

INTER OFFICE MEMORANDUM

RECEIVED

MAR 3 1977

RADIOLOGICAL
HEALTH SERVICE

TO: Geoff Leighton

FROM: Alex Buchnea

February 24, 1977

SUBJECT: FAIL-SAFE OPERATION & SHUTTER POSITION
INDICATORS IN BETAMETER (BGIII)

DESCRIPTION

The Model BG-III is a standard "O" or "C" frame beta gauge designed for measuring mass per unit area or thickness of sheet materials such as paper, plastic or rubber, either continuously produced or stationary. The sealed radioactive source is mounted in a Mallory 1000 heavy metal holder. The source shutter is made of 3/8" thick heavy metal. The source assembly is bolted into a 1 1/4" thick aluminum block which is firmly bolted to the 3/16" thick steel guide plate. The whole is enclosed in a steel box. The sources authorized for use in the gauge are Model AAC 40057B (manufactured by American Atomics Corporation) containing a maximum of 500 millicuries of Krypton 85 and Model 3FIL (manufactured by 3M Company) containing a maximum of 20 millicuries of Strontium 90.

The heavy metal shutter is moved in a horizontal plane by an electrically activated spring-loaded solenoid (see figure). This horizontal motion allows closer proximity of the shutter to the source holder optimizing the shielding of the source radiation in the closed position. The shutter is firmly attached to the solenoid with a 1/4" steel shaft and a steel coupler. To open the shutter and expose the radiation source the solenoid must be energized. A heavy duty spring, an integral part of the solenoid, returns the shutter to its closed position when the solenoid is de-energized. The spring is of sufficient strength to return the shutter to its closed position with the gauge head in any orientation.

A fail-safe mechanism is incorporated into the shutter mechanism. If power fails, the solenoid is de-energized and the spring automatically returns the shutter to its closed position.

The indicator lamps are turned on and off by a microswitch (see figure) activated by a cam on the shutter shaft coupler. If the shutter is in its closed position, the cam closes the microswitch turning on a green light. This indicates that it is safe. If the shutter moves from its closed position by more than 1/8", the microswitch opens and a red light is illuminated indicating caution is required when working in the vicinity of the source.

Both lights mounted in the gauge housing are easily accessible for bulb replacement.

SOURCE HOLDER CONSTRUCTION

The components of the source holder assembly items 417 012 690 and 417 012 691 are identical in all respects to items 417 012 254 and 417 012 253 of Betameter TBl except that the main block 417 012 691 has had three holes removed thus improving the effective shielding.

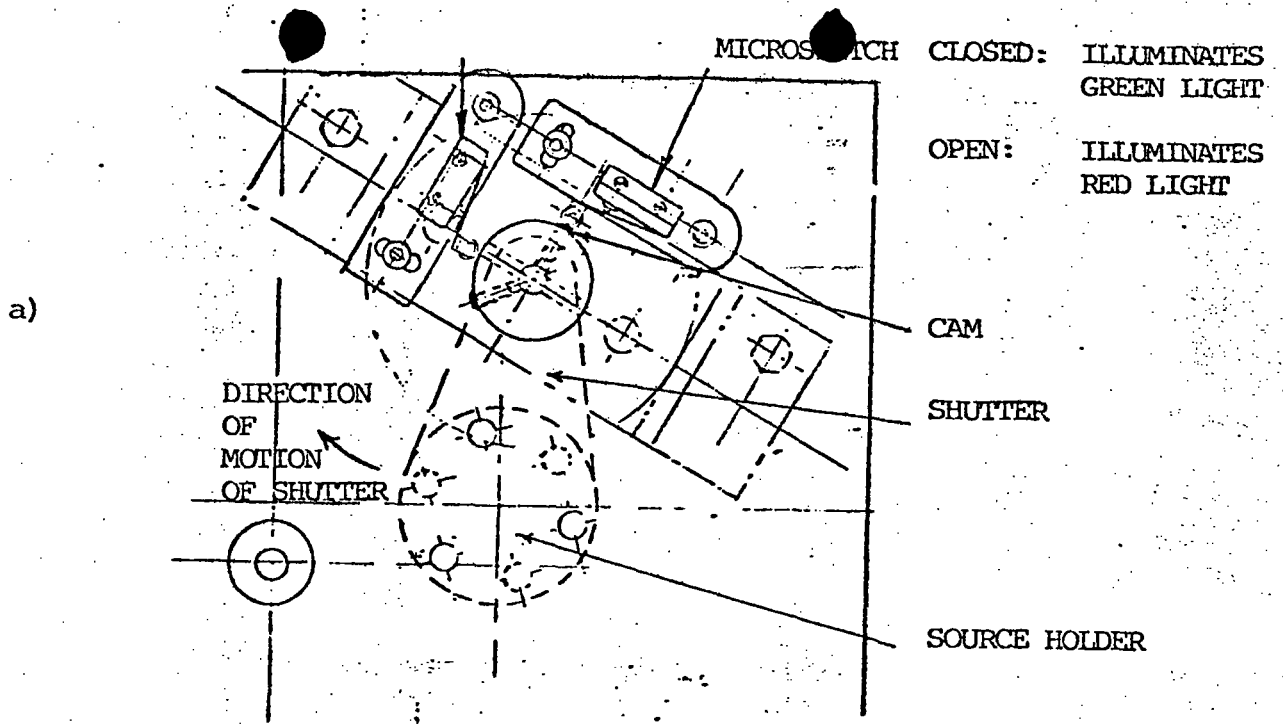
RADIATION PROFILES:

Attached are radiation profiles of the Betameter BGIII taken at distances of 12" from the gauge housing.

