SenTrol
SYSTEMS, INC.
SENSORS/CONTROLS FOR THE PROCESS INDUSTRIES

May 2, 1975.

Mr. John A. Miele,
Associate Radiophysicist,
Office of Occupational Health,
Two World Trade Center,
New York, New York 10047,
U.S.A.

Dear Mr. Miele:

Enclosed please find our application for a radioactive general license to enable Sentrol Systems Inc. to import, manufacture install, relocate, service, maintain and test the Sentrol Systems' Beta Gauge, Model Number TB1, O-Frame or C-Frame, including the removal and replacement of source housings at the sites of customers, and to distribute these devices to persons exempt from specific licensing (general license) pursuant to the State of New York Industrial Code Rule No. 38 requirement 38.5.2b or equivalent provisions of the regulations of the U.S. Nuclear Regulatory Commission or other Agreement States.

We also request that this license include the provision that permits Sentrol Systems' trained personnel to service, maintain and test the Electronic Automation Systems Beta Gauge Mark II O-Frame or Mark II C-Frame and Basis Weight Profilographs. The included list details all of the various models which were manufactured and distributed under New York State General License No. GL 1407-1169.

Included with the application for Radioactive Materials License is the following back-up information:

1. Additional information re license application.

2. Drawing FLO-008-002, Source Storage Facility.

3. Information on the sealed sources to be used in the device.

4. Information on the device.

5. Sketch 202.003 Betameter Source Holder Assembly
   Sketch 132.010 O-Frame Sensor Mounting
   Sketch 044.001 C-Frame Sensor Mounting

Cont'd...../2

2957 ALT BLVD., GRAND ISLAND, N.Y.
14072 (716) 773-7525

6. Radiation Surveys for both Sr. 90 and Kr.85.

7. Facsimilie of Source Labels to be attached to the device.

8. Copy of the Safety Regulations for users of Radioactive Isotopes, included as part of the customer training manual.

9. Copy of the Basic Radiation Training Manual.

10. Copy of the Basic Radiation Examination with typical answers.

11. Copy of resumes of all personnel named on License Application.

12. Additional information for General License.

13. Complete set of source holder, shutter mechanism and source housing Drawings as listed in Drawing Office Material Release #200.

Mr. Alex MacMillan will be communicating with you separately regarding the revisions to the bond to include a continuation certificate and power of attorney.

We hope that this information, after it has been reviewed, will be sufficient to enable you to grant us the required general license.

Yours truly,

G. J. Leighton,
Product Manager.

GL:lc
(Enclosures)

STATE OF NEW YORK

APPLICATION FOR RADIOACTIVE MATERIALS LICENSE

INSTRUCTIONS. — Complete Items 1 through 16 if this is an initial application. If application is for renewal of a license, complete only Items 1 through 7 and indicate new information or changes in the program as requested in Items 8 through 15. Use supplemental sheets where necessary. Item 16 must be completed on all applications. Mail three copies to: New York State Coordinating Council on Atomic Energy, Alfred E. Smith State Office Building, P.O. Box 7036, Albany 1, New York, Attention: Committee on Licensing. Upon approval of an application, the applicant will receive a "Radioactive Materials License" issued pursuant to statutory and implementing regulatory authority and subject to all applicable rules, regulations and orders of all appropriate regulatory agencies now or hereafter in effect and to any conditions specified in the license.

1. (a) NAME AND STREET ADDRESS OF APPLICANT. (Institution, firm, hospital, person, etc.)

Sentrol Systems, Inc.,
2957 Alt Blvd.,
Grand Island, N.Y. 14072.

(b) STREET ADDRESS(ES) AT WHICH RADIOACTIVE MATERIAL WILL BE USED. (If different from 1(a).)

