NRC Form 374A (8-82) U.S. NUCLEAR REGULATORY COMMISSION

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MATERIALS LICENSE
SUPPLEMENTARY SHEET

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License number: 24-19500-01

Docket or Reference number:

Amendment No. 02

Southwestern Engineering Company
11th & Pearl Street
P. O. Box 1385
Joplin, Missouri 64801

In accordance with letter dated August 8, 1983, License Number 24-19500-01 is amended as follows:

Subitems 6.A., 7.A., 8.A. and 9.A. are amended to read:

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 sources (Gamma Industries Century Model A-2-A)	A. Not to exceed 100 curies per source

9. Authorized use

A. For use in Gamma Industries Model Century (SA) exposure device for industrial radiography and Gamma Industries Model C-10 source changers for storage and replacement of sources.

Condition 16. is amended to read:

16. Except as specifically provided otherwise by this license, the licensee shall possess and use licensed material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated August 7, 1980; letters dated February 24, 1981 and March 10, 1983 with attached application and letter dated August 8, 1983. The Nuclear Regulatory Commission's regulations shall govern the licensee's statements in applications or letters, unless the statements are more restrictive than the regulations.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date SEP 23 1983

By _____
Material Licensing Branch
Division of Fuel Cycle and
Material Safety
Washington, D. C. 20555

LEAK TEST PROCEDURE

A. Fill out the form relating to source identification plus, date location, name, etc.

B. Dissolve dry detergent in small amount of water.

C. Dampen the cotton end of the swab in the liquid and proceed with test according to kit supplier's instructions supplied with or on the kit.

NOTE: For our (crankout) devices, remove the plug cap from the source exit port where the guide tube connects and wipe the inside of the S-tube with dampened swab. DO NOT REMOVE THE SOURCE FROM THE DEVICE SO THE SOURCE ITSELF CAN BE WIPED.

D. Repeat the wipe dry with the second swab if two are provided.

E. Place the swab (s) back in the kit according to the supplier's instructions and prepare the kit for mailing to the Radiation Safety Officer.

F. Survey the package kit with your radiation survey meter. If a reading above background is obtained do not mail the kit; contact the Radiation Safety Officer immediately.

G. If no radiation is detected during the survey, mail the kit to the Radiation Safety Officer for return to the vendor.

OPERATING AND EMERGENCY PROCEDURES

Section	Title
I.	The Handling and use of radiographic exposure device.
II.	Methods and occasions for conducting radiation surveys.
III.	Methods for controlling access to radiographic (radiation) areas.
IV.	Methods and occasions for locking and securing sources of radiation.
V.	Personnel Monitoring.
VI.	Transporting sources of radiation.
VII.	Emergency procedures.
VIII.	Emergency Notification.
IX.	Maintenance of Records.
X.	Inspection and maintenance of radiographic (radiation) exposure devices.
XI.	Internal inspection of conformance to requirements.

OPERATING AND EMERGENCY PROCEDURES

I. THE HANDLING AND USE OF RADIOGRAPHIC (RADIATION) EXPOSURE DEVICES.

A. Operating Procedures for Standard Radiography

1. Prior to making an exposure the Radiation Area shall be established (by calculations) and "Radiation Area" signs posted at the 2 mR/hr level; also at the 100 mR/hr level "High Radiation Area" signs shall be posted.

2. Check exposure device with survey meter to be certain that source is inside. (Safe position)

3. Obtain locked exposure device from truck or storage area.

4. Connect controls in accordance with directions given in this manual for each device.

5. With survey meter "ON", exposure source.

6. Survey perimeter of Radiation Area and adjust signs where necessary to conform to (1) above.

7. A radiographer or radiographer's assistant must maintain constant "area surveillance" to keep unauthorized personnel out.

8. After exposure, return source to a safe position.

9. Check with survey meter after every exposure to be sure that source is in a safe position.

10. The device shall be locked immediately.

11. In breaking down the device crank out controls will be disconnected first.

12. Remove signs.

13. Return exposure device to proper storage.

B. Exposure Procedure Using "Crank out" type devices.

1. Have an operating survey meter on hand always and use it.

2. Remove the protector cap from the lock block thereby exposing the pigtail connector.

3. Crank the control cable to a length of approximately six (6) inches.

4. Connect control cable to pigtail.

5. Crank control cable is so that male connecting thread can be screwed into lock block.

6. Screw control cable into lock block.

7. Remove safety plug from outlet.

8. Connect source tube.

9. Place free end of source tube in desired position trying to keep it in a straight line without kinks.

10. Stretch control cable away from exposure device in as straight a line as possible.

11. Unlock unit.

12. Crank source out as smoothly as possible. When you feel that source is approaching end of source tube, slow turning speed so that pigtail does not bang into end of source tube.