All other features of the descriptive sheet issued by the Georgia Dept. of Human Resources are identical to those for TBl.

AB:lc

BOTTOM VIEW



b) CROSS-SECTIONAL VIEW

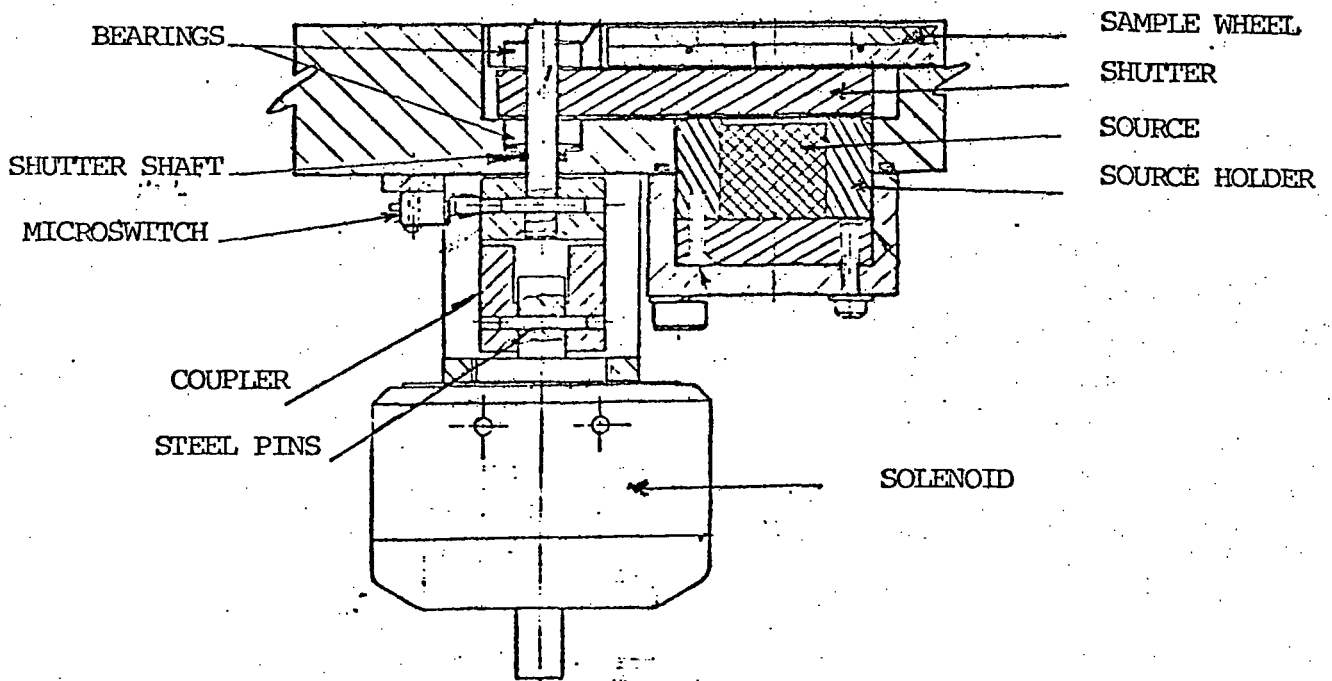


FIGURE: SHUTTER MECHANISM AND SHUTTER POSITION INDICATORS

RADIATION PATTERN

Date of Survey Feb 24/77
Customer SENTRON SYSTEMS LTD
Address 4401 STABLES AV. W.
Site Location SAME AS ABOVE
Survey Meter Eberline S-120
Checked by A.S.

Type Gauge Ratemeter III
Gauge Serial # _____
Type of Source Kr
Strength 500 mC
Source Serial # 214
Send Pattern to _____

