials - Notify Civil Authorities If Found." This label must be legible at all times.
- 7.2 Never leave an exposure device unattended when it is unlocked or when it is in an unsecured area where it could be removed by unauthorized personnel.
- 7.3 When an exposure device is removed from storage the radiographer shall retain the key to the device in his possession until the device is returned to storage.
- 7.4 During use, the radiographer, or his assistant, will maintain direct surveillance of the operation to protect against unauthorized entry into the area or removal of the exposure device. Barriers and or properly posted vehicles shall be used to prevent unauthorized entry into the area where radiographic operations are being performed.
- 7.5 After each exposure, a radiation survey shall be performed on the camera and source tube to ensure that the source has returned to the shielded position. (A complete discussion of surveys is included in part 9.0 of this section.)
- 7.6 Control cables and source tubes will be removed and dust covers and source plugs will be installed on the camera before it is placed in the vehicle for transport to the storage facility.

8.0 Posting and Restricting Radiographic Areas

The following procedures are to ensure that areas where radiographic operations are performed, are posted and properly restricted.

8.1 Restricted Areas

This is an area in which radiation levels are such that, if an individual were continuously present, he could receive a dose in excess of 2 mRem in any one hour. The boundary of this area must be posted with signs that read "Caution - Radiation Area." Entry into such an area shall be controlled by the radiographer as follows:

- 8.1.1 Calculate the area boundaries for the source being used and determine where the radiation dose should equal 2 mR in one hour.
- 8.1.2 Secure the calculated boundaries and post "Caution - Radiation Area" signs.
- 8.1.3 During exposure of the source survey the boundary and make any necessary adjustments to assure that the dose at the boundary will not exceed 2 mR in any one hour.
- 8.1.4 Record the surveyed perimeter dose rates on the utilization log and indicate any relevant surrounding obstructions or shielding that significantly effects dose rates.
- 8.1.5 While the source is exposed direct surveillance of the area shall be maintained by the radiographer or his assistant to prevent entry into the restricted area by other personnel.
- 8.1.6 In the event that the restricted area is entered, the source shall be immediately returned to the shielded position and the exposure terminated. The individual should then be advised regarding the reason for the restricted area. When the restricted area has been re-established and secured resume radiographic operations. If an entry problem persists, the individual's supervisor should be contacted. If this fails to correct the entry problem, immediately contact the Radiation Safety Officer.

8.2 Radiation Area

This is an area in which radiation levels are such that, if an individual were continuously present in the area, he could receive a dose in excess of 5 m/Rem in any one hour.

8.3 High Radiation Area

This is any area in which radiation levels are such that, if an individual were continuously present in the area, he could receive a dose in excess of 100 mRem in any one hour. The boundary of these areas must be posted with signs that read "Caution - High Radiation Area".

- 8.3.1 Calculate the 100 mR/hr boundary and post signs that read "Caution - High Radiation Area."
- 8.3.2 DO NOT SURVEY the 100 mR/hr boundary.

9.0 Surveys

Upon receipt of radioactive sources, a survey shall be made of the shipping container within 2 hours. Physical radiation surveys shall be performed in the manner and at the times specified below.

9.1 Survey Upon Receipt of New Radioactive Sources

- 9.1.1 Upon receiving a new radioactive source the exterior surface of the transport container shall be surveyed. The maximum acceptable dose rate for this survey is 50 mR/hr at 6 inches from the exterior surface.
- 9.1.2 After the exposure device has been removed from the transport container another survey shall be performed. The above referenced dose rate limit shall apply.
- 9.1.3 The readings observed during the above surveys shall be recorded on the Camera Survey form. (Attachment II-2, or equivalent)

9.2 Surveys Upon Removal of Exposure Devices From Storage Facility

(Note: for the purpose of this procedure a storage facility and a storage vault are one and the same)

- 9.2.1 Upon removing an exposure device from the storage facility and prior to placing it in a vehicle for transport, it shall be surveyed. The maximum allowable exposure limits from the exposure device shall be those outlined in 9.1.1 above.
- 9.2.2 The results of these surveys shall be recorded on the Daily Radiation Job Sheet under the section titled "Check-out Survey". (Attachment II-3, or equivalent)

9.3 Surveys of the Perimeter of Restricted Areas

- 9.3.1 After the restricted area boundaries have been calculated the boundaries shall be surveyed as required in 8.1.3 of this section.
- 9.3.2 The results of these surveys and the distance to the boundaries shall be recorded on the Daily Radiation Job Sheet. (Attachment II-3, or equivalent)

9.4 Surveys After Completion of Each Exposure

- 9.4.1 The area shall be surveyed at the completion of each exposure and while approaching the exposure device.
- 9.4.2 Upon reaching the exposure device, the circumference of the device and the entire length of the source guide tube shall be surveyed. Exposure levels observed should correspond to those previously determined by surveys made during initial removal of the exposure device from the storage facility.

- 9.4.3 IF INTENSITY LEVELS DO NOT CORRESPOND TO THOSE PREVIOUSLY MEASURED, THE SOURCE HAS NOT RETURNED TO THE FULLY SHIELDED POSITION. (In this case refer to the Emergency Procedures)
- 9.5 Surveys Upon Completion of final Exposure
- 9.5.1 Upon completing the final exposure for a job, the steps in 9.4 above are to be repeated. This must be done prior to placing the exposure device in a vehicle for transport back to the storage vault.
- 9.5.2 Exposure devices are to be locked and survey readings required in 9.5.1 above shall be recorded on the Daily Radiation Job Sheet in the "Lock-out" survey section (Attachment II-3, or equivalent).
- 9.6 Surveys of Permanent Storage Area
- 9.6.1 With sources present placed in the storage facility, a survey shall be performed of the areas surrounding the facility.
- 9.6.2 The results of these surveys shall be recorded on the Storage Vault Survey form (Attachment II-4 or 5, or equivalent).
- 9.6.3 Radiation dose rates at the boundaries of the storage vault must not exceed 2 mR/hr. If the radiation levels are found to exceed 2 mR/hr, additional shielding shall be added to the vault in order to bring the dose rate into compliance.
- 9.6.4 In addition to the requirement in 9.6.3, the permanent storage area shall be constructed and shielded in a manner that the total effective dose equivalent to individual members of the public shall not exceed 0.1 rem (1 millisievert) in a year.
- 9.7 Vehicle Surveys
- 9.7.1 After radioactive materials have been placed in a vehicle and secured, a survey of the exterior surface of the vehicle and the passenger compartment shall be performed.
- 9.7.2 The maximum dose rate at any exterior surface of the vehicle shall not exceed 2 mR/hr, and the maximum dose rate in the passenger compartment shall not exceed 1 mR/hr.
- 9.7.3 If a vehicle is used as a temporary storage area the entry shall be posted with a "CAUTION RADIOACTIVE MATERIALS" sign and precautions taken to

assure, that if an individual were continually present in the adjacent unrestricted area the dose would not exceed 2 mRem in an hour or 50 mRem in a year.

9.7.4 If radiation levels exceed those specified in 9.7.2. or 9.7.3 above, the radioactive source(s) must be repositioned and or additional shielding provided until the specified limits are met.

9.7.5 The highest dose rate observed during the above vehicle survey shall be recorded on the Daily Radiation Job Sheet (Attachment II-3, or equivalent).

10.0 Utilization Log

Utilization logs (Attachment II-6, or equivalent) shall be maintained at the Permanent and Temporary Storage Facilities and shall include the following information:

10.1 The serial number and model number of the device used.

10.2 The identification of the radiographer.

10.3 Where the device is used.

10.4 The date and time the device is checked out of storage.

10.5 The date and time the device is checked into storage.

11.0 Transportation of Radioactive Material

The following procedures shall be followed when transporting radioactive materials by vehicle:

11.1 Radioactive materials will be transported by company vehicles or commercial carriers only.

11.2 Company vehicles shall not be used to transport radioactive materials which have radiation levels that require D.O.T. Yellow III warning labels.

11.3 Transport containers used for radioactive materials shall be labeled with Yellow II warning labels when the intensity is less than 50 mR/hr at the surface and less than 1 mR/hr at 1 meter from the surface. These labels shall be placed on two opposite sides of each container. Containers shall not be transported by company vehicles if the radiation intensity exceeds the above readings.

11.4 The radioactive materials shipping papers shall be obtained for the source prior to shipment. (Attachment II-9 or equivalent)

- 11.5 The required utilization log entries shall be completed when a source is removed from storage.
- 11.6 The exposure device shall be surveyed prior to being placed in a vehicle to ensure that the source is in the fully shielded position.
- 11.7 The exposure device shall be placed in the vehicle and secured, or if the device is not a Type B Container, placed in a Type B overpack which is securely attached to the vehicle.
- 11.8 Vehicle surveys shall be performed and properly recorded in accordance with the procedures outlined in part 9.7 of this section.
- 11.9 After completion of a radiographic operation the exposure device shall be secured in the vehicle and the vehicle surveyed prior to transport back to the storage facility.
- 11.10 A utilization log entry shall indicate when exposure devices are placed in the storage facility.
- 12.0 Receipt and Disposal of Radioactive Materials
 - 12.1 Receipt of Radioactive Materials - Upon receipt of radioactive materials, the following steps shall be taken:
 - 12.1.1 A survey shall be performed in accordance with the procedures outlined in part 9.1 of this section within 2 hours of receipt.
 - 12.1.2 The receipt record shall be signed or initialed and dated.
 - 12.1.3 Camera surveys shall be completed on all new sources when received.
 - 12.1.4 Information concerning the radioactive source and required surveys shall be entered on the appropriate form. (Attachment II-2 or equivalent)
 - 12.1.5 Records shall be maintained on each source, containing the decay chart, camera survey, receipt records and leak test results.
 - 12.2 Disposal of Radioactive Materials - All radioactive materials shall be returned to the supplier for disposal. When disposing of radioactive material the following steps shall be taken.
 - 12.2.1 Radioactive sources shall be prepared for shipment in accordance with procedures outlined in part 11.0 of this section.
 - 12.2.2 The date of disposal shall be recorded on the appropriate form. (Attachment II-2 or equivalent)

12.2.3 Radioactive sources shall be transported to the source supplier for disposal.

12.2.4 Upon receipt of the disposal record from the supplier, all information concerning the source (i.e., receipt record, decay chart, leak test records, camera survey and disposal records) shall be placed in the disposal file.

13.0 Leak Testing of Sealed Sources

Leak testing of sources will normally be performed by the Radiation Safety Officer or his assistant. The following are procedures to be followed in the event that leak tests must be performed by the radiographer in the field.

13.1 Leak Testing of Crank-Out Type Exposure Devices

13.1.1 Upon receipt of the leak test kit from the Radiation Safety Officer, all information must be filled out. This includes source serial number, activity, type of source, date, etc.

13.1.2 Remove the red swab from the leak test kit.

13.1.3 Wipe around source pigtail connector and just inside source tube connector on the exposure device with the swab.

13.1.4 Place swab inside plastic vial, breaking off excess stick. Replace cap on vial and place inside mailing envelope.

13.1.5 Remove white swab from the kit, wet with ordinary tap water and repeat the above operation.

13.1.6 Survey the leak test kit with a survey meter. If a reading in excess of background is detected, DO NOT MAIL the kit; instead contact the Radiation Safety Officer immediately.

13.1.7 If no radiation levels in excess of background are detected, mail the kit to the Radiation Safety Officer.

14.0 Internal Inspection Program

Internal inspections will be performed to evaluate each radiographer and radiographer's assistants' compliance with the Nuclear Regulatory Commission's regulatory requirements and Western X-ray Company's, Operating and Emergency Procedures. Each such inspection of a radiographer or radiographer's assistant will include observation of his performance during an actual radiographic operation. Additionally, the following criteria shall apply to all internal inspections.

- 14.1 Internal Inspections shall be performed by the following individuals:
- a. Radiation Safety Officer
 - b. Assistant Radiation Safety Officer
 - c. Radiation Field Supervisor (Section-I, para. 3)
- 14.2 Each radiographer, and radiographer's assistant shall be inspected at least once every three months.
- 14.3 If a radiographer or a radiographer's assistant has not participated in a radiographic operation for more than three months since the last inspection, that individual will be inspected during the next radiographic project that he participates in.
- 14.4 Internal inspections shall be unannounced. Only the Radiation Safety Officer or Assistant Radiation Safety Officer will schedule internal inspections.
- 14.5 A record of each internal inspection shall be recorded on the internal inspection checklist. (Attachment II-7, or equivalent) The internal inspection records shall be maintained by the Radiation Safety Officer for a period of 3 years.
- 14.6 In addition to those items listed on the internal inspection checklist, (Attachment II-7, or equivalent), any other items of noncompliance that are identified during the inspection shall be recorded on the inspection record.
- 14.7 All items of noncompliance shall be reviewed by the Radiation Safety Officer. The RSO shall determine the specific corrective actions to be taken regarding identified deficiencies. This decision shall be based on the severity of the noncompliance. As a minimum the Radiation Safety Officer will assure that the individual responsible for the noncompliance is notified of the specific noncompliance and that the relevant regulation or procedure is reviewed and understood by the individual.
- 15.0 Inventory, Inspection and Maintenance of Equipment
- The following procedures shall be performed by the Radiation Safety Officer or Assistant Radiation Safety Officer, and records shall be maintained for inspection by the Commission.
- 15.1 Equipment Inventory - All radiography sources shall be inventoried quarterly. (Attachment II-8, or equivalent)
- 15.2 Inspection and Maintenance - Radioactive sources, exposure devices and related equipment shall be inspected and necessary maintenance performed on a quarterly basis. (Attachment II-8, or equivalent)

16.0 Records Management

The following records shall be maintained by the Radiation Safety Officer at: 3803 Branson Rd., Poteau, OK, for inspection by the Nuclear Regulatory Commission.

- 16.1 Utilization Logs: All completed utilization logs shall be maintained on file.
- 16.2 Exposure Records: These records include daily dosimeter records, monthly film badge records and NRC Form 5's (or comparable form).
- 16.3 Survey Records: Survey records to be kept by the Radiation Safety Officer shall include area surveys, vehicle surveys and camera surveys performed by radiographers and turned in on the utilization records. They shall also include initial camera surveys for new radioactive sources and storage facility surveys.
- 16.4 Calibration Records: Calibration records for survey instruments, alarm ratemeters, and dosimeters.
- 16.5 Inventory, Inspection and Maintenance Records: As outlined in part 15.0 of this section.
- 16.6 Training Records: All training of radiographic personnel shall be performed in accordance with the criteria outlined in Section V of this procedure. All records of training, including copies of examinations shall be maintained by the Radiation Safety Officer.
- 16.7 Receipt, Transfer and Disposal Records: All receipt, transfer and disposal of radioactive materials shall be performed in accordance with the procedures outlined in part 12.0 of this section. Additionally a perpetual record of sources currently located in the source storage facility and sources assigned to radiographers for use at field locations shall be maintained.

17.0 Records to be Maintained at Temporary Jobsite

The following records shall be available at each temporary jobsite for inspection by the Commission.

- 17.1 Nuclear Regulatory Commission - Materials License
- 17.2 Company Operating and Emergency procedures.
- 17.3 Nuclear Regulatory Commission Regulations, 10 CFR parts 19, 20 and 34.
- 17.4 Surveys recorded on the current Daily Radiation Job Sheet. (Attachment II-3, or equivalent) Camera surveys, vehicle surveys, and area surveys shall be recorded.
- 17.5 Daily pocket dosimeter records.
- 17.6 Survey instrument calibration.
- 17.7 Decay Chart for the source being used.

18.0 Internal Audits

- 18.1 The entire radiation protection program content and implementation shall be reviewed by senior management at least annually. Steps shall be taken to correct any deficiency found in the program. The audit shall consist of the following as a minimum:
- 18.1.1 Senior management oversight of the radiation protection program to determine that the program and license meet the requirements of the applicable NRC regulations. This review shall ensure that the NRC regulations are current and that applicable NRC bulletins and newsletters, have been reviewed by the Radiation Safety Officer.
 - 18.1.2 Review of the Radiation Safety Officer and staff performance. This review must be conducted by a professional individual having a background in the industry and shall be knowledgeable with the applicable NRC regulations and radioactive materials license. The review may be conducted by an in-house individual or by an outside consultant designated by senior management. Results of this review shall be reported to senior management.
 - 18.1.3 The Radiation Safety Officer or member of the staff shall conduct an audit to determine user compliance with the requirements of the NRC license and the radiation protection program. This audit shall include such topics as: reviews of company inventory and survey records, evaluation of radiation safety procedures through observation and discussion, and performance of independent work area surveys.

ATTACHMENT II-1WESTERN X-RAY COMPANY
DOSIMETER CALIBRATION RECORD

DATE _____		LOCATION _____		CALIBRATED BY _____			
CALIBRATION DEVICE _____		MODEL _____		S/N _____			
DOSIMETER MFG	MODEL	SERIAL NUMBER	EXPOSURE IN MR		ACCURACY (MUST BE WITHIN $\pm 30\%$)	S	U
			ACTUAL	RESPONSE			
REMARKS							

5-15-97

GENERAL OPERATING PROCEDURES

SECTION II

ATTACHMENT II-2

WESTERN X-RAY COMPANY
ISOTOPE SHIPPING/RECEIVING FORM

DATE ORDERED _____ ORDERED BY _____ ORDERED FROM _____
TYPE OF ISOTOPE _____ NO. SOURCES ORDERED _____ SHIPPED VIA _____

RECEIVING

DATE RECEIVED _____ TIME _____ AM / PM RECEIVED BY _____
NUMBER OF CURIES RECEIVED _____ SOURCE SERIAL NUMBER _____
IN SHIPPING CONTAINER: MAKE _____ MODEL NO. _____ S/N _____
READING AT SURFACE OF CONTAINER _____ MR/HR READING AT 1 METER _____ MR/HR
IN CAMERA: MAKE _____ MODEL NO. _____ S/N _____
READING AT 6 IN. FROM CAMERA _____ MR/HR READING AT 1 METER _____ MR/HR
SURVEY METER: MAKE _____ MODEL _____ S/N _____ CAL DUE _____
SURVEY: DATE _____ TIME _____ AM/PM SURVEY MADE BY _____

TRANSFER

DATE _____ NUMBER OF CURIES _____ SOURCE SERIAL NO. _____
FROM SHP/CON: S/N _____ TO CAMERA: MAKE _____ MODEL _____ SERIAL NO. _____
READING AT 6 INCHES _____ MR/HR READING AT 1 METER _____ MR/HR
FROM CAMERA: MODEL _____ SERIAL NO. _____ TO CAMERA: MODEL _____ SERIAL NO. _____
READING AT 6 INCHES _____ MR/HR READING AT 1 METER _____ MR/HR
SURVEY METER: MAKE _____ MODEL _____ S/N _____ CAL DUE _____
TRANSFERS AND SURVEYS MADE BY: _____

DISPOSAL

DATE _____ NUMBER OF CURIES _____ SOURCE SERIAL NO. _____
FROM CAMERA: MAKE _____ MODEL _____ SERIAL NO. _____ TO SHP/CON: S/N _____
SURVEY OF SHIPPING CONTAINER: SURFACE _____ MR/HR AT 1 METER _____ MR/HR
SURVEY METER: MAKE _____ MODEL _____ S/N _____ CAL DUE _____
FOR DISPOSAL TO: _____ PREPARED BY: _____

FORM WXC-008 12/1/88

ATTACHMENT II-3

DAILY RADIATION JOB SHEET

COMPANY _____ DATE _____

LOCATION _____

JOB DESCRIPTION _____

CAMERA _____ SOURCE _____ CURIES _____

SURVEY METER _____ SERIAL NO _____ CALIBRATED Yes () No ()

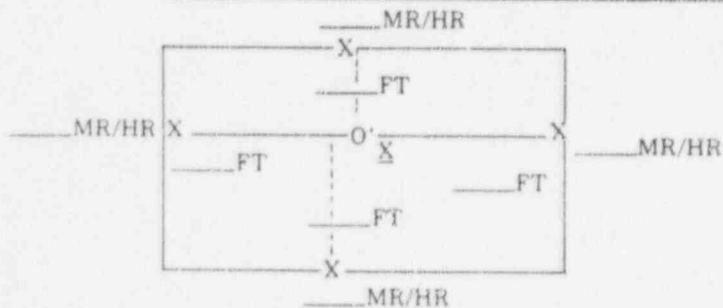
CAMERA SURVEYS CHECK OUT _____ MR/HR
LOCK OUT _____ MR/HR

VEHICLE SURVEY BEFORE LEAVING SHOP _____ MR/HR

BEFORE LEAVING JOB SITE _____ MR/HR

(Note: Vehicle survey is the highest reading obtained on all four sides and in the drivers seat)

	FILM BADGE	DOSIMETER READINGS		TOTAL MR READINGS
		START	END OF DAY	



X = RADIATION AREA SIGN
 X = HIGH RADIATION SIGN
 O = SOURCE

DAILY EQUIPMENT CHECK _____
ANY MALFUNCTIONS NOTE ON BACK OF SHEET _____"LAST USE" SURVEY MADE AT STORAGE VAULT _____
VEHICLE _____ MR/HR AT SOURCE OUTLET
PORT WITH SAFETY PLUG INSTALLED.

TIME _____

RADIOGRAPHERS SIGNATURE _____

ATTACHMENT II-4**WESTERN X-RAY COMPANY
RADIOACTIVE ISOTOPE PERMANENT STORAGE FACILITY PHYSICAL SURVEY**FACILITY ADDRESS 3803 Branson Rd.
Poteau, OK 74953

DATE _____ SURVEYED BY: _____

SURVEY METER: MODEL _____ S/N _____

CAMERA S/N	SOURCE S/N	ACTIVITY

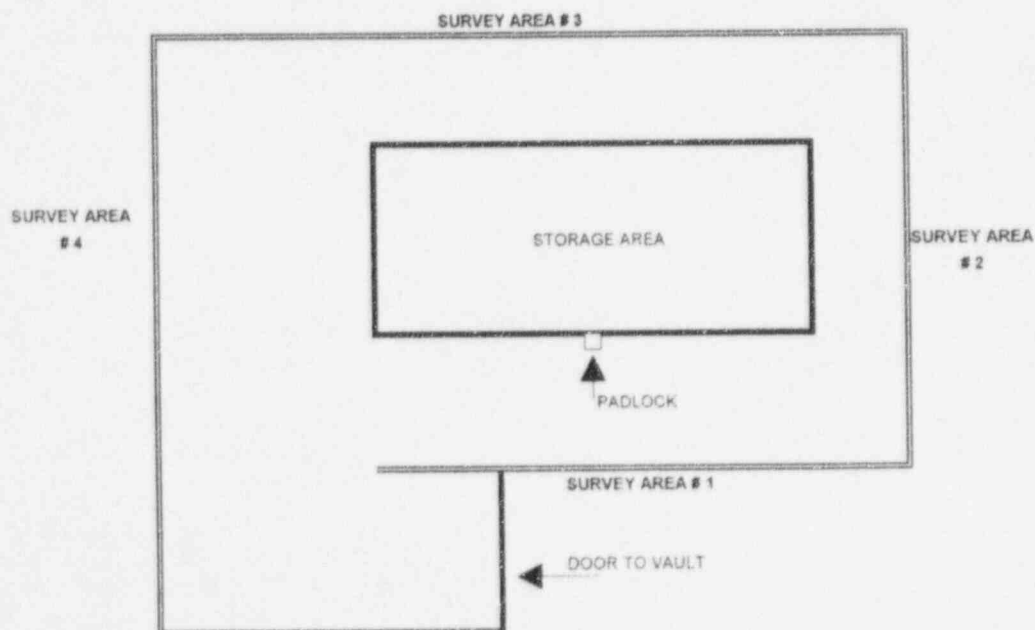
AREA #1 _____ mR/HR

AREA #2 _____ mR/HR

AREA #3 _____ mR/HR

AREA #4 _____ mR/HR

NOTES: SURVEYS MADE OUTSIDE 6" BLOCK WALL



WESTERN X-RAY COMPANY

SURVEY METER: _____ MODEL: _____ S/N: _____

[illegible]

AREA #4 _____ mR/HR

21

WESTERN X-RAY COMPANY
RADIOACTIVE ISOTOPE UTILIZATION LOG

[illegible]

5-15-97

GENERAL OPERATING PROCEDURES

SECTION II

ATTACHMENT II-7

WESTERN X-RAY COMPANY
QUARTERLY INSPECTION RECORD

Date _____		Location _____		Auditor _____	
RADIOGRAPHER #1 _____		SERIAL # _____	VOID DATE _____	READING _____	
DOSIMETER _____		_____	_____	_____	
RATE ALARM _____		_____	_____	_____	
FILM BADGE/TLD _____		_____	_____	_____	
RADIOGRAPHER #2 _____		SERIAL # _____	VOID DATE _____	READING _____	
DOSIMETER _____		_____	_____	_____	
RATE ALARM _____		_____	_____	_____	
FILM BADGE/TLD _____		_____	_____	_____	
DEVICE MANUFACTURER _____		MODEL _____	S/N _____		
RADIATION LABEL <input type="checkbox"/> YES <input type="checkbox"/> NO		CHECKLIST LABEL <input type="checkbox"/> YES <input type="checkbox"/> NO			
SOURCE MANUFACTURER _____		TYPE _____			
CURIE STRENGTH _____		SERIAL NO. _____			
SURVEY METER #1					
MANUFACTURER _____		MODEL NUMBER _____			
SERIAL NUMBER _____		VOID DATE _____			
SURVEY METER #2					
MANUFACTURER _____		MODEL NUMBER _____			
SERIAL NUMBER _____		VOID DATE _____			
Were other individuals working within the Restricted Area wearing film badges/tld's, rate alarms, and dosimeters? YES _____ NO _____ Was Radiographer wearing film badge/tld, rate alarm, and dosimeter? YES _____ NO _____ Radioactive Material License with Amendments available? YES _____ NO _____ Company Operating and Emergency Procedures available? YES _____ NO _____ NRC or State Radiation Regulations available? YES _____ NO _____ Utilization log properly filled out? YES _____ NO _____ Decay chart and wipe test records available? YES _____ NO _____ Calibrated and properly operating survey meter available? YES _____ NO _____ Survey meter used properly/each exposure YES _____ NO _____ Source projector locked after each exposure? YES _____ NO _____ Restricted Area properly controlled to prevent unauthorized entry? YES _____ NO _____ Was the Restricted Area posted with "Caution Radiation Area" signs? YES _____ NO _____ Was storage area posted with "Caution Radioactive Material" signs? YES _____ NO _____ Were radioactive isotopes stored properly and kept locked to prevent unauthorized removal? YES _____ NO _____ Were there any items of noncompliance other than those listed on this form? (If any, explain in remarks) YES _____ NO _____					
LIST REMARKS AND/OR PERIODIC TRAINING IF PERFORMED _____					

WESTERN X-RAY COMPANY
QUARTERLY INVENTORY INSPECTION AND MAINTENANCE

INSPECTED BY

[illegible]

[illegible]

5-15-97

EMERGENCY PROCEDURES

SECTION IV

1.0 Purpose and Scope

- 1.1 With the best of safety precautions, the possibility of accidents occurring must still be considered. This section establishes procedures to be followed in the event of an emergency while utilizing radioactive materials. It is the responsibility of each radiographer and assistant radiographer to become thoroughly familiar with the procedures outlined in this section and to follow them explicitly in the event of an emergency.
- 1.2 Source retrievals shall not be attempted by company personnel. Source retrievals must be accomplished only by an authorized consultant having the required training and equipment. Authorized consultants are listed at the end of this section.

2.0 General Policy

If there is any question as to whether or not a given situation constitutes an emergency, then emergency procedures are to be followed. If there are any questions after reading this section the Radiation Safety Officer should be contacted for further explanation.

3.0 Emergencies Arising from Equipment Malfunctions

In the event of an emergency arising from malfunction of an exposure device including a disconnected source, damage to a source, or damage to an exposure device the following steps are to be taken:

- 3.1 Immediately survey the area with an operable survey instrument and post a boundary at the 2 mR/hr area.
- 3.2 Place "CAUTION - RADIATION AREA" signs at the boundary.
- 3.3 UNDER NO CIRCUMSTANCES is the area to be left unattended by the radiographer in charge.
- 3.4 Keep visual surveillance on the area in order to keep all unauthorized personnel out.
- 3.5 Send someone, with a written message, to contact the Radiation Safety Officer. In the event that the Radiation Safety Officer is not available, contact the Assistant Radiation Safety, or appropriate regulatory agencies. The telephone numbers are listed at the end of this section.
- 3.6 DO NOT PANIC if help is not immediately available, remember that no harm will be done if all persons stay back behind the boundaries and out of the posted area.
RADIOGRAPHERS ARE NOT TO ATTEMPT TO RETRIEVE DISCONNECTED SOURCES!