13. Survey the area to see that radiation levels are within the limits established in number 1 of operating Procedure for Standard Radiography."

14. At the end of exposure, retract source into unit.

15. Now for the most important step of all: SURVEY BOTH THE SOURCE TUBE AND THE DEVICE CAREFULLY TO BE SURE THAT SOURCE HAS RETURNED TO SAFE POSITION.

16. Depress plunger lock.

17. Disconnect control cable.

18. Screw Safety cap into place.

19. Disconnect source tube.

20. Insert safety plug.

C. Exposure Procedure using "Pipeliner" type devices.

1. Have an operating survey meter on hand always and use it.

2. Place device on surface to be radiographed.

3. Position the device such that when the device is turned "ON", the control knob rotation is toward the operator. This action rotates the source away from the operator.

4. Connect chain and latching device to camera and around the pipe and latch.

5. Position film.

6. Unlock device.

7. Turn device "ON" at arm's length to reduce body exposure and immediately walk away from the device.

8. Survey the area to see that radiation levels are within the limits established in number 1 of "Operating Procedures for Standard Radiography."

9. After the exposure, with survey meter in hand and "ON", approach device and at arm's length, turn control knob to "OFF" position.

10. SURVEY CAREFULLY TO BE SURE THAT SOURCE IS IN THAT SAFE POSITION.

11. Depress plunger lock.

12. Remove from pipe and relocate for next exposure or return to storage.

II. METHODS AND OCCASIONS FOR CONDUCTING RADIATION SURVEYS

A. Physical Radiation Surveys

Area surveys shall be performed as listed below.

1. A calibrated and operable survey instrument shall be on each job site where radiography is being performed. This instrument is to be calibrated at intervals no greater than ninety (90) days.

2. Physical radiation survey during exposure period

   a. Determine area larger than necessary for actual exposure from calculations of souce strength and distance. (Inverse Square Law)

   b. Expose source as specified in Schedule I of this handbook.

   c. Survey boundaries determined in Paragraph "2" above with survey meter.

   d. Adjust boundaries as necessary to maintain 2 mR/hr or less at the perimeter of the restricted area.

   e. Results of these surveys must be recorded on the Daily Radiation Report.

3. Physical radiation survey device after completion of each exposure.

   a. Return source to its safe position within the exposure device.

   b. Survey the surface of the device to assure that the source is inthe shielded position.

   c. After determining source is in safe position from meter reading, lock the device.

4. A physical radiation survey prior to storage of device after last exposure will be made.

5. Since the outer surface of a transporting vehicle must be treated as an unrestricted area, a physicalsurvey shall be made after the exposure device has been secured in the vehicle to assure that radiation levels at the outer surface of the vehicle do not exceed 2 mR/hr. A record of this survey must be made on the Daily Radiation Record. If radiation levels of more than 2 mR/hr are found, additional shielding must be used.

III. METHODS FOR CONTROLLING ACCESS TO RADIOGRAPHIC (RADIATION) AREAS.

A. "High Radiation Areas" are those areas which contain radiation levels of 100 mR/hr or greater.

B. "Radiation Areas" are those areas which contain radiation levels of 5mR/hr or greater.

C. "Restricted Areas" are those areas which contain radiation levels of 2mR/hr or greater.

D. Controlling Restricted Areas

1. It is the policy of our company to post "Radiation Area" signs at the perimeter of the restricted area (2 mR/hr radiation levels). Therefore, no action need be taken reguarding the perimeter of the Radiation Area.

2. Establish perimeter around exposure sites at Radiation levels of 2 mR/hr and post "Radiation Area" signs as needed.

3. At the 100 mR/hr level "High Radiation Area" signs shall be posted.

4. A radiographer, logger or their assistant shall maintain constant "area surveillance" to keep unauthorized personnel out.