Manufacturer SENTRON
Model # R57E
Model # _____
Pattern sent to _____

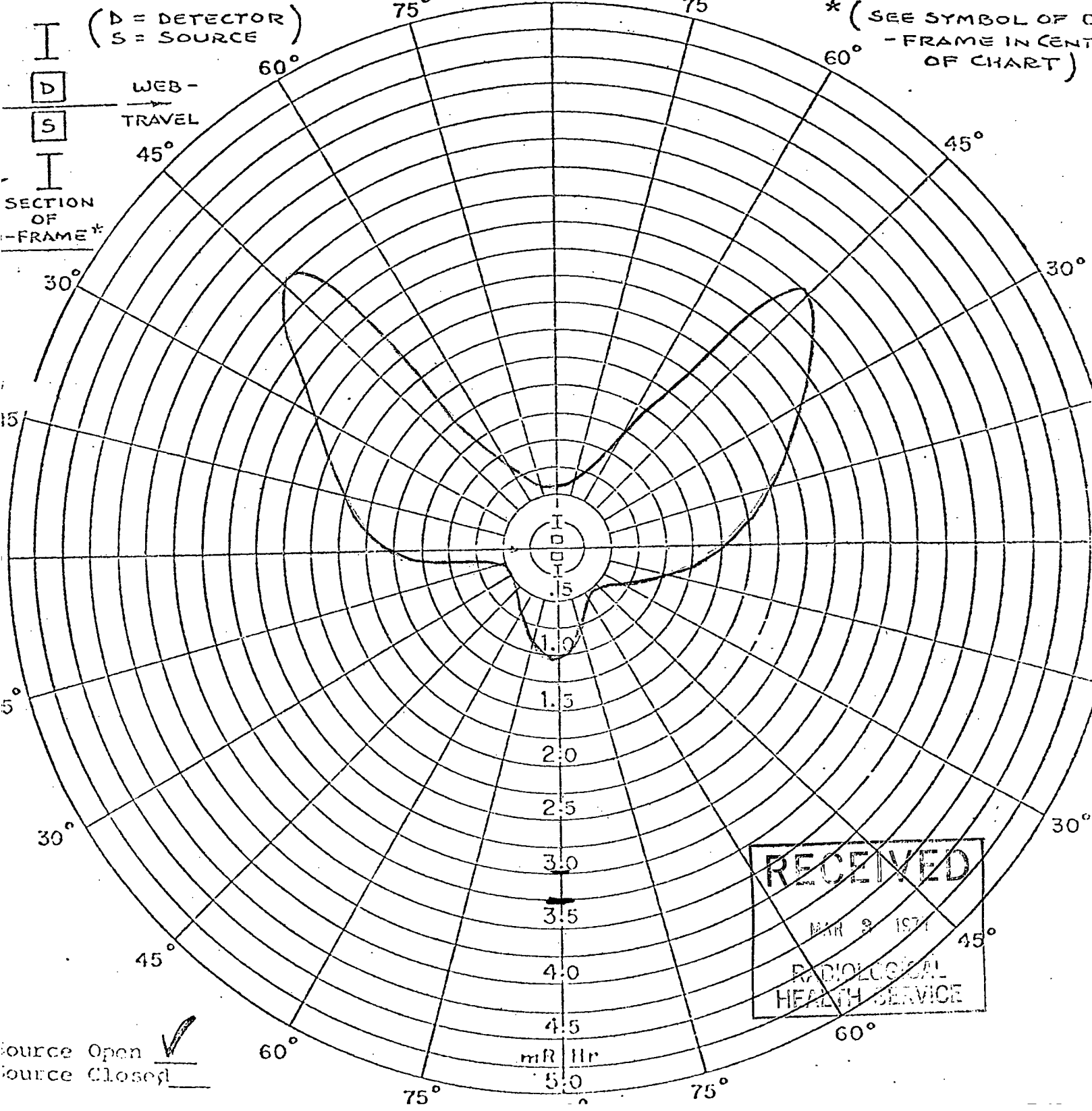
NOTE: End View must be taken; and either Side or Top View.
Level must not exceed 5 mR/Hr. at 12" from surface.

End View: At right angles to paper & "0"-Frame.

END VIEW
TOP 90°

Pattern - Radiation Level at 12" from surface of head

* (SEE SYMBOL OF 0 - FRAME IN CENT OF CHART)



Source Open
Source Closed

Date of Survey _____
 Customer _____
 Address _____
 Site Location _____
 Survey Meter _____
 Checked by _____

Type Gauge BETH
 Gauge Serial # _____
 Type of Source Cr
 Strength 500 mCi
 Source Serial # _____
 Send Pattern to _____

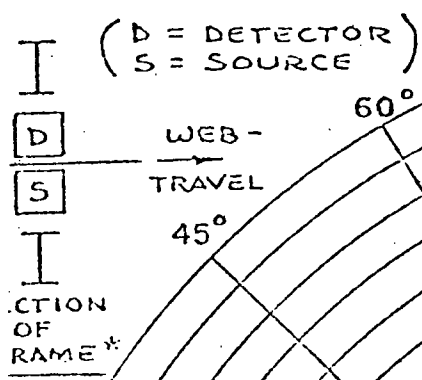
Manufacturer _____
 Model # _____
 Model # _____
 Pattern sent to _____

TE: End View must be taken; and either Side or Top View.
 Level must not exceed 5 mR/Hr. at 12" from surface.