5-15-97

EMERGENCY PROCEDURES

SECTION IV

- 3.7 After securing the area and sending someone to request assistance, maintain surveillance of the area until help arrives. Do not leave untrained, or inexperienced, personnel to watch the area.
- 3.8 All equipment malfunctions or defects shall be reported to company management listed in Section IV, page 4 as soon as possible.

4 Lost or Stolen Devices

In the event that an exposure device should be lost, or stolen, immediately notify the Radiation Safety Officer. If the RSO can not be contacted, notify the appropriate regulatory agency. The telephone numbers are listed at the end of this section.

5.0 Vehicle Accidents

In the event that an accident occurs involving a vehicle transporting radioactive materials, the following steps must be followed:

- 5.1 Utilizing a survey instrument determine if the source is in the shielded position.
- 5.2 If the source is in the shielded position, remain with the exposure device while someone notifies the Radiation Safety Officer.
- 5.3 If the survey instrument indicates that the source is not in the shielded position, or if the survey instrument is broken, the following steps must be taken:
- 5.3.1 Move everyone as far back from the vehicle as possible and keep surveillance over the area to ensure that no one enters.
- 5.3.2 Calculate the distance to the 2 mR/hr boundary and adjust the perimeter established in 5.3.1 above, if necessary.
- 5.3.3 Remain with the vehicle while sending someone with written instructions to notify the Radiation Safety Officer.
- 5.3.4 UNDER NO CIRCUMSTANCES is the radiographer in charge to leave the area. Maintain surveillance until help arrives.
- 5.4 In the case of a minor accident when no radiation hazard exists and the vehicle is movable, no restriction of the area is necessary. In any event, notify the Radiation Safety Officer as soon as possible.

6.0 Accidents Involving Exposure to Non-Monitored Personnel

The following procedures are to be followed in the event that unauthorized persons, who are not wearing personnel monitoring devices become exposed:

- 6.1 Immediately return the radioactive source to the shielded position.
- 6.2 If source cannot be returned to the shielded position, follow procedures in 3.0 of this section.
- 6.3 Obtain names and addresses of non-monitored personnel involved.
- 6.4 Notify the Radiation Safety Officer and proceed with his instructions.

7.0 Emergencies Due to Fire

- 7.1 Return source to shielded position, lock exposure device and remove it from the fire hazard area.
- 7.2 If the exposure device cannot be removed from the area, notify fire department personnel, upon their arrival, of the condition of the source (i.e., exposed or shielded, but exposure device still in fire hazard area).
- 7.3 If the source is exposed, obtain the names of all fire department personnel who were near the exposure device while fighting the fire.
- 7.4 If the source is exposed and cannot be brought back to a shielded position after the fire is extinguished, proceed with procedures as outlined in 3.0 of this section.

5-15-97

EMERGENCY PROCEDURES

SECTION IV

PERSONNEL TO BE NOTIFIED IN CASE OF EMERGENCY

WESTERN X-RAY COMPANY

James Peters - Radiation Safety Officer
 Phone (918) 647-5044 3803 Branson Road Poteau, OK 74953 FAX (918) 647-7291

United States Nuclear Regulatory Commission

24 Hour Safety Hotline: 800-695-7403
 24 Hour Office of Inspector General: 800-233-3497

Region IV Arlington, TX 800-952-9677 817-860-8100

Other NRC Regions

Region I	King of Prussia, PA	800-432-1156	215-337-5000
Region II	Atlanta, GA	800-577-8510	404-331-4503
Region III	Glen Ellyn, IL	800-522-3025	708-790-5500
Region V	Walnut Creek, CA	800-882-4672	510-975-0200

Refer to: NRC Form 3 for Nuclear Regulatory Commission region locations

Agreement States

Alabama	334-613-5391	Nebraska	402-471-2133
Arizona	602-255-4845	Nevada	702-687-5394
Arkansas	501-661-2301	New Hampshire	603-271-4588
California	916-322-3482	New Mexico	505-827-1557
Colorado	303-692-3030	New York	518-457-1202
Florida	904-487-1004	North Carolina	919-571-4141
Georgia	404-362-2675	North Dakota	701-328-5188
Illinois	217-785-9868	Oregon	503-731-4014
Iowa	515-281-3478	Rhode Island	401-277-2438
Kansas	913-296-1562	South Carolina	803-737-7400
Kentucky	502-564-3700	Tennessee	615-532-0360
Louisiana	504-765-0160	Texas	512-834-6688
Maryland	410-631-3300	Utah	801-538-4250
Mississippi	601-354-6657	Washington	360-586-8949

AUTHORIZED SOURCE RETRIEVAL CONSULTANTS

Amersham Corporation
 40 North Avenue
 Burlington, MA 01803
 617-272-2000 800-225-1383

Source Production & Equipment Co.
 113 Teal Street
 St. Rose, LA 70087
 (504) 464-9471

1.0 Purpose and Scope

This section establishes the procedures to be followed in handling radioactive sources and their related tools. The procedures are intended to ensure compliance with safety practices outlined in this manual. Radiographic personnel are responsible for following all procedures outlined herein.

- 1.1 All equipment malfunctions or defects shall be reported to company management listed in Section IV, page 4 as soon as possible.

2.0 Daily Equipment Inspection Procedures

It is the responsibility of the radiographer to inspect all equipment assigned to him, on a daily basis. Records of these inspections are to be recorded on the Daily Radiation Job Sheet (Section II, Attachment II-3). The following procedures are to be followed when inspecting equipment.

- 2.1 Film or TLD badges, pocket dosimeters and alarm ratemeters shall be checked as follows:

- 2.1.1 Visible damage to either piece of equipment.
- 2.1.2 Film or TLD badge is for current period.
- 2.1.3 Dosimeter hairline indicator set on zero.
- 2.1.4 Alarm ratemeter functions
- 2.1.5 Devices worn in appropriate manner.

- 2.2 Radiation survey instruments shall be checked as follows:

- 2.2.1 Instrument free from visible damage.
- 2.2.2 Instrument is properly calibrated.
- 2.2.3 Batteries are properly charged.
- 2.2.4 Meter detects radiation.

- 2.3 Crank-out exposure devices shall be inspected as follows:

- 2.3.1 Device is properly labeled.
- 2.3.2 Source identification plate is in place.
- 2.3.3 Proper operation of locking mechanism.
- 2.3.4 No abnormal radiation levels when removed from storage.

- 2.3.5 Crank-out cables and source guide tubes free from visible damage.
- 2.3.6 Cranking mechanism is working properly.
- 2.3.7 Connections of pigtail to inner drive cable, outer drive cable conduit to exposure device and source tube to exposure device are checked for excessive wear.
- 2.3.8 Entire assembly is working normally.
- 2.4 Pipeline type exposure devices shall be inspected as follows:
 - 2.4.1 Device is properly labeled.
 - 2.4.2 Source identification plate is in place.
 - 2.4.3 Locking mechanism is working properly.
 - 2.4.4 No abnormal radiation level is found when removed from storage.
 - 2.4.5 Tie-down chains and jigs for holding the exposure device on the pipe are in good working order.
 - 2.4.6 Entire assembly is operating normally.
- 2.5 Any deficiencies found during the equipment inspection shall be noted on the utilization log and immediately brought to the attention of the Radiation Safety Officer. All deficiencies shall be corrected before the equipment is used.

3.0 Quarterly Inspection and Maintenance of Equipment

In addition to daily inspections of equipment by the radiographer the radiation safety officer, his assistant, or radiation field supervisor will perform a quarterly inspection of equipment. Any required maintenance shall also be performed during this inspection. Quarterly inspections and maintenance shall be recorded on the Equipment Inspection Record (Section II, Attachment II-8). The following procedures shall be followed:

- 3.1 Inspection and maintenance of crank-out type exposure devices.
 - 3.1.1 All warning labels and source identification plates should be in place and legible. Any labels that are missing, or that are not legible shall be replaced prior to use.
 - 3.1.2 The Source Assembly Connector shall be inspected to ensure that it is not cracked, worn, or otherwise damaged. Visually inspect the source assembly connector to check for foreign matter such as dirt, grease and grit. Use a brush or cloth with mild cleaning solvent as needed for the type of foreign material to be removed.

Excess residue should be wiped off. Aerosol spray solvents should be used with caution to avoid spraying into the device.

- 3.1.3 Remove the safety plug and visually inspect the outlet nipple for excessive wear, dents, cracks, or other obvious damage. Check to determine if the outlet nipple is out of round. Out-of-roundness can occasionally be corrected by using a punch, or round bar. If it cannot be corrected, or if the nipple has been broken off, it must be replaced before the device is used.
- 3.1.4 The drive cable should be free from visible damage such as crimps, corrosion and rust. The cable should also be flexible. The connector shall be inspected to ensure that it is not excessively worn, rusted or corroded and that it makes a normal connection to the source pigtail. The connector may be replaced by sending the unit to the supplier to have a new connector welded on, or a new drive cable assembly may be used. Drive cables should be cleaned with a brush or cloth. If necessary, use 1:1:1 trichloroethane degreaser. Do not soak the drive cable. If the inner drive cable is extremely rusted, or contains crimps too severe to straighten, the inner cable must be replaced.
- 3.1.5 The crank-out assembly consists of a gear inside a housing, with a handle attached. The most likely places for excessive wear are the bronze bushings inside the gear and gear housing. If the bushings are worn excessively, it will permit the gear to wobble, which causes the inner cable to slip and eventually wears out the gear. Use a brush or cloth with mild solvent to clean dirt, debris and foreign material off all components, excluding the drive cable. Do not use lubricants. It is not recommended to spray with liquids or use compressed air due to the possibility of contamination. The bushings should be replaced if worn excessively.
- 3.1.6 The conduit should be checked to ensure that it is not severely kinked or damaged. Additionally, the ends should be checked to ensure that they have not been damaged. If the inner lining of the conduit has been damaged, the conduit must be replaced. If the outer covering has been damaged it may be repaired with tape. If the ends are damaged, they must be replaced.
- 3.1.7 Source guide tubes should be inspected for damage such as crimps, cuts, foreign matter in the tube and ease of connection to the exposure device. Source guide tubes that exhibit indication of such damage must be replaced.

3.2 Inspection and Maintenance of Pipeline Type Exposure Devices

- 3.2.1 All warning labels and source identification plate should be in place and legible. If labels are missing, or are not legible they must be replaced.

- 3.2.2 The locking mechanism should be inspected for proper operation and ease of movement. The lock plunger should retract to it's fullest extent, which is about 1/2". Foreign matter could foul the plunger and make it inoperable. The Lock plunger may be removed and cleaned using a solvent to remove dirt and other foreign matter. The lock may also be cleaned by spraying a lubricant (such as WD-40) into the lock and working the lock plunger several times.
- 3.2.3 All latching devices, tie-down chains and jigs for holding the device on the pipe should be inspected to ensure that they are in good operating condition. All hold down equipment should be cleaned in solvent to remove dirt and rust. Hinge type connectors should be lubricated to ensure proper operation.
- 3.2.4 The rotator "on-off" knob should be inspected and checked for ease of movement. Device should be placed flat on the ground and unlocked. Then, **STANDING AS FAR BACK AS POSSIBLE**, while still able to operate the device, check for proper operation by turning the rotator knob to the exposed position and then back to the shielded position, observe ease of operation. Lock and secure the device. Any extensive maintenance must be performed by the manufacturer. Do not attempt any dismantling, or extensive repairs to the device. If the rotator knob sticks it can be lubricated around the shaft where it enters the device. If lubrication does not correct the problem, the device should be returned to the manufacturer for repair.
- 3.3 Inspection and Maintenance of Master Minder Control Units
 - 3.3.1 All warning labels and source identification plates should be in place and legible. If labels have become worn and are not legible, they shall be replaced.
 - 3.3.2 The locking mechanism should be checked for ease of operation. The lock plunger should retract to it's fullest extent, which is about 1/2". However, at times foreign matter may foul the plunger and make it inoperable. The lock may be cleaned by spraying a lubricant (such as WD-40) into the lock and working the plunger several times. If this does not correct the problem the lock may be removed by removing the set screws in the lock box. The lock should then be cleaned and any foreign matter removed using a solvent.
 - 3.3.3 The source holder assembly should be inspected for proper operation. This is done by placing the device on the ground and unlocking it. Then, pull the source holder out to the fullest extent and push it back in while observing for ease of movement. Lock and secure the device. Any maintenance, or repairs to the source holder assembly shall be made by the manufacturer.
 - 3.3.4 In addition to the above mentioned items, an over all visual inspection for damage of the device should be performed. Special attention should be given to inspection for cracks or worn spots in the source holder device. Any minor damage (i.e.,

cracked handles, etc.) may be repaired by the Radiation Safety Officer. Any major damage, adapting, or source changes must be made by the manufacturer.

4.0 Source Exchange Procedures

The following procedures are for source exchange in crank-out type exposure devices. All pipeline type exposure devices and master minder control units will be returned to the supplier for source exchange. In all exchange procedures, locate the control unit to the exposure device as far away as possible from the exposure device and preferably behind radiation shielding. The instructions listed below must be followed explicitly.

4.1 The following procedures are for Amersham Model 650L source changers.

4.1.1 TRANSFER: PROJECTOR TO CHANGER

- a. Perform surveys as required in Section II, 9.1 of this manual.
- b. Check that there is no visible damage and that all seals are intact.
- c. Position the changer and projector close together so that one section of source guide tube will connect them with no sharp bends. The bend radius of the guide tube should never be less than about 20 inches. Smaller bend radii can restrict movement in the guide tube.

NOTE: Keep the changer upright to retain the source inside the shield.

- d. Remove the shipping plug from the source projector. Attach an intermediate source guide tube. Remove the source changer cover and attach the other end of the tube to an empty channel of the changer as described in the source changer manual.
- e. Attach a drive cable control to the projector.
- f. Crank the source rapidly from the projector fully into the source changer. During this process, the survey instrument reading should increase as the source is first exposed, fall slightly as the source is being cranked out then drop to background when the source is in the source changer.
- g. Approach the source changer and source guide tube with the survey meter to ensure that the source is fully within the changer. Perform proper surveys of the source changer, guide tube, and exposure device.
- h. Lock the source in place. Disconnect the drive cable from the source. Disconnect the source guide tube from the changer. If a new source is not to be transferred from the changer to the projector immediately, or if the projector is to undergo maintenance, connect the drive cable to the test connector (found inside the selector cover) and withdraw it into the projector storage position.
- i. Secure the source in the changer and replace the cover. Wire the source identification plate to the changer.

4.1.2 TRANSFER: CHANGER TO PROJECTOR

- a. If a replacement source is to be installed in the projector, connect the source guide tube to the fitting above the channel containing the new source.
- b. Return to the controls and retract the new source rapidly into the projector. The survey meter reading should increase as the source leaves the changer and approaches the projector, then drop to background when the source is shielded in the projector.
- c. Survey the projector to ensure that the transfer has been properly completed. Radiation should be less than 200 mR/hr at the surface and less than 10 mR/hr. at 1 meter. Rotate the projector selector ring to the lock position.
- d. Survey the source guide tube and source changer to confirm that the source has been correctly transferred.
- e. Disconnect the guide tube from the changer and secure the source.
- f. Disconnect the control unit and source guide tube from the projector and replace the shield plug. Fix the new source identification plate firmly to the projector.

4.2 The following procedures are for the S.P.E.C. Model C-1 source changers.

- 4.2.1 Perform surveys as required in Section II, 9.1
- 4.2.2 Open both top and side doors to their fullest positions, exposing the outlet tubes on top and lock plungers on the side.
- 4.2.3 Pull the lock plunger on the blue side and turn to the left.
- 4.2.4 Connect one side of the short source guide tube (supplied with the changer) to the uncapped outlet tube in the top of the container. Connect the other end to the source tube side of the camera.
- 4.2.5 Connect the drive cable to the old source in the camera.
- 4.2.6 Unlock the camera and crank the old source into the changer.
- 4.2.7 Lock the container by turning the lock plunger 1/4 turn to the right and release. This will cause the plunger to lock down on the source.
- 4.2.8 Survey the camera, changer and source guide tube.
- 4.2.9 Disconnect the source guide tube from the changer.
- 4.2.10 Attach tape to the old source pigtail, securing it to the walls of the source changer. Remove heavy brown paper tape from the outlet tube on the red side of the container and discard.

- 4.2.11 Attach source guide tube to changer and unlock the new source side of the changer by turning 1/4 turn to the left.
- 4.2.12 Retract (crank in) the new source into the camera.
- 4.2.13 Lock the exposure device and the changer by turning the lock plunger on the red side of the changer 1/4 turn to the right and release.
- 4.2.14 Survey the changer, camera and source guide tube.
- 4.2.15 Disconnect drive cable from camera and disconnect source guide tube from camera and changer.
- 4.2.16 Affix new source identification plate to the camera.
- 4.2.17 Perform the final survey on the source exchanger and return it to the supplier.

5.0 Operating Procedures for Exposure Devices

The following is a step-by-step guide for operating exposure devices. Specific procedures are outlined for each type of device.

5.1 Instructions for operating crank-out type exposure devices.

- 5.1.1 The following equipment must be present prior to beginning any radiographic operation:

- * Film badge or TLD badge
- * Pocket Dosimeter
- * Alarm ratemeter
- * Survey Instrument
- * Barricade equipment

- 5.1.2 Position the exposure device conveniently near exposure site.
- 5.1.3 Remove plug from the lock side of the exposure device.
- 5.1.4 Connect the inner drive cable on the crank-outs to the source pigtail. Check that the connection is made properly.
- 5.1.5 Connect the outer drive cable housing (conduit) to the exposure device.
- 5.1.6 Remove the plug from the (source tube) opening on the exposure device.

- 5.1.7 Connect the source guide tube to the exposure device. Check that the connection is made properly.
- 5.1.8 Position the end of the source guide tube in the location where the exposure is to be made.
- 5.1.9 Attach the film to the exposure point.
- 5.1.10 Straighten out the source guide tube and crank-out control cables, placing the crank-out handle as far from the exposure point as possible.
- 5.1.11 Calculate the required exposure time.
- 5.1.12 Calculate the dimensions of the "Restricted Area" so that no person, continuously present outside the area, will receive more than 2 mR in any one hour.
- 5.1.13 Establish a restricted area and prevent unauthorized entry into the area. Post this area with "Caution - Radiation Area" signs.
- 5.1.14 Calculate the area where the radiation levels will be 100 mR/hr and post this area with "Caution - High Radiation Area" signs.
- 5.1.15 Unlock the exposure device.
- 5.1.16 Crank the control handle toward the exposed position (clockwise for the SPEC 150 or counter clockwise for the Amersham 660) until it stops. **DO NOT FORCE THE HANDLE.** If undue resistance is encountered, reverse the crank direction. Make necessary adjustments (change guide tube position etc.) until the control unit works freely.
- 5.1.17 When the crank handle stops, the source is in the exposed position. Start exposure timer.
- 5.1.18 Survey the perimeter of the "Restricted Area" to ensure that radiation levels are within the 2 mR in any one hour limits.
- 5.1.19 Maintain constant surveillance of the "Restricted Area" to ensure that no unauthorized personnel enter.
- 5.1.20 When the exposure is completed, return the source to the shielded position by turning the crank handle in the opposite direction from that in para. 5.1.16 until it stops.
- 5.1.21 Carry and observe the survey meter continuously when approaching the exposure device. The entire circumference of the camera and the full length of the source

guide tube must be surveyed to ensure that the source has returned to the shielded position before locking the camera.

5.1.22 Lock the exposure device and return it to the storage area.

5.2 Instructions for operating "pipeliner" type exposure devices

5.2.1 All equipment listed in 5.1.1 above must be present before beginning any radiographic operation.

5.2.2 Position film on pipe weld to be radiographed.

5.2.3 Place exposure device in position to make the exposure.

5.2.4 Use chains and locking boomers to secure the device to the pipe.

5.2.5 Unlock the exposure device.

5.2.6 **STANDING AS FAR BACK AS POSSIBLE**, expose the source by rotating the knurled knob 180 degrees.

5.2.7 Move as far away as practical for the duration of the exposure.

5.2.8 After the exposure is complete, turn the device "off" by rotating the knurled knob 180 degrees back.

5.2.9 Approach the exposure device with a survey meter in hand to ensure that the source is in the shielded position, and lock the device.

5.2.10 When radiographic operations are completed, lock and survey the device before returning it to the storage area.

6.0 Instructions for operating Master Minder (signaling devices)

Master Minder signaling devices provide signals that control internal pipeline crawler equipment. The isotope contained in the Master Minder is approximately 225 millicurie of Cesium-137. Because it is possible to receive doses from the Master Minder that exceed those allowable under 10CFR, Part 20 the signaling device must be used in accordance with all applicable radiation safety regulations and instructions outlined in these operating procedures.

6.1 Operation of Master Minder

6.1.1 All equipment listed in 5.1.1 above must be present before using the signaling device.

- 6.1.2 To produce a signal survey the Master Minder to assure that it is in the locked safe position then place the Master Minder firmly on the pipe surface.
- 6.1.3 Unlock the Master Minder by turning the key clockwise and allowing the lock plunger to spring up.
- 6.1.4 Grasp the source holder and pull out gently.
- 6.1.5 Step back away from the Master Minder to avoid unnecessary exposure during the signal.
- 6.1.6 To terminate the signal, grasp the source holder and push in to the farthest extent.
- 6.1.7 Depress the lock plunger and turn the key counter clockwise to lock the device.
- 6.1.8 Survey the Master Minder to assure the source has returned to the safe and locked position.

7.0 Instruction for operating Tattle Tale locating devices

The Tattle Tale locating device has a capacity of 100 mCi Cesium-137 and is designed primarily as a locating device for internal pipeline crawler equipment. A locking safety key mechanism prevents unauthorized use. The source rod is manually raised to the "on" position by unlocking the safety mechanism, and raising the source up to the "on" position. The locking mechanism can be used to hold the source in the "on" position. The radiation beam is horizontal (90 degrees from the locking mechanism) and the beam angle is 28 degrees.

7.1 Operation of Tattle Tale locating device

- 7.1.1 All equipment listed in 5.1.1 above must be present before operating the Tattle Tale locating device.
- 7.1.2 Survey the Tattle Tale to assure the device is in the "off" shielded position.
- 7.1.3 Place the Tattle Tale in the Tattle Tale holder that is attached to the pipeline crawler.
- 7.1.4 Position the Tattle Tale so that the beam opening is directed toward the round side opening in the Tattle Tale holder.
- 7.1.5 Secure the Tattle Tale with the retaining bolt located at the top of the holder.
- 7.1.6 Raise the source rod to the "on" position and secure, place crawler in the pipe and proceed with the operation.

5-15-97EQUIPMENT HANDLING PROCEDURESSECTION VI

- 7.1.7 When the crawler exits the pipe, lower the source on the Tattle Tale to the "off" shielded position.
- 7.1.8 Survey the Tattle Tale to assure it is in the shielded position then lock the device.
- 7.1.9 If further operation is required repeat 7.1.6 through 7.1.8.
- 7.1.10 If operations are complete remove the Tattle Tale from the holder and return it to storage.

8.0 Instruction for Operation of X-ray devices

Operating procedures for x-ray machines are not covered in this manual. The RSO or operations manager will make available operating instructions for specific x-ray devices on an as needed basis. The NRC does not regulate radiography using x-ray machines. For regulations concerning x-ray radiography refer to the individual states regulations or the U. S. Occupational Safety and Health Administration (OSHA) regulations.

APR 29 1997

License No. 35-19993-01
Docket No. 030-19640
Control No. 465522

James Peters
Radiation Safety Officer
Western X-Ray Company
3803 Branson Road
Poteau, Oklahoma 74953

Dear Mr. Peters:

This is in reference to your application dated December 26, 1994 requesting to renew Nuclear Regulatory Commission License No. 35-19993-01. In order to continue our review, we need the following additional information:

1. 10 CFR 20.1101(c) requires that the licensee review the radiation protection program content and implementation at least annually. Submit a description of your program for performing the required annual review. It should include the following criteria:
 - a. Senior management oversight of the radiation protection program. Specify the mechanisms that will be used by senior management to ensure that they are aware of NRC regulations, the provisions of the license, and the compliance status of the institution's licensed program.
 - b. Review of the Radiation Safety Officer and staff performance. Specify the minimum qualifications for an individual who will perform this review, and confirm that the results will be reported to senior management.
 - c. Audits by the Radiation Safety Officer and staff to determine user compliance with the requirements of the NRC license and your radiation protection program. Audits should include such topics as: reviews of users' inventory and survey records, evaluation of users' radiation safety procedures through observation and discussion, and performance of independent work area surveys.
2. Section II, 9.4.2 of your Operating and Emergency Procedures does not contain sufficient information to determine that the circumference of the exposure device is surveyed in accordance with 10 CFR 34.43(b). Please modify your operating procedures to require surveying of the circumference of the exposure device and the entire length of the guide tube.

OFFICIAL RECORD COPY

ML 40

3. Section II, 9.6. of your Operating and Emergency Procedures describes your procedures for complying with 10 CFR 20.1301(a)(2) for your permanent storage areas. Please modify your operating procedures in accordance with 10 CFR 20.1302 to demonstrate that your permanent storage areas comply with the dose limit in 10 CFR 20.1301(a)(1).
4. Section II, 11.2 of your Operating and Emergency Procedures indicates that you transport radioactive materials in packages with Yellow III warning labels which requires that the vehicle be placarded. Operation of a vehicle which is required to be placarded requires compliance with the Federal Motor Carrier Safety Regulations in 49 CFR Parts 390-397. Please modify your operating procedures to include instructions for your personnel to comply with the applicable requirements in 49 CFR Parts 390-397.
5. Please modify Attachment II-9 of your Operating and Emergency Procedures to include:
 - a. the letters "RQ" as required by 49 CFR 172.324 and Table 2 to Appendix A of 49 CFR 172.101; and
 - b. radiographic devices that meet the requirements of 10 CFR 34.20.
6. Section IV, page 4 of your Operating and Emergency Procedures includes telephone numbers for NRC regional offices to contact in the event of an emergency. Please update this page to include the "800" telephone numbers for the NRC regional offices and the phone numbers for the NRC Operations Center which is staffed 24 hours a day.
7. Your Operating and Emergency Procedures appear to authorize the Radiation Safety Officer to perform source retrievals and authorize other individuals to perform retrievals. NRC expects individuals who perform source retrieval operations to have special training and equipment for performance of this task. Please describe your specific training which prepares you and other radiographic personnel for these operations. You may choose to use an outside consultant with expertise in source recovery as an alternative. If you intend to do your own source recovery, please also include detailed procedures describing special equipment, (high range self-reading dosimetry, shields and remote handling tools) and its use. You should also modify Section V of your Operating and Emergency Procedures to include the specific training to qualify personnel to perform source retrievals.
8. Please modify Section VI of your Operating and Emergency Procedures to include only radiographic devices that meet the performance requirements of 10 CFR 34.20.

J. Peters
Western X-Ray Company

-3-

9. Your application does not contain sufficient instructions to your personnel that management should be notified whenever there is a malfunction or defect in equipment. Please modify your procedures to require this notification.

We will continue our review upon receipt of this information. Please reply in duplicate to my attention at the Region I Office and refer to Mail Control No. 465522. If you have any technical questions regarding this deficiency letter, please call me at (610) 337-5042.

In order to continue prompt review of your application, we request that you submit your response to this letter within 30 calendar days from the date of this letter.

Sincerely,

Original Signed By:

Duncan White

Duncan White

Senior Health Physicist

Division of Nuclear Materials Safety

License No. 35-19993-01
Docket No. 030-19640
Control No. 465522

Enclosures:
10 CFR Parts 20, 21 and 34

DOCUMENT NAME: R:\WPS\DLTR\L3519993.01

To receive a copy of this document, indicate in the box: "C" = Copy w/o attach/encl "E" = Copy w/ attach/encl "N" = No copy

OFFICE	DNMS/RI	N	DNMS/RI				
NAME	DWhite						
DATE	04/25/97	04/ /97	04/ /97	04/ /97	04/ /97	04/ /97	04/ /97

OFFICIAL RECORD COPY



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION IV

611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

JAN 5 1995

Western X-Ray Company
ATTN: James Peters, RSO
3803 Branson Road
Poteau, Oklahoma 74953

Docket No. 030-19640
License No. 35-1993-01
Control No. 465522

Gentlemen:

This is to acknowledge receipt of your application for renewal of the byproduct material license identified above. Your application is deemed timely filed and, accordingly, the license will not expire until final action has been taken by this office.