2957 Alt Blvd.,
Grand Island, N.Y. 14072
and Customer plants.

2. DEPARTMENT TO USE RADIOACTIVE MATERIAL

Systems Engineering
Quality Assurance
Service Dept.
Field Service Representative

3. PREVIOUS LICENSE NUMBERS AND ISSUING AGENCY. (If you have ever been denied a license or if your license has ever been revoked or suspended, describe details on an additional sheet. If this is a renewal, please indicate and state license number.)

None

4. INDIVIDUAL USER(S). (Name and title of individual(s) who will use or directly supervise use of radioactive materials. State training and experience in Items 8 and 9.)

The radioactive material shall be used by or under the supervision of G.J. Leighton, H. Laverie, C.F.Goodsole, C. Birmingham and qualified individuals designated by said persons. (See Addendum).

5. RADIATION SAFETY OFFICER (Name of person designated as radiation protection officer if other than individual user. Attach resume of his training and experience as in Items 8 and 9.)

C. F. Goodsole

6 (a). RADIOACTIVE MATERIALS. (Elements and mass number of each.)

A) Strontium 90

B) Krypton 85

(b) CHEMICAL AND/OR PHYSICAL FORM AND MAXIMUM AMOUNT OF EACH CHEMICAL AND/OR PHYSICAL FORM THAT YOU WILL POSSESS AT ANY ONE TIME. (If sealed source(s), also state name of manufacturer, model number, number of sources and maximum activity per source.)

A) Sealed Sources 3M Model 3 F1L, maximum number of sealed sources held at any one time 10, each source 20 mCi, Total 200 mCi.

B) Sealed Sources AAC Model 40057B, maximum number of sealed sources held at any one time 20, each source 500 mCi, Total 10 Ci.

7. DESCRIBE PURPOSE FOR WHICH RADIOACTIVE MATERIALS WILL BE USED. (If byproduct material is for "human use," supplement A must be completed in lieu of this item. If byproduct material is in the form of a sealed source, include the make and model number of the storage container and/or device in which the source will be stored and/or used.)

Sources will be used in a Sentrol Systems Beta Gauge Model #TB1 either O-Frame or C-Frame. The source will be mounted in a source housing details of which are included in the supporting documentation.

(Continued on reverse side)

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEMS 4 AND 5 (Use supplemental sheets if necessary)

8. TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COURSE (Circle answer)
a. Principles and practices of radiation protection			Yes No	Yes No
b. Radioactivity measurement standardization and monitoring techniques and instruments	SEE ATTACHED DOCUMENTATION		Yes No	Yes No
c. Mathematics and calculations basic to the use and measurement of radioactivity			Yes No	Yes No
d. Biological effects of radiation			Yes No	Yes No

9. EXPERIENCE WITH RADIATION. (Actual use of radioactive materials or equivalent experience)

RADIOACTIVE MATERIALS	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
		SEE ATTACHED DOCUMENTATION		

10. RADIATION DETECTION INSTRUMENTS. (Use supplemental sheets if necessary.)

TYPE OF INSTRUMENTS (Include make and model number of each)	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY RANGE (mr/hr)	WINDOW THICKNESS (mg/cm²)	USE (Monitoring, surveying, measuring)
Eberline Instrument Corp. Model E-120 with HP-190 Probe SH-3 Sample Holder 99Tc Beta Source	2	Beta-Gamma	3 linear ranges .5,5,50 mR/hr. full scale	1.4 to 2.0 mg/cm^2	Survey for field patterns. Source wipe checking.

11. METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED ABOVE.

A 0.005 mCi 99 Tc source is used as a reference standard each time a wipe sample is measured.

12. FILM BADGES, DOSIMETERS, AND BIO-ASSAY PROCEDURES USED. (For film badges, specify method of calibrating and processing, or name of supplier.)

This service will be supplied by Nuclear Services Division, Eberline Instrument Corp., P.O. Box 2108 Santa Fe., N.M. 87501.