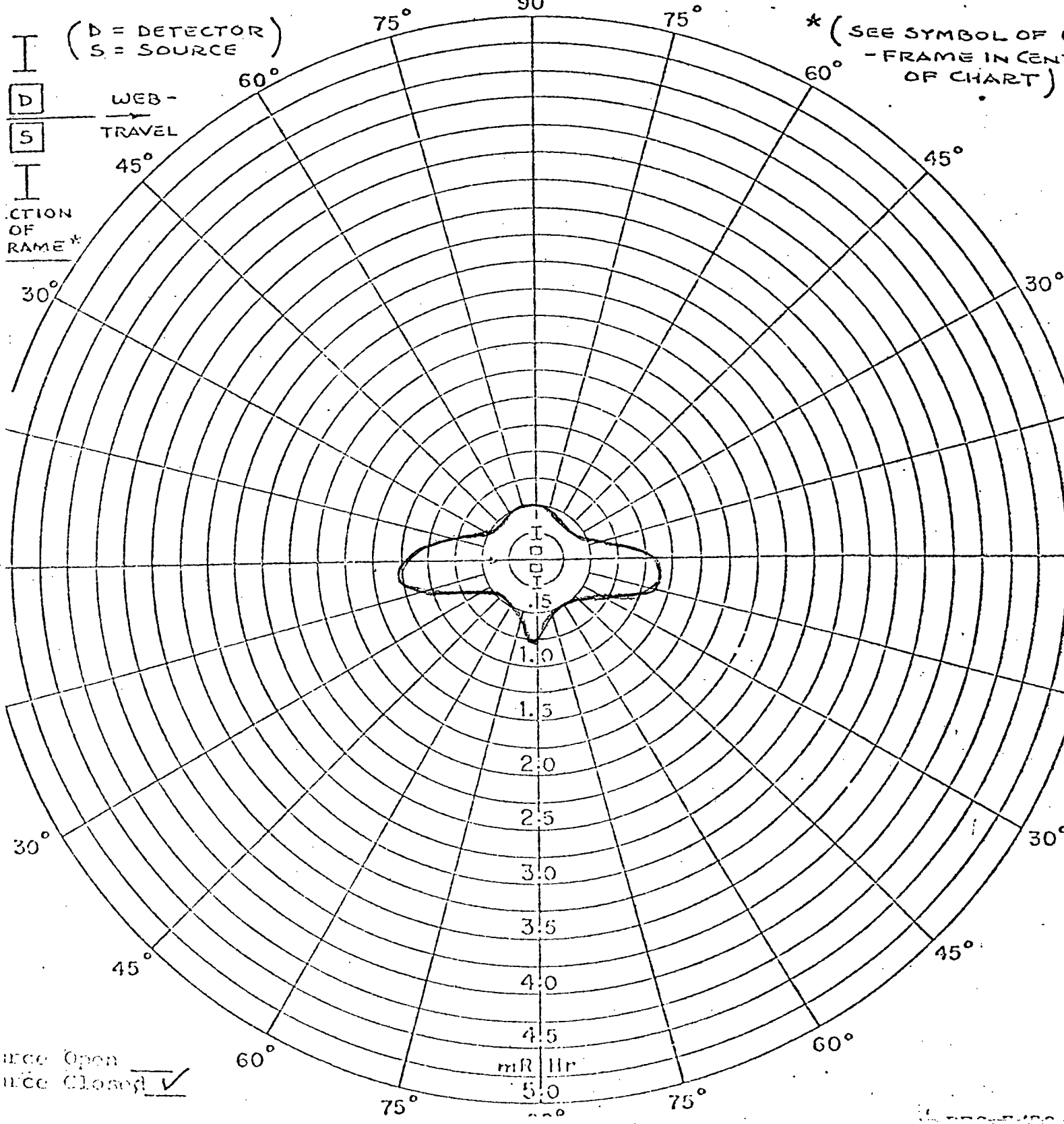
End View: At right angles
 paper & "0"-Frame.

END VIEW
 TOP 90°

Pattern - Radiation Level
 at 12" from surface of head

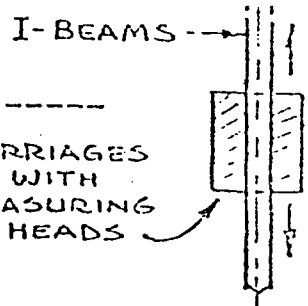


* (SEE SYMBOL OF 0
 - FRAME IN CENT
 OF CHART)



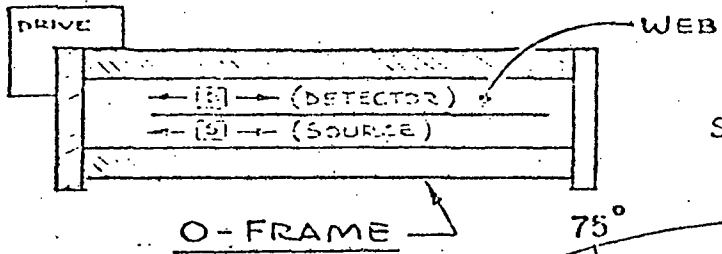
Source Open _____
 Source Closed

NOTE: End View must be taken; and either Side or Top View.
 Level must not exceed 5 mR/Hr. at 12" from surface.