5. When working under conditions which require exposures of short duration, the following table may be used to determine the radiation level at the perimeter boundary where barricading and / or posting should be set up. (in stead of the 2 mR/hr line)

Exposure time during any one hour	Radiation level at boundary
60 minutes	2mR/hr
30 minutes	4mR/hr
20 minutes	6mR/hr
10 minutes	12mR/hr
5 minutes	24mR/hr
2 minutes	60mR/hr
1 minutes	120mR/hr

IV. METHODS AND OCCASIONS FOR LOCKING AND SECURING SOURCES OF RADIATION.

A. After every exposure, the device will be locked after it has been determined the source is in a safe position.

B. All sources shall be locked in the radiographic device in such a way that they will prevent injury or their use by an unauthorized individual.

1. While at temporary job sites, the device will be locked in the approved storage box built into the company vehicle.

2. If another locked storage area is considered, the radiation levels outside the storage area shall not exceed 2mR/hr at any outer surface.

3. The locked door to any storage area shall be posted with the proper signs "Caution Radioactive Materials".

C. Transporting and /or storage of isotopes on company vehicles.

1. The source in its device shall be locked inside the approved storage box built into the truck.

2. The company vehicle must be clearly marked with the Dot Diamond "RADIOACTIVE" sign displayed onall four sides of the transporting vehicle.

3. The outer surface of the vehicle shall be surveyed with a survey meter to assure that the radiation levels do not exceed 2mR/hr level.

4. A survey of the passenger compartment shall be made to assure that the radiation levels do not exceed 2mR/hr in the cab area.

V. PERSONNEL MONITORING

A. Every radiographer and assistant radiographer shall be assigned a dosimeter and a film badge. New film badges will be issued at the first of each month.

B. Dosimeters will be recharged at the beginning of each work day.

C. Dosimeters should be read several times a day, so as to be aware of any radiation exposure you may have received.

D. Dosimeter readings (total dose), will be recorded at the end of each day on the daily dosimeter form.

E. Personnel shall not exchange film badges.

F. Upon discovery of an off scale pocket dosimeter reading, the radiographer shall take the following actions:

1. Stop work immediately.

2. Retract the source to the stored position. If source cannot be retracted, institute emergency procedures per instruction.

3. Notify the Radiation Safety Officer listed in Part VIII.

G. An exposed film packet shall be reported to the Radiation Safety Officer immediately.

H. The loss of film badge or dosimeter shall be reported to the Radiation Safety Officer immediately.

I. Because of number F, G, or H above the Radiation Safety Officer shall advise what further action shall be taken. In any case, the film badge will be returned for immediate processing upon receipt of a new film badge.

J. Pocket dosimeters shall be checked annually for response to a known amount of radiation. Dosimeters exhibiting a reading of $\pm$ 30% of true dose shall be acceptable. Records of dosimeter checks shall be maintained for inspection by the commission until it authorizes their disposal.

VI. TRANSPORTING SEALED SOURCES

Follow instructions as per Section IV.

VII. EMERGENCY PROCEDURES

A. Emergency Operating Procedures

General Emergency Operating Procedures

1. Plant Emergency

In the event of plant emergency, in an area adjacent to a radiographic device, such as fire or an accident involving plant personnel, the following procedure will be followed:

a. Return source to shielded position in exposure device. Lock exposure device.

b. Perform physical radiation survey of exposure device to assure that the source is in the shielded position.

c. Remove device from danger area and, if possible, return to storage facilities.

d. Notify your supervisor.

e. If a radiographic device cannot be removed from a danger area, do the following:

(1) set up a restricted area around the exposure device using survey instrument to determine the area.

(2) Notify your supervisor.

(3) Supervisor shall notify the Radiation Safety Officer.

(4) Radiation Safety Officer shall determine further course of action.

2. Source Accident

In the event of an accident to the source or exposure device, immediately do the following.

a. Return source to exposure device, if possible, and lock exposure device.

b. Notify the supervisor and the Radiation Safety Officer.

c. Do not use exposure device again until the Radiation Safety Officer has made an inspection of exposure device and personnel monitoring equipment and grants approval for its use.

d. In the event the source cannot be returned to the exposure device, immediately do the following:

(1) Set up and post a restricted area using a survey meter, to determine the 2 mR/hr level.
(2) Do not allow anyone to enter the area.
(3) Notify your Radiation Safety Officer.
(4) Continue to restrict entry into area.