Any correspondence regarding the renewal application should reference the control number specified and your license number.

Sincerely,

Original Signed By
Billie Gruszynski

Billie Gruszynski (Ms.)
Nuclear Materials Licensing Branch

JAN 5 1995

RIV:NMLB
BGruszynski
1/5/95

Western X-Ray

3803 Branson Road • Poteau, OK 74953 • 918-647-5044

December 27, 1994

United States Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
Arlington, Texas 76011-8064



Attention: Nuclear Materials Licensing Section

Enclosed are duplicate sets of the license renewal documents for Western X-Ray Company (License No. 35-19993-01). Please note that we have revised our entire Operating and Emergency Procedures of the Radiation Safety Program. The appropriate fee for License renewal is also enclosed.

Should you have any questions regarding this application, please contact me at (918) 647-5044.

Sincerely,

A handwritten signature in cursive script that reads "James Peters".

James Peters
Radiation Safety Officer

OFFICIAL RECORD COPY

ML40

465522

(6-93)
10 CFR 30, 32, 33
34, 35, 36, 39 and 40

APPLICATION FOR MATERIAL LICENSE

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 9 HOURS. SUBMITTAL OF THE APPLICATION IS NECESSARY TO DETERMINE THAT THE APPLICANT IS QUALIFIED AND THAT ADEQUATE PROCEDURES EXIST TO PROTECT THE PUBLIC HEALTH AND SAFETY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0120), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW.

APPLICATION FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:

DIVISION OF INDUSTRIAL AND MEDICAL NUCLEAR SAFETY
OFFICE OF NUCLEAR MATERIALS SAFETY AND SAFEGUARDS
U.S. NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20555-0901

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS:

IF YOU ARE LOCATED IN:

CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, PENNSYLVANIA, RHODE ISLAND, OR VERMONT, SEND APPLICATIONS TO:

LICENSING ASSISTANT SECTION
NUCLEAR MATERIALS SAFETY BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406-1415

ALABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA, PUERTO RICO, SOUTH CAROLINA, TENNESSEE, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO:

NUCLEAR MATERIALS LICENSING SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION II
101 MARIETTA STREET, NW, SUITE 2900
ATLANTA, GA 30323-0199

IF YOU ARE LOCATED IN:

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO:

MATERIALS LICENSING SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION III
801 WARRENVILLE RD
LISLE, IL 60532-4351

ARKANSAS, COLORADO, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, SOUTH DAKOTA, TEXAS, UTAH, OR WYOMING, SEND APPLICATIONS TO:

NUCLEAR MATERIALS LICENSING SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TX 76011-8064

ALASKA, ARIZONA, CALIFORNIA, HAWAII, NEVADA, OREGON, WASHINGTON, AND U.S. TERRITORIES AND POSSESSIONS IN THE PACIFIC, SEND APPLICATIONS TO:

RADIOACTIVE MATERIALS SAFETY BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION V
1450 MARIA LANE
WALNUT CREEK, CA 94596-5368

PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S. NUCLEAR REGULATORY COMMISSION JURISDICTIONS.

1. THIS IS AN APPLICATION FOR (Check appropriate item)

- ☐ A. NEW LICENSE
☐ B. AMENDMENT TO LICENSE NUMBER _____
☒ C. RENEWAL OF LICENSE NUMBER 35-19993-01

2. NAME AND MAILING ADDRESS OF APPLICANT (Include Zip code)

Western X-Ray Company
3803 Branson Rd.
Poteau, Oklahoma 74953

3. ADDRESS(ES) WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED

3803 Branson Rd. Poteau, OK 74953 -Permanent
Storage

All Space Storage Building No. 33

Highway 270 and 4th Street Seiling, OK -Temporary
Storage

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

James Peters

TELEPHONE NUMBER

(918) 647-5044

SUBMIT ITEMS 5 THROUGH 11 ON 8-1/2 X 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.

5. RADIOACTIVE MATERIAL

a. Element and mass number; b. chemical and/or physical form; and c. maximum amount which will be possessed at any one time. See attached

6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED

See attached

7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING EXPERIENCE

See attached

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS

See attached

9. FACILITIES AND EQUIPMENT

See attached

10. RADIATION SAFETY PROGRAM

See attached

11. WASTE MANAGEMENT

See attached

12. LICENSEE FEES (See 10 CFR 170 and Section 170.31)

FEE CATEGORY AMOUNT
ENCLOSED \$ 3,060.00

13. CERTIFICATION (Must be completed by applicant) THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35, 36, 39 AND 40, AND THAT ALL INFORMATION CONTAINED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF.

WARNING: 18 U.S.C. SECTION 1001 ACT OF JUNE 25, 1948 62 STAT. 749 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

CERTIFYING OFFICER - TYPED/PRINTED NAME AND TITLE

James Peters/Owner/RSO

SIGNATURE

James Peters

DATE

12-26-94

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	AMOUNT RECEIVED	CHECK NUMBER	COMMENTS
Ren	Jan 2	30 2B	\$3,060	7606	
APPROVED BY	<i>Kita Messer</i>			DATE	
				11/3/95	

465522

December 26, 1994
Western X-Ray Company
Application for Material License

- Item 5. We request that the license be renewed to include all sources, cameras, and source changers as listed on our previous license no.35-19993-01 amendment no. 6 attached. In addition, we request that the license include the following:

<u>Isotope</u>	<u>Manufacturer & Model No. of Source Assemblies</u>	<u>Maximum Activity per Source</u>	<u>Manufacturer & Model No. of Exposure Devices</u>	<u>Manufacturer & Model No. of Source Changer</u>
Cs-137GI Model VD (HP)		225 milli- curies	GI Master Minder Model 1 or 2	N/A
Cs-137GI Model VD (HP)		125 milli- curies	GI Model Tattle-Tale 1	N/A

- Item 6. Licensed Material will be used for Industrial Radiography.
- Item 7. See Radiation Safety Program, Section I.
- Item 8. See Radiation Safety Program, Section V.
- Item 9. See Radiation Safety Program, Section III.
- Item 10. See enclosed Radiation Safety Program
- Item 11. All Radiography Sources will be sent back to the manufacturer for disposal.

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 39, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee

1. Western X-Ray Company
2. 3803 Branson Road
Poteau, Oklahoma 74953

In accordance with letter dated
January 28, 1992

3. License number 35-19993-01 is amended in its entirety to read as follows:

4. Expiration date January 31, 1995

5. Docket or
Reference No. 030-19640

6. Byproduct, source, and/or
special nuclear material

7. Chemical and/or physical
form

8. Maximum amount that licensee
may possess at any one time
under this license

A. See Condition 10.

A. Sealed sources

A. See Condition 10.

9. Authorized use

A. For use in industrial radiography and replacement of sources.

CONDITIONS

10. Sealed sources, exposure devices, and source changers authorized for use are as follows:

Isotope	Manufacturer & Model No. of Source Assemblies	Maximum Activity per Source	Manufacturer & Model No. of Exposure Devices	Manufacturer & Model No. of Source Changers
A. Ir-192	AMSHM Model 89911 AMSHM Model 848 AMSHM A-1-A SPEC Model G-1F SPEC Model G-3F SPEC Model B-16F IN Model 22 AMSHM RG-13	100 curies	GN Model 20V	SPEC Model C-1 GI Model C-10 GI Model C-4 GN Model U-110 GN Model U-110A AMSHM Model 650 AMSHM Model 500-SU IN Model IR-50

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number

35-19993-01

Docket or Reference number

030-19640

Amendment No. 06

10. (Continued)

Isotope	Manufacturer & Model No. of Source Assemblies	Maximum Activity per Source	Manufacturer & Model No. of Exposure Devices	Manufacturer & Model No. of Source Changers
B. Ir-192	AMSHM Model A424-9 AMSHM Model 91813 RTS Model 702 SPEC Model T-5F SPEC Model T-7F IN Model 7	100 curies	AMSHM Model 660	SPEC Model C-1 GI Model C-10 GI Model C-4 GN Model U-110 GN Model U-110B AMSHM Model 855 AMSHM Model 650 AMSHM Model 414 AMSHM Model 820 AMSHM Model 500-SU IN Model IR-50 RTS Model 424
C. Ir-192	AMSHM Model A424-9 AMSHM Model 91813 RTS Model 701 RTS Model 702	100 curies	AMSHM Model 660 System 660 A 660 B 660 AE 660 BE	SPEC Model C-1 GI Model C-10 GI Model C-4 GN Model U-110 GN Model U-110B AMSHM Model 855 AMSHM Model 650 AMSHM Model 414 AMSHM Model 820 AMSHM Model 500-SU IN Model IR-50 RTS Model 424
D. Ir-192	AMSHM Model 68309 SPEC T-6 **	100 curies	AMSHM Model 683	AMSHM Model 750
**Requires that the device be returned to manufacturer for source replacement				
E. Ir-192	AMSHM Model 89911 AMSHM Model 848 AMSHM Model A-1-A SPEC Model G-1F SPEC Model G-3F SPEC Model B-16F IN Model 22	100 curies	SPEC Model Spec 2-T	SPEC Model C-1 GI Model C-10 GI Model C-4 GN Model U-110 GN Model U-110A AMSHM Model 650 AMSHM Model 500-SU IN Model IR-50

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number

35-19993-01

Docket or Reference number

030-19640

Amendment No. 06

10. (Continued)

Isotope	Manufacturer & Model No. of Source Assemblies	Maximum Activity per Source	Manufacturer & Model No. of Exposure Devices	Manufacturer & Model No. of Source Changers
F. Ir-192	AMSHM Model 89911 AMSHM Model 848 AMSHM Model A-1-A SPEC Model G-1F SPEC Model G-3F SPEC Model B-16F IN Model 88	185 curies	SPEC Model 2-T	SPEC Model C-1 GI Model C-10 GI Model C-4 AMSHM Model 650 AMSHM Model 500-SU IN Model IR-50
G. Ir-192	AMSHM Model 89911 AMSHM Model 848 AMSHM Model A-1-A SPEC Model G-1F SPEC Model G-3F SPEC Model B-16F IN Model 22	100 curies	GI Model Century S	SPEC Model C-1 GI Model C-10 GI Model C-4 GN Model U-110 GN Model U-110A AMSHM Model 650 AMSHM Model 500-SU IN Model IR-50
H. Ir-192	AMSHM Model 89912 AMSHM Model 848 AMSHM Model A-2-A SPEC Model G-3F SPEC Model B-16F IN Model 88	100 curies	GI Model Century SA	SPEC Model C-1 GI Model C-10 GI Model C-4 GN Model U-110 GN Model U-110A AMSHM Model 500-SU AMSHM Model 650 IN Model IR-50
I. Ir-192	AMSHM Model 89916* AMSHM Model 87703 IN Model 32 SPEC Model G-40F	100 curies	IN Model IR-100	GI Model C-10 GI Model U-110 AMSHM Model 500-SU* AMSHM 650 IN Model IR-50 IN Model 130

*Requires a double
stop ball to go into
AMSHM 500-SU with
modified lock box

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number

35-19993-01

Docket of Reference number

030-19640

Amendment No. 06

10. (Continued)

Isotope	Manufacturer & Model No. of Source Assemblies	Maximum Activity per Source	Manufacturer & Model No. of Exposure Devices	Manufacturer & Model No. of Source Changers
J. Ir-192	GN Model RPL-5 GI Model PL-3	100 curies	GN Model 10X Pipeline Camera	N/A
K. Ir-192	AMSHM Model GP AMSHM Model 87651 SPEC Model 6-23 GN Model RPL-1-G	100 curies	GI Pipeliner Model 1	N/A
L. Co-60	AMSHM Model A424-14 GI Model T-8-T	100 curies	AMSHM Model 680	AMSHM Model 488 AMSHM Model 771 GI Model C-8
M. Co-60	GI Model A-8-A SPEC Model G-21	100 curies	GI Model Gammatron-100A	GI Model C-8

ABBREVIATIONS USED IN LICENSE:

Amersham (AMSHM) Amersham/Gulf Nuclear (GN) Source Production & Equipment Co. (SPEC)
Amersham/Gamma Industries (GI) Risk Technology (RTS) Industrial Nuclear (IN)

11. Licensed material may be stored at the licensee's facility at 3803 Branson Road, Poteau, Oklahoma; All Space Storage Building Number 33, at Highway 270 and 4th Street, Seiling, Oklahoma; and may be used at temporary job sites of the licensee anywhere in the United States where the U. S. Nuclear Regulatory Commission maintains jurisdiction for regulating the use of licensed material.
12. A. Licensed material shall be used by, or under the supervision and in the physical presence of, James Peters, or individuals who have been trained as specified in application dated December 6, 1989. The licensee shall maintain records of individuals designated as users.
- B. The Radiation Safety Officer for this license is James Peters.
13. Notwithstanding the periodic leak test required by Section 34.25(b) of 10 CFR Part 34, such requirement does not apply to radiography sources that are stored and not being used. The sources excepted from this test shall be tested for leakage before use or transfer to another person.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number

35-10003-01

Docket or Reference number

030-19640

Amendment No. C6

14. The licensee is authorized to receive, possess, and use sealed sources of iridium-192 or cobalt-60 where the radioactivity exceeds the maximum amount of radioactivity specified in this license provided:
- A. Such possession does not exceed the quantity per source specified in Item 8 by more than 20% for iridium-192 or 10% for cobalt-60;
 - B. Records of the licensee show that no more than the maximum amount of radioactivity per source specified in this license was ordered from the supplier or transferor of the byproduct materials; and
 - C. The levels of radiation for radiographic exposure devices and storage containers do not exceed those specified in Section 34.21, 10 CFR Part 34.
15. Pursuant to 10 CFR Part 40, "Domestic Licensing of Source Material," the licensee is authorized to possess, use, transfer, and import up to 999 kilograms of uranium contained as shielding material in the radiography exposure devices and source changers authorized by this license.
16. The licensee may transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."
17. In addition to the possession limits in Item 8, the licensee shall further restrict the possession of licensed material to quantities below the minimum limit specified in 10 CFR 30.35(d) for establishing decommissioning financial assurance.
18. The licensee shall maintain records of information important to safe and effective decommissioning at Western X-Ray Company, 3803 Branson Road, Poteau, Oklahoma, per the provision of 10 CFR 30.35(g) until this license is terminated by the Commission.

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License number

35-19993-01

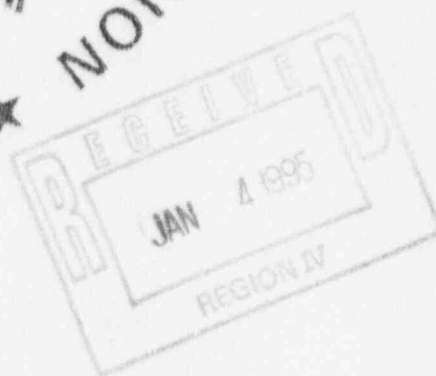
Docket or Reference number

030-19640

Amendment No. 06

19. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

- A. Letter dated December 6, 1989
- B. Letter dated December 18, 1989
- C. Letter dated October 5, 1990
- D. Letter received November 18, 1990
- E. Letter dated July 23, 1991
- F. Letter dated January 28, 1992



FOR THE U.S. NUCLEAR REGULATORY COMMISSION

By

[Signature]
Nuclear Materials Licensing Section
Region IV
Arlington, Texas 76011

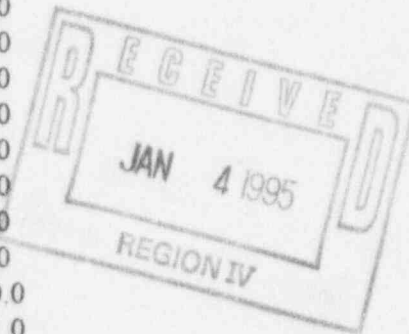
Date FEB - 5 1992

465522

12-1-94

TABLE OF CONTENTS

<u>SECTION</u>	<u>TITLE</u>	<u>PARA.</u>	<u>EFFECTIVE PAGES</u>	<u>DATE</u>
i	Table of Contents		1-2	12-1-94
ii	Record of Revision		1	12-1-94
iii	NRC License and Amendments			
I	Organization and Responsibilities		1-8	12-1-94
	Radiation Safety Officer	1.0		
	Assistant RSO	2.0		
	Radiation Field Supervisor	3.0		
	Radiographer	4.0		
	Radiographer Assistant	5.0		
	Resumes	6.0		
II	General Operating Procedures			
	Purpose and Scope	1.0	1-24	12-1-94
	General Policy	2.0		
	Distribution	3.0		
	Personnel Monitoring	4.0		
	Survey Instruments	5.0		
	Collimator	6.0		
	Radioactive Source Security	7.0		
	Posting and Restricting Areas	8.0		
	Surveys	9.0		
	Utilization Log	10.0		
	Transportation of Material	11.0		
	Receipt and Disposal	12.0		
	Leak Testing of Sources	13.0		
	Internal Inspection Program	14.0		
	Inventory, Inspection, Maint.	15.0		
	Records Management	16.0		
	Records at Temporary Jobsites	17.0		
III	Description of Facilities and Use Areas		1-7	12-1-94
	Purpose and Scope	1.0		
	Location	2.0		
	Description of Storage Facility	3.0		
	Posting of Storage Areas	4.0		
	Security of Storage Areas	5.0		
IV	Emergency Procedures		1-4	12-1-94
	Purpose and Scope	1.0		
	General Policy	2.0		
	Equipment malfunctions	3.0		



12-1-94

TABLE OF CONTENTS

i

<u>SECTION</u>	<u>TITLE</u>	<u>PARA.</u>	<u>EFFECTIVE PAGES</u>	<u>DATE</u>
	Lost or Stolen Devices	4.0		
	Vehicle Accidents	5.0		
	Accidents involving			
	Non-Monitored Personnel	6.0		
	Emergencies due to fire	7.0		
	Emergency Telephone Numbers (page 4)			
V	Training		1-22	12-1-94
	Purpose and Scope	1.0		
	Responsibility	2.0		
	Radiographer Assistants	3.0		
	New Radiographers	4.0		
	Previous Trained Radiographers	5.0		
	Refresher Training	6.0		
	Examination Number 1			
	Examination Number 2			
	Examination Number 3			
VI	Equipment Handling Procedures		1-13	12-1-94
	Purpose and Scope	1.0		
	Daily Equipment Inspection	2.0		
	Quarterly Inspection & Maint.	3.0		
	Source Exchange Procedures	4.0		
	Operating Exposure Devices	5.0		
	Operating Master Minder	6.0		
	Operating Tattle Tale	7.0		
	Operating X-ray Devices	8.0		
VII	Q. A. Program for Shipping Containers			
VIII	NRC Regulations 10 CFR 19, 20 and 34			

12-1-94

RECORD OF REVISION

ii

Revision

Date

Original Issue

12/1/94

12-1-94

ORGANIZATION AND RESPONSIBILITIES

SECTION I

1.0 Radiation Safety Officer (RSO) - James Peters

It shall be the responsibility of the Radiation Safety Officer to assume the overall direction of the Radiation Safety Program.

- 1.1 Employ necessary personnel who, in their judgment, are qualified to implement and maintain the Radiation Safety Program outlined in these procedures.
- 1.2 Be directly responsible to the Nuclear Regulatory Commission for implementing any necessary programs that may become needed as a result of any change in regulatory policies.
- 1.3 Authorize expenditures for the acquisition of any equipment, supplies or training needed to ensure a safe and effective radiation program.
- 1.4 Be directly responsible to the Nuclear Regulatory Commission for any items of non-compliance and for any needed corrective action.
- 1.5 Be responsible for authorizing procedural changes and issuing new requirements.
- 1.6 The establishment of, or any changes in the educational programs outlined in these procedures.
- 1.7 Personally review any radiation exposures in excess of the limits outlined in 10 CFR Part 20 Standards for Protection Against Radiation.
- 1.8 Approval of all amendments to the company's NRC license.
- 1.9 Supervision of all radiographers, radiographer's assistants and other personnel in matters pertaining to radiation safety.
- 1.10 Issuing personnel monitoring equipment and ensuring that such equipment is exchanged at the appropriate intervals.
- 1.11 Conducting safety meetings and periodic training sessions for all personnel involved in the radiation program.
- 1.12 Performing periodic surveys of the storage facility as outlined in section III, 9.6 of this procedure.
- 1.13 Ensuring that all radiographers and radiographer's assistants have all required equipment and documents and that the documents are complete and current.

12-1-94

ORGANIZATION AND RESPONSIBILITIES

SECTION I

- 1.14 Performing the required inventory, maintenance and inspection of exposure devices and related equipment.
- 1.15 Ensuring that all procedures are followed (i.e., camera surveys, vehicle surveys, rate alarm checks, dosimeter readings recorded, daily reports completed, etc.).
- 1.16 Performing field inspections of radiographers and radiographer's assistants as required.
- 1.17 Maintaining the following listed pertinent radiation program records.
 - a. Personnel records
 - b. Receipt and disposal records
 - c. Safety meetings
 - d. Field inspections
 - e. Utilization records
 - f. Quarterly exposure device records of: inventories, inspections, and maintenance
 - g. Film badge records
 - h. Field inspection reports
 - i. Leak test reports
 - j. Survey meter calibrations
 - k. Dosimeter calibrations
 - m. Rate alarm calibrations
 - n. Storage surveys
 - o. Camera surveys
 - p. Termination notices
 - q. Annual reports
- 1.18 Notifying the Nuclear Regulatory Commission in the event of an exposure which requires such notification and subsequently notifying the individual involved.
- 1.19 Ensuring that source exchanges, performed at remote sites, are performed by personnel who have had experience in this procedure, or that exchanges are performed in the presence of the RSO or his assistant.

2.0 Assistant Radiation Safety Officer - Johnny G. Peters

The Assistant Radiation Safety Officer shall report to the RSO and assist the RSO in matters involving the use of radioactive sources and exposure devices. In the absence of the RSO, the Assistant RSO shall be responsible for the Radiation Safety Program. Additional responsibilities include but are not limited to assisting the RSO with the following:

- 2.1 Supervision of all radiographers, radiographer's assistants and other personnel in matters pertaining to radiation safety.

- 2.2 Issuing personnel monitoring equipment and ensuring that such equipment is exchanged at the appropriate intervals.
- 2.3 Conducting safety meetings and periodic training sessions for all personnel involved in the radiation program.
- 2.4 Performing periodic surveys of the storage facility as outlined in section III, 9.6 of this procedure.
- 2.5 Documenting and maintaining records of receipt and disposal of all radioactive materials.
- 2.6 Ensuring that all radiographers and radiographer's assistants have all required equipment and documents and that the documents are complete and current.
- 2.7 Performing the required inventory, maintenance and inspection of exposure devices and related equipment.
- 2.8 Ensuring that all procedures are followed (i.e., camera surveys, vehicle surveys, dosimeter readings recorded, daily reports completed, etc.).
- 2.9 Performing field inspections of radiographers and assistant radiographers as required.
- 2.10 Maintaining records to ensure that all leak tests and instrument calibrations are performed at the proper intervals.
- 2.11 Keeping all utilization records current in order to account for all radioactive sources at all times.
- 2.12 Implementing any procedural changes or revisions as directed by the Radiation Safety Director.
- 2.13 Maintaining the following listed pertinent radiation program records.
 - a. Personnel records
 - b. Receipt and disposal records
 - c. Safety meetings
 - d. Field inspections
 - e. Utilization records
 - f. Quarterly exposure device records of:
inventories, inspections, and maintenance
 - g. Film badge records
 - h. Field inspection reports
 - i. Leak test reports
 - j. Survey meter calibrations
 - k. Dosimeter calibrations

12-1-94

ORGANIZATION AND RESPONSIBILITIES

SECTION I

- m. Rate alarm calibrations
- n. Storage surveys
- o. Camera surveys
- p. Termination notices
- q. Annual reports

2.14 Notifying the Nuclear Regulatory Commission in the event of an exposure which requires such notification and subsequently notifying the individual involved.

2.15 Ensuring that source exchanges, performed at remote sites, are performed by personnel who have had experience in this procedure, or that exchanges are performed in the presence of the RSO or his assistant.

3.0 Radiation Field Supervisor

Radiation Field Supervisor's shall be designated by the RSO. A record of this designation will be retained in the individuals personnel file along with a copy of the individuals resume. As a minimum, Radiation Field Supervisors will have (5) five years experience as a radiographer, and have received specific instructions on conducting field radiography internal inspections. In addition to normal supervisory duties, Radiation Field Supervisors may be utilized to assist the RSO in performing periodic inspections of radiographers and radiographer's assistants. Records of all internal inspections performed shall be retained by the RSO for a minimum of three years.

4.0 Radiographer

A radiographer shall be a person who has met, as a minimum, the requirements outlined in the regulations 10 CFR 34.31(a). Radiographer's duties shall include the following:

- 4.1 Shall be responsible for any radiation producing devices assigned to him.
- 4.2 Shall be responsible for performing radiography in accordance with the policies of this company as outlined in these Operating and Emergency Procedures.
- 4.3 Shall be responsible for having all required equipment on hand before performing radiographic operations.
- 4.4 Shall be responsible for complying with applicable NRC regulations, when performing radiographic operations.
- 4.5 Shall be responsible for completing required records on a daily basis.

12-1-94

ORGANIZATION AND RESPONSIBILITIES

SECTION I

5.0 Radiographer's Assistant

A radiographer's assistant shall be a person who has met, as a minimum, the requirements outlined in the regulations 10 CFR 34.31(b). His duties shall include the following:

- 5.1 Shall only perform radiographic operations under the direct supervision of a qualified radiographer.
- 5.2 Shall be responsible for understanding the policies of this company as outlined in these operating and emergency procedures.
- 5.3 Shall be responsible for completing the records required on a daily basis.

6.0 Resumes (Attached)

- 1) James Peters Radiation Safety Officer
- 2) Johnny Peters Assistant Radiation Safety Officer

12-1-94

ORGANIZATION AND RESPONSIBILITIES

SECTION I

RESUME**James E. Peters**

3803 Branson Rd.
Poteau, Oklahoma 74953

(918) 647-5044

EXPERIENCE

Mr. Peters has over (27) twenty seven years experience related to nondestructive testing and visual inspection of a wide range of materials, components, and structures. Primary areas of expertise include (RT) radiographic testing, (MT) magnetic particle testing, (PT) liquid penetrant testing, and (VT) visual testing. Mr. Peters was qualified as a radiographer in Texas in 1969. Since that time, Tech-Ops, Gamma Industries, and Gulf Nuclear isotope equipment, (Iridium and Cobalt) and x-ray machines and crawlers have been used.

EMPLOYMENT HISTORY

5/82 - Present Owner and Radiation Safety Officer, Western X-ray Company, Poteau and Seiling, OK
1979 - 1982 Level II Radiographer, Big State X-Ray, Chickasha, OK
1978 Level II Radiographer, Longview X-Ray, Longview, TX
1977 Level II Radiographer, Big State X-Ray, Borger, TX
1977 Level II Radiographer, Conam Inspection, Odessa, TX
1975 - 1977 Level II Radiographer, Radiation Safety Officer, Utility Testing Services, Houston, TX
1974 - 1975 Level II Radiographer, Booth Mobile Inspection, Oxnard, CA
1972 - 1974 Level II Radiographer, Central Inspection, Houston, TX
1971 - 1972 Level II Radiographer, Conam Inspection, Rahway, NJ
1969 - 1971 Level II Radiographer, Consolidated X-Ray Service Corp., Dallas, TX
1968 - 1969 Level I Radiographer, Consolidated X-Ray Service Corp., Dallas, TX

EDUCATION AND TRAINING

1967 - Whitesboro High School, Whitesboro, OK
1969 - Radiation Safety and Basic Radiography, Consolidated X-Ray Service Corp., Dallas, TX
1971 - Radiation Safety, Radiography, Liquid Penetrant, and Magnetic Particle Course, Conam Inspection, Rahway, NJ
1977 - Radiation Safety, Utility Testing Service, Houston, TX
1988 - Radiation Safety and Radiography, Tech Cek, Inc., Yaic, OK

REFERENCES

Available upon request

12-1-94

ORGANIZATION AND RESPONSIBILITIES

SECTION I

RESUME**Johnny G. Peters**

8617 South Pittsburg
Tulsa, Oklahoma 74137

(918) 491-6770

EXPERIENCE

Mr. Peters has over (25) twenty five years experience related to nondestructive testing and visual inspection of a wide range of materials, components, and structures. Primary areas of expertise include (RT) radiographic testing, (UT) ultrasonic testing, (MT) magnetic particle testing, (PT) liquid penetrant testing, (ET) electromagnetic testing, and (VT) visual testing.