Top View: In the plane of the web-----

Side View: In same plane as "O"-Frame.

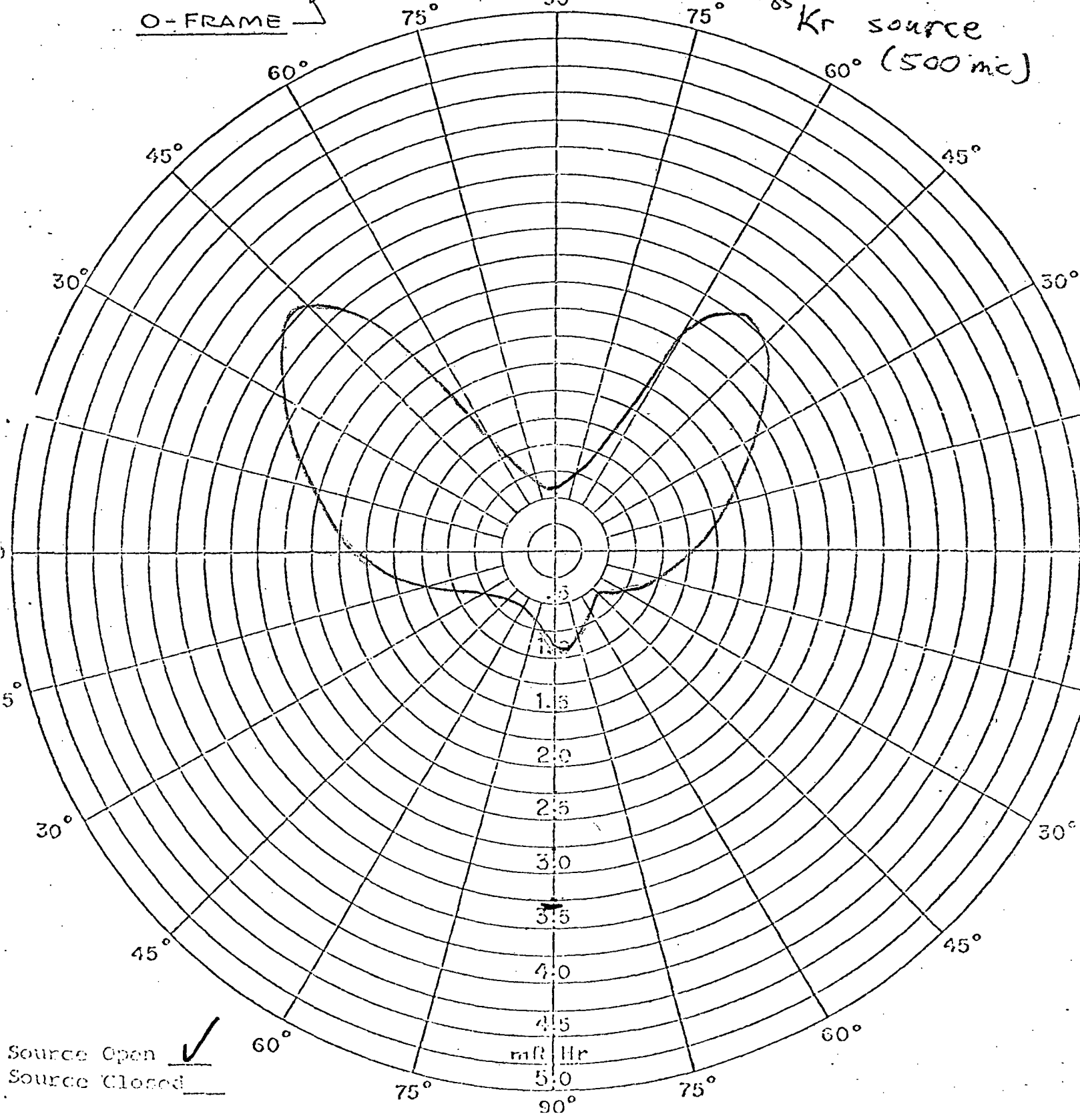


Top View ()
 Side View ()

Pattern: Radiation Level at 12" from surface of head

TOP

BG III
 85 Kr source
 (500 mc)



Source Open ✓
 Source Closed

mR/Hr

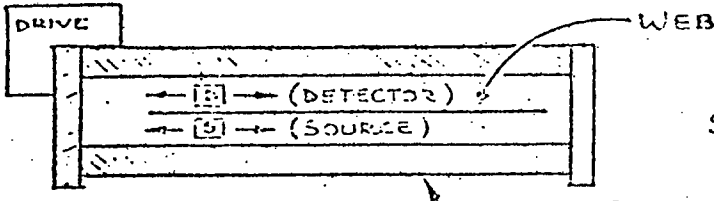
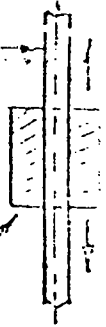
NOTE: End View must be taken; and either Side or Top View. Level must not exceed 5 mR/Hr. at 12" from surface.