3. Exposure of Non-Monitored Personnel

In the event of exposure of non-monitored personnel to radiation, immediately do the following:

a. Retain and take names, addresses, ages, time and distance to source of all personnel involved.

b. Notify your supervisor and Radiation Safety Officer.

c. Supervisor or Radiation Safety Officer shall obtain all pertinent facts involving accident.

d. Radiation Safety Officer shall determine the course of action and shall notify local agency.

4. Loss and Theft

In the event of loss or theft of source and device:

a. Notify your supervisor and Radiation Safety Officer.

b. Notify local police.

c. The following shall be performed by the Radiation Safety Officer:

(1) Notify licensing agency
(2) Obtain all information on the last known location of the source.

5. In the event of a DISCONNECT of source or failing of source to return to shielded position.

a. Recheck the Radiation Area, adjust signs, if necessary, to maintain 2mR/hr level.

b. Post guards to prevent admittance into radiation area (guards shall be employees of licensee).

c. Notify Radiation Safety Officer and Supervisor.

d. Do not leave this condition unattended for any reason.

e. Do not attempt to recover source without proper authorization.

6. Vehicle Accidents

In case of vehicle accident, if possible, do the following:

a. Survey area if survey meter is operable.
b. Try to establish source location.
c. Mark off as wide an area as possible.
d. Advise police of radioactive presence and degree of hazard.
e. Ask anyone available to call Radiation Safety Officer and police.
f. Do not leave area unattended unless:
   (1) You are certain that source is safe
   (2) Container is locked
   (3) No one can at all tamper or reach source.

7. Product Malfunction and/or Defect

Any product used in the operation or handling of radiographic sources which malfunctions or is discovered to be defective shall be removed from service. Products removed from service shall be turned in, with a report of malfunction, to the Radiation Safety Officer for his disposition.

VIII. EMERGENCY NOTIFICATION (ORIGINAL)

Emergency Telephone Numbers

delete ~~Donald R. Cox~~	~~RSO/RADIOGRAPHER~~	~~417-781-9400~~
Henry Tietz	MFGRS. REP.	918-835-6496
DAVID RUCKER	RSO / Level III	417-623-3379
TIM HARRIS	RADIOGRAPHER	417-
RICHARD DUKE	QC MGR	417-782-2311

CHANGE

Operating and emergency procedures Section VIII (Emergency Notification) is to be amended as follows:

		Emergency Phone No's.
David Rucker	RSO/Level III	417 623-3379
Tim Harris	Ass't. RSO Level II	417 781-9083
Henry Tietz	Mfr's. Rep.	918 835-6496
Richard Duke	QC Mgr.	417 782-2311

CONTROL NO. 78866

IX. MAINTENANCE OF RECORDS

A. Daily Radiation Records

1. A written daily radiation report shall be filled out by each radiographer. This form contains the following information:

   a. Safety check on equipment
   b. Name of radiographer
   c. Location
   d. Date
   e. Source used (Gamma or X-Rays)
   f. Record of radiation survey made before source is moved from storage.
   g. Camera number
   h. Survey meter number
   i. Maximum radiation level at perimeters of restricted area. If other than 2mr/hr give full explanation as to why.
   j. Record of survey after source is returned to storage.
   k. Record of the radiation survey made of the exposure device at the completion of the day's work.
   l. If unit is to be transported on a vehicle, the radiographer shall make a record of the survey on the outside surface of the vehicle.
   m. Distance to unmonitored personnel.

2. This report must be turned in daily to the Radiation Safety Officer.

3. Dosimeter reading will be posted to the dosimeter report daily. Each report will be totaled and turned in every seven (7) days.

4. Daily Radiation Records shall be maintained on file.

X. INSPECTION AND MAINTENANCE OF RADIOGRAPHIC (RADIATION). EXPOSURE DEVICES.

A. Daily check list for "Crank out" type devices.

1. Inspect SAF-T-Key connectors.

2. Inspect lock plunger mechanism.

3. Check outlet nipple for roundness.

4. Inspect handle.

5. Inspect source tube.

6. Make sure cap is on end of source tube.

7. Check diameter of hole in drive cable connector by mating it with connector on source pigtail. Try to disconnect in all directions.