INFORMATION TO BE SUBMITTED ON ADDITIONAL SHEETS

13. FACILITIES AND EQUIPMENT. Describe laboratory facilities and remote handling equipment, storage containers, shielding, fume hoods, etc. Explanatory sketch of facility is attached. (Circle answer) (Yes) No See FLO - 008 - 002

14. RADIATION PROTECTION PROGRAM. Describe the radiation protection program including control measures. If application covers sealed sources, submit leak testing procedures where applicable, name, training, and experience of person to perform leak tests, and arrangements for performing initial radiation survey, servicing, maintenance and repair of the source.

15. WASTE DISPOSAL. If a commercial waste disposal service is employed, specify name of company. Otherwise submit detailed description of methods which will be used for disposing of radioactive wastes and estimates of the type and amount of activity involved.

CERTIFICATE (This item must be completed by applicant)

16. THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATE ON BEHALF OF THE APPLICANT NAMED IN ITEM 1, CERTIFY THAT ALL INFORMATION CONTAINED IN THIS APPLICATION, INCLUDING ANY SUPPLEMENTS ATTACHED HERETO, IS TRUE AND CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF.

Applicant named in Item 1

Date_____ BY:_____

Title of certifying official

NOTE. — Any misrepresentation of any material fact found to have been made in securing a license pursuant to this application shall constitute cause for the suspension or revocation of such license.

INFORMATION TO BE SUBMITTED ON ADDITIONAL SHEETS.

STATE OF NEW YORK

APPLICATION FOR RADIOACTIVE MATERIALS LICENSE

INFORMATION TO BE SUBMITTED ON ADDITIONAL SHEETS

4. ADDENDUM TO 4

The radioactive materials shall be used by or under the supervision of G. J. Leighton, C. Goodsole and qualified individuals designated by said persons.

Sentrol Systems Inc. presently employs 35 Field Service representatives all of whom have successfully completed and passed the Basic Radiation Course. The course is a 3-day one covering both theoretical and practical aspects of radioactivity particularly in respect to beta gauges. The course also covers decontamination and clean-up procedures with respect to the sources which Sentrol Systems uses. Correct shipping procedures are also thoroughly covered.

The courses are given by the Radiation Safety Officer and others who are named on the licensing committee. The individuals include:

1. H. Laverie
2. C. Birmingham
3. C. Goodsole
4. G. J. Leighton

The practical course is given by senior personnel from the quality assurance department.

At the end of the course a written examination is given which is graded per the New York State educational grading system:

A	90 - 100%
B	80 - 89%
C	70 - 79%
D	65 - 69%
E	FAIL

Normally, only students with A or B rating will be employed to handle radioactive devices in the field.

Three copies of the examination papers, with answers, are included.

13. FACILITIES & EQUIPMENT

2957 Alt Boulevard is a single story building with a floor space of approximately 20,000 square feet. The floor consists of two slabs of poured concrete and the walls are of cinder block construction. There are no windows in the main portion of the building. The heating system is a gas heated forced air system; in Summer the same duct work is used for air-conditioning. The building is housed on a 3 1/2 acre plot of land.

There is no sprinkler system, but the building has the prescribed number and types of fire extinguishers.

The source storage area is located in the N.E. corner of the building; the two internal walls are of 12 inch poured concrete. The area is roofed and is provided with adequate ventilation. Underground source storage is provided by means of pipes passing through the concrete floor and going four feet into the ground.

A work bench with the required remote handling tools and a clear plastic shield are provided for the mounting or dismounting of the sealed sources in the source mounting blocks.

A sketch of the facility is attached. (See Dwg. FLO-008-002)

14. RADIATION PROTECTION PROGRAM

All personnel involved in the installation and servicing of the Sentrol Betagauge have passed a training program which covers all the necessary procedures for the safe handling of sealed sources and the performance of leak tests, and radiation surveys. A copy of this Radiation Training Manual is included with this application. Reference to Section 6.4 provides details of the procedures followed by field personnel when making source wipe tests. Section 12.1.2.3 gives a step by step procedure for source inspection.