I-BEAMS

Top View: In the plane of the web-----

Side View: In same plane as "O"-Frame.

CARRIAGES WITH MEASURING HEADS



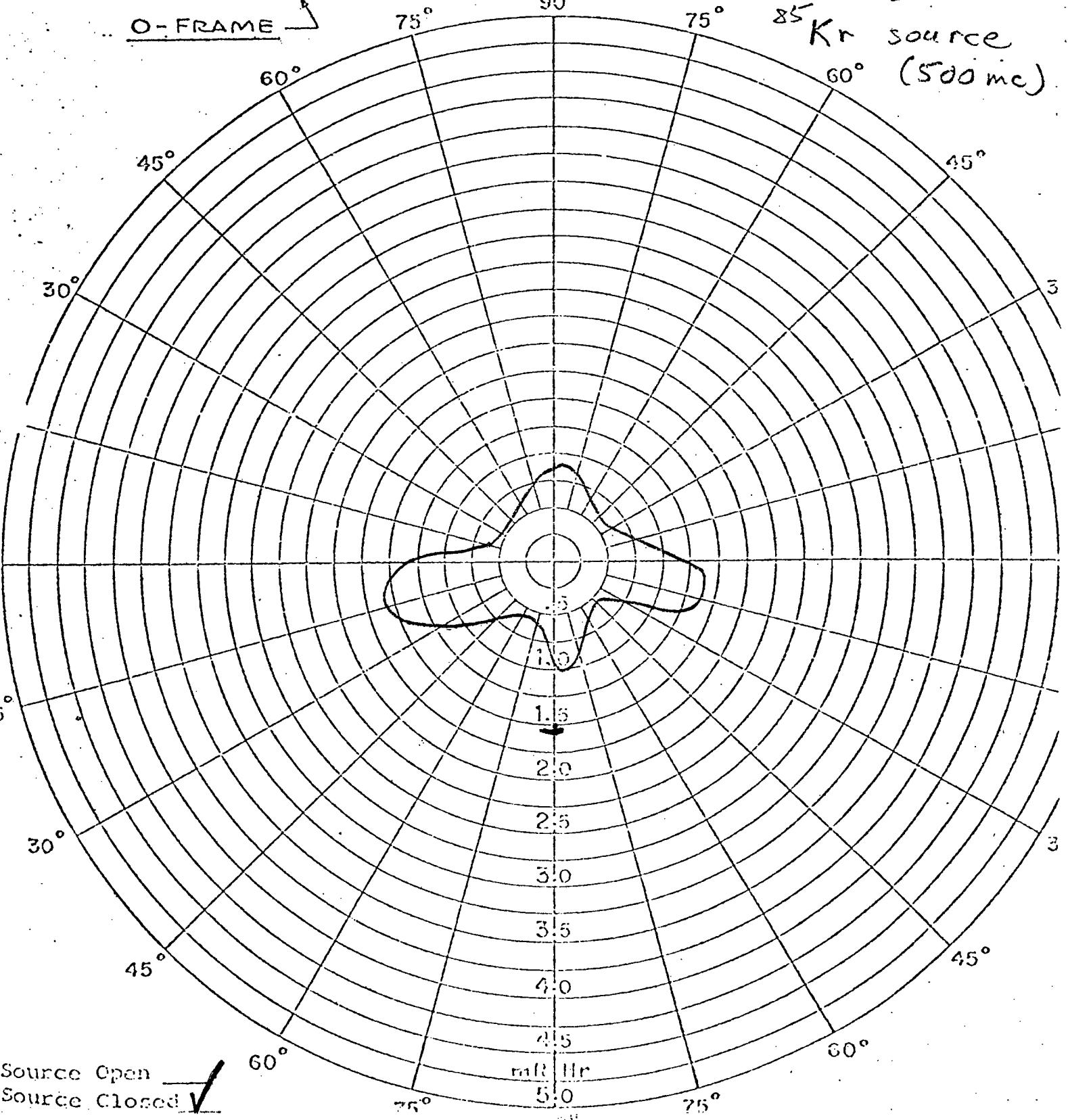
Top View ()
Side View (✓)

Pattern: Radiation Level at 12" from surface of h

BG III

85 Kr source (500 mc)

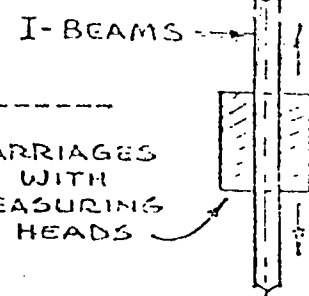
O-FRAME



Source Open ()
Source Closed (✓)

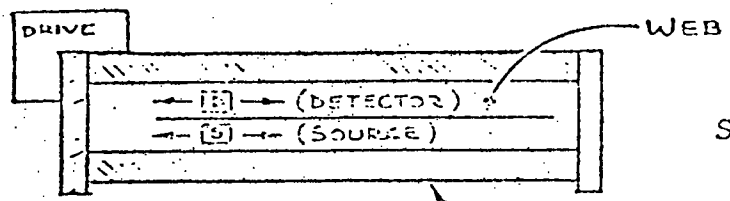
mR/Hr

NOTE: End View must be taken; and either Side or Top View.
Level must not exceed 5 mR/Hr. at 12" from surface.



