



**MODEL SPEC C-1**

**SOURCE CHANGER**

**OPERATING INSTRUCTIONS**

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## OPERATING PROCEDURES

The source assembly is initially loaded into the SPEC C-1 Source Changer at the SPEC facilities under the provisions of Louisiana Radioactive Material License LA-2966-L01 in accordance with the procedures and radiation protection standards established under that license.

Only licensed users of the SPEC C-1 Source Changer are authorized to exchange source assemblies in accordance with specific provisions of their agreement state or NRC radioactive material license.

The SPEC C-1 Source Changer consists of an inner unit (the source changer) and an outer housing (the shipping overpack). Both components are considered to be the device, and the inner unit may only be removed from the outer housing as part of the source exchange process.

- The outer housing (overpack) may only be opened by trained, monitored and authorized personnel.
- The source exchange process begins with removing the inner changer unit from the outer housing (overpack) and ends with replacing it in the overpack.
- The inner changer unit must be stored in the overpack when not in use.

### 1.0 PREPARATION FOR EXCHANGE

- 1.1 Perform safety survey in accordance with safety regulations and your company's Operating Procedures to verify that the source(s) are properly shielded.
- 1.2 Establish restricted area.
- 1.3 Unscrew bolt to loosen bolt ring on outer housing.
- 1.4 Remove the lid. Remove the changer unit and changer tube from the outer housing.
- 1.5 Inspect the changer tube to assure that one end fits the exposure device outlet.
- 1.6 In accordance with your operating procedures, prepare exposure device for use while the changer unit is still in the locked position,
- 1.7 Place the changer unit and exposure device approximately one (1) foot apart. Face the outlet end of the exposure device toward the back of the changer unit.

- 1.8 Rotate the changer unit's carrying handle to fall against the back of the changer unit (toward the exposure device).
- 1.9 Gently lay the changer unit on its back. (The changer unit will be slightly inclined due to resting upon the carrying handle). Unlock padlock and open the front door and the top door.

## 2.0 TRANSFER OLD SOURCE TO CHANGER UNIT

- 2.1 Open the empty (blue) side of changer unit by pulling up the spring-loaded plunger knob and rotating it slightly. The knob must be rotated in either direction to keep the plunger in the retracted position.
- 2.2 Connect the changer tube to outlet nipple of the changer unit. Pull on the tube to assure a secure connection.
- 2.3 Extend the changer tube toward the outlet nipple end of the exposure device to establish the proper distance between the two units. Adjust the distance if needed.
- 2.4 Remove the safety plug from outlet end of exposure device.
- 2.5 Connect the loose end of the changer tube to the exposure device. Pull on the tube to assure a secure connection.
- 2.6 Assure that there are no sharp bends or binds in the changer tube.
- 2.7 Unlock the exposure device.
- 2.8 Pick up the survey meter. With survey meter in hand, extend control assembly to its fullest extent.
- 2.9 Crank the source into the changer unit, by cranking forward until a stop is met.
- 2.10 While applying slight forward pressure on the control assembly crank arm, approach the transfer area with a survey meter. Survey the changer unit, the changer tube and the exposure device. If high radiation is detected, follow your company's emergency procedures. If radiation intensity is safe, proceed with the following steps.
- 2.11 Rotate the changer unit plunger knob until the plunger snaps into its originally engaged (closed ) position.
- 2.12 Pick up the survey meter, extend the control assembly to its fullest extent,

and gently attempt to crank the source backward out of the changer unit. Resistance will indicate that the source is properly secure. Verify this by surveying.

- 2.13 While applying a slight forward pressure on the crank arm, carefully disconnect the end of the changer tube attached to the changer unit.
- 2.14 Gently crank forward until approximately one foot of the drive cable is exposed.
- 2.15 Carefully disconnect the drive cable from the source pigtail according to normal operating procedures.
- 2.16 Verify that the source has been properly secured in the shielded position by surveying.

### 3.0 TRANSFER NEW SOURCE FROM CHANGER UNIT TO EXPOSURE DEVICE

- 3.1 Remove the safety plug from the empty exposure device and connect the changer tube to it. Pull on the tube to assure a secure installation.
- 3.2 Extend the changer tube toward the outlet nipple of the loaded side of the changer unit to establish the proper distance between the two units.
- 3.3 Unlock the exposure device.
- 3.4 Crank forward until approximately one (1) foot of drive cable is exposed beyond the end of the source tube.
- 3.5 Verify that the changer unit lock plunger is still closed.
- 3.6 Connect the drive cable connector to the connector of the source assembly in the changer unit.
- 3.7 Gradually crank the drive cable backward until all of the slack is removed between the changer unit and the changer tube.
- 3.8 Connect the changer tube to the changer unit outlet nipple. Pull on the tube to assure a secure connection.
- 3.9 Assure that there are no sharp bends or binds in the changer tube.
- 3.10 Apply a slight forward pressure on the crank arm to assure that the source stays in the fully shielded position when opening the changer unit lock plunger.

- 3.11 Open the lock plunger by pulling up and rotating slightly. The knob must be rotated in either direction to keep the plunger in the retracted (open) position.
- 3.12 Pick up the survey meter.
- 3.13 Keeping a slight pressure forward on the crank arm, extend the control assembly to its fullest extent.
- 3.14 Crank the source backward from the changer unit into the exposure device.
- 3.15 Approach the exchange area with the survey meter. Immediately survey the area, then survey the exposure device, the changer tube, and the changer unit. If high radiation is detected, follow your company's emergency procedures. If radiation intensity is safe, proceed with the following steps.
- 3.16 Lock the exposure device.
- 3.17 Disconnect the control assembly from the exposure device in accordance with normal operating procedures.
- 3.18 Disconnect the changer tube from the outlet nipple end of the exposure device and install the safety plug.
- 3.19 Lock changer unit by rotating lock plunger.
- 3.20 Disconnect changer tube from outlet nipple of changer unit.

#### 4.0 COMPLETING EXCHANGE PROCESS

- 4.1 Verify that the lock plungers are fully depressed, that the source assembly(ies) are properly secured, and that the doors to the changer unit are fully closed and secured together by a padlock or similar fastener. Remove the key from the lock.
- 4.2 Place the changer unit in the outer housing.
- 4.3 Secure the top of the outer housing with the bolt or snap closure ring.

#### 5.0 MAINTENANCE

There are no quarterly maintenance requirements for the C-1 Source Changer. Maintenance, if required, is performed by SPEC.

## 6.0 EQUIPMENT MALFUNCTIONS AND ACCIDENTS

The procedures in the licensee's Operating and Emergency Procedures Manual must be strictly followed in an emergency. The emergency procedures recommended by the U.S. Nuclear Regulatory Commission consist of the following:

1. Quickly move away from the exposed source.
2. Stay calm, do not panic. Stop and think.
3. Establish or extend the restricted area.
4. Send for help and maintain surveillance.

Do not attempt to retrieve the source or engage in emergency repairs if you have not been trained and authorized to do so. SPEC is available to provide emergency assistance on a 24-hour basis. Phone 504-464-9471.