8. Check exposure device for proper labelling.

B. Daily check list for X-ray machine.

1. Check leads for break in insulation.

2. Check panel box for moisture, dust, etc.

3. Check X-ray machine and panel box for proper labelling.

C. Storage Container

1. Check locking.

2. Check for proper labelling.

D. It is the radiographer's responsibility to hold the daily inspection and sign the Area Survey Report.

E. Because of the "daily inspection" by the radiographer, if any equipment is in the need of maintenance and/or repair and cannot be done by the radiographer, he shall notify the Radiation Safety Officer immediately.

F. Quarterly Inspection and Maintenance shall be performed and documented by the RSO or his delegated Radiographer. Documentation shall remain on file for a minimum of 2 years. (Sample Attached)

Southwestern-Joplin, Inc.
Subsidiary of Southwestern Engineering Company
11th & Pearl Streets, P.O. Box 1385
Joplin, Missouri 64801
417-781-9400

QUARTERLY INSPECTION OF RADIOGRAPHIC DEVICES

This inspection is to be performed by the Radiation Safety Officer of SOUTHWESTERN ENGINEERING COMPANY or appointed Assistant, (only if he is not available).

Exposure Devices:
Mfg._____ MODEL_____ SER. NO._____

I. Exposure Device:
   A. Crank source out of exposure device to a shielded area. Then survey device for any radiation. Survey Reading_____ mr/hr.
   B. Inspect safety plug for proper condition OK_____ Damaged_____
   C. Check locking Mechanism
      Operates properly_____ Firm attachment_____
   D. Check proper alignment of "S" Tube with entrance and exit port.
      OK_____ Damaged_____
   E. Condition of hold Down Components OK_____ Damaged_____
   F. Condition of Labeling OK_____ Damaged_____

II. Pigtail Assembly:
   A. Inspect connector for proper condition (See manufacture specification attachment
      OK_____ Damaged_____

III. Source Tubes:
   A. Is there any rust, dirt or sludge build up inside tubes.
      Yes_____ No_____
   B. Condition of tube connectors OK_____ Damaged_____
   C. Condition of Source Stop OK_____ Damaged_____
   D. Is there any kinks, crushed section or anything to prevent proper operation
      YES_____ NO_____

IV. Crank Assembly:
   A. Does it operate properly YES_____ NO_____
   B. Any excessive wear or damaged components YES_____ NO_____
   C. Source indicator operate properly YES_____ NO_____

Source Drive Cable:
   A. Inspect connector proper condition (See Mfg. specification attachment.
      OK_____ Damaged_____
   B. Remove cable and inspect for:
      1. Flexibility
      OK_____ Damaged_____

CONTROL NO. 78866

Southwestern-Joplin, Inc.
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QUARTERLY INSPECTION OF RADIOGRAPHIC DEVICES

(cont.d)

V. Source Drive Cable:

B. (cont.d)

2. Wear — OK _____ Damaged _____
3. Rust — Yes _____ No _____
4. Broken Wires — Yes _____ No _____

C. Mechanical operating abilities.

1. Does source pigtail assembly and cable fit properly. Yes _____ No _____
2. Is there any possibility of an accidental disconnection. Yes _____ No _____

Clean, Lubricate and replace any damaged part at this time.

The manufacture inspection and maintenance guide (Attachment F) will be used to make above safety inspection.

Inspection Date _____ Time _____
Location _____

REMARKS _____

_____

_____

_____

_____

_____

_____
RADIATION SAFETY OFFICER

XI. INTERNAL INSPECTION OF CONFORMANCE TO REQUIREMENTS.

A. Receipt and shipment of radioactive materials

1. Upon receipt of any source material, a survey of the container shall be performed by the Radiation Safety Officer or his delegate. Any indication of leaking shall be cause to institute actions as described in Part VII Emergency Procedures, Para. 6.

2. Records as to date, serial number, isotope, curies and package condition shall be maintained for each receipt or shipment of isotopes.

B. Audits of compliance to requirements shall be performed at intervals not to exceed 3 months. Audits may be performed by Non-Radiographic Management Personnel, Radiation Safety Officer or Consultants.

1. The following areas of compliance shall be audited

a. License Provisions
b. Commission Regulations
c. Operating Procedures
d. Logs and Records of Receipt, Use, Disposal, Surveys, Calibrations and Personnel monitoring.
e. Radiographer evaluation

C. Reporting and records of audit findings.

1. Written reports of all audit findings shall be submitted to the Radiation Safety Officer for retention and/or action as required.

2. Discrepancies noted on audits shall be corrected in a timely manner consistent with safe practice and commission regulations.