Top View: In the plane of the web-----

Side View: In same plane as "O"-Frame.

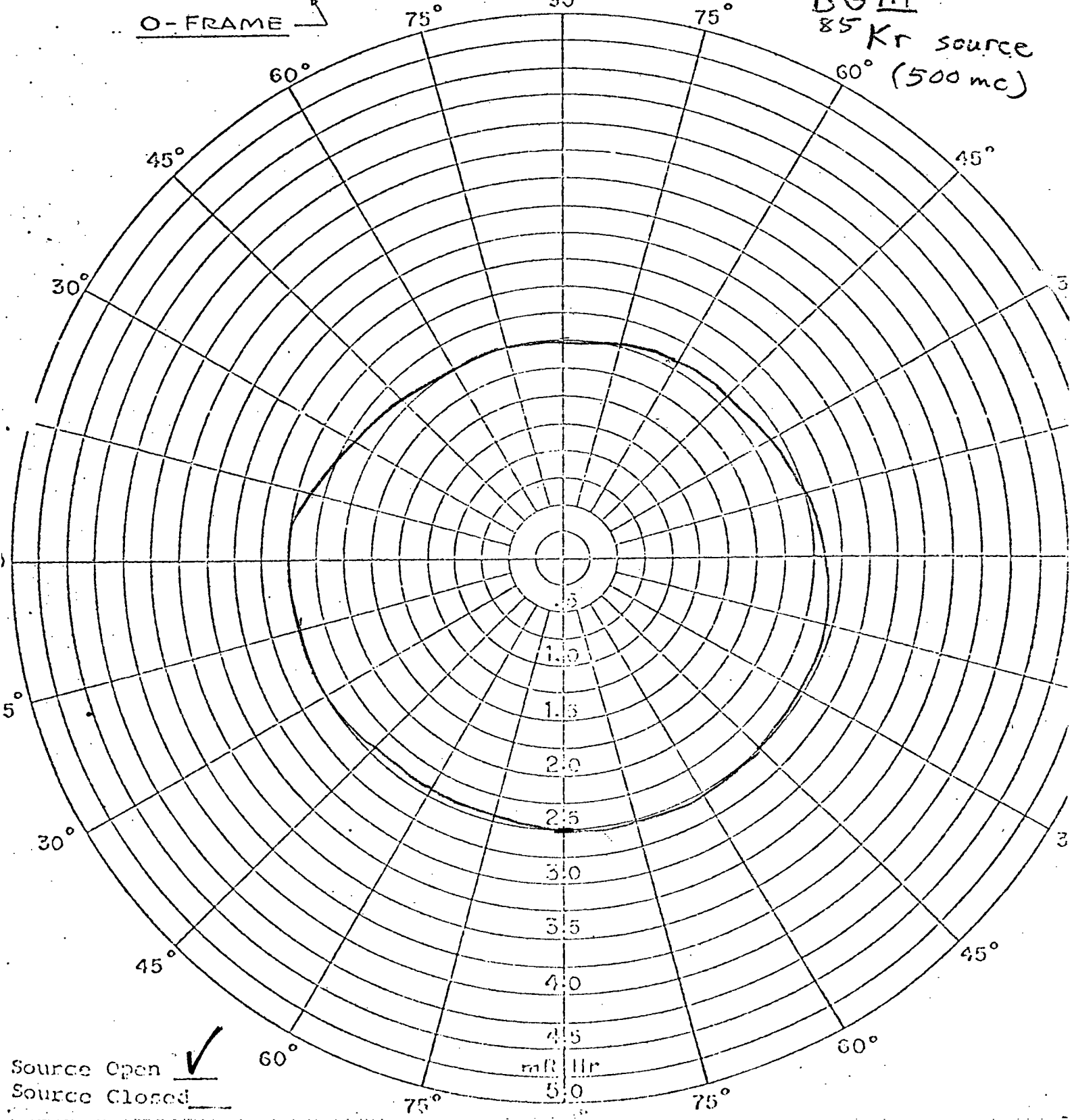


Top View (✓)
 Side View ()

Pattern: Radiation Level
 at 12" from surface of h

FRONT
 90°

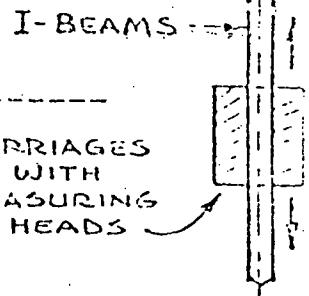
BG III
 85 Kr source
 60° (500 mc)