CERTIFICATIONS

- ASNT level III certification for RT, UT, MT, and PT, certificate no. MM-760
- AWS Welding Inspector certification (QC-1), certificate no. 82054051
- NACE Basic Coating Inspector, certificate no. 2285
- Texas Department of Health, Bureau of Radiation Control, Radiographer no. 05895

EMPLOYMENT HISTORY

- 1/94-Present President, Edwards Pipeline Testing, Inc., Tulsa, OK
- 12/85-1/94 Operations Manager, Corporate Level III, and Assistant Radiation Safety Director,
& 7/82-11/84 Century Inspection, Inc., Dallas, TX, Anchorage, AK, and Bakersfield, CA
- 1984-1985 Field Supervisor, Consolidated Chugach Inspection, Inc., Prudhoe Bay, AK
(a subsidiary of Consolidated X-Ray Service Corp.)
- 7/81-7/82 NDT Level III, QA Welding and Heat Treat Coordinator, Otis Engineering
Corporation, Dallas, TX
- 8/77-7/81 NDT Level II, Consolidated X-Ray Service Corporation, Dallas, TX
- 5/76-8/77 Owner, Vice President, NDT Level II, Sumar Inspection, Inc., Addison, TX
- 5/69-5/76 NDT Level I and Level II, Consolidated X-Ray Service Corporation, Dallas, TX
- 5/66-5/68 Welder, Truck Driver, Carpenter and Plumber, U.S. Army 63rd and 97th Engineer
Battalions
- 6/64-5/66 Soils and Materials Analyst, Heavy Equipment Operator, Welder, Asst. Mechanic,
and Time Keeper, Curry Materials Company Antlers, OK

RESUME

Johnny G. Peters

Resume, page two

EDUCATION AND TRAINING

- High School, Whitesboro, OK
- College, Brookhaven Community College, Dallas, TX (no degree)
- Radiographic Testing, ASNT, Tulsa, OK
- Ultrasonic Weld Inspection, Magnaflux Corporation, Chicago, IL
- Magnetic Particle Testing, Consolidated X-Ray Service Corporation, Dallas, TX
- Penetrant Testing, ASNT, Ft. Worth, TX
- Electromagnetic Testing, Consolidated X-Ray Service Corporation, Dallas, TX
- Ultrasonic Testing, Rockwell International, Canoga Park, CA
- Elements Of Metallurgy, American Society for Metals, Metals Park, OH
- Welding Inspection and Quality Control, American Society for Metals, Metals Park, OH
- Preparatory Course for Certified Welding Inspector, American Welding Society, Miami, FL
- Fundamentals of Welding Inspection, Otis Engineering Corporation, Dallas, TX
- Session 1, Coating Inspector, National Association of Corrosion Engineers, Anchorage, AK
- Health and Safety for Oilfield Workers, University of Alaska, Anchorage, AK

REFERENCES

Available upon request

12-1-94

GENERAL OPERATING PROCEDURES

SECTION II

1.0 Purpose and Scope

This section establishes procedures to assure that the radiation safety program operates effectively. Except as otherwise specifically provided, this section applies to all individuals involved in radiographic operations.

2.0 General Policy

The objective of this procedure is to protect the health of the general public and the employees of the company. The company is committed to and supports the (ALARA) philosophy described in Regulatory Guide 8.10, "Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As Is Reasonably Achievable".

3.0 Distribution

A copy of these procedures shall be available to all employees that work with radioactive material. Each involved employee will sign a statement confirming that they have read and understand these instructions and the regulations (Title 10 Code of Federal Regulations.) of the Nuclear Regulatory Commission prior to performing any radiographic operations. If any doubt exists concerning these instructions, or the safety conditions in the performance of radiographic operations, the RSO should be contacted immediately.

4.0 Personnel Monitoring

All Western X-ray Company personnel shall be required to wear the following monitoring equipment when performing radiographic work.

- * Film badge or TLD
- * Direct reading pocket dosimeter - range 0 to 200 milliroentgen
- * Alarm ratemeter

4.1 Film Badge or TLDs

Radiographic personnel shall wear film badges or TLD badges. These devices shall be supplied by Atomic Energy Laboratory, Houston, TX, or other processor accredited by NVLAP of the U. S. Department of Commerce as having the competence to perform specified tests in accordance with prescribed test methods and accreditation criteria. Personnel monitoring devices shall be exchanged at monthly intervals.

- 4.1.1 Film badges or TLDs will be assigned by name and number to each employee involved in radiographic operations. UNDER NO CIRCUMSTANCES will an employee be permitted to use a film or TLD badge other than his own.
- 4.1.2 The Radiation Safety Officer will be responsible for distribution of film or TLD badges, and the procedures governing their use. Film or TLD badges are to be

12-1-94

GENERAL OPERATING PROCEDURES

SECTION II

returned to the Radiation Safety Officer promptly at the end of each control period.

- 4.1.3 Film or TLD badges are to be worn in a manner most likely to receive a representative whole body exposure, during all operations which involve potential for exposure to radiation.
- 4.1.4 Care should be taken to prevent exposure of the film or TLD badge to environmental conditions which involve excessive heat or moisture such exposure may impair the ability of the badge to measure radiation doses accurately.

4.2 Pocket Dosimeters

Radiographic personnel shall wear pocket dosimeters with a range from 0 to 200 milliroentgen. Dosimeters will be manufactured by Victoreen, Dosimeter Corporation of America or Landsverk. The Radiation Safety Officer or his assistants may wear pocket dosimeters that read from 0 to 1000 Milliroentgen for recovery operations. This dosimeter shall be Dosimeter Corporation Model 862 or equivalent.

- 4.2.1 Pocket dosimeters are to be worn in a manner most likely to receive a representative whole body exposure during all operations which involve potential for exposure to radiation.
- 4.2.2 All dosimeters must be recharged at the start of each shift.
- 4.2.3 Dosimeter readings shall be recorded on the utilization log. (Attachment II-1, or equivalent)
- 4.2.4 Care should be taken to ensure that dosimeters are not dropped or jarred as they are delicate instruments and can be easily damaged. If a dosimeter is damaged, the Radiation Safety Officer shall be contacted immediately.
- 4.2.5 Pocket dosimeters response to radiation will be checked for accuracy by calibration at least once each year. Dosimeters that are accurate within plus or minus 30% of the actual radiation exposure shall be considered acceptably calibrated. Calibrations shall be performed by the manufacturer, the RSO, or his assistant, using Victoreen/Nuclear Associates, Multi-Dosimeter Calibrator, Model 06-201, or Victoreen, Dosimeter Calibrator, Model 541-205. Results of the Calibration shall be recorded on the Dosimeter Calibration Form. (Attachment II-1, or equivalent)
- 4.2.6 Any individual whose pocket dosimeter goes off scale while using a source of radiation, shall immediately stop work, recharge his dosimeter and make a complete radiation survey of the area and immediately proceed with one of the following:

12-1-94

GENERAL OPERATING PROCEDURES

SECTION II

- (1) If the source of radiation is in the shielded position, immediately notify the Radiation Safety Officer about the condition of the dosimeter.
- (2) If the source is in the exposed position, make certain the area is restricted and access is controlled. Then notify the Radiation Safety Officer about the condition of the source and the dosimeter.

In both of the above cases, regardless of which steps are taken, the individual's film or TLD badge shall be processed immediately and he shall not be allowed to receive additional exposure until the results show that his total is not in excess of the allowable limits.

4.3 Operating Procedures for Dosimeter Chargers

The following procedures are to ensure that dosimeters are recharged properly.

- 4.3.1 Place the end of the dosimeter containing the charging electrode onto the charging contact of the charger.
- 4.3.2 Press down firmly on dosimeter and look into eyepiece to view scale and movable hairline.
- 4.3.3 Turn adjusting knob on dosimeter charger until the hairline is set on zero.
- 4.3.4 Remove dosimeter from charger and look into the eyepiece while pointing the dosimeter toward a light source.
- 4.3.5 If the hairline has moved from the zero position the above procedures must be repeated until the hairline remains on zero when the dosimeter is removed from the charger.

4.4 Alarm Ratemeter

Radiographic personnel shall wear alarm ratemeters. Alarm ratemeters will be either Model 18C manufactured by Dosimeter Corporation of America, Cincinnati, Ohio, Model RA-500 manufactured by NDS Products, Pasadena, Texas, or equivalent.

- 4.4.1 Alarm ratemeters shall be checked at the beginning of each shift to confirm that the alarm is operable.
- 4.4.2 Alarm ratemeters shall be set to give a continuous alarm when exposed to dose rates of 500 mR/hr or greater.
- 4.4.3 Radiographic personnel are not to attempt adjustment of the alarm settings on alarm ratemeters.

4.4.4 Alarm ratemeters will be calibrated at least once each year and following repairs. (Note: For the purpose of this procedure changing batteries does not constitute a repair) Alarm ratemeters must alarm within plus or minus 20 percent of the actual radiation dose rate. Alarm ratemeters shall be considered to be acceptably calibrated when:

- a. The alarm makes an intermittent "chirp" sound when placed in a 450 mr/hr radiation field.
- b. The alarm tone becomes continuous when the unit is moved toward the radiation field.
- c. The alarm stops sounding within a few seconds when removed from the radiation field.

4.4.5 The following companies may be used for calibrations and repair of alarm ratemeters:

- a. Venture Technical Sales and Service, Inc.
Tulsa, Oklahoma
NRC license #35-23196-01
- b. Source Production & Equipment Co., Inc.
St. Rose, Louisiana
Louisiana license #LA-2966-L01
- c. W. H. Henken Industries, Inc.
Arlington, Texas
Texas license #L00967
- c. The manufacturer of the alarm ratemeter

5.0 Survey Instruments

5.1 Radiographic personnel will use operable and calibrated survey instruments to perform all surveys outlined in these procedures.

5.1.1 The following G-M type survey instruments will be used:

- a. Ludlum, Model 6
- b. G.E. Smith & Assoc., Model GS1000A, GS2000A or M1000
- c. Victoreen, Model 492, 592B, 400 or 410
- d. Eberline Instruments, E120G or E130G
- e. NDS Products, Model 2000
- f. Bicron, Radiographer Model
- g. NDS Products, Model 500P

12-1-94

GENERAL OPERATING PROCEDURES

SECTION II

5.1.2 As a minimum survey instruments will be capable of measuring dose rates from 0-1000 mR/hr. Survey instruments will be calibrated at intervals not to exceed 90 days and following any repairs. (Note: for the purpose of this procedure changing batteries does not constitute a repair) The following companies may be utilized to repair and or calibrate survey instruments:

- a. Venture Technical Sales and Service, Inc.
Tulsa, Oklahoma
NRC license #35-23196-01
- b. Source Production & Equipment Co., Inc.
St. Rose, Louisiana
Louisiana license #LA-2966-L01
- c. W. H. Henken Industries, Inc.
Arlington, Texas
Texas license #L00967
- d. The manufacturer of the survey instrument

5.2 Operation

The following steps must be taken to assure that survey instruments are operating properly.

- 5.2.1 The calibration label on the instrument must be checked to ensure the calibration is current. **IF THE CALIBRATION HAS EXPIRED, DO NOT USE THE INSTRUMENT** until it has been properly calibrated.
- 5.2.2 The batteries condition must be checked. Some instruments have a battery check position on the range selector switch. Turn selector switch to this position and observe the meters indication. Some instruments have a battery test button. Turn the selector switch to the appropriate position, depress the test button and observe the meter indication. **BATTERIES THAT ARE NOT PROPERLY CHARGED MUST BE REPLACED** before using the instrument.
- 5.2.3 The survey instrument must be exposed to a source of radiation to assure that it detects radiation. This is best accomplished by setting the selector switch to the "X10" position and holding the instrument adjacent to the surface of an exposure device containing a radioactive source. **IF THE METER DOES NOT RESPOND TO RADIATION IT MUST NOT BE USED.**
- 5.2.4 Exposure rates are determined by multiplying the reading of the meter times the selector switch position. (Example: Meter reading is 4, selector switch setting is "X10", the dose rate is 40 mR/hr)

12-1-94

GENERAL OPERATING PROCEDURES

SECTION II

- 5.2.5 If a survey instrument fails to meet any of the above criteria, the Radiation Safety Officer shall be contacted immediately.
- 5.2.6 Survey instrument limitation (SATURATION) - It is a well known phenomenon that all Geiger-Mueller tube instruments saturate or overload at some point (this may also be called flooding or jamming). Saturation occurs when an instrument has been subjected to an excessive dose rate. To reduce the potential for saturation survey instruments should not be subjected to dose rates in excess of 20 R/hr. When an instrument reaches saturation one of the following events take place; THE INSTRUMENT READS FULL SCALE "PEGGED" or THE INSTRUMENT WILL NOT REACT TO RADIATION. WARNING - IF A PROPERLY SERVICED SURVEY INSTRUMENT READS ZERO IN A KNOWN RADIATION FIELD, the problem may be saturation.

5.3 General Use of Instruments

The following listed steps are included to assure that all personnel involved in the radiographic operations are aware of the proper use of survey instruments.

- 5.3.1 Do not commence any radiographic operation without at least one properly operating survey instrument.
- 5.3.2 If a survey instrument fails during radiographic operations, all radiographic work involving radioactive material must STOP until an operable and properly calibrated survey instrument is available.
- 5.3.3 Under no circumstances should a survey instrument be placed adjacent to an exposure device and left there during an exposure.
- 5.3.4 If it rains during a radiographic operation the survey instrument should be protected. Clear plastic bags do not appreciably affect the dose rate and allow for the instrument and controls to be read.
- 5.3.5 If at any time it is suspected that a survey instrument is not operating properly, the Radiation Safety Officer shall be contacted immediately.
- 5.3.6 Methods and occasions for utilizing the survey instrument to perform surveys is discussed in part 9.0 of the section.
- 5.3.7 Instruments operated in close proximity to electric generators may give erroneous readings due to the magnetic fields produced. If an erroneous reading is suspected, turn off the generator and perform another survey.

6.0 Collimator

A directional or panoramic collimator should be used to reduce exposure from sources whenever practical.

7.0 Radioactive Source Security

The following procedures are designed to ensure maximum security of radioactive sources at all times.

- 7.1 Each exposure device shall have at least one label attached to it which reads "Caution-Radioactive Materials - Notify Civil Authorities If Found." This label must be legible at all times.
- 7.2 Never leave an exposure device unattended when it is unlocked or when it is in an unsecured area where it could be removed by unauthorized personnel.
- 7.3 When an exposure device is removed from storage the radiographer shall retain the key to the device in his possession until the device is returned to storage.
- 7.4 During use, the radiographer, or his assistant, will maintain direct surveillance of the operation to protect against unauthorized entry into the area or removal of the exposure device. Barriers and or properly posted vehicles shall be used to prevent unauthorized entry into the area where radiographic operations are being performed.
- 7.5 After each exposure, a radiation survey shall be performed on the camera and source tube to ensure that the source has returned to the shielded position. (A complete discussion of surveys is included in part 9.0 of this section.)
- 7.6 Control cables and source tubes will be removed and dust covers and source plugs will be installed on the camera before it is placed in the vehicle for transport to the storage facility.

8.0 Posting and Restricting Radiographic Areas

The following procedures are to ensure that areas where radiographic operations are performed, are posted and properly restricted.

8.1 Restricted Areas

This is an area in which radiation levels are such that, if an individual were continuously present, he could receive a dose in excess of 2 mRem in any one hour. The boundary of this area must be posted with signs that read "Caution - Radiation Area." Entry into such an area shall be controlled by the radiographer as follows:

- 8.1.1 Calculate the area boundaries for the source being used and determine where the radiation dose should equal 2 mR in one hour.
- 8.1.2 Secure the calculated boundaries and post "Caution - Radiation Area" signs.

12-1-94

GENERAL OPERATING PROCEDURES

SECTION II

- 8.1.3 During exposure of the source survey the boundary and make any necessary adjustments to assure that the dose at the boundary will not exceed 2 mR in any one hour.
- 8.1.4 Record the surveyed perimeter dose rates on the utilization log and indicate any relevant surrounding obstructions or shielding that significantly effects dose rates.
- 8.1.5 While the source is exposed direct surveillance of the area shall be maintained by the radiographer or his assistant to prevent entry into the restricted area by other personnel.
- 8.1.6 In the event that the restricted area is entered, the source shall be immediately returned to the shielded position and the exposure terminated. The individual should then be advised regarding the reason for the restricted area. When the restricted area has been re-established and secured resume radiographic operations. If an entry problem persists, the individual's supervisor should be contacted. If this fails to correct the entry problem, immediately contact the Radiation Safety Officer.

8.2 Radiation Area

This is an area in which radiation levels are such that, if an individual were continuously present in the area, he could receive a dose in excess of 5 m/Rem in any one hour.

8.3 High Radiation Area

This is any area in which radiation levels are such that, if an individual were continuously present in the area, he could receive a dose in excess of 100 mRem in any one hour. The boundary of these areas must be posted with signs that read "Caution - High Radiation Area".

- 8.3.1 Calculate the 100 mR/hr boundary and post signs that read "Caution - High Radiation Area."
- 8.3.2 DO NOT SURVEY the 100 mR/hr boundary.

9.0 Surveys

Upon receipt of radioactive sources, a survey shall be made of the shipping container within 2 hours. Physical radiation surveys shall be performed in the manner and at the times specified below.

9.1 Survey Upon Receipt of New Radioactive Sources

12-1-94

GENERAL OPERATING PROCEDURES

SECTION II

- 9.1.1 Upon receiving a new radioactive source the exterior surface of the transport container shall be surveyed. The maximum acceptable dose rate for this survey is 50 mR/hr at 6 inches from the exterior surface.
- 9.1.2 After the exposure device has been removed from the transport container another survey shall be performed. The above referenced dose rate limit shall apply.
- 9.1.3 The readings observed during the above surveys shall be recorded on the Camera Survey form. (Attachment II-2, or equivalent)
- 9.2 Surveys Upon Removal of Exposure Devices From Storage Facility

(Note: for the purpose of this procedure a storage facility and a storage vault are one and the same)

 - 9.2.1 Upon removing an exposure device from the storage facility and prior to placing it in a vehicle for transport, it shall be surveyed. The maximum allowable exposure limits from the exposure device shall be those outlined in 9.1.1 above.
 - 9.2.2 The results of these surveys shall be recorded on the Daily Radiation Job Sheet under the section titled "Check-out Survey". (Attachment II-3, or equivalent)
- 9.3 Surveys of the Perimeter of Restricted Areas
 - 9.3.1 After the restricted area boundaries have been calculated the boundaries shall be surveyed as required in 8.1.3 of this section.
 - 9.3.2 The results of these surveys and the distance to the boundaries shall be recorded on the Daily Radiation Job Sheet. (Attachment II-3, or equivalent)
- 9.4 Surveys After Completion of Each Exposure
 - 9.4.1 The area shall be surveyed at the completion of each exposure and while approaching the exposure device.
 - 9.4.2 Upon reaching the exposure device the area around the device and the source guide tube shall be surveyed. Exposure levels observed should correspond to those previously determined by surveys made during initial removal of the exposure device from the storage facility.
 - 9.4.3 IF INTENSITY LEVELS DO NOT CORRESPOND TO THOSE PREVIOUSLY MEASURED, THE SOURCE HAS NOT RETURNED TO THE FULLY SHIELDED POSITION. (In this case refer to the Emergency Procedures)
- 9.5 Surveys Upon Completion of final Exposure

12-1-94

GENERAL OPERATING PROCEDURES

SECTION II

- 9.5.1 Upon completing the final exposure for a job, the steps in 9.4 above are to be repeated. This must be done prior to placing the exposure device in a vehicle for transport back to the storage vault.
- 9.5.2 Exposure devices are to be locked and survey readings required in 9.5.1 above shall be recorded on the Daily Radiation Job Sheet in the "Lock-out" survey section (Attachment II-3, or equivalent).

9.6 Surveys of Permanent Storage Area

- 9.6.1 With sources present placed in the storage facility, a survey shall be performed of the areas surrounding the facility.
- 9.6.2 The results of these surveys shall be recorded on the Storage Vault Survey form (Attachment II-4 or 5, or equivalent).
- 9.6.3 Radiation dose rates at the boundaries of the storage vault must not exceed 2 mR/hr. If the radiation levels are found to exceed 2 mR/hr, additional shielding shall be added to the vault in order to bring the dose rate into compliance.

9.7 Vehicle Surveys

- 9.7.1 After radioactive materials have been placed in a vehicle and secured, a survey of the exterior surface of the vehicle and the passenger compartment shall be performed.
- 9.7.2 The maximum dose rate at any exterior surface of the vehicle shall not exceed 2 mR/hr, and the maximum dose rate in the passenger compartment shall not exceed 1 mR/hr.
- 9.7.3 If a vehicle is used as a temporary storage area the entry shall be posted with a "CAUTION RADIOACTIVE MATERIALS" sign and precautions taken to assure, that if an individual were continually present in the adjacent unrestricted area the dose would not exceed 2 mRem in an hour or 50 mRem in a year.
- 9.7.4 If radiation levels exceed those specified in 9.7.2. or 9.7.3 above, the radioactive source(s) must be repositioned and or additional shielding provided until the specified limits are met.
- 9.7.5 The highest dose rate observed during the above vehicle survey shall be recorded on the Daily Radiation Job Sheet (Attachment II-3, or equivalent)

10.0 Utilization Log

Utilization logs (Attachment II-6, or equivalent) shall be maintained at the Permanent and Temporary Storage Facilities and shall include the following information:

- 10.1 The serial number and model number of the device used.
- 10.2 The identification of the radiographer.
- 10.3 Where the device is used.
- 10.4 The date and time the device is checked out of storage.
- 10.5 The date and time the device is checked into storage.

11.0 Transportation of Radioactive Material

The following procedures shall be followed when transporting radioactive materials by vehicle:

- 11.1 Radioactive materials will be transported by company vehicles or commercial carriers only.
- 11.2 Vehicles used to transport radioactive materials which have radiation levels that require D.O.T. Yellow III warning labels, will be posted with placards that read "Radioactive", or "Caution - Radioactive" on the front, back and both sides.
- 11.3 Transport containers used for radioactive materials shall be labeled with Yellow II warning labels when the intensity is less than 50 mR/hr at the surface and less than 1 mR/hr at 1 meter from the surface. Containers shall be labeled with Yellow III warning labels if the radiation intensity exceeds the above. These labels shall be placed on two opposite sides of each container.
- 11.4 The radioactive materials shipping papers shall be obtained for the source prior to shipment. (Attachment II-9 or equivalent)
- 11.5 The required utilization log entries shall be completed when a source is removed from storage.
- 11.6 The exposure device shall be surveyed prior to being placed in a vehicle to ensure that the source is in the fully shielded position.
- 11.7 The exposure device shall be placed in the vehicle and secured, or if the device is not a Type B Container, placed in a Type B overpack which is securely attached to the vehicle.
- 11.8 Vehicle surveys shall be performed and properly recorded in accordance with the procedures outlined in part 9.7 of this section.
- 11.9 After completion of a radiographic operation the exposure device shall be secured in the vehicle and the vehicle surveyed prior to transport back to the storage facility.

12-1-94

GENERAL OPERATING PROCEDURES

SECTION II

- 11.10 A utilization log entry shall indicate when exposure devices are placed in the storage facility.

12.0 Receipt and Disposal of Radioactive Materials

- 12.1 Receipt of Radioactive Materials - Upon receipt of radioactive materials, the following steps shall be taken:

12.1.1 A survey shall be performed in accordance with the procedures outlined in part 9.1 of this section within 2 hours of receipt.

12.1.2 The receipt record shall be signed or initialed and dated.

12.1.3 Camera surveys shall be completed on all new sources when received.

12.1.4 Information concerning the radioactive source and required surveys shall be entered on the appropriate form. (Attachment II-2 or equivalent)

12.1.5 Records shall be maintained on each source, containing the decay chart, camera survey, receipt records and leak test results.

- 12.2 Disposal of Radioactive Materials - All radioactive materials shall be returned to the supplier for disposal. When disposing of radioactive material the following steps shall be taken.

12.2.1 Radioactive sources shall be prepared for shipment in accordance with procedures outlined in part 11.0 of this section.

12.2.2 The date of disposal shall be recorded on the appropriate form. (Attachment II-2 or equivalent)

12.2.3 Radioactive sources shall be transported to the source supplier for disposal.

12.2.4 Upon receipt of the disposal record from the supplier, all information concerning the source receipt record, decay chart, leak test records, camera survey and disposal record shall be placed in the disposal file.

13.0 Leak Testing of Sealed Sources

Leak testing of sources will normally be performed by the Radiation Safety Officer or his assistant. The following are procedures to be followed in the event that leak tests must be performed by the radiographer in the field.

13.1 Leak Testing of Crank-Out Type Exposure Devices

12-1-94

GENERAL OPERATING PROCEDURES

SECTION II

- 13.1.1 Upon receipt of the leak test kit from the Radiation Safety Officer, all information must be filled out. This includes source serial number, activity, type of source, date, etc.
- 13.1.2 Remove the red swab from the leak test kit.
- 13.1.3 Wipe around source pigtail connector and just inside source tube connector on the exposure device with the swab.
- 13.1.4 Place swab inside plastic vial, breaking off excess stick. Replace cap on vial and place inside mailing envelope.
- 13.1.5 Remove white swab from the kit, wet with ordinary tap water and repeat the above operation.
- 13.1.6 Survey the leak test kit with a survey meter. If a reading in excess of background is detected, DO NOT MAIL the kit; instead contact the Radiation Safety Officer immediately.
- 13.1.7 If no radiation levels in excess of background are detected, mail the kit to the Radiation Safety Officer.

14.0 Internal Inspection Program

Internal inspections will be performed to evaluate each radiographer and radiographer's assistants' compliance with the Nuclear Regulatory Commission's regulatory requirements and Western X-ray Company's, Operating and Emergency Procedures. Each such inspection of a radiographer or radiographer's assistant will include observation of his performance during an actual radiographic operation. Additionally, the following criteria shall apply to all internal inspections.

- 14.1 Internal Inspections shall be performed by the following individuals:
 - a. Radiation Safety Officer
 - b. Assistant Radiation Safety Officer
 - c. Radiation Field Supervisor (Section-I, para 3)
- 14.2 Each radiographer, and radiographer's assistant shall be inspected at least once every three months.
- 14.3 If a radiographer or a radiographer's assistant has not participated in a radiographic operation for more than three months since the last inspection, that individual will be inspected during the next radiographic project that he participates in.
- 14.4 Internal inspections shall be unannounced. Only the Radiation Safety Officer or Assistant Radiation Safety Officer will schedule internal inspections.

12-1-94

GENERAL OPERATING PROCEDURES

SECTION II

- 14.5 A record of each internal inspection shall be recorded on the internal inspection checklist. (Attachment II-4, or equivalent) The internal inspection records shall be maintained by the Radiation Safety Officer for a period of 3 years.
- 14.6 In addition to those items listed on the internal inspection checklist, (Attachment II-4, or equivalent), any other items of noncompliance that are identified during the inspection shall be recorded on the inspection record.
- 14.7 All items of noncompliance shall be reviewed by the Radiation Safety Officer. The RSO shall determine the specific corrective actions to be taken regarding identified deficiencies. This decision shall be based on the severity of the noncompliance. As a minimum the Radiation Safety Officer will assure that the individual responsible for the noncompliance is notified of the specific noncompliance and that the relevant regulation or procedure is reviewed and understood by the individual.

15.0 Inventory, Inspection and Maintenance of Equipment

The following procedures shall be performed by the Radiation Safety Officer or Assistant Radiation Safety Officer, and records shall be maintained for inspection by the Commission.

- 15.1 Equipment Inventory - All radiography sources shall be inventoried quarterly. (Attachment II-8, or equivalent)
- 15.2 Inspection and Maintenance - Radioactive sources, exposure devices and related equipment shall be inspected and necessary maintenance performed on a quarterly basis. (Attachment II-8, or equivalent)

16.0 Records Management

The following records shall be maintained by the Radiation Safety Officer at: 3803 Branson Rd., Poteau, OK, for inspection by the Nuclear Regulatory Commission.