After completion of the wipe test the Eberline Instrument Corp. model E-120 with HP 190 probe will be used to compare the activity on the wipe with a 0.005 mCi Technetium 99 source. If the wipe sample reads higher than the source it will be considered as leaking. The energy of the Technetium 99 beta particles is 0.29 MeV (maximum), whereas the energy for Strontium 90 is higher than 0.29 MeV. Thus 0.005 mCi of this isotope will cause a higher reading than the Technetium 99 source.

After the leak test has been completed, the swab will be placed into the Source Report Envelope and returned to the Sentrol Radiation Safety Officer at Grand Island for re-checking by him. A report is then provided to the customer (copies included).

If for any reason a source is suspected of leaking, the procedure detailed in the Radiation Safety Manual, Section 12B, will be followed.

Whenever it is necessary to unload a source from the source housing the work will be performed in the facilities described in Section 13.

15. Waste Disposal

It is intended to use a properly licensed commercial waste burial site for the disposal of all waste material.

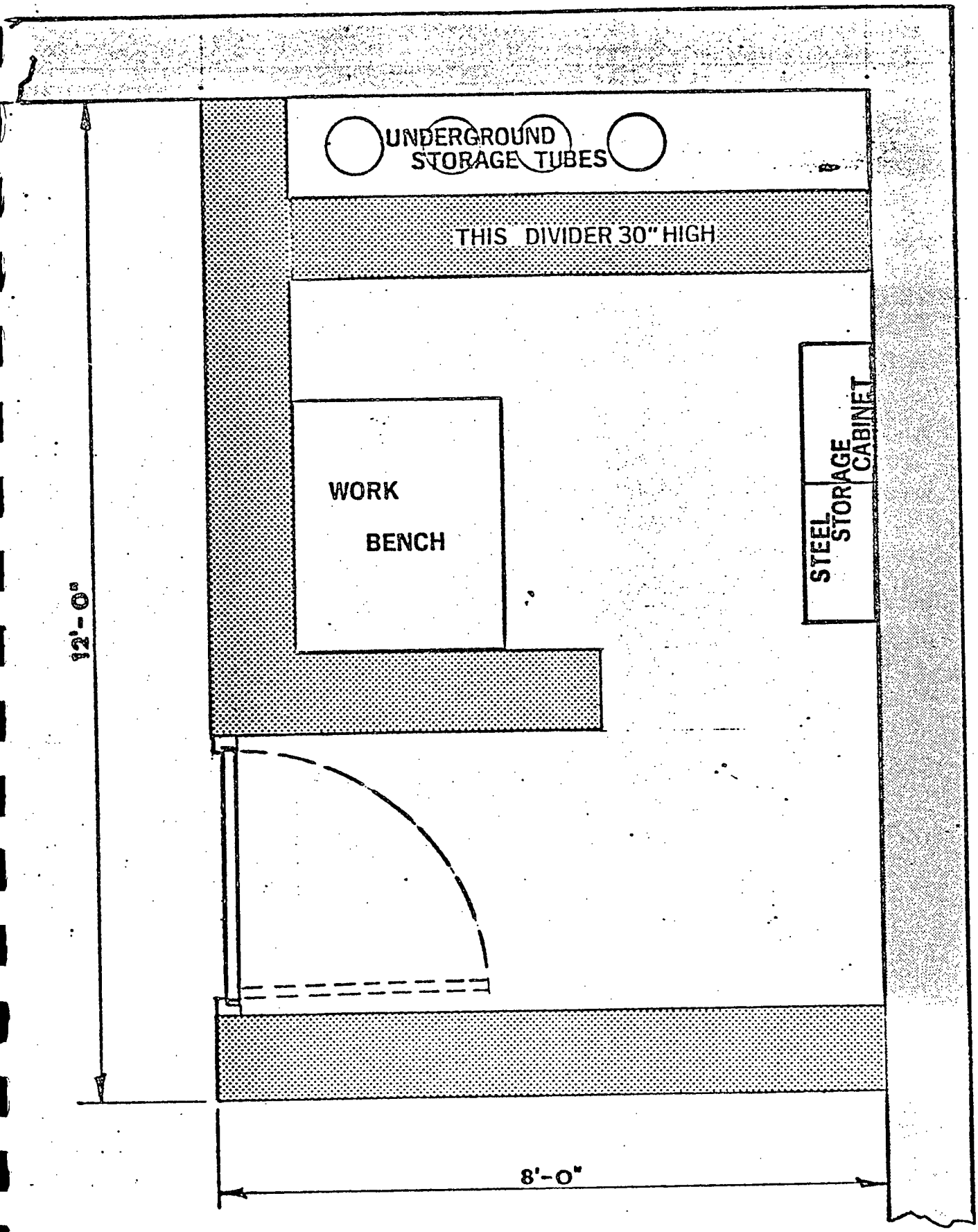
The method of disposal will be as follows:

When a source is to be disposed of, a D.O.T. approved container will be supplied to transport the source from the customer's plant to the disposal company. A Sentrol Systems approved field representative will remove the source housing from the Betagauge and load it into the approved container, the appropriate labels will be attached, and arrangements for shipping will be concluded. Section 11 of the Radiation Training Manual gives the detailed instruction which will be followed by the Sentrol Systems field representative.

The amount of waste disposed should be small and would normally consist of sealed sources which have reached one half life. The source materials are normally Krypton 85 or Strontium 90 and possibly Promethium 147 or Ruthenium 106.

PLAN VIEW:

SENTROL SYSTEMS INC.
2957 Alt Blvd., Grand Island



CONCRETE WALL =12"nominal thickness

CINDER BLOCK MAIN WALL

FLO-008-002

INFORMATION FOR LICENSING SENTROL SYSTEMS INC.

BETA GAUGE MODEL TB-1

1. Sealed Sources

A. Use for which the source was designed.

Material thickness measurements with Beta Radiation.

B. Radioisotopes which will be used.

KRYPTON 85 or STRONTIUM 90

C. Model Number assigned to source.

KRYPTON 85	AAC40057B
STRONTIUM 90	3 FIL

D. Maximum amount of byproduct material.

500 millicuries Krypton 85 20 Mc Strontium 90

E. Physical form of byproduct material.

Gas	Krypton 85
Strontium Sulphate	Strontium 90

F. Drawing of source container.

Drawing enclosed - AAC 40057B and 3M 3FIL

G. Drawing of source holder.

Drawing enclosed. Same for both Krypton 85 and Strontium 90.

H. Label for source holder.

See Appendix A

I. Description of Prototype Tests

See attached letters.

...../2

J. Quality Control Procedures

All sources at Sentrol Systems Inc. received from the manufacturer are accompanied with a certification form which indicates the tests made to establish the source integrity and comply with ANSI 5-10 1968 Classification of Sealed Radioactive Sources. They are kept under the supervision of the radiation officer. Each source (except Krypton 85) is wipe tested upon receipt from the supplier and then placed in a safe. The component parts of the source holder are continuously checked by our Quality Control Department during every stage of fabrication and assembly. When finally assembled, the source holder is checked by quality control and the test department to assure its meeting all the specifications of the engineering drawings. The proper source is then installed by the radiation safety Officer and the assembly closed.

A radiation survey is then made when the assembly is mounted in its proper location.

AMERICAN ATOMICS CORPORATION
425 SOUTH PLUMER AVE., TUCSON, ARIZONA 85719

622-4881
AREA CODE 602

April 3, 1973

Mr. Larry Keating, Sales Mgr.
Nuclear Radiation Development, Inc.
2937 Alt Boulevard
Grand Island, New York 14072

Re: Classification of AAC Sealed Radioactive Source

Dear Mr. Keating:

This is to certify that I-RAD source Model 40057-B manufactured by American Atomics Corporation has been found to comply with the following test requirements in Table 4 of ANSI 5.10, 1968, Classification of Sealed Radioactive Sources.