Source Open ✓
 Source Closed _____

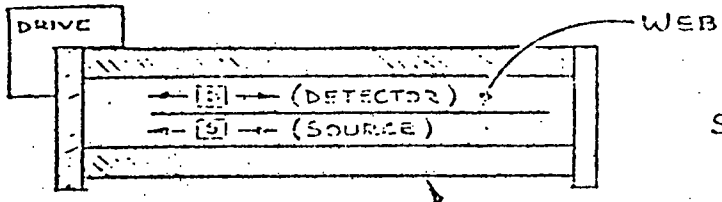
mR/Hr
 5.0

NOTE: End View must be taken; and either Side or Top View.
 Level must not exceed 5 mR/Hr. at 12" from surface.



Top View: In the plane of the web

Side View: In same plane as "O"-Frame.

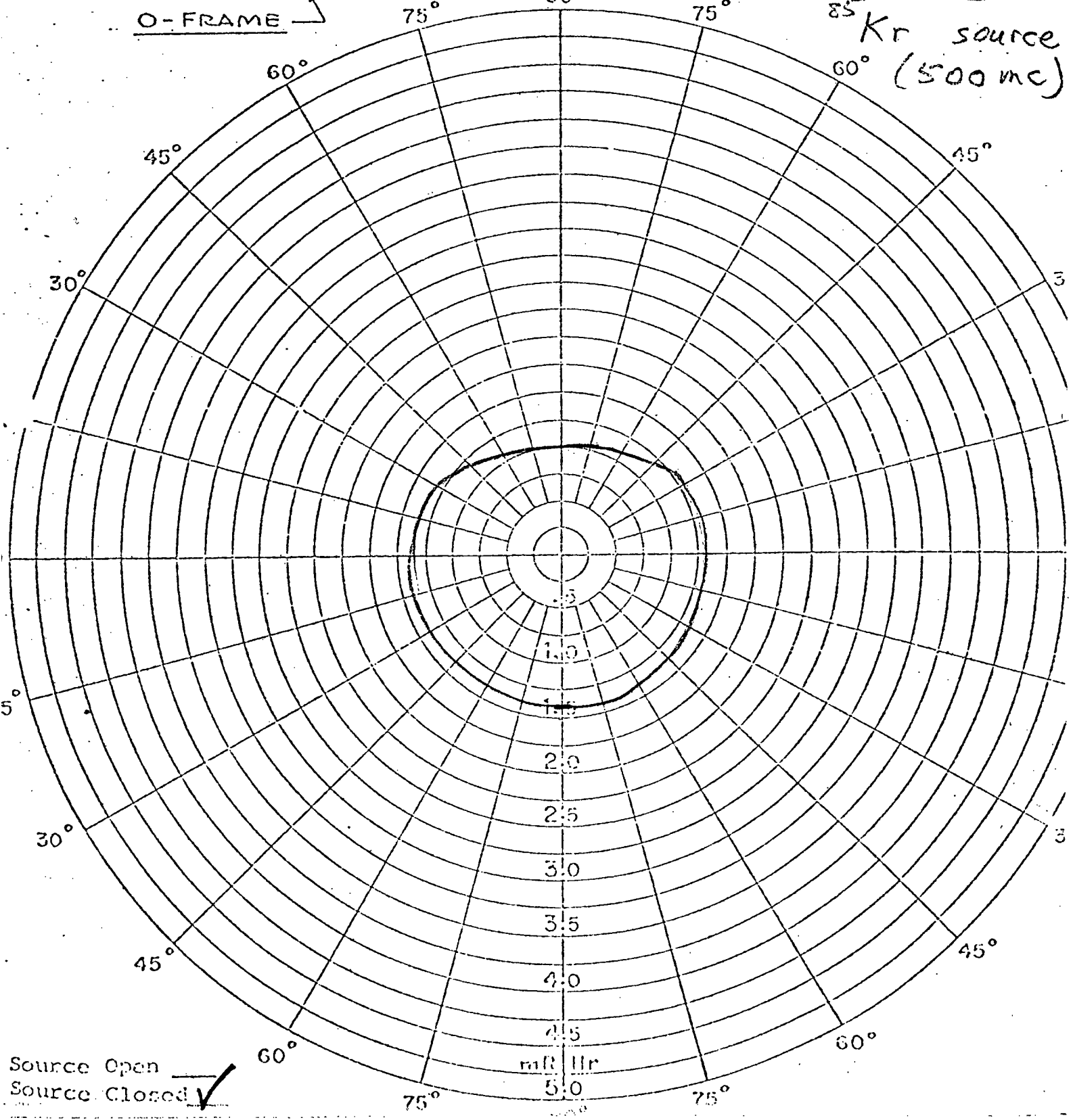


Top View (✓)
 Side View ()

Pattern: Radiation Level at 12" from surface of h

FRONT
 90°

BG III
 85 Kr source
 60 (500 mc)



Source Open ✓
 Source Closed ✓