- 16.1 Utilization Logs: All completed utilization logs shall be maintained on file.
- 16.2 Exposure Records: These records include daily dosimeter records, monthly film badge records and NRC Form 5's (or comparable form).
- 16.3 Survey Records: Survey records to be kept by the Radiation Safety Officer shall include area surveys, vehicle surveys and camera surveys performed by radiographers and turned in on the utilization records. They shall also include initial camera surveys for new radioactive sources and storage facility surveys.
- 16.4 Calibration Records: Calibration records for survey instruments, alarm ratemeters, and dosimeters.
- 16.5 Inventory, Inspection and Maintenance Records: As outlined in part 15.0 of this section.

- 16.6 Training Records: All training of radiographic personnel shall be performed in accordance with the criteria outlined in Section V of this procedure. All records of training, including copies of examinations shall be maintained by the Radiation Safety Officer.
- 16.7 Receipt, Transfer and Disposal Records: All receipt, transfer and disposal of radioactive materials shall be performed in accordance with the procedures outlined in part 12.0 of this section. Additionally a perpetual record of sources currently located in the source storage facility and sources assigned to radiographers for use at field locations shall be maintained.
- 17.0 Records to be Maintained at Temporary Jobsite
- The following records shall be available at each temporary jobsite for inspection by the Commission.
- 17.1 Nuclear Regulatory Commission - Materials License
- 17.2 Company Operating and Emergency procedures.
- 17.3 Nuclear Regulatory Commission Regulations, 10 CFR parts 19, 20 and 34.
- 17.4 Surveys recorded on the current Daily Radiation Job Sheet. (Attachment II-3, or equivalent) Camera surveys, vehicle surveys, and area surveys shall be recorded.
- 17.5 Daily pocket dosimeter records.
- 17.6 Survey instrument calibration.
- 17.7 Decay Chart for the source being used.

12-1-94

GENERAL OPERATING PROCEDURES

SECTION II

ATTACHMENT II-1WESTERN X-RAY COMPANY
DOSIMETER CALIBRATION RECORD

DATE _____		LOCATION _____		CALIBRATED BY _____			
CALIBRATION DEVICE _____		MODEL _____		S/N _____			
DOSIMETER MFG.	MODEL	SERIAL NUMBER	EXPOSURE IN MR		ACCURACY (MUST BE WITHIN $\pm 30\%$)	S	U
			ACTUAL	RESPONSE			
REMARKS							

12-1-94

GENERAL OPERATING PROCEDURES

SECTION II

ATTACHMENT II-2

WESTERN X-RAY COMPANY
ISOTOPE SHIPPING/RECEIVING FORM

DATE ORDERED _____ ORDERED BY _____ ORDERED FROM _____
TYPE OF ISOTOPE _____ NO. SOURCES ORDERED _____ SHIPPED VIA _____

RECEIVING

DATE RECEIVED _____ TIME _____ AM / PM RECEIVED BY _____
NUMBER OF CURIES RECEIVED _____ SOURCE SERIAL NUMBER _____
IN SHIPPING CONTAINER: MAKE _____ MODEL NO. _____ S/N _____
READING AT SURFACE OF CONTAINER _____ MR/HR READING AT 1 METER _____ MR/HR
IN CAMERA: MAKE _____ MODEL NO. _____ S/N _____
READING AT 6 IN. FROM CAMERA _____ MR/HR READING AT 1 METER _____ MR/HR
SURVEY METER: MAKE _____ MODEL _____ S/N _____ CAL DUE _____
SURVEY: DATE _____ TIME _____ AMPM SURVEY MADE BY _____

TRANSFER

DATE _____ NUMBER OF CURIES _____ SOURCE SERIAL NO. _____
FROM SHIP/CON: S/N _____ TO CAMERA: MAKE _____ MODEL _____ SERIAL NO. _____
READING AT 6 INCHES _____ MR/HR READING AT 1 METER _____ MR/HR
FROM CAMERA: MODEL _____ SERIAL NO. _____ TO CAMERA: MODEL _____ SERIAL NO. _____
READING AT 6 INCHES _____ MR/HR READING AT 1 METER _____ MR/HR
SURVEY METER: MAKE _____ MODEL _____ S/N _____ CAL DUE _____
TRANSFERS AND SURVEYS MADE BY: _____

DISPOSAL

DATE _____ NUMBER OF CURIES _____ SOURCE SERIAL NO. _____
FROM CAMERA: MAKE _____ MODEL _____ SERIAL NO. _____ TO SHIP/CON: S/N _____
SURVEY OF SHIPPING CONTAINER: SURFACE _____ MR/HR AT 1 METER _____ MR/HR
SURVEY METER: MAKE _____ MODEL _____ S/N _____ CAL DUE _____
FOR DISPOSAL TO: _____ PREPARED BY: _____

FORM WXC-008 12/1994

12-1-94

GENERAL OPERATING PROCEDURES

SECTION II

ATTACHMENT II-3

DAILY RADIATION JOB SHEET

COMPANY _____ DATE _____

LOCATION _____

JOB DESCRIPTION _____

CAMERA _____ SOURCE _____ CURIES _____

SURVEY METER _____ SERIAL NO _____ CALIBRATED Yes () No ()

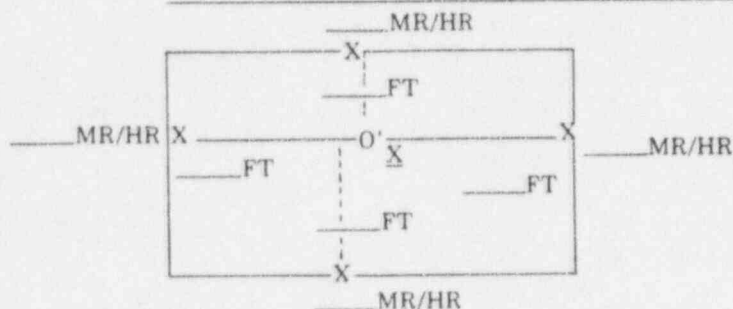
CAMERA SURVEYS CHECK OUT _____ MR/HR
LOCK OUT _____ MR/HR

VEHICLE SURVEY BEFORE LEAVING SHOP _____ MR/HR

BEFORE LEAVING JOB SITE _____ MR/HR

(Note: Vehicle survey is the highest reading obtained on all four sides and in the drivers seat)

	FILM BADGE	DOSIMETER READING		TOTAL MR READINGS
		START	END OF DAY	



X = RADIATION AREA SIGN
 X = HIGH RADIATION SIGN
 O = SOURCE

DAILY EQUIPMENT CHECK _____
ANY MALFUNCTIONS NOTE ON BACK OF SHEET _____"LAST USE" SURVEY MADE AT STORAGE VAULT _____
VEHICLE _____ MR/HR AT SOURCE OUTLET
PORT WITH SAFETY PLUG INSTALLED.

TIME _____

RADIOGRAPHERS SIGNATURE _____

ATTACHMENT II-4

WESTERN X-RAY COMPANY
RADIOACTIVE ISOTOPE PERMANENT STORAGE FACILITY PHYSICAL SURVEY

FACILITY ADDRESS: 3803 Branson Rd.
Poteau, OK 74953

DATE: _____ SURVEYED BY: _____

SURVEY METER: MODEL _____ S/N _____

CAMERA S/N	SOURCE S/N	ACTIVITY

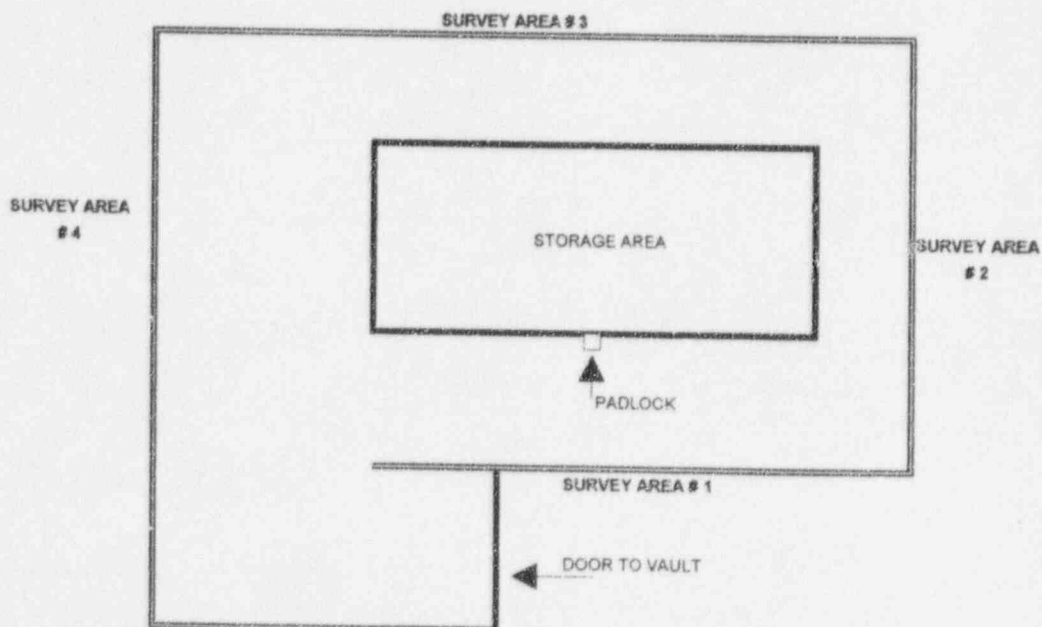
AREA #1 _____ mR/HR

AREA #2 _____ mR/HR

AREA #3 _____ mR/HR

AREA #4 _____ mR/HR

NOTES: SURVEYS MADE OUTSIDE 6" BLOCK WALL



12-1-94

GENERAL OPERATING PROCEDURES

SECTION II

ATTACHMENT II-5

WESTERN X-RAY COMPANY
RADIOACTIVE ISO10PE TEMPORARY STORAGE FACILITY PHYSICAL SURVEY

FACILITY ADDRESS: All Space Storage Building
Number 33
Highway 270 & 4th Street
Selling, Oklahoma 73663

DATE: _____ SURVEYED BY: _____

SURVEY METER: MODEL _____ S/N _____

CAMERA S/N	SOURCE S/N	ACTIVITY

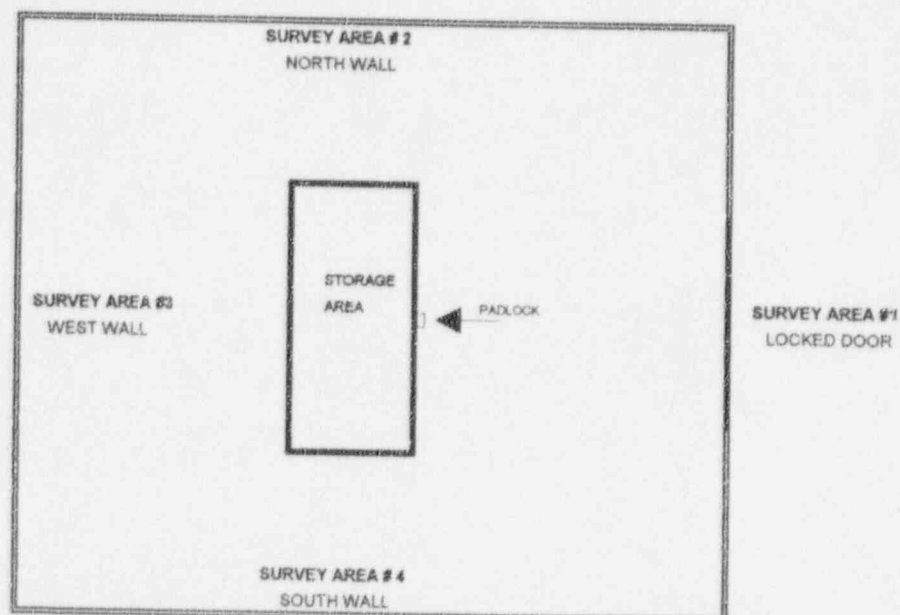
AREA #1 _____ mR/HR

AREA #2 _____ mR/HR

AREA #3 _____ mR/HR

AREA #4 _____ mR/HR

NOTES: WALL SURVEYS MADE INSIDE 8" BLOCK WALL
DOOR SURVEY MADE OUTSIDE METAL DOOR



ATTACHMENT II-6

WESTERN X-RAY COMPANY
RADIOACTIVE ISOTOPE UTILIZATION LOG

[illegible]

12-1-94

GENERAL OPERATING PROCEDURES

SECTION II

ATTACHMENT II-7

WESTERN X-RAY COMPANY
QUARTERLY INSPECTION RECORD

Date _____		Location _____		Auditor _____	
RADIOGRAPHER #1 _____		SERIAL # _____	VOID DATE _____	READING _____	
DOSIMETER _____		_____	_____	_____	
RATE ALARM _____		_____	_____	_____	
FILM BADGE/TLD _____		_____	_____	_____	
RADIOGRAPHER #2 _____		SERIAL # _____	VOID DATE _____	READING _____	
DOSIMETER _____		_____	_____	_____	
RATE ALARM _____		_____	_____	_____	
FILM BADGE/TLD _____		_____	_____	_____	
DEVICE MANUFACTURER _____		MODEL _____		S/N _____	
RADIATION LABEL <input type="checkbox"/> YES <input type="checkbox"/> NO		CHECKLIST LABEL <input type="checkbox"/> YES <input type="checkbox"/> NO			
SOURCE MANUFACTURER _____		TYPE _____			
CURIE STRENGTH _____		SERIAL NO. _____			
SURVEY METER #1 _____					
MANUFACTURER _____		MODEL NUMBER _____			
SERIAL NUMBER _____		VOID DATE _____			
SURVEY METER #2 _____					
MANUFACTURER _____		MODEL NUMBER _____			
SERIAL NUMBER _____		VOID DATE _____			
Were other individuals working within the Restricted Area wearing film badges/tld's, rate alarms, and dosimeters? ___ YES ___ NO Was Radiographer wearing film badge/tld, rate alarm, and dosimeter? ___ YES ___ NO Radioactive Material License with Amendments available? ___ YES ___ NO Company Operating and Emergency Procedures available? ___ YES ___ NO NRC or State Radiation Regulations available? ___ YES ___ NO Utilization log properly filled out? ___ YES ___ NO Decay chart and wipe test records available? ___ YES ___ NO Calibrated and properly operating survey meter available? ___ YES ___ NO Survey meter used properly/each exposure ___ YES ___ NO Source projector locked after each exposure? ___ YES ___ NO Restricted Area properly controlled to prevent unauthorized entry? ___ YES ___ NO Was the Restricted Area posted with "Caution Radiation Area" signs? ___ YES ___ NO Was storage area posted with "Caution Radioactive Material" signs? ___ YES ___ NO Were radioactive isotopes stored properly and kept locked to prevent unauthorized removal? ___ YES ___ NO Were there any items of noncompliance other than those listed on this form? (If any, explain in remarks) ___ YES ___ NO					
LIST REMARKS AND/OR PERIODIC TRAINING IF PERFORMED _____					

12-1-94

GENERAL OPERATING PROCEDURES

SECTION II

ATTACHMENT II-8

WESTERN X-RAY COMPANY
QUARTERLY INVENTORY INSPECTION AND MAINTENANCE

PERIOD ENDING

INSPECTED BY _____

[illegible]

1.0 Purpose and Scope

This section describes the permanent storage facility, temporary storage facilities and use areas.

2.0 Location

- 2.1 The physical location of the permanent storage facility for all radioactive materials issued under this license shall be at:

3803 Branson Road
Poteau, Oklahoma 74953

- 2.2 Radioactive material may also be stored at the following temporary storage area:

All Space Storage Building
Number 33
Highway 270 & 4th Street
Seiling, Oklahoma 73663

- 2.3 Radioactive material may also be stored in company special designed darkroom trucks on temporary job sites throughout the United States.

- 2.4 See attached drawings for physical dimensions of storage areas.

3.0 Description of Storage Facility

- 3.1 Permanent Storage Facility (See paragraph 2.1)

Radiographic exposure devices will be kept in a 1/8 in. thick steel box 4 ft. long x 18 in. wide x 14 in. high. This will have a steel lid on top with a padlock to prevent unauthorized entry. Surrounding the steel storage vault will be concrete block walls, 6 in. thick, measuring 6 ft. long x 6 ft. wide x 6 ft. high. Radiation levels will be less than 2 mR/hr at external surface of storage facility. This storage facility is located inside a wood frame building with a concrete floor. The building is 12 ft. wide x 36 ft. long. (See attachment III-1, 2, and 3)

- 3.2 Temporary Storage Facility (See paragraph 2.2)

Radiographic exposure devices will be kept in a 1/8 in. thick steel box 4 ft. long x 18 in. wide x 14 in. high. This will have a steel lid on top with a padlock to prevent unauthorized entry. Surrounding the steel storage vault will be concrete block walls, 8 in. thick, measuring 12 ft. long x 12 ft. wide x 7 ft. high. Radiation levels will be less than 2 mR/hr at external surface of storage facility. (See attachment III-4 and 5)

4.0 Posting of Storage Areas

Storage facilities shall be conspicuously posted, with a minimum of one sign on each side that has potential access. The signs shall bear the radiation symbol described in 10 CFR Part 20, and the words "CAUTION RADIOACTIVE MATERIAL" or "DANGER RADIOACTIVE MATERIAL". Areas adjacent to the storage facility will be designated as "Unrestricted Areas" and the radiation intensity at the perimeter of the storage facility will be maintained at a level not exceeding 2 mR/hr.

5.0 Security of Storage Areas

The storage areas shall be locked, except when radioactive materials, exposure devices, and /or related equipment, are being removed, replaced, or maintenance is being performed. To assure security of the storage facility, the Radiation Safety Officer will control issuance of keys to the facility.

12-1-94

DESCRIPTION OF FACILITIES AND USE AREAS

SECTION III

ATTACHMENT III-1

WESTERN X-RAY COMPANY
RADIOACTIVE ISOTOPE PERMANENT STORAGE FACILITY

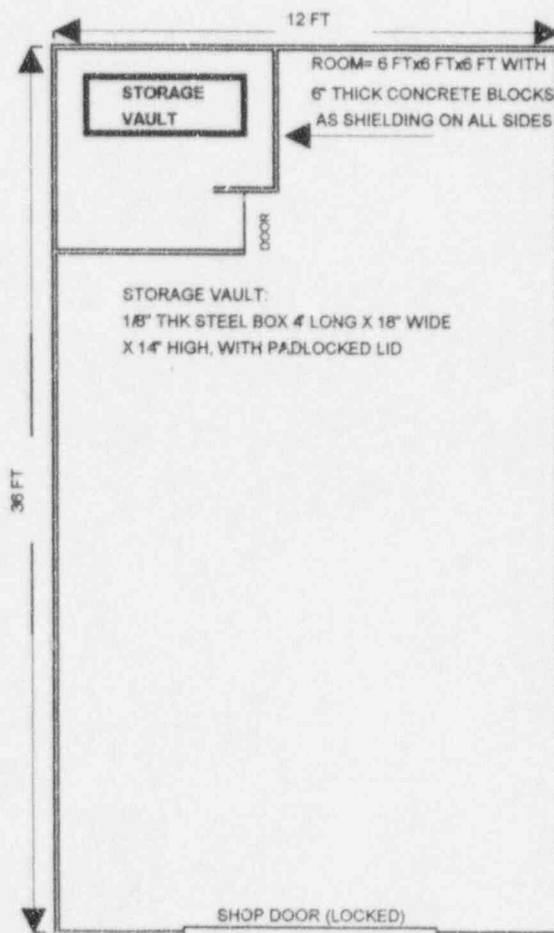
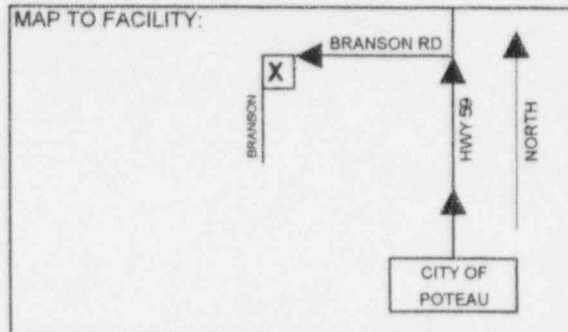
FACILITY ADDRESS:

3803 BRANSON RD.
POTEAU, OK 74953

Directions to Facility:

Take Hwy. 59 approx. 3 miles north of Poteau, OK, go left on Branson Rd. approx. 2 miles to location as shown on map. Storage facility is located on a 6 acre lot.

MAP TO FACILITY:



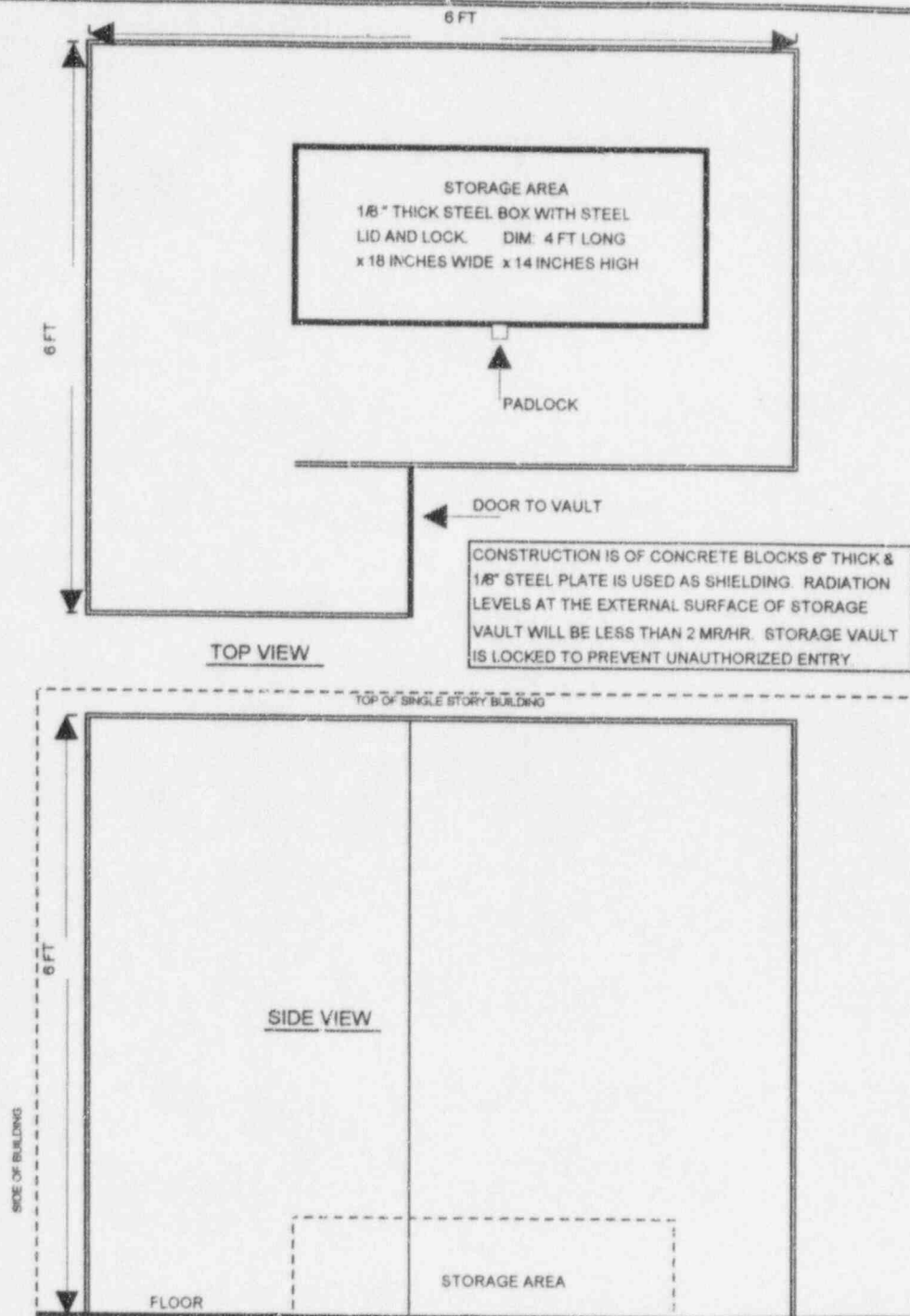
PLAN VIEW OF BUILDING

12-1-94

DESCRIPTION OF FACILITIES AND USE AREAS

SECTION III

ATTACHMENT III-2

WESTERN X-RAY COMPANY
RADIOACTIVE ISOTOPE PERMANENT STORAGE FACILITY

12-1-94

DESCRIPTION OF FACILITIES AND USE AREAS

SECTION III

ATTACHMENT III-3

WESTERN X-RAY COMPANY
RADIOACTIVE ISOTOPE PERMANENT STORAGE FACILITY PHYSICAL SURVEY

FACILITY ADDRESS: 3803 Branson Rd.
Poteau, OK 74953

DATE: _____ SURVEYED BY: _____

SURVEY METER: MODEL _____ S/N _____

CAMERA S/N	SOURCE S/N	ACTIVITY

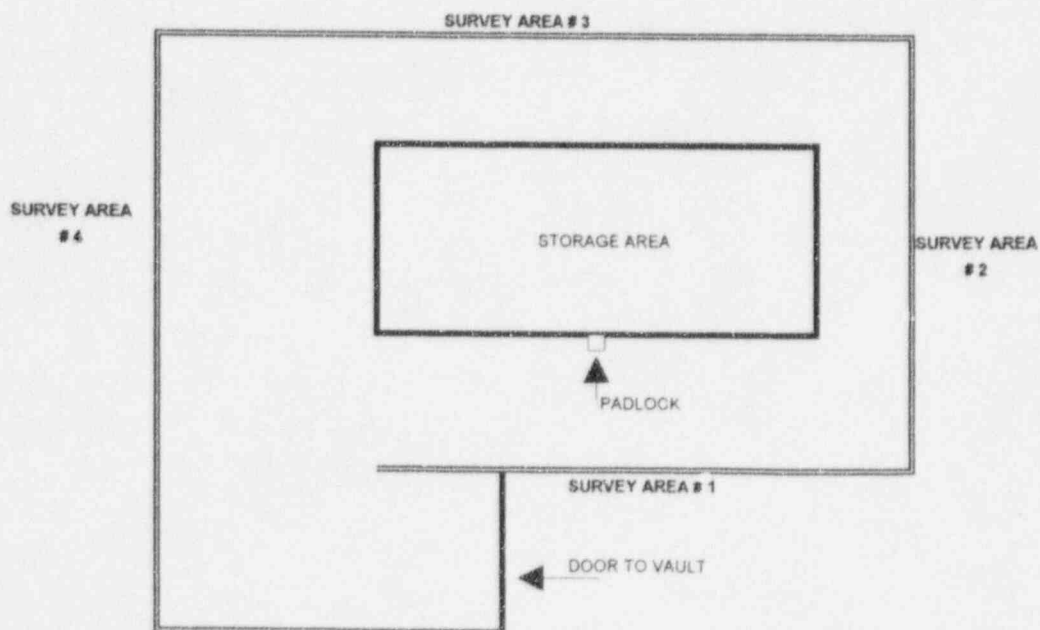
AREA #1 _____ mR/HR

AREA #2 _____ mR/HR

AREA #3 _____ mR/HR

AREA #4 _____ mR/HR

NOTES: SURVEYS MADE OUTSIDE 6" BLOCK WALL



12-1-94

DESCRIPTION OF FACILITIES AND USE AREAS

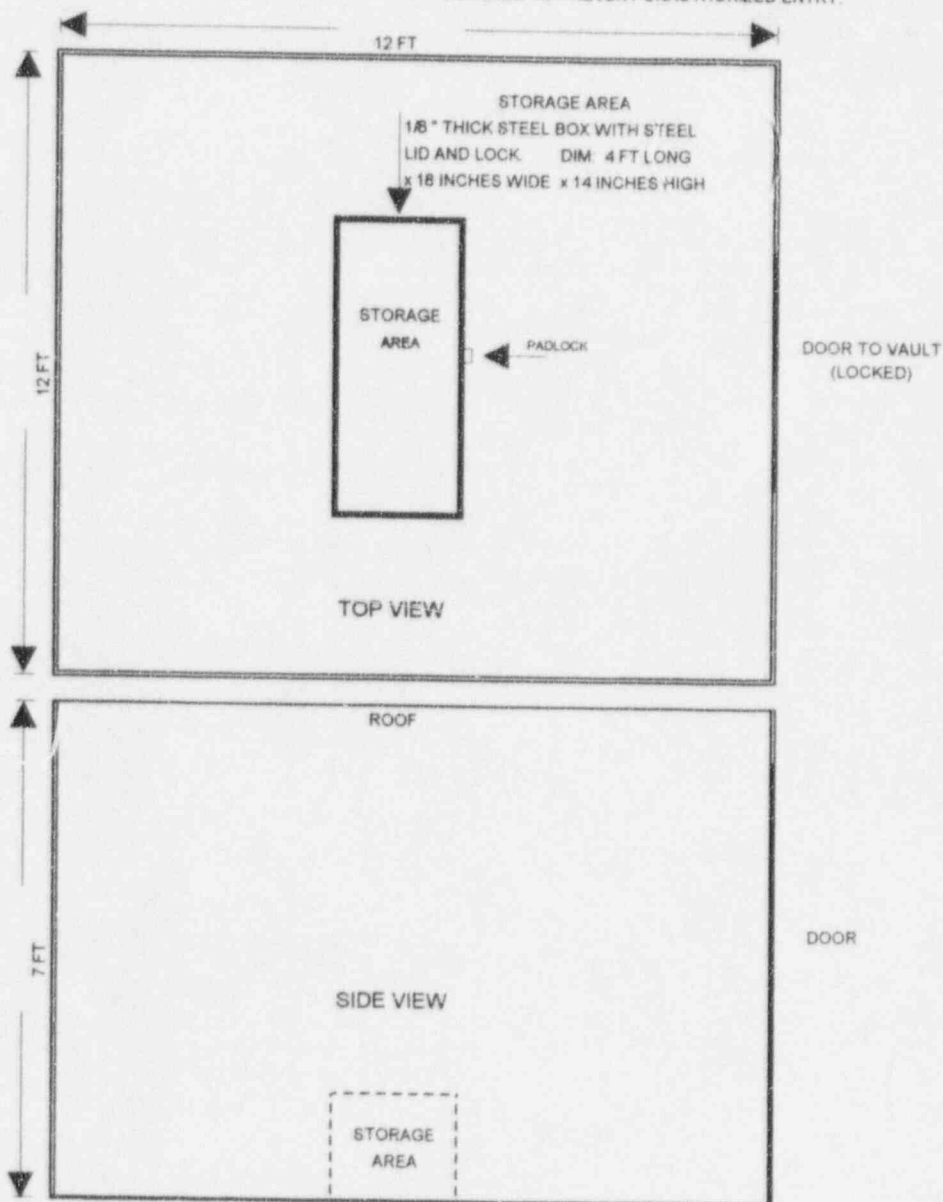
SECTION III

ATTACHMENT III-4

WESTERN X-RAY COMPANY
RADIOACTIVE ISOTOPE TEMPORARY STORAGE FACILITY

FACILITY ADDRESS: All Space Storage Building
Number 33
Highway 270 & 4th Street
Seiling, Oklahoma 73663

THE TEMPORARY STORAGE FACILITY IS 12' WIDE X 12'
DEEP X 7' HIGH, SINGLE STORY.
WALL CONSTRUCTION IS CONCRETE BLOCKS 8" THICK.
DOOR IS CONSTRUCTED OF METAL PLATE.
LEVELS AT THE EXTERNAL SURFACE OF STORAGE
BUILDING WILL BE LESS THAN 2 MR/HR. STORAGE BUILDING
IS LOCKED TO PREVENT UNAUTHORIZED ENTRY.