Test	Class
Temperature	2
Pressure	2
Impact	2
Vibration	3
Puncture	1

This classification, therefore, would apply to any Model 40057-B sealed radioactive source having a nominal ^{85}Krypton content of 500 mCi.

Sincerely,

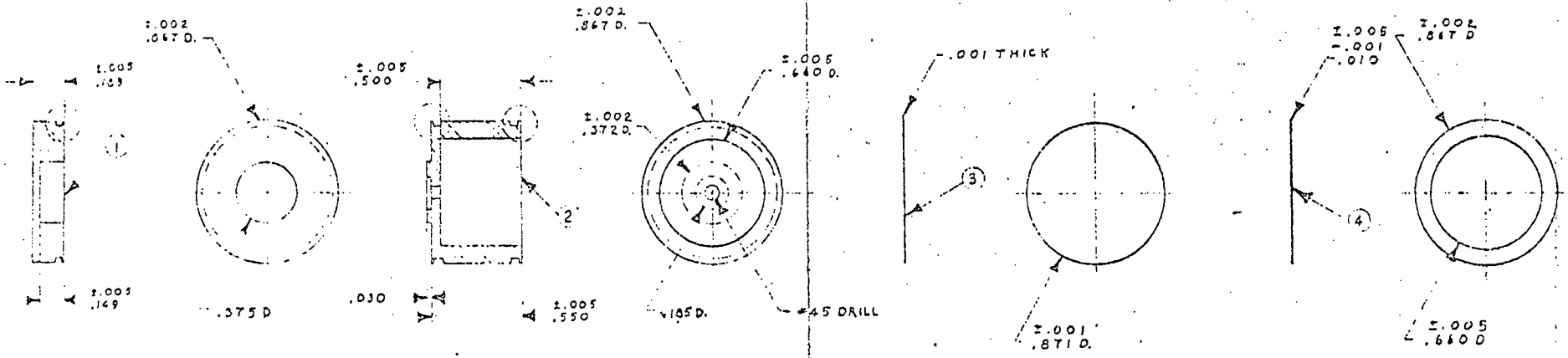
Harry H. Dooley

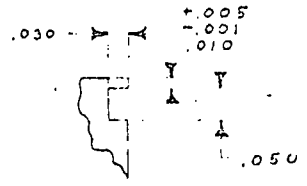
Harry H. Dooley
President

HHD:so

Air Mail

AMERICAN ATOMICS





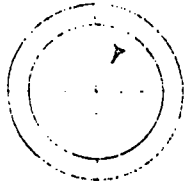
TYPICAL

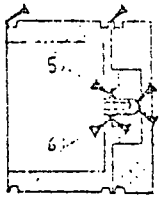
40057

B

TIG WELD

ACTIVE AREA





SOFT SOLDER TIP PROTECTION

COLD WELD CRIMP CLOSURE

SILVER BRAZE

CAUTION
RADIOACTIVE MATERIAL
KR-85 500MC
SN000
AAC MOD #40057
DATE 00-00

	15	40057-15	TIG WELD ITEM 1 TO ITEM 14	
	14	40057-14	FILL	
	13	40057-13	ENGRAVE ITEM 1 AS REQUIRED	
	12	40057-12	TIG WELD ITEM 3 & 4 TO ITEM 10	
	11	40057-11	ULTRA CLEAN ITEMS 3 & 4	
	10	40057-10	REMOVE OXIDE & ULTRA CLEAN 9	
	9	40057-9	SILVER BRAZE ITEMS 2,5 & 6	
	8	40057-8	ULTRA CLEAN ITEMS 2,5 & 6	
1	7	40057-7	SHIELD	ALUMINUM .090 I.D. X .119 O.D. X .040 THICK
1	6	40016-5	PREFORM	BT
1	5	40023	TAIL	O.F. COPPER TUBE .081 O.D.
1	4	40057-4	RING	321 STAINLESS
1	3	40057-3	WINDOW	321 STAINLESS
1	2	40057-2	BODY	321 STAINLESS
1	1	40057-1	CAP	321 STAINLESS
QTY		PART NO.		

