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INSTRUCTION
SOURCE REPLACEMENT PROCEDURE
THERATRON JUNIOR AND C-II



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INSTRUCTION
SOURCE REPLACEMENT PROCEDURE
THERATRON JUNIOR & THERATRON CII
TELETHERAPY EQUIPMENT

INSTRUCTION REFERENCE: SRT-4

ISSUE NUMBER 4

SECTION A: GENERAL

1. Not less than one (1) authorized A.E.C.L. person and one (1) assistant shall participate in this operation.
2. Prior to commencement, the authorized person shall check that the following equipment is on hand.
 - (a) pocket dosimeter charger
 - (b) calibrated radiation survey meter - Jordan type AG8-50-SR or equivalent capable of reading radiation field as low as .5 mR/hr and a high range in the order of 25 - 50 r/hr.
 - (c) end windows geiger counter - Electronics Associates Ltd. type EA-147-A or equivalent having a low scale capable of reading in the range of 0 - 500 counts per minute and a high scale of not less than 25,000 C.P.M.
 - (d) set of source drawer handling tools
 - (e) hydraulic lift truck for moving source transfer shipping container
 - (f) teletherapy Head Survey blanks in duplicate
 - (g) return shipping instructions and documents
3. Both persons shall wear 0 - 50 mR/hr and 0 - 5 r/hr pocket dosimeters - correctly zeroed together with an A.E.C.L. film badge.
4. Prior to commencement the Authorized person shall:
 - (a) make a survey of these areas from which uncontrolled persons may have to be evacuated in the event of mal-transfer. This area in which the radiation field is 5 mR/hr or greater will be referred to as the "Danger Area".
 - (b) should such an accident occur, be guided by the Official Atomic Energy Control Authority in the country in which you are working.
 - (c) if immediate assistance is required, consult the Municipal Police, Fire Department or Civil Defense Authority.
 - (d) do not depend on locked doors. See that guards are posted to prevent entrance to the "Danger Area"
 - (e) report to A.E.C.L. Radiation Hazards Section immediately after the entrances to the "Danger Area" have been secured.

SECTION B: PREPARATION

1. Check that the shutter is in the closed position by noting that the "shutter closed" green light is illuminated on a control panel and on the equipment before entering the treatment room. Enter the treatment room with a survey meter in the "on" position and check that the radiation level is normal.
2. Operate the curved arm to the 180° position, i.e. counterweight at the top and head at the bottom position of rotation.
3. Position the source transfer case approximately in line with the head.
4. Check that the radiation level at both drawer ends is within the level indicated on the radiation warning label.
5. Unlock the transfer case and remove the source drawer cover plates and lead filler plug.
6. Check the loading card and note the location of the live source drawer e.g. upper or lower compartment.

NOTE:

Note that the live source drawer has a brass end plate stamped with the source serial number and an arrow indicating the position of the source proper. The dummy drawer is of stainless steel and is stamped as such.

7. Check that the number stamped on the live drawer end plate is that indicated on the shipping document and note that the live source drawer indicator (arrow) is in the inverted vertical plane.
8. With the power off - disconnect wiring to air compressor and release the air from the air reservoir.
9. Disconnect the wires to the skinner air valve - wires No. 0 and No. 1
10. Position the transfer case to a point approximately 2 inches from the head. Elevate the transfer case by means of the elevation screws (supplied in tool section of transfer case.)
11. Align the dummy drawer with the head aperture.
12. Very carefully recheck the alignment between the dummy drawer in the transfer case and the live drawer in the Cobalt Head. Block and shim between the transfer case skid members and the floor as a safety precaution. Connect the appropriate drawer couplings as detailed on drawing D5V-62.
13. Place the survey meter in such a position that it is not subjected to the incident beam during the transfer, but in such a position that the meter scale may be viewed by both persons. Use the 0 to 50 r/hr scale.
14. Insure that all passageways above, below and both sides, are controlled so that there is no possibility of other persons being exposed during the transfer.

SECTION C: SOURCE REMOVAL

1. Always check pocket dosimeters for zero prior to starting.
2. Never move from your assigned position during the source transfer without first observing the survey meter and advising the other person of your intent.
3. Never use more force to effect a transfer of the drawer into the head of the unit than is required to move the drawer in the transfer case.
4. Both persons shall take position behind the transfer case during the actual transfer.
5. The Authorized person shall securely thread the "T" transfer tool into the dummy drawer, after removing cover plates from the transfer case and releasing the locking screw on the rear of the live drawer in the Cobalt head.
6. The person in 5 above, after notifying the other of his intent, will gently draw the dummy drawer out of the transfer case and unlock the quick release connection after the decayed source is fully entered the transfer case. Install the end plates on the transfer case until servicing has been completed.
7. Carry out the test procedure using the geiger probe as detailed in Issue 1, Contamination Test of Teletherapy Units, D-1421 through D-1427. Any waste disposal shall be dealt with as outlined in Bulletin WD-3 part B Section No. 1.
8. Complete any servicing and/or repairs necessary.
9. After all servicing and/or repairs have been satisfactorily completed, test the door interlock switch as follows:
 - (a) Close the door to the treatment room
 - (b) Set up the remote control for a simulated treatment
 - (c) Operate the unit with the shutter in the "on" condition
 - (d) Open the door to the treatment room and note that the "shutter" closes immediately and that the "reset" control must be re-activated before the "shutter" will open (red lights on control unit and equipment).
 - (e) Repeat the above at least 5 times

NOTE:

The EA 147A geiger counter has been calibrated against AECL standards. In the United States the licensee must be notified if the wipe test indicates contamination of .05 micro-curies or more. A reading of 8,800 counts per minute is equal to .05 micro-curies. With a geometry of approximately 35%, a window of 2.5 milligrams/centimeter squared and a counting efficiency of 8%, a scale reading of 8,800 counts per minute is equal to .05 micro curies. Any removable contamination of this level or greater must be reported to the licensee, who in turn must advise the appropriate office of the U.S.A.E.C. This condition shall be reported to the Radiation Hazards Section in A.E.C.L. Follow all instructions issued by the Regional Office of the U.S.A.E.C. in the area in which the equipment is located.

SECTION D: REPLACEMENT

1. Review Section A, paragraph 4, section (a) to (e)
2. Realign the Replacement Live Drawer in the transfer case to the aperture in the head.
3. Double check the alignment, block and shim the transfer case to the floor.
4. Connect the dummy drawer to the live replacement drawer with the quick release couplings.
5. With the dummy drawer, gently push the replacement live drawer into the Cobalt Head and disconnect the coupling between the drawers.
6. Reconnect all wiring, install the retaining end blocks. Install the rear retaining screw in the live drawer in the Cobalt Head.
7. Perform head survey and fill in the blank forms.
8. With the diaphragm set to the maximum opening, and the shutter in the open position, perform a radiation survey on all external surfaces of the treatment room to insure that there are no obvious deficiencies in the room construction.

NOTE:

If possible, 8 above should be performed in the company of the customer's physicist.

SECTION E: CONCLUSION

1. All source drawers, tools, transfer cases are free of any contamination before shipment. However, check all tools, etc., before packing for return shipment.
2. Should low level contamination be encountered, all waste, etc., shall be handled as outlined in Bulletin TB-WO-3 attached to this instruction.

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