12-1-94

DESCRIPTION OF FACILITIES AND USE AREAS

SECTION III

ATTACHMENT III-5

WESTERN X-RAY COMPANY
RADIOACTIVE ISOTOPE TEMPORARY STORAGE FACILITY PHYSICAL SURVEY

FACILITY ADDRESS: All Space Storage Building
Number 33
Highway 270 & 4th Street
Selling, Oklahoma 73663

DATE: _____ SURVEYED BY: _____

SURVEY METER: MODEL _____ S/N _____

CAMERA S/N	SOURCE S/N	ACTIVITY

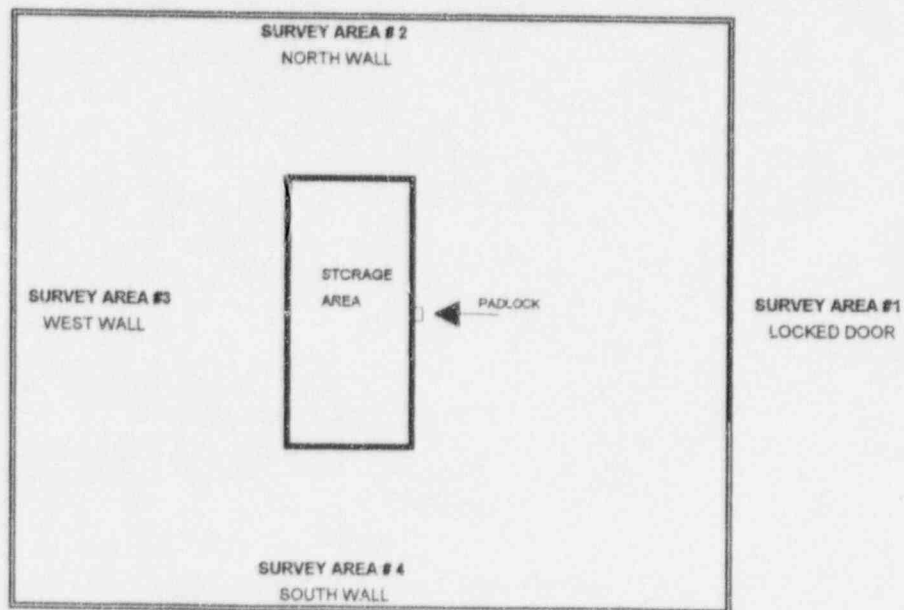
AREA #1 _____ mR/HR

AREA #2 _____ mR/HR

AREA #3 _____ mR/HR

AREA #4 _____ mR/HR

NOTES: WALL SURVEYS MADE INSIDE 8" BLOCK WALL
DOOR SURVEY MADE OUTSIDE METAL DOOR



12-1-94

EMERGENCY PROCEDURES

SECTION IV

1.0 Purpose and Scope

With the best of safety precautions, the possibility of accidents occurring must still be considered. This section establishes procedures to be followed in the event of an emergency while utilizing radioactive materials. It is the responsibility of each radiographer and assistant radiographer to become thoroughly familiar with the procedures outlined in this section and to follow them explicitly in the event of an emergency.

2.0 General Policy

If there is any question as to whether or not a given situation constitutes an emergency, then emergency procedures are to be followed. If there are any questions after reading this section the Radiation Safety Officer should be contacted for further explanation.

3.0 Emergencies Arising from Equipment Malfunctions

In the event of an emergency arising from malfunction of an exposure device including a disconnected source, damage to a source, or damage to an exposure device the following steps are to be taken:

- 3.1 Immediately survey the area with an operable survey instrument and post a boundary at the 2 mR/hr area.
- 3.2 Place "CAUTION - RADIATION AREA" signs at the boundary.
- 3.3 UNDER NO CIRCUMSTANCES is the area to be left unattended by the radiographer in charge.
- 3.4 Keep visual surveillance on the area in order to keep all unauthorized personnel out.
- 3.5 Send someone, with a written message, to contact the Radiation Safety Officer. In the event that the Radiation Safety Officer is not available, contact the Assistant Radiation Safety, or appropriate regulatory agencies. The telephone numbers are listed at the end of this section.
- 3.6 DO NOT PANIC if help is not immediately available, remember that no harm will be done if all persons stay back behind the boundaries and out of the posted area.
RADIOGRAPHERS ARE NOT TO ATTEMPT TO RETRIEVE DISCONNECTED SOURCES UNLESS THEY HAVE BEEN TRAINED IN THE PROCEDURE AND HAVE THE APPROVAL OF THE RADIATION SAFETY OFFICER!
- 3.7 After securing the area and sending someone to request assistance, maintain surveillance of the area until help arrives. Do not leave untrained, or inexperienced, personnel to watch the area.

12-1-94

EMERGENCY PROCEDURES

SECTION IV

4.0 Lost or Stolen Devices

In the event that an exposure device should be lost, or stolen, immediately notify the Radiation Safety Officer. If the RSO can not be contacted, notify the appropriate regulatory agency. The telephone numbers are listed at the end of this section.

5.0 Vehicle Accidents

In the event that an accident occurs involving a vehicle transporting radioactive materials, the following steps must be followed:

- 5.1 Utilizing a survey instrument determine if the source is in the shielded position.
- 5.2 If the source is in the shielded position, remain with the exposure device while someone notifies the Radiation Safety Officer.
- 5.3 If the survey instrument indicates that the source is not in the shielded position, or if the survey instrument is broken, the following steps must be taken:
 - 5.3.1 Move everyone as far back from the vehicle as possible and keep surveillance over the area to ensure that no one enters.
 - 5.3.2 Calculate the distance to the 2 mR/hr boundary and adjust the perimeter established in 5.3.1 above, if necessary.
 - 5.3.3 Remain with the vehicle while sending someone with written instructions to notify the Radiation Safety Officer.
 - 5.3.4 UNDER NO CIRCUMSTANCES is the radiographer in charge to leave the area. Maintain surveillance until help arrives.
- 5.4 In the case of a minor accident when no radiation hazard exists and the vehicle is movable, no restriction of the area is necessary. In any event, notify the Radiation Safety Officer as soon as possible.

6.0 Accidents Involving Exposure to Non-Monitored Personnel

The following procedures are to be followed in the event that unauthorized persons, who are not wearing personnel monitoring devices become exposed:

- 6.1 Immediately return the radioactive source to the shielded position.
- 6.2 If source cannot be returned to the shielded position, follow procedures in 3.0 of this section.

12-1-94

EMERGENCY PROCEDURES

SECTION IV

- 6.3 Obtain names and addresses of non-monitored personnel involved.
- 6.4 Notify the Radiation Safety Officer and proceed with his instructions.
- 7.0 Emergencies Due to Fire
 - 7.1 Return source to shielded position, lock exposure device and remove it from the fire hazard area.
 - 7.2 If the exposure device cannot be removed from the area, notify fire department personnel, upon their arrival, of the condition of the source (i.e., exposed or shielded, but exposure device still in fire hazard area).
 - 7.3 If the source is exposed, obtain the names of all fire department personnel who were near the exposure device while fighting the fire.
 - 7.4 If the source is exposed and cannot be brought back to a shielded position after the fire is extinguished, proceed with procedures as outlined in 3.0 of this section.

12-1-94

EMERGENCY PROCEDURES

SECTION IV

PERSONNEL TO BE NOTIFIED IN CASE OF EMERGENCY

WESTERN X-RAY COMPANY

James Peters - Radiation Safety Officer

3803 Branson Road

Poteau, OK 74953

Phone (918) 647-5044

FAX (918) 647-7291

United States Nuclear Regulatory Commission

Region IV	Arlington, TX	817-860-8100
-----------	---------------	--------------

Other NRC Regions

Region I	King of Prussia, PA	215-337-5000
Region II	Atlanta, GA	404-331-4503
Region III	Glen Ellyn, IL	708-790-5500
Region V	Walnut Creek, CA	510-975-0200

Refer to: NRC Form 3 for Nuclear Regulatory Commission region locations

Agreement States

Alabama	205-261-5313	Nebraska	402-471-2168
Arizona	602-255-4845	Nevada	702-885-5394
Arkansas	501-661-2301	New Hampshire	603-271-4588
California	916-445-0931	New Mexico	505-827-2959
Colorado	303-331-8482	New York	518-473-0048
Florida	904-487-1004	North Carolina	919-741-4283
Georgia	404-894-5795	North Dakota	701-224-2348
Illinois	217-785-9868	Oregon	503-229-5797
Iowa	515-281-4928	Rhode Island	401-277-2438
Kansas	913-296-1542	South Carolina	803-734-4700
Kentucky	502-564-3700	Tennessee	615-741-7812
Louisiana	504-925-4518	Texas	512-834-6688
Maryland	301-631-3300	Utah	801-538-6734
Mississippi	601-354-6657	Washington	206-586-8949

1.0 Purpose and Scope

The purpose of this section is to establish the training program to be followed when qualifying personnel to act as radiographers and radiographer's assistants. This section shall apply to all personnel involved in radiographic operations.

2.0 The training program for qualifying radiographic personnel shall be the responsibility of the Radiation Safety Officer.

- 2.1 Formal classroom training shall be administered by James Peters or Johnny Peters (resumes listing training and experience located in section I) or an outside training instructor teaching a course that is recognized by the regulatory agency, on the topics outlined in paragraph 4.2.

3.0 Training Program for Qualifying Radiographer's Assistants:

A new employee without previous experience shall be designated as a trainee after he has completed the following:

3.1 Classroom Training - 6-8 hours instruction in the following:

- 3.1.1 Company's radioactive materials license
- 3.1.2 Company's operating and emergency procedures
- 3.1.3 Nuclear Regulatory Commission's Regulations

3.2 Laboratory Training - 6-8 hours instruction in equipment operations including the following:

- 3.2.1 Use of sources of radiation (i.e., crank-out cameras, pipeliner cameras, etc.)
- 3.2.2 Related handling tools collimator, source tubes, etc.
- 3.2.3 Radiation survey instruments
- 3.2.4 Personnel monitoring equipment (Film badges or TLD badges, pocket dosimeters, alarm ratemeters, and dosimeter chargers)

3.3 The trainee will take a written Examination #1 (or equivalent). He must achieve a score of 70% or better to pass. Any areas that were missed on the examination will be reviewed with the instructor. Personnel failing to score 70% or better on the examination will be required to repeat the above training and re-take the examination.

3.4 Upon completion of the training program outlined in 3.1 through 3.3 above, the individual will work under the supervision of a qualified radiographer for a period of 3 to 6 months,

depending upon his ability and development, before becoming eligible to attend the formal training course to become a radiographer.

4.C Training Program for Qualifying New Radiographers

The following training program shall be completed by all individuals, who have never had formal training and wish to become qualified radiographers.

4.1 Completion of the assistant radiographer training program as outlined in 3.1 through 3.4 of this section.

4.2 Completion of an in-depth radiation safety course, given by the training instructor, or similar course from a company recognized by the regulatory agency, on the following topics:

4.2.1 Fundamentals of Radiation Safety (6-8 hours).

- A Characteristics of Gamma and X-Ray Radiation.
- B Units of Radiation Dose (MREM) and Quantity of Radioactivity (curies).
- C Hazards of Excessive Radiation Exposure.
- D Levels of Radiation from Sources.
- E Methods of Controlling Radiation Dose.
 - (1) Time.
 - (2) Distance.
 - (3) Shielding.
- F Inverse Square Law Problem.
- G Shielding Problems.

4.2.2 Radiation Detection Instruments including Survey Meters, Film Badges, Dosimeters, and Rate Alarms. (8-10 hrs)

- A Use of Survey Instruments.
 - (1) Operation.
 - (2) Limitations.
- B Survey Techniques.
- C Review of Company's Operating and Emergency Procedures which pertains to the proper performing and recording of surveys.

4.2.3 In depth review of Company's operating and emergency procedures with special emphasis on: (6-8 hrs)

- A Records of a Radiographer.
- B Radiographic Exposure Devices.
- C Radioactive Materials Shipping and Receiving Procedures.
- D Remote Handling Equipment
- E Storage Containers

F Inspection and Maintenance performed by the Radiographer

- 4.2.4 Government Regulations - Including, but not limited to, NRC Title 10, Parts 19, 20, 21, and 34 and/or applicable Agreement State Regulations. (2-4 hrs)
 - 4.2.5 Case Histories of Radiography Accidents. (1-2 hrs)
 - 4.3 Successful completion of Examination #2 (or equivalent) at the end of this section, with a score of 70% or better.
 - 4.4 Demonstration, by performance test, of competency in the use of radiation exposure devices, sealed sources, related handling tools, survey instruments, film or TLD badges, dosimeters and other safety equipment used by the company. Acceptance will be determined by the Radiation Safety Officer's evaluation of Examination #3 (or equivalent).
 - 4.5 Demonstration to the Radiation Safety Officer that the individual can safely perform all duties required of a radiographer. This may consist of proceeding through all steps involved in making a radiograph; from the removal of the camera from the storage area, to making an actual exposure and returning the camera to the storage area.
- 5.0 Training Program for Previously Trained Radiographers
- Personnel with previous radiation safety training and experience as a radiographer will have their training, qualifications and experience verified by previous employers. Additionally, they will be required to complete the following:
- 5.1 Demonstrate an understanding of the following:
 - 5.1.1 Company's radioactive materials license
 - 5.1.2 Company's Radiation Safety Program
 - 5.1.3 Nuclear Regulatory Commission Regulations
 - 5.1.4 Handling of radioactive sources and exposure devices
 - 5.1.5 Handling and operation of survey instruments
 - 5.1.6 Handling of related radiographic tools
 - 5.2 Successful completion of Examination #2 (or equivalent) with a grade of 70% or better.
 - 5.3 Demonstration, by performance test, of his competency in the use of radiation exposure devices, sealed sources, related handling tools, survey instruments, film or TLD badges, dosimeters, alarm ratemeters and other safety equipment used by the company. Acceptance

shall be determined by the Radiation Safety Officer's evaluation of Examination #3 (or equivalent).

- 5.4 Demonstration to the Radiation Safety Officer that the individual can safely perform those duties required of a radiographer. This may consist of proceeding through all steps involved in making an exposure; from the removal of the camera from the storage area to making the actual radiograph and returning the camera to the storage area.

6.0 Periodic Refresher Training and Safety Meetings

Periodic refresher training will be conducted at least annually. These meetings shall be scheduled when new devices are acquired, or significant changes are made to operating procedures. Records of these meetings shall be kept by the Radiation Safety Officer. These meetings are intended to keep radiographic personnel advised of new equipment and procedures. Topics to be covered in these meetings shall include, but are not be limited to the following:

- * Nuclear Regulatory Commission's Regulations
- * Radiation safety procedures in field operations
- * Posting and restricting radiographic areas
- * Calculations of boundaries
- * Proper inspection and maintenance of equipment
- * Violations found during previous field inspections
- * Use and care of film badges, TLD's and dosimeters
- * Use and care of Alarm ratemeters
- * Use and care of survey instruments

WESTERN X-RAY COMPANY

3803 Branson Road
Poteau, Oklahoma 74953

EXAMINATION NUMBER 1

RADIOGRAPHERS SAFETY TRAINING EXAMINATION

PLEASE DO NOT WRITE ON THIS TEST - USE THE ANSWER SHEET PROVIDED

1. A survey meter for industrial radiography must have a range of ____ mR/hr to ____ mR/hr.
2. The mR/hr reading that distinguishes a restricted area from a nonrestricted area is the ____.
3. The radiographic area to which access is controlled by the licensee is called a ____.
4. A check of your equipment at ____ intervals is a requirement stated in the ____ and is required to make sure that everything is in good working order before going to the job site.
5. A dosimeter shall be recharged _____, or whenever the hairline nears the high end of the scale.
6. In the process of making a radiograph you discover that your dosimeter has been discharged off scale. You are to:
 - (a) Assume that you will receive the maximum allowable limit or that film badge period.
 - (b) Immediately calculate your exposure using the Inverse Square Law.
 - (c) Send in your film badge or TLD for immediate processing and reading.
7. If you lose your film badge you are to:
 - (a) Notify your Radiation Safety Officer, or supervisor, so that you can be issued another film badge.
 - (b) Be alert for regulatory personnel so that they don't catch you.
 - (c) Wait until time to turn in badge and then tell someone.
8. When should a survey instrument be used?
 - (a) When in doubt about the source being in a shielded position.
 - (b) During any radiation activity or source manipulation.

- (c) When uncertain about radiation levels.
9. When making an exposure you should put up rope barriers and post "Caution Radiation Area" signs where the radiation level is:
- (a) 5 mR/hr
 - (b) 100 mR/hr
 - (c) 2 mR/hr
10. If, while making a radiograph, you noticed an unauthorized raising your boundary ropes and entering the restricted area you should:
- (a) Give him a lecture on radiation safety so he will know that he is in a radiation area and not stay too long.
 - (b) Holler at the man so that he will see the radiographer on duty.
 - (c) Crank the source back into the shielded position until the individual has left the area.
11. In the event that you, as a radiographer, have a disconnect while making an exposure and are not able to return the source to the shielded position inside the camera, you should:
- (a) Notify the supervisor in charge of the operation and immediately bring all work to a stop.
 - (b) Post an actual 2 mR/hr boundary, keep everyone out of the area and send someone to notify your Radiation Safety Officer.
 - (c) Rope off a large area, notify everyone that you have a disconnect and put the source back into the exposure device.
12. In case of a vehicle accident while transporting radioactive materials you should:
- (a) Use survey meter to establish whether source is unshielded or not and if it is move everyone back, follow emergency procedures and have someone notify your Radiation Safety Officer.
 - (b) Put out flares and flags to avoid accidents and move out of the area so you do not receive an overexposure.
 - (c) Call insurance company to inform them of the damage and then call your Radiation Safety Officer so he can get another vehicle underway.
13. Which of the following records as a radiographer are you required to keep for safety reasons?
- (a) Dosimeter readings, film badge, quarterly inventory and delivery tickets.
 - (b) Dosimeter readings, film badge, and occupational exposure history.
 - (c) Dosimeter readings, film badge, survey reports, utilization log, and storage survey.
14. A radiographer working out in the field is required to have with him which of the following:

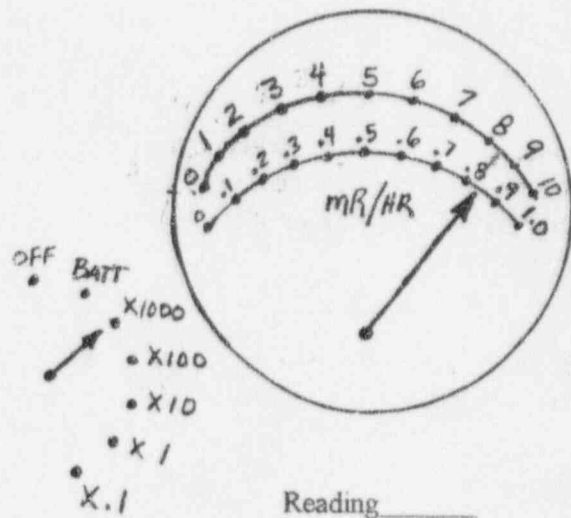
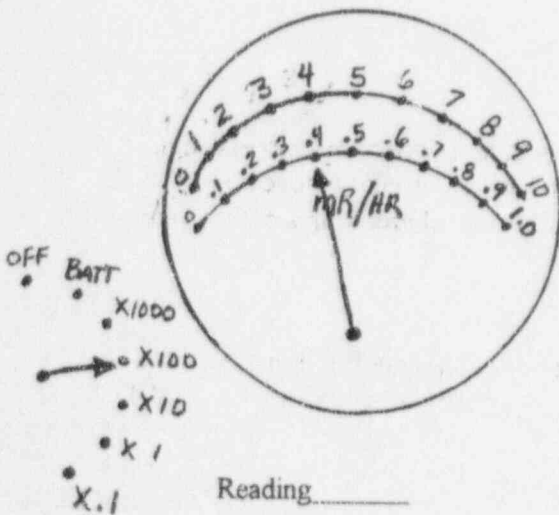
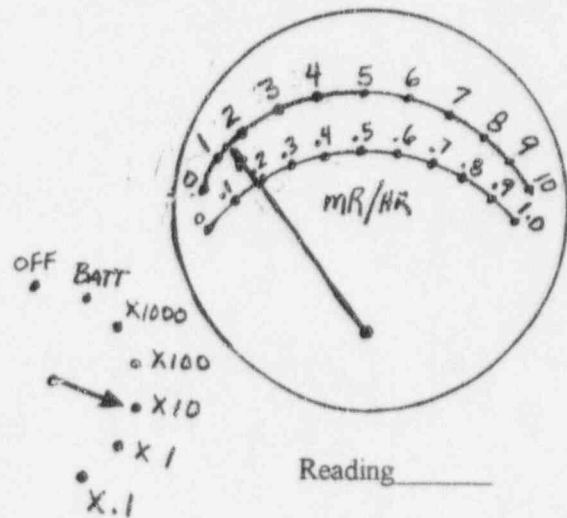
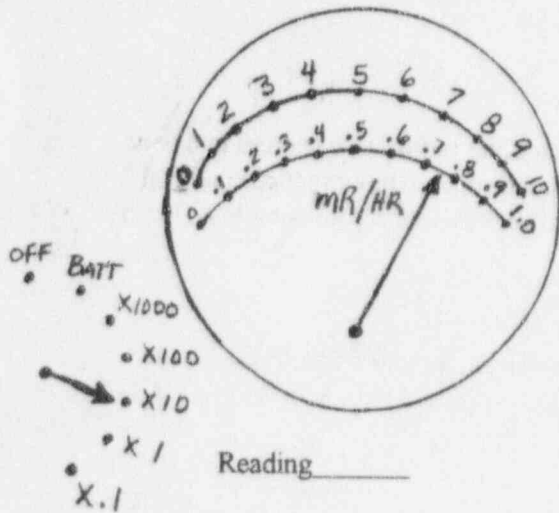
- (a) Radioactive materials license.
 - (b) Operating and emergency procedures and regulations.
 - (c) All of the above.
15. The pieces of personnel monitoring equipment that a person must have before beginning radiographic operations:
- (a) Film badge and dosimeter
 - (b) Film badge and survey meter
 - (c) Dosimeter and survey meter
16. Survey meters used for industrial radiography must be calibrated at which of the following intervals?
- (a) Every six months.
 - (b) Every 90 days.
 - (c) Every day.
17. The same safety requirements are required when using x-ray machines as when using radioactive isotopes.
- True_____ False_____
18. X-ray machines are not radiation producing except when energized.
- True_____ False_____
19. Governing agencies for radiation control are only concerned about overexposure to personnel from radioactive isotopes.
- True_____ False_____
20. What surveys must be performed and recorded on the job sheet each time you do a radiographic job?
21. When receiving a new Ir-192 source, what are the maximum readings that the device can emit and still be usable?
22. What signs and labels are required on the vehicle and transport container before transporting radioactive materials on the vehicle?
23. What is the purpose of the final lock-up survey at the end of the day?

12-1-94

TRAINING

SECTION V

24. What is the best means for ensuring that unauthorized personnel are kept out of the posted area's boundaries?
25. Write the number that represents the appropriate survey meter reading.



Survey Meter Illustrations

KEY TO EXAMINATION NUMBER 1

1. 2 Mr/HR, 1000 Mr/HR
2. 2 Mr/HR.
3. Restricted area
4. daily, Operating Procedures
5. Daily
6. (C)
7. (A)
8. (B)
9. (C)
10. (C)
11. (B)
12. (A)
13. (C)
14. (C)
15. (A)
16. (B)
17. True
18. True
19. False
20. Check-out survey, lock-out survey and vehicle survey.
21. 200 mR/hr @ contact, 50 mR/hr @ 6" and 10 mR/hr @ 1 meter

22. Vehicle - "Radioactive" signs, Transport container - D.O.T. Yellow Diamond III.
23. To ensure that the source is in the camera in the shielded position.
24. Visual surveillance in addition to ropes and signs.
25. 7.5 mR/hr 15 mR/hr 40 mR/hr 850 mR/hr

WESTERN X-RAY COMPANY

3803 Branson Road
Poteau, Oklahoma 74953

EXAMINATION NUMBER 2

RADIOGRAPHERS SAFETY TRAINING EXAMINATION

PLEASE DO NOT WRITE ON THIS TEST - USE THE ANSWER SHEET PROVIDED

Question 1

The strength of a radioactive source is measured in curies.

- a. True
- b. False

Question 2

The ability of a material to block or partially block the passage of X-rays and gamma rays is referred to as absorption.

- a. True
- b. False

Question 3

Radiation is damaging to living tissue.

- a. True
- b. False

Question 4

You must survey the boundary of the high radiation area during every exposure of the source.

- a. True
- b. False

Question 5

When your dosimeter goes off scale, you just recharge it and go back to work.

- a. True

12-1-94

TRAINING

SECTION V

- b. False

Question 6

The same safety requirements are needed when using X-Ray machines as when using radioactive material sources.