REVISIONS			
	DATE	BY	
A	7-5-69	D.W.	
B	7-8-69	D.B.	
C			
D			
E			

AMERICAN ATOMICS CORP.
TUCSON, ARIZONA

CYLINDRICAL BETA SOURCE

DRAWN	D. BRANDEN	DATE 7-7-69	SIZE NONE
APPROVED		DATE 7-19-69	DRAWING NO. 40057

TOLERANCES

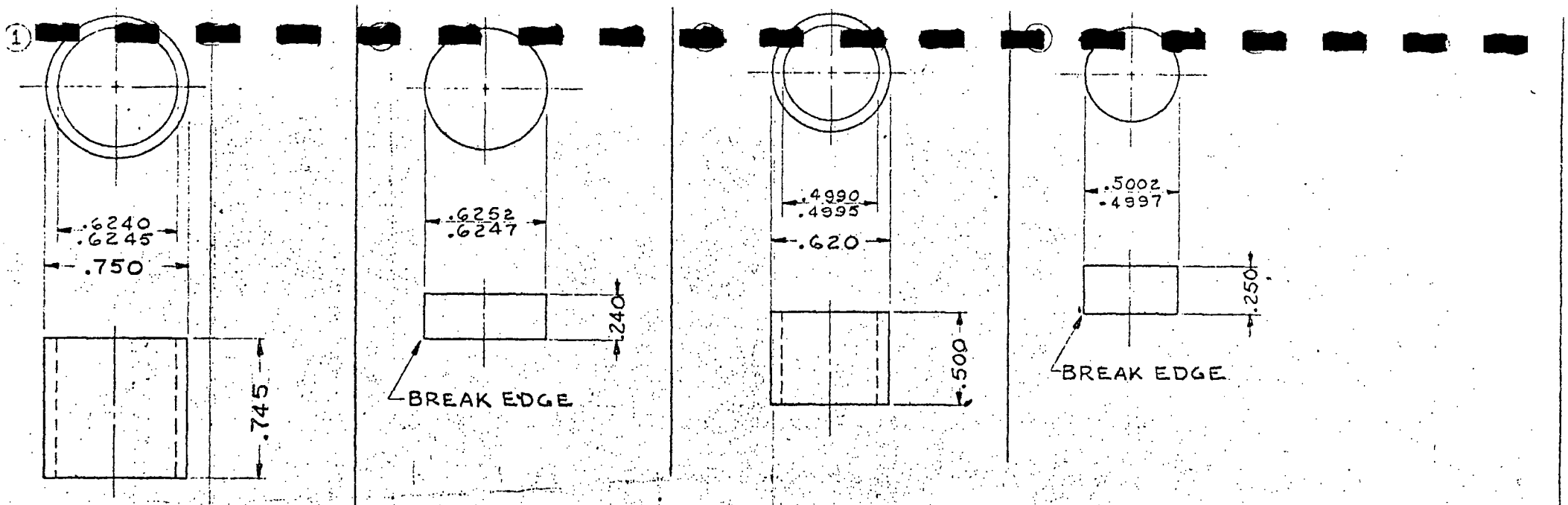
NEXT ASSY

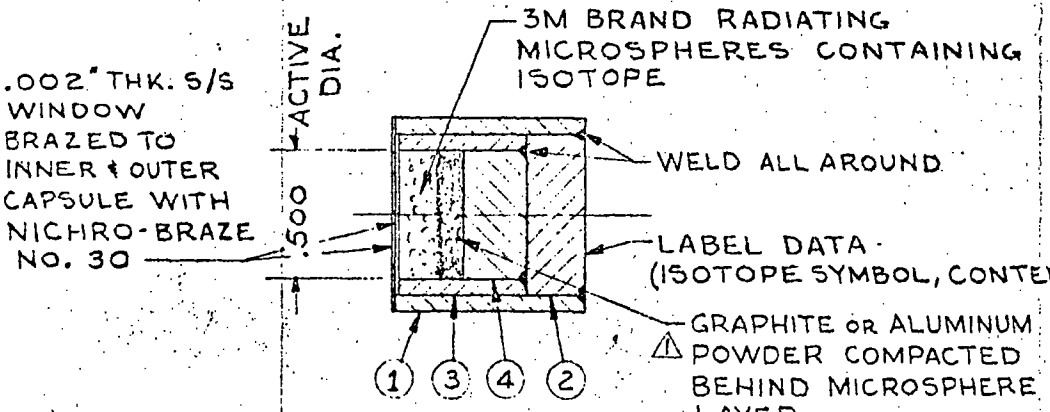
3. VOLUME 2.80

2. ITEM 12 SHOULD BE KEPT IN ITEM 9 AT ALL TIMES PRACTICAL DURING ASSEMBLY

1. TAIL IS TO BE COLD WELD CRIMPED AS NEAR END AS POSSIBLE WHILE UNDER VACUUM. (FOR TEMPORARY STORAGE)

NOTES:





MAT'L.
STAINLESS STEEL TYPE 304

Sr^{90} – 2.0 millicuries

USED ON

TOLERANCES EXCEPT AS NOTED		MAXIMUM SURFACE ROUGHNESS EXCEPT AS NOTED
MACHINED DIMENSIONS .00 ±	.000 ± .005	63
ANGULAR DIM. ±		SCALE 2" = 1"
WELDMENT DIM.	UNDER 30' ±	DR. J.D. SWENSON
	30' & OVER ±	CH. J.W. JOHNSON
CASTING DIM. ±		APP.

MINNESOTA MINING & MANUFACTURING CO.
ST. PAUL, MINNESOTA

ISSUE	ISSUE DATE AND CHANGE RECORD	REV.	CH.
2	JUNE 9, 1967 △ ADDED NOTE	JDS	
1	APRIL 20, 1967		

DIVISION NUCLEAR PRODS PROJ.

TITLE
SR-90 BETA SOURCE
3M MODEL NO. 3F1L

B 1921-612

the shutter and filter assembly guarantees that a green light will show only if the shutter is physically closed. A second red warning light is illuminated wherever the shutter is open.

F. Special Design Features