- a. True
b. False

Question 7

Radioactivity is the spontaneous disintegration of unstable nuclei with the resulting emission of nuclear radiation.

- a. True
b. False

Question 8

The half-life of a given radioisotope is always the same.

- a. True
b. False

Question 9

During a working shift, you drop your dosimeter and it breaks, you continue to work until the shift is over and get a new one the next day.

- a. True
b. False

Question 10

Iridium-192 yields 5.9 R/Hr./Ci. at one foot.

- a. True
b. False

Question 11

Cobalt-60 yields 14.4 R/Hr./Ci at one foot.

- a. True
b. False

Question 12

Radiation may be detected by man's five senses.

- a. True
- b. False

Question 13

When transporting a Radioactive Device that requires a RADIOACTIVE YELLOW III label (a transport index of 1.0 - 10 mr/hr.), you must have Radioactive placards on all four sides of the transporting vehicle.

- a. True
- b. False

Question 14

When transporting a Radioactive Device that requires a RADIOACTIVE YELLOW II label (a transport index of less than 1.0 mr/hr.), you need not have Radioactive placards posted on all four sides of the transporting vehicle.

- a. True
- b. False

Question 15

A Maximum permissible dose which an industrial radiographer is allowed to receive is:

- a. 100 rem/yr
- b. 20 rem/yr
- c. 1.25 rem in a calendar quarter
- d. 3.7×10^{10} rem/yr

Question 16

Which of the following best describes the means for protection from external radiation?

- a. wearing a film badge and dosimeter
- b. standing behind lead, concrete, and steel
- c. using time, distance, and shielding
- d. using a GM type survey meter

Question 17

An area that has radiation intensity levels above 2 mR/hr and not greater than 5 mR/hr. should be designated as a:

- a. high radiation area
- b. radiation area
- c. restricted area

- d. unrestricted area

Question 18

If your survey meter fails, you must discontinue radiographic operations until:

- a. an operable survey meter which is within calibration is obtained.
- B. for at least 30 minutes.
- C. until you have made certain that your pocket dosimeter reading is within normal limits
- d. only exposures of less than one minute can be made when using a rate alarm in place of a survey meter

Question 19

A term used to describe the time required for one half of the atoms to decay in a specific radioisotope is:

- a. curie
- b. half value layer
- c. half-life
- d. MEV

Question 20

While making an X-ray exposure in an unshielded area, you find that the dose rate 3 feet from the source of radiation is 1600 mR/hr. What would the dose rate be at 12 feet?

- a. 75 mR/hr
- b. 100 mR/hr
- c. 200 mR/hr
- d. 300 mR/hr

Question 21

When making a radiation survey of a given area with the survey meter on the highest range, the needle which was reading up-scale suddenly starts falling to zero. You should:

- a. proceed with no concern, the radiation field is zero.
- b. switch to a lower scale since the radiation field may be less than registered in the high range.
- c. retreat immediately from the area; the geiger tube may have become saturated from the very high radiation field.
- d. check the batteries in the meter

Question 22

A cobalt 60 isotope has an approximate half-life of:

- a. 1.2 years
- b. 6 months
- c. 5.3 years
- d. 75 days

Question 23

When an Iridium 192 source was purchased, the activity was 100 Curies, 2 1/2 months later the activity will be:

- a. 100 Curies
- b. 50 Curies
- c. 25 Curies
- d. 12.5 Curies

Question 24

The condition of the batteries and calibration expiration date of the survey meter should be checked at the beginning of each:

- a. year
- b. workday
- c. month
- d. quarterly

Question 25

Individuals working in a restricted area are required to wear:

- a. film badge or TLD
- b. pocket dosimeter
- c. rate alarm
- d. all the above

Question 26

The half life of an isotope is which of the following?

- a. LD/50
- b. average life after passing through a half value layer
- c. half of its total life
- d. the time required for the original activity to decrease by one half

Question 27

In industrial radiography work, the dosimeter used for personal monitoring should have a range from zero to:

- a. 1,000 MR.
- b. 100 MR.
- c. 200 MR.
- d. 500 MR.

Question 28

While working in the field you suddenly find you have lost your film badge or TLD, you are to:

- a. Continue to work and get a new badge in the morning.
- b. Watch out for the Regulatory Inspectors.
- c. Notify your Radiation Safety Officer and stop work until you have received a new badge.
- d. Send a note with your weekly time sheet and continue to work as you will receive a new one on the first of the month.

Question 29

The "half value layer" thickness for lead when using IR-192 is:

- a. 3.33 inches
- b. determined by the number of curies being used
- c. 0.19 inches
- d. the thickness of lead required to reduce a beam of radiation to 2 mr/hr.

Question 30

The yearly allowed occupational exposure is:

- a. 200 REM
- b. 5 REM
- c. 15 REM
- d. 125 REM

Question 31

Which of the following instruments would most likely be used to determine a transport index ?

- a. film badge
- b. dosimeter
- c. survey meter
- d. postage scales

Question 32

The Public Health Services' basic philosophy in accessing the health aspects of radiation exposures can best expressed by which of the following statements?

- a. To reduce all radiation exposures.
- b. Any unnecessary exposure to radiation should be avoided.
- c. Since man has lived with it for years and there has been no visible effects, any increase would be of no value.
- d. any dose over 5 R per week is excessive.

Question 33

While working in the field as a radiographer, you crank your source back into the camera after the exposure is finished, upon checking your survey meter you see that you are showing an abnormally high reading. You assume:

- a. that your meter is not working.
- b. that your source has not returned to the shielded position and you should post the area and follow the procedures in the operating manual.
- c. that you should disconnect the source tube and find out where the source is.
- d. that your survey meter is just recording residual radiation.

Question 34

The first person to notify in case of a radiation accident is:

- a. your Radiation Safety Officer (RSO).
- b. The Nuclear Regulatory Commission (NRC).
- c. the local Civil Defense emergency officer.
- d. the state health department.

Question 35

While working in the field you discover that your dosimeter is off scale. Your responsibility is to:

- a. Recharge your dosimeter and continue work.
- b. Calculate the amount of exposure you have received and continue to work.
- c. Stop work, notify your Radiation Safety Officer and have your badge sent in for immediate processing and reading.
- d. Watch out for the Regulatory Inspectors.

Question 36

A curie is the equivalent of:

- a. .001 millicuries
- b. 1000 millicuries

- c. 1000 megacuries
- d. 100 megacuries

Question 37

A radiography isotope that is encapsulated in stainless steel would be classified as:

- a. wafer form
- b. special form
- c. solid form
- d. normal form

Question 38

A pocket dosimeter should be recharged at what interval?

- a. When it is off scale.
- b. Daily.
- c. Weekly
- d. Monthly

Question 39

The thickness of any material necessary to reduce the intensity of any X or Gamma Ray to one-half of the original strength is called the:

- a. Beam reducer.
- b. Half-life.
- c. Half value layer.
- d. Quarter mode.

Question 40

The inverse square law means that if you move a source twice as far away as before, the intensity is:

- a. One-fourth as great
- b. Twice as great.
- c. Half as great.
- D. Four times as great

Question 41

Approximately what percent of the original radioactivity is left after six half-lives?

- a. 0.005
- b. 10
- c. 1.50

- d. 33.3

Question 42

A survey meter is set on times one (X1) and the scale reads eight. What is the dose rate?

- a. 8 R/hr
- b. 8 mR/hr
- c. 80 R/hr
- d. 0.8 mR/hr

Question 43

A survey meter is set on times ten (X10) and the scale is reading four. What is your actual dose rate?

- a. 400 mR/hr
- b. 40 mR/hr
- c. 4 mR/hr
- d. 40 R/hr

Question 44

A source assembly is best described as:

- a. the steel capsule that the source is contained in
- b. the capsule, pigtail cable, and connector
- c. the camera and the source inside
- d. all of the above

Question 45

An S tube is part of the:

- a. protective garments worn by radiographers
- b. exposure device, or "camera"
- c. survey meter
- d. film badge

Question 46

How far is the unrestricted area from the source when using 60 curies of unshielded IR-192 for a period of 1 hour?

- a. 420.7 ft.
- b. 396.5 ft.
- c. 120 ft.
- d. 30 ft.

Question 47

What is the intensity at 40 feet from an unshielded 60 curie source of IR-192?

- a. 21
- b. 400
- c. 543.6
- d. 221.2

Question 48

When transporting a Radioactive Source, which of the following documents must you have?

- a. Shippers Declaration for Dangerous Goods.
- b. Decay Chart.
- c. Leak Test Results.
- d. All of the above.

Question 49

If you receive a dose of 2 mrem in 2 minutes at a distance of 2 feet from a source, what time would be required to receive 2 mrem if the distance to the source was changed to 1 foot?

- a. 120 seconds
- b. 30 seconds
- c. 15 seconds
- d. 240 seconds

Question 50

A person 10 feet from a gamma ray source reduces his exposure rate to which of the following when he steps back to 20 feet?

- a. 1/3
- b. 1/2
- c. 1/4
- d. 1/10

**ANSWER SHEET
RADIATION SAFETY EXAMINATION # 2**

1 - A	26 - D
2 - A	27 - C
3 - A	28 - C
4 - B	29 - C
5 - B	30 - B
6 - A	31 - C
7 - A	32 - B
8 - A	33 - B
9 - B	34 - A
10 - A	35 - C
11 - A	36 - B
12 - B	37 - B
13 - A	38 - B
14 - A	39 - C
15 - C	40 - A
16 - C	41 - C
17 - C	42 - B
18 - A	43 - B
19 - C	44 - B
20 - B	45 - B
21 - C	46 - A
22 - C	47 - D
23 - B	48 - D
24 - B	49 - B
25 - D	50 - C

WESTERN X-RAY COMPANY

3803 Branson Road
Poteau, Oklahoma 74953

EXAMINATION #3 RADIOGRAPHER PERFORMANCE CHECKLIST

RADIOGRAPHER: _____ DATE _____

The performance test consists of one or more actual film exposure performed by the individual being tested without the assistance of any other radiographer.

1. Removal of camera from storage vault.
 - a. Signing out the camera on the utilization log.
 - b. Surveying camera.
 - c. Performing a daily inspection of the camera and related handling equipment.
2. Safety Equipment
 - a. Survey meter.
 - b. Film badge or TLD
 - c. Pocket dosimeter
 - d. Alarm Ratemeter
 - e. Barrier tape and radiation signs.
3. Film badge or TLD, dosimeter, and alarm ratemeter present on individual.
4. Dosimeter charged and reading recorded on log sheet.
5. Survey meter
 - a. Surveying camera to insure source is in safe position. Making sure that survey meter is working, calibrated and reading radiation.
 - b. Survey of the perimeter of the restricted area.
 - c. Survey of camera and source tube after each exposure.
6. Calculations of restricted area and posting of barriers and warning signs.
7. Exposure device being locked after each exposure and before being moved.
8. Removing crank outs and source tube and replacing dust covers and safety plugs.
9. Use of available shielding if present and collimator if available.
10. Storage vault secured and locked after returning camera to storage.
11. Completion of Records
 - a. Utilization log.
 - b. Daily radiation log sheet.
 - c. dosimeter report.

1.0 Purpose and Scope

This section establishes the procedures to be followed in handling radioactive sources and their related tools. The procedures are intended to ensure compliance with safety practices outlined in this manual. Radiographic personnel are responsible for following all procedures outlined herein.

2.0 Daily Equipment Inspection Procedures

It is the responsibility of the radiographer to inspect all equipment assigned to him, on a daily basis. Records of these inspections are to be recorded on the Daily Radiation Job Sheet (Section II, Attachment II-3). The following procedures are to be followed when inspecting equipment.

2.1 Film or TLD badges, pocket dosimeters and alarm ratemeters shall be checked as follows:

- 2.1.1 Visible damage to either piece of equipment.
- 2.1.2 Film or TLD badge is for current period.
- 2.1.3 Dosimeter hairline indicator set on zero.
- 2.1.4 Alarm ratemeter functions
- 2.1.5 Devices worn in appropriate manner.

2.2 Radiation survey instruments shall be checked as follows:

- 2.2.1 Instrument free from visible damage.
- 2.2.2 Instrument is properly calibrated.
- 2.2.3 Batteries are properly charged.
- 2.2.4 Meter detects radiation.

2.3 Crank-out exposure devices shall be inspected as follows:

- 2.3.1 Device is properly labelled.
- 2.3.2 Source identification plate is in place.
- 2.3.3 Proper operation of locking mechanism.
- 2.3.4 No abnormal radiation levels when removed from storage.
- 2.3.5 Crank-out cables and source guide tubes free from visible damage.

- 2.3.6 Proper operation of cranking mechanism.
 - 2.3.7 Normal connections of pigtail to inner drive cable, outer drive cable conduit to exposure device and source tube to exposure device.
 - 2.3.8 Normal operation of entire assembly.
 - 2.4 Pipeline type exposure devices shall be inspected as follows:
 - 2.4.1 Proper device labelling.
 - 2.4.2 Source identification plate is in place.
 - 2.4.3 Proper operation of locking mechanism.
 - 2.4.4 No abnormal radiation level when removed from storage.
 - 2.4.5 Tie-down chains and jigs for holding the exposure device on the pipe are in good working order.
 - 2.4.6 Normal operation of entire assembly.
 - 2.5 Any deficiencies found during the equipment inspection shall be noted on the utilization log and immediately brought to the attention of the Radiation Safety Officer. All deficiencies shall be corrected before the equipment is used.
- 3.0 Quarterly Inspection and Maintenance of Equipment
- In addition to daily inspections of equipment by the radiographer the radiation safety officer, his assistant, or radiation field supervisor will perform a quarterly inspection of equipment. Any required maintenance shall also be performed during this inspection. Quarterly inspections and maintenance shall be recorded on the Equipment Inspection Record (Section II, Attachment II-8). The following procedures shall be followed:
- 3.1 Inspection and maintenance of crank-out type exposure devices.
 - 3.1.1 All warning labels and source identification plates should be in place and legible. Any labels that are missing, or that are not legible shall be replaced prior to use.
 - 3.1.2 Lock plungers shall be checked for proper operation. Lock plungers that do not operate properly should be cleaned and lubricated. If cleaning and lubrication does not correct the problem, the lock shall be replaced before the device is used.
 - 3.1.3 The source connector shall be inspected to ensure that it is straight and free from rust or corrosion. Additionally, it shall be checked for excessive wear that could adversely affect the operation. The source connector may be checked by pulling

on the cable, apply 30 to 40 pounds of pressure. If rust and corrosion has been removed from the connector it should be re-inspected.

- 3.1.4 The outlet nipple should be round and smooth and it's O.D. should match the I.D. of the source tube connector. Out-of-roundness can occasionally be corrected by using a punch, or round bar. If it cannot be corrected, or if the nipple has been broken off, it must be replaced before the device is used.
- 3.1.5 The drive cable should be free from visible damage such as crimps, corrosion and rust. The cable should also be flexible. The connector shall be inspected to ensure that it is not excessively worn, rusted or corroded and that it makes a normal connection to the source pigtail. The connector may be replaced by sending the unit to the supplier to have a new connector welded on, or a new drive cable assembly may be used. Drive cables may be cleaned using varsol, diesel fuel or other solvent that will not dry out. Inner drive cables should be kept lubricated at all times to prevent them from becoming stiff and non-flexible. In areas where sand and other abrasive materials are a problem, the cables may be lubricated by using powdered graphite. Graphite should not be packed as it will build-up and cause wear of the crank-out gear and gear housing. If the inner drive cable is extremely rusted, or contains crimps too severe to straighten, the inner cable must be replaced.
- 3.1.6 The crank-out assembly consists of a gear inside a housing, with a handle attached. The most likely places for excessive wear are the bronze bushings inside the gear and gear housing. If the bushings are worn excessively, it will permit the gear to wobble, which causes the inner cable to slip and eventually wears out the gear. If powdered graphite is used as a lubricant it is suggested that the assembly be periodically cleaned using compressed air. Some type of light oil should be used to lubricate the bushings and they should be replaced if worn excessively.
- 3.1.7 The conduit should be checked to ensure that it is not severely kinked or damaged. Additionally, the ends should be checked to ensure that they have not been damaged. If the inner lining of the conduit has been damaged, the conduit must be replaced. If the outer covering has been damaged it may be repaired with tape. If the ends are damaged, they must be replaced.
- 3.1.8 Source guide tubes should be inspected for damage such as crimps, cuts, foreign matter in the tube and ease of connection to the exposure device. Crimps, cuts and other damage may be repaired by cutting the damaged section out and placing connectors on both ends to reconnect the tube. Quick disconnect couplings may be removed and replaced if damaged. Foreign matter should be blown out with compressed air.

3.2 Inspection and Maintenance of Pipeline Type Exposure Devices

12-1-94

EQUIPMENT HANDLING PROCEDURES

SECTION VI

- 3.2.1 All warning labels and source identification plate should be in place and legible. If labels are missing, or are not legible they must be replaced.
 - 3.2.2 The locking mechanism should be inspected for proper operation and ease of movement. The lock plunger should retract to it's fullest extent, which is about 1/2". Foreign matter could foul the plunger and make it inoperable. The Lock plunger may be removed and cleaned using a solvent to remove dirt and other foreign matter. The lock may also be cleaned by spraying a lubricant (such as WD-40) into the lock and working the lock plunger several times.
 - 3.2.3 All latching devices, tie-down chains and jigs for holding the device on the pipe should be inspected to ensure that they are in good operating condition. All hold down equipment should be cleaned in solvent to remove dirt and rust. Hinge type connectors should be lubricated to ensure proper operation.
 - 3.2.4 The rotator "on-off" knob should be inspected and checked for ease of movement. Device should be placed flat on the ground and unlocked. Then, **STANDING AS FAR BACK AS POSSIBLE**, while still able to operate the device, check for proper operation by turning the rotator knob to the exposed position and then back to the shielded position, observe ease of operation. Lock and secure the device. Any extensive maintenance must be performed by the manufacturer. Do not attempt any dismantling, or extensive repairs to the device. If the rotator knob sticks it can be lubricated around the shaft where it enters the device. If lubrication does not correct the problem, the device should be returned to the manufacturer for repair.
- 3.3 Inspection and Maintenance of Master Minder Control Units
- 3.3.1 All warning labels and source identification plates should be in place and legible. If labels have become worn and are not legible, they shall be replaced.
 - 3.3.2 The locking mechanism should be checked for ease of operation. The lock plunger should retract to it's fullest extent, which is about 1/2". However, at times foreign matter may foul the plunger and make it inoperable. The lock may be cleaned by spraying a lubricant (such as WD-40) into the lock and working the plunger several times. If this does not correct the problem the lock may be removed by removing the set screws in the lock box. The lock should then be cleaned and any foreign matter removed using a solvent.
 - 3.3.3 The source holder assembly should be inspected for proper operation. This is done by placing the device on the ground and unlocking it. Then, pull the source holder out to the fullest extent and push it back in while observing for ease of movement. Lock and secure the device. Any maintenance, or repairs to the source holder assembly shall be made by the manufacturer.

12-1-94

EQUIPMENT HANDLING PROCEDURES

SECTION VI

- 3.3.4 In addition to the above mentioned items, an over all visual inspection for damage of the device should be performed. Special attention should be given to inspection for cracks or worn spots in the source holder device. Any minor damage (i.e., cracked handles, etc.) may be repaired by the Radiation Safety Officer. Any major damage, adaption, or source changes must be made by the manufacturer.

4.0 Source Exchange Procedures

The following procedures are for source exchange in crank-out type exposure devices. All pipeline type exposure devices and master minder control units will be returned to the supplier for source exchange. In all exchange procedures, locate the control unit to the exposure device as far away as possible from the exposure device and preferably behind radiation shielding. The instructions listed below must be followed explicitly.

- 4.1 The following procedures are for Gamma Industries Model C-4, C-8, C-10, R-100 and Gulf Nuclear Model U-110 source changers.
- 4.1.1 Perform surveys as required in Section II, 9.1 of this manual.
 - 4.1.2 Connect the short source guide tube (supplied with the source changer) to the "Old Source" side of the changer and to your camera.
 - 4.1.3 Connect the drive cable to the source in your camera.
 - 4.1.4 Unlock the devices and crank the source that is in your camera into the changer.
 - 4.1.5 Lock the "Old Source" side of the changer and survey the camera changer and source guide tube.
 - 4.1.6 Disconnect source guide tube from changer and disconnect the drive cable from old source pigtail. Replace dust cover.
 - 4.1.7 Turn changer around and connect drive cable to new source pigtail.
 - 4.1.8 Reconnect short source guide tube to changer and unlock "New Source" side of changer.
 - 4.1.9 Retract (crank in) the drive cable, which will pull the new source into the camera.
 - 4.1.10 Survey the camera, changer and source guide tube and lock the camera.
 - 4.1.11 Disconnect drive cable from new source pigtail and replace dust cover.
 - 4.1.12 Disconnect source guide tube from both devices.

12-1-94

EQUIPMENT HANDLING PROCEDURES

SECTION VI

- 4.1.13 Remove the old source identification plate from the camera and place it on the changer, on the "Old Source" side.
- 4.1.14 Remove the new source identification plate from the changer and place it on the camera.
- 4.1.15 Perform final survey on source changer and return it to the supplier.
- 4.2 The following procedures are for the N.P.E.C. Model C-1 source changers.
 - 4.2.1 Perform surveys as required in Section II, 9.1
 - 4.2.2 Open both top and side doors to their fullest positions, exposing the outlet tubes on top and lock plungers on the side.
 - 4.2.3 Pull the lock plunger on the blue side and turn to the left.
 - 4.2.4 Connect one side of the short source guide tube (supplied with the changer) to the uncapped outlet tube in the top of the container. Connect the other end to the source tube side of the camera.
 - 4.2.5 Connect the drive cable to the old source in the camera.
 - 4.2.6 Unlock the camera and crank the old source into the changer.
 - 4.2.7 Lock the container by turning the lock plunger 1/4 turn to the right and release. This will cause the plunger to lock down on the source.
 - 4.2.8 Survey the camera, changer and source guide tube.
 - 4.2.9 Disconnect the source guide tube from the changer.
 - 4.2.10 Attach tape to the old source pigtail, securing it to the walls of the source changer. Remove heavy brown paper tape from the outlet tube on the red side of the container and discard.
 - 4.2.11 Attach source guide tube to changer and unlock the new source side of the changer by turning 1/4 turn to the left.
 - 4.2.12 Retract (crank in) the new source into the camera.
 - 4.2.13 Lock the exposure device and the changer by turning the lock plunger on the red side of the changer 1/4 turn to the right and release.
 - 4.2.14 Survey the changer, camera and source guide tube.

12-1-94

EQUIPMENT HANDLING PROCEDURES

SECTION VI

- 4.2.15 Disconnect drive cable from camera and disconnect source guide tube from camera and changer.
- 4.2.16 Affix new source identification plate to the camera.
- 4.2.17 Perform the final survey on the source exchanger and return it to the supplier.
- 4.3 The following procedures are for Amersham Model 650 source changers.
 - 4.3.1 Perform surveys as required in Section II, 9.1 of this manual.
 - 4.3.2 Remove the cover from the source changer by unlocking the padlock and breaking the seal wire and removing bolts.
 - 4.3.3 Remove the source holddown cap that covers the source by breaking the seal wire and unbolting. Remove the identification plate for the new source.

NOTE: WHEN THE SOURCE HOLDOWN CAP IS REMOVED, THE
SOURCE CONNECTOR IS EXPOSED. CARE MUST BE TAKEN
TO ASSURE THAT THE SOURCE IS NOT DISLODGED WHEN
HANDLING THE CHANGER.
 - 4.3.4 Set the radiographic exposure device as for an exposure
 - 4.3.4 Connect one end of the guide tube extension to the exposure device and the other end to the fitting above the empty chamber of the source changer.
 - 4.3.5 Close and latch the source guides.
 - 4.3.6 At the exposure device controls, crank the source rapidly from the exposure device to the source changer. The radiation intensity should greatly increase as the source is first exposed, decrease slightly as the source is being cranked out from the exposure device to the source changer and then drop to background when the source is in the source changer.
 - 4.3.7 Perform proper surveys of the source changer, guide tube, and exposure device.
 - 4.3.8 Open the source guides. Disconnect the drive cable from the source assembly by moving the lock pin of the source connector down towards the source and slide the drive cable out through the keyway.
 - 4.3.9 When the disconnect of the source connector and the drive cable is complete, remove the guide tube from the source changer. Connect the guide tube to the fitting above the chamber containing the new source.

- 4.3.10 Couple the drive cable to the source by depressing the lock pin, sliding the drive cable connector into the keyway and releasing the lock pin. Assure that the connection is secure before continuing.
- 4.3.11 Close and latch the source guides above the new source.
- 4.3.12 At the exposure device controls, crank the new source from the source exchanger to its storage position in the exposure device. Observe the survey meter reading during this operation. The radiation intensity should increase as the source exits the source changer. The radiation intensity should steadily increase as the source travels to the exposure device and drop to background when the source is properly stored in the exposure device.
- 4.3.13 Perform proper surveys of the source changer, guide tube, and exposure device.
- 4.3.14 Lock the exposure device and remove the guide tube and controls. Disconnect the guide tube from the source changer.
- 4.3.15 Place the source holddown cap over the old spent source in the source changer. Attach the identification plate of the old source to the holddown cap.
- 4.3.16 Bolt down the source holddown cap in place and seal wire. Assure that the source holddown cap is bolted down firmly over the source connector (s).
- 4.3.17 Affix the identification plate of the new source to the exposure device.
- 4.3.18 Perform the final survey on the source changer and return it to the supplier.
- 4.4 The following procedures are for Amersham Model 500 3U source changers.
 - 4.4.1 Perform surveys as required in Section II, 9.1 of this manual.
 - 4.4.2 Unlock the source changer and open the cover. Remove the envelope containing the documentation and remove the source guide tube extension.
 - 4.4.3 Set the radiographic exposure device as for an exposure.
 - 4.4.4 Connect one end of the guide tube extension to the exposure device and the other end to the fitting above the empty tube, unlock the key-operated lock and raise the lock slide of the source changer to the OPEN position.
 - 4.4.5 At the exposure device controls, crank the source rapidly from the exposure device to the source changer. The radiation intensity should greatly increase as the source is first exposed, decrease slightly as the source is being cranked out from the exposure device to the source changer and then drop to background when the source is in the source changer.

- 4.4.6 Perform proper surveys of the source changer, guide tube, and exposure device.
- 4.4.7 Move the lock slide on the source changer to the LOCK position (down). Engage the key operated lock. While maintaining positive forward force on the drive cable and source assembly, disconnect the source guide tube extension from the source changer and expose the drive cable to source assembly connection. Disconnect the drive cable from the source assembly. Install the appropriate hold-down cap over the source assembly.
- 4.4.8 Remove the hold-down cap from the other source assembly. Connect the guide tube to the source changer fitting. Unlock the key operated and raise the lock slide to the OPEN position.

NOTE: ASSURE THAT THE SOURCE EXCHANGE TUBE IS SECURELY CONNECTED TO THE SOURCE CHANGER. IF THE SOURCE EXCHANGE TUBE IS NOT PROPERLY CONNECTED THE SOURCE CAN NOT BE REMOVED FROM THE SOURCE CHANGER.

- 4.4.9 At the exposure device controls, crank the new source from the source exchanger to its storage position in the exposure device. Observe the survey meter reading during this operation. The radiation intensity should increase as the source exits the source changer. The radiation intensity should steadily increase as the source travels to the exposure device and drop to background when the source is properly stored in the exposure device.
- 4.4.10 Perform proper surveys of the source changer, guide tube, and exposure device.
- 4.4.11 Lock the exposure device. Move the lock slide of the source changer to the LOCK position. Disconnect the guide tube from the source changer install it in the front compartment of the source changer.
- 4.3.12 Attach the identification plate of the old source to the holddown cap on the source changer.
- 4.4.13 Affix the identification plate of the new source to the exposure device.
- 4.4.14 Assure that the proper hold-down cap is installed over the source in the source changer. seal wire the caps in place. Insert seal wire through the hold-down cap and the drilled bolt on the lock mechanism. Insert hold-down cap over empty tube also. Assure that the key operated locks are engaged, and remove keys.
- 4.4.15 Close the source changer cover and insert closure bolt and padlock and secure. Insert seal wire through closure bolt.

4.4.16 Perform the final survey on the source changer and return it to the supplier.

5.0 Operating Procedures for Exposure Devices

The following is a step-by-step guide for operating exposure devices. Specific procedures are outlined for each type of device.

5.1 Instructions for operating crank-out type exposure devices.

5.1.1 The following equipment must be present prior to beginning any radiographic operation:

- * Film badge or TLD badge
- * Pocket Dosimeter
- * Alarm ratemeter
- * Survey Instrument
- * Barricade equipment

5.1.2 Position the exposure device conveniently near exposure site.

5.1.3 Remove plug from the lock side of the exposure device.

5.1.4 Connect the inner drive cable on the crank-outs to the source pigtail. Check that the connection is made properly.

5.1.5 Connect the outer drive cable housing (conduit) to the exposure device.

5.1.6 Remove the plug from the (source tube) opening on the exposure device.

5.1.7 Connect the source guide tube to the exposure device. Check that the connection is made properly.

5.1.8 Position the end of the source guide tube in the location where the exposure is to be made.

5.1.9 Attach the film to the exposure point.

5.1.10 Straighten out the source guide tube and crank-out control cables, placing the crank-out handle as far from the exposure point as possible.

5.1.11 Calculate the required exposure time.

5.1.12 Calculate the dimensions of the "Restricted Area" so that no person, continuously present outside the area, will receive more than 2 mR in any one hour.

- 5.1.13 Establish a restricted area and prevent unauthorized entry into the area. Post this area with "Caution - Radiation Area" signs.
- 5.1.14 Calculate the area where the radiation levels will be 100 mR/hr and post this area with "Caution - High Radiation Area" signs.
- 5.1.15 Unlock the exposure device.
- 5.1.16 Crank the control handle clockwise until it stops. **DO NOT FORCE THE HANDLE.** If undue resistance is encountered, reverse the crank direction. Make necessary adjustments (change guide tube position etc.) until the control unit works freely.
- 5.1.17 When the crank handle stops, the source is in the exposed position. Start exposure timer.
- 5.1.18 Survey the perimeter of the "Restricted Area" to ensure that radiation levels are within the 2 mR in any one hour limits.
- 5.1.19 Maintain constant surveillance of the "Restricted Area" to ensure that no unauthorized personnel enter.
- 5.1.20 When the exposure is completed, return the source to the shielded position by turning the crank handle in a counter-clockwise direction, until it stops.
- 5.1.21 Carry and observe the survey meter continuously when approaching the exposure device. The entire circumference of the camera and the full length of the source guide tube must be surveyed to ensure that the source has returned to the shielded position before locking the camera.
- 5.1.22 Lock the exposure device and return it to the storage area.
- 5.2 Instructions for operating "pipeliner" type exposure devices
 - 5.2.1 All equipment listed in 5.1.1 above must be present before beginning any radiographic operation.
 - 5.2.2 Position film on pipe weld to be radiographed.
 - 5.2.3 Place exposure device in position to make the exposure.
 - 5.2.4 Use chains and locking boomers to secure the device to the pipe.
 - 5.2.5 Unlock the exposure device.

12-1-94

EQUIPMENT HANDLING PROCEDURES

SECTION VI

- 5.2.6 STANDING AS FAR BACK AS POSSIBLE, expose the source by rotating the knurled knob 180 degrees.
- 5.2.7 Move as far away as practical for the duration of the exposure.
- 5.2.8 After the exposure is complete, turn the device "off" by rotating the knurled knob 180 degrees back.
- 5.2.9 Approach the exposure device with a survey meter in hand to ensure that the source is in the shielded position, and lock the device.
- 5.2.10 When radiographic operations are completed, lock and survey the device before returning it to the storage area.

6.0 Instructions for operating Master Minder (signaling devices)

Master Minder signaling devices provide signals that control internal pipeline crawler equipment. The isotope contained in the Master Minder is approximately 225 millicurie of Cesium-137. Because it is possible to receive doses from the Master Minder that exceed those allowable under 10CFR, Part 20 the signaling device must be used in accordance with all applicable radiation safety regulations and instructions outlined in these operating procedures.

6.1 Operation of Master Minder

- 6.1.1 All equipment listed in 5.1.1 above must be present before using the signaling device.
- 6.1.2 To produce a signal survey the Master Minder to assure that it is in the locked safe position then place the Master Minder firmly on the pipe surface.
- 6.1.3 Unlock the Master Minder by turning the key clockwise and allowing the lock plunger to spring up.
- 6.1.4 Grasp the source holder and pull out gently.
- 6.1.5 Step back away from the Master Minder to avoid unnecessary exposure during the signal.
- 6.1.6 To terminate the signal, grasp the source holder and push in to the farthest extent.
- 6.1.7 Depress the lock plunger and turn the key counter clockwise to lock the device.
- 6.1.8 Survey the Master Minder to assure the source has returned to the safe and locked position.

7.0 Instruction for operating Tattle Tale locating devices

The Tattle Tale locating device has a capacity of 100 mCi Cesium-137 and is designed primarily as a locating device for internal pipeline crawler equipment. A locking safety key mechanism prevents unauthorized use. The source rod is manually raised to the "on" position by unlocking the safety mechanism, and raising the source up to the "on" position. The locking mechanism can be used to hold the source in the "on" position. The radiation beam is horizontal (90 degrees from the locking mechanism) and the beam angle is 28 degrees.

7.1 Operation of Tattle Tale locating device

- 7.1.1 All equipment listed in 5.1.1 above must be present before operating the Tattle Tale locating device.
- 7.1.2 Survey the Tattle Tale to assure the device is in the "off" shielded position.
- 7.1.3 Place the Tattle Tale in the Tattle Tale holder that is attached to the pipeline crawler.
- 7.1.4 Position the Tattle Tale so that the beam opening is directed toward the round side opening in the Tattle Tale holder.
- 7.1.5 Secure the Tattle Tale with the retaining bolt located at the top of the holder.
- 7.1.6 Raise the source rod to the "on" position and secure, place crawler in the pipe and proceed with the operation.
- 7.1.7 When the crawler exits the pipe, lower the source on the Tattle Tale to the "off" shielded position.
- 7.1.8 Survey the Tattle Tale to assure it is in the shielded position then lock the device.
- 7.1.9 If further operation is required repeat 7.1.6 through 7.1.8.
- 7.1.10 If operations are complete remove the Tattle Tale from the holder and return it to storage.

8.0 Instruction for Operation of X-ray devices

Operating procedures for x-ray machines are not covered in this manual. The RSO or operations manager will make available operating instructions for specific x-ray devices on an as needed basis. The NRC does not regulate radiography using x-ray machines. For regulations concerning x-ray radiography refer to the individual states regulations or the U. S. Occupational Safety and Health Administration (OSHA) regulations.

on the cable, apply 30 to 40 pounds of pressure. If rust and corrosion has been removed from the connector it should be re-inspected.

- 3.1.4 The outlet nipple should be round and smooth and it's O.D. should match the I.D. of the source tube connector. Out-of-roundness can occasionally be corrected by using a punch, or round bar. If it cannot be corrected, or if the nipple has been broken off, it must be replaced before the device is used.
- 3.1.5 The drive cable should be free from visible damage such as crimps, corrosion and rust. The cable should also be flexible. The connector shall be inspected to ensure that it is not excessively worn, rusted or corroded and that it makes a normal connection to the source pigtail. The connector may be replaced by sending the unit to the supplier to have a new connector welded on, or a new drive cable assembly may be used. Drive cables may be cleaned using varsol, diesel fuel or other solvent that will not dry out. Inner drive cables should be kept lubricated at all times to prevent them from becoming stiff and non-flexible. In areas where sand and other abrasive materials are a problem, the cables may be lubricated by using powdered graphite. Graphite should not be packed as it will build-up and cause wear of the crank-out gear and gear housing. If the inner drive cable is extremely rusted, or contains crimps too severe to straighten, the inner cable must be replaced.
- 3.1.6 The crank-out assembly consists of a gear inside a housing, with a handle attached. The most likely places for excessive wear are the bronze bushings inside the gear and gear housing. If the bushings are worn excessively, it will permit the gear to wobble, which causes the inner cable to slip and eventually wears out the gear. If powdered graphite is used as a lubricant it is suggested that the assembly be periodically cleaned using compressed air. Some type of light oil should be used to lubricate the bushings and they should be replaced if worn excessively.
- 3.1.7 The conduit should be checked to ensure that it is not severely kinked or damaged. Additionally, the ends should be checked to ensure that they have not been damaged. If the inner lining of the conduit has been damaged, the conduit must be replaced. If the outer covering has been damaged it may be repaired with tape. If the ends are damaged, they must be replaced.
- 3.1.8 Source guide tubes should be inspected for damage such as crimps, cuts, foreign matter in the tube and ease of connection to the exposure device. Crimps, cuts and other damage may be repaired by cutting the damaged section out and placing connectors on both ends to reconnect the tube. Quick disconnect couplings may be removed and replaced if damaged. Foreign matter should be blown out with compressed air.

3.2 Inspection and Maintenance of Pipeline Type Exposure Devices

12-1-94

EQUIPMENT HANDLING PROCEDURES

SECTION VI

- 3.2.1 All warning labels and source identification plate should be in place and legible. If labels are missing, or are not legible they must be replaced.
 - 3.2.2 The locking mechanism should be inspected for proper operation and ease of movement. The lock plunger should retract to it's fullest extent, which is about 1/2". Foreign matter could foul the plunger and make it inoperable. The Lock plunger may be removed and cleaned using a solvent to remove dirt and other foreign matter. The lock may also be cleaned by spraying a lubricant (such as WD-40) into the lock and working the lock plunger several times.
 - 3.2.3 All latching devices, tie-down chains and jigs for holding the device on the pipe should be inspected to ensure that they are in good operating condition. All hold down equipment should be cleaned in solvent to remove dirt and rust. Hinge type connectors should be lubricated to ensure proper operation.
 - 3.2.4 The rotator "on-off" knob should be inspected and checked for ease of movement. Device should be placed flat on the ground and unlocked. Then, **STANDING AS FAR BACK AS POSSIBLE**, while still able to operate the device, check for proper operation by turning the rotator knob to the exposed position and then back to the shielded position, observe ease of operation. Lock and secure the device. Any extensive maintenance must be performed by the manufacturer. Do not attempt any dismantling, or extensive repairs to the device. If the rotator knob sticks it can be lubricated around the shaft where it enters the device. If lubrication does not correct the problem, the device should be returned to the manufacturer for repair.
- 3.3 Inspection and Maintenance of Master Minder Control Units
- 3.3.1 All warning labels and source identification plates should be in place and legible. If labels have become worn and are not legible, they shall be replaced.
 - 3.3.2 The locking mechanism should be checked for ease of operation. The lock plunger should retract to it's fullest extent, which is about 1/2". However, at times foreign matter may foul the plunger and make it inoperable. The lock may be cleaned by spraying a lubricant (such as WD-40) into the lock and working the plunger several times. If this does not correct the problem the lock may be removed by removing the set screws in the lock box. The lock should then be cleaned and any foreign matter removed using a solvent.
 - 3.3.3 The source holder assembly should be inspected for proper operation. This is done by placing the device on the ground and unlocking it. Then, pull the source holder out to the fullest extent and push it back in while observing for ease of movement. Lock and secure the device. Any maintenance, or repairs to the source holder assembly shall be made by the manufacturer.

12-1-94

EQUIPMENT HANDLING PROCEDURES

SECTION VI

- 3.3.4 In addition to the above mentioned items, an over all visual inspection for damage of the device should be performed. Special attention should be given to inspection for cracks or worn spots in the source holder device. Any minor damage (i.e., cracked handles, etc.) may be repaired by the Radiation Safety Officer. Any major damage, adaption, or source changes must be made by the manufacturer.

4.0 Source Exchange Procedures

The following procedures are for source exchange in crank-out type exposure devices. All pipeline type exposure devices and master minder control units will be returned to the supplier for source exchange. In all exchange procedures, locate the control unit to the exposure device as far away as possible from the exposure device and preferably behind radiation shielding. The instructions listed below must be followed explicitly.

- 4.1 The following procedures are for Gamma Industries Model C-4, C-8, C-10, R-100 and Gulf Nuclear Model U-110 source changers.
- 4.1.1 Perform surveys as required in Section II, 9.1 of this manual.
 - 4.1.2 Connect the short source guide tube (supplied with the source changer) to the "Old Source" side of the changer and to your camera.
 - 4.1.3 Connect the drive cable to the source in your camera.
 - 4.1.4 Unlock the devices and crank the source that is in your camera into the changer.
 - 4.1.5 Lock the "Old Source" side of the changer and survey the camera changer and source guide tube.
 - 4.1.6 Disconnect source guide tube from changer and disconnect the drive cable from old source pigtail. Replace dust cover.
 - 4.1.7 Turn changer around and connect drive cable to new source pigtail.
 - 4.1.8 Reconnect short source guide tube to changer and unlock "New Source" side of changer.
 - 4.1.9 Retract (crank in) the drive cable, which will pull the new source into the camera.
 - 4.1.10 Survey the camera, changer and source guide tube and lock the camera.
 - 4.1.11 Disconnect drive cable from new source pigtail and replace dust cover.
 - 4.1.12 Disconnect source guide tube from both devices.

- 4.1.13 Remove the old source identification plate from the camera and place it on the changer, on the "Old Source" side.
- 4.1.14 Remove the new source identification plate from the changer and place it on the camera.
- 4.1.15 Perform final survey on source changer and return it to the supplier.
- 4.2 The following procedures are for the S.P.E.C. Model C-1 source changers.
 - 4.2.1 Perform surveys as required in Section II, 9.1
 - 4.2.2 Open both top and side doors to their fullest positions, exposing the outlet tubes on top and lock plungers on the side.
 - 4.2.3 Pull the lock plunger on the blue side and turn to the left.
 - 4.2.4 Connect one side of the short source guide tube (supplied with the changer) to the uncapped outlet tube in the top of the container. Connect the other end to the source tube side of the camera.
 - 4.2.5 Connect the drive cable to the old source in the camera.
 - 4.2.6 Unlock the camera and crank the old source into the changer.
 - 4.2.7 Lock the container by turning the lock plunger 1/4 turn to the right and release. This will cause the plunger to lock down on the source.
 - 4.2.8 Survey the camera, changer and source guide tube.
 - 4.2.9 Disconnect the source guide tube from the changer.
 - 4.2.10 Attach tape to the old source pigtail, securing it to the walls of the source changer. Remove heavy brown paper tape from the outlet tube on the red side of the container and discard
 - 4.2.11 Attach source guide tube to changer and unlock the new source side of the changer by turning 1/4 turn to the left.
 - 4.2.12 Retract (crank in) the new source into the camera.
 - 4.2.13 Lock the exposure device and the changer by turning the lock plunger on the red side of the changer 1/4 turn to the right and release.
 - 4.2.14 Survey the changer, camera and source guide tube.

- 4.2.15 Disconnect drive cable from camera and disconnect source guide tube from camera and changer.
- 4.2.16 Affix new source identification plate to the camera.
- 4.2.17 Perform the final survey on the source exchanger and return it to the supplier.
- 4.3 The following procedures are for Amersham Model 650 source changers.
 - 4.3.1 Perform surveys as required in Section II, 9.1 of this manual.
 - 4.3.2 Remove the cover from the source changer by unlocking the padlock and breaking the seal wire and removing bolts.
 - 4.3.3 Remove the source holddown cap that covers the source by breaking the seal wire and unbolting. Remove the identification plate for the new source.

NOTE: WHEN THE SOURCE HOLDOWN CAP IS REMOVED, THE SOURCE CONNECTOR IS EXPOSED. CARE MUST BE TAKEN TO ASSURE THAT THE SOURCE IS NOT DISLODGED WHEN HANDLING THE CHANGER.
 - 4.3.4 Set the radiographic exposure device as for an exposure.
 - 4.3.4 Connect one end of the guide tube extension to the exposure device and the other end to the fitting above the empty chamber of the source changer.
 - 4.3.5 Close and latch the source guides.
 - 4.3.6 At the exposure device controls, crank the source rapidly from the exposure device to the source changer. The radiation intensity should greatly increase as the source is first exposed, decrease slightly as the source is being cranked out from the exposure device to the source changer and then drop to background when the source is in the source changer.
 - 4.3.7 Perform proper surveys of the source changer, guide tube, and exposure device.
 - 4.3.8 Open the source guides. Disconnect the drive cable from the source assembly by moving the lock pin of the source connector down towards the source and slide the drive cable out through the keyway.
 - 4.3.9 When the disconnect of the source connector and the drive cable is complete, remove the guide tube from the source changer. Connect the guide tube to the fitting above the chamber containing the new source.

- 4.3.10 Couple the drive cable to the source by depressing the lock pin, sliding the drive cable connector into the keyway and releasing the lock pin. Assure that the connection is secure before continuing.
- 4.3.11 Close and latch the source guides above the new source.
- 4.3.12 At the exposure device controls, crank the new source from the source exchanger to its storage position in the exposure device. Observe the survey meter reading during this operation. The radiation intensity should increase as the source exits the source changer. The radiation intensity should steadily increase as the source travels to the exposure device and drop to background when the source is properly stored in the exposure device.
- 4.3.13 Perform proper surveys of the source changer, guide tube, and exposure device.
- 4.3.14 Lock the exposure device and remove the guide tube and controls. Disconnect the guide tube from the source changer.
- 4.3.15 Place the source holddown cap over the old spent source in the source changer. Attach the identification plate of the old source to the holddown cap.
- 4.3.16 Bolt down the source holddown cap in place and seal wire. Assure that the source holddown cap is bolted down firmly over the source connector (s).
- 4.3.17 Affix the identification plate of the new source to the exposure device.
- 4.3.18 Perform the final survey on the source changer and return it to the supplier.
- 4.4 The following procedures are for Amersham Model 500 SU source changers.
 - 4.4.1 Perform surveys as required in Section II, 9.1 of this manual.
 - 4.4.2 Unlock the source changer and open the cover. Remove the envelope containing the documentation and remove the source guide tube extension.
 - 4.4.3 Set the radiographic exposure device as for an exposure.
 - 4.4.4 Connect one end of the guide tube extension to the exposure device and the other end to the fitting above the empty tube, unlock the key-operated lock and raise the lock slide of the source changer to the OPEN position.
 - 4.4.5 At the exposure device controls, crank the source rapidly from the exposure device to the source changer. The radiation intensity should greatly increase as the source is first exposed, decrease slightly as the source is being cranked out from the exposure device to the source changer and then drop to background when the source is in the source changer.

12-1-94

EQUIPMENT HANDLING PROCEDURES

SECTION VI

- 4.4.6 Perform proper surveys of the source changer, guide tube, and exposure device.
- 4.4.7 Move the lock slide on the source changer to the LOCK position (down). Engage the key operated lock. While maintaining positive forward force on the drive cable and source assembly, disconnect the source guide tube extension from the source changer and expose the drive cable to source assembly connection. Disconnect the drive cable from the source assembly. Install the appropriate hold-down cap over the source assembly.
- 4.4.8 Remove the hold-down cap from the other source assembly. Connect the guide tube to the source changer fitting. Unlock the key operated and raise the lock slide to the OPEN position.

NOTE: ASSURE THAT THE SOURCE EXCHANGE TUBE IS SECURELY CONNECTED TO THE SOURCE CHANGER. IF THE SOURCE EXCHANGE TUBE IS NOT PROPERLY CONNECTED THE SOURCE CAN NOT BE REMOVED FROM THE SOURCE CHANGER.

- 4.4.9 At the exposure device controls, crank the new source from the source exchanger to its storage position in the exposure device. Observe the survey meter reading during this operation. The radiation intensity should increase as the source exits the source changer. The radiation intensity should steadily increase as the source travels to the exposure device and drop to background when the source is properly stored in the exposure device.
- 4.4.10 Perform proper surveys of the source changer, guide tube, and exposure device.
- 4.4.11 Lock the exposure device. Move the lock slide of the source changer to the LOCK position. Disconnect the guide tube from the source changer install it in the front compartment of the source changer.
- 4.3.12 Attach the identification plate of the old source to the holddown cap on the source changer.
- 4.4.13 Affix the identification plate of the new source to the exposure device.
- 4.4.14 Assure that the proper hold-down cap is installed over the source in the source changer. seal wire the caps in place. Insert seal wire through the hold-down cap and the drilled bolt on the lock mechanism. Insert hold-down cap over empty tube also. Assure that the key operated locks are engaged, and remove keys.
- 4.4.15 Close the source changer cover and insert closure bolt and padlock and secure. Insert seal wire through closure bolt.

12-1-94

EQUIPMENT HANDLING PROCEDURES

SECTION VI

4.4.16 Perform the final survey on the source changer and return it to the supplier.

5.0 Operating Procedures for Exposure Devices

The following is a step-by-step guide for operating exposure devices. Specific procedures are outlined for each type of device.

5.1 Instructions for operating crank-out type exposure devices.

5.1.1 The following equipment must be present prior to beginning any radiographic operation:

- * Film badge or TLD badge
- * Pocket Dosimeter
- * Alarm ratemeter
- * Survey Instrument
- * Barricade equipment

5.1.2 Position the exposure device conveniently near exposure site.

5.1.3 Remove plug from the lock side of the exposure device.

5.1.4 Connect the inner drive cable on the crank-outs to the source pigtail. Check that the connection is made properly.

5.1.5 Connect the outer drive cable housing (conduit) to the exposure device.

5.1.6 Remove the plug from the (source tube) opening on the exposure device.

5.1.7 Connect the source guide tube to the exposure device. Check that the connection is made properly.

5.1.8 Position the end of the source guide tube in the location where the exposure is to be made.

5.1.9 Attach the film to the exposure point.

5.1.10 Straighten out the source guide tube and crank-out control cables, placing the crank-out handle as far from the exposure point as possible.

5.1.11 Calculate the required exposure time.

5.1.12 Calculate the dimensions of the "Restricted Area" so that no person, continuously present outside the area, will receive more than 2 mR in any one hour.

- 5.1.13 Establish a restricted area and prevent unauthorized entry into the area. Post this area with "Caution -Radiation Area" signs.
- 5.1.14 Calculate the area where the radiation levels will be 100 mR/hr and post this area with "Caution - High Radiation Area" signs.
- 5.1.15 Unlock the exposure device.
- 5.1.16 Crank the control handle clockwise until it stops. **DO NOT FORCE THE HANDLE.** If undue resistance is encountered, reverse the crank direction. Make necessary adjustments (change guide tube position etc.) until the control unit works freely.
- 5.1.17 When the crank handle stops, the source is in the exposed position. Start exposure timer.
- 5.1.18 Survey the perimeter of the "Restricted Area" to ensure that radiation levels are within the 2 mR in any one hour limits.
- 5.1.19 Maintain constant surveillance of the "Restricted Area" to ensure that no unauthorized personnel enter.
- 5.1.20 When the exposure is completed, return the source to the shielded position by turning the crank handle in a counter-clockwise direction, until it stops.
- 5.1.21 Carry and observe the survey meter continuously when approaching the exposure device. The entire circumference of the camera and the full length of the source guide tube must be surveyed to ensure that the source has returned to the shielded position before locking the camera.
- 5.1.22 Lock the exposure device and return it to the storage area.
- 5.2 Instructions for operating "pipeliner" type exposure devices
 - 5.2.1 All equipment listed in 5.1.1 above must be present before beginning any radiographic operation.
 - 5.2.2 Position film on pipe weld to be radiographed.
 - 5.2.3 Place exposure device in position to make the exposure.
 - 5.2.4 Use chains and locking boomers to secure the device to the pipe.
 - 5.2.5 Unlock the exposure device.

- 5.2.6 STANDING AS FAR BACK AS POSSIBLE, expose the source by rotating the knurled knob 180 degrees.
- 5.2.7 Move as far away as practical for the duration of the exposure.
- 5.2.8 After the exposure is complete, turn the device "off" by rotating the knurled knob 180 degrees back.
- 5.2.9 Approach the exposure device with a survey meter in hand to ensure that the source is in the shielded position, and lock the device.
- 5.2.10 When radiographic operations are completed, lock and survey the device before returning it to the storage area.

6.0 Instructions for operating Master Minder (signaling devices)

Master Minder signaling devices provide signals that control internal pipeline crawler equipment. The isotope contained in the Master Minder is approximately 225 millicurie of Cesium-137. Because it is possible to receive doses from the Master Minder that exceed those allowable under 10CFR, Part 20 the signaling device must be used in accordance with all applicable radiation safety regulations and instructions outlined in these operating procedures

6.1 Operation of Master Minder

- 6.1.1 All equipment listed in 5.1.1 above must be present before using the signaling device.
- 6.1.2 To produce a signal survey the Master Minder to assure that it is in the locked safe position then place the Master Minder firmly on the pipe surface.
- 6.1.3 Unlock the Master Minder by turning the key clockwise and allowing the lock plunger to spring up.
- 6.1.4 Grasp the source holder and pull out gently.
- 6.1.5 Step back away from the Master Minder to avoid unnecessary exposure during the signal.
- 6.1.6 To terminate the signal, grasp the source holder and push in to the farthest extent.
- 6.1.7 Depress the lock plunger and turn the key counter clockwise to lock the device.
- 6.1.8 Survey the Master Minder to assure the source has returned to the safe and locked position.

7.0 Instruction for operating Tattle Tale locating devices

12-1-94

EQUIPMENT HANDLING PROCEDURES

SECTION VI

The Tattle Tale locating device has a capacity of 100 mCi Cesium-137 and is designed primarily as a locating device for internal pipeline crawler equipment. A locking safety key mechanism prevents unauthorized use. The source rod is manually raised to the "on" position by unlocking the safety mechanism, and raising the source up to the "on" position. The locking mechanism can be used to hold the source in the "on" position. The radiation beam is horizontal (90 degrees from the locking mechanism) and the beam angle is 28 degrees.

7.1 Operation of Tattle Tale locating device

- 7.1.1 All equipment listed in 5.1.1 above must be present before operating the Tattle Tale locating device.
- 7.1.2 Survey the Tattle Tale to assure the device is in the "off" shielded position.
- 7.1.3 Place the Tattle Tale in the Tattle Tale holder that is attached to the pipeline crawler.
- 7.1.4 Position the Tattle Tale so that the beam opening is directed toward the round side opening in the Tattle Tale holder.
- 7.1.5 Secure the Tattle Tale with the retaining bolt located at the top of the holder.
- 7.1.6 Raise the source rod to the "on" position and secure, place crawler in the pipe and proceed with the operation.
- 7.1.7 When the crawler exits the pipe, lower the source on the Tattle Tale to the "off" shielded position.
- 7.1.8 Survey the Tattle Tale to assure it is in the shielded position then lock the device.
- 7.1.9 If further operation is required repeat 7.1.6 through 7.1.8.
- 7.1.10 If operations are complete remove the Tattle Tale from the holder and return it to storage.

8.0 Instruction for Operation of X-ray devices

Operating procedures for x-ray machines are not covered in this manual. The RSO or operations manager will make available operating instructions for specific x-ray devices on an as needed basis. The NRC does not regulate radiography using x-ray machines. For regulations concerning x-ray radiography refer to the individual states regulations or the U. S. Occupational Safety and Health Administration (OSHA) regulations.

BETWEEN:

LICENSE FEE MANAGEMENT BRANCH, ARM
AND
REGIONAL LICENSING SECTIONS

(FOR LFMS USE)
INFORMATION FROM LTS

PROGRAM CODE: 03320
STATUS CODE: 2
FEE CATEGORY: 30 2B
EXP. DATE: 19950131
FEE COMMENTS:
DECOM FIN ASSUR REQD: N

1995 JAN -6 PM 5:30

LICENSE FEE TRANSMITTAL

A. REGION IV

1. APPLICATION ATTACHED
APPLICANT/LICENSEE: WESTERN X-RAY COMPANY
RECEIVED DATE: 950105
DOCKET NO: 3019640
CONTROL NO: 465522
LICENSE NO: 35-19993-01
ACTION TYPE: RENEWAL

FEE ATTACHED
AMOUNT: \$3060.00
CHECK NO.: 7606

3. COMMENTS

SIGNED
DATE

Billie Gruszynski
1/5/95

B. LICENSE FEE MANAGEMENT BRANCH (CHECK WHEN MILESTONE 03 IS ENTERED A/1)

1. FEE CATEGORY AND AMOUNT: 30 2B \$3060

2. CORRECT FEE PAID. APPLICATION MAY BE PROCESSED FOR:

AMENDMENT
RENEWAL
LICENSE ✓

3. OTHER

SIGNED
DATE

Rita Messier
1/13/95