The source is mounted in a Mallory 1000 heavy metal holder. Source shutter is a lamination of 1/8" aluminum and heavy metal. The source assembly is housed in a steel tube with 1/8" walls which is closed with 5/8" steel end caps. The whole is enclosed in a welded steel box.

G. Radiation Profiles of Prototype Beta Gauge

Enclosed

H. Facsimile of Label

See Appendix C

I. Description of Prototype Tests

The design and construction of the Sentrol Systems Beta Gauge, Model TB1 is fundamentally the same as the EAS Mark II Beta Gauges generally licensed under New York Stage GL 1407-1169. The Beta Gauge consists primarily of the following main components:

1. Source and Source Holder.
2. Measuring Head.
3. Positioning device for 1 and 2, either "C" Frame or "O" Frame.
4. Electronic console.

Only minor changes to upgrade the overall reliability of the device and to also lower the external radiation levels to conform to more stringent European standards have been effected. Several hundred gauges of this design have been in continuous operation over the past ten years. During this period, the integrity of the radiation safety design features of the device have been proven in a wide variety of field installations under the most adverse conditions. No basic design deficiencies have ever come to light. The present Sentrol Systems Beta Gauge, Model TB1 O-Frame and C-Frame is designed to operate continuously in an ambient temperature of 100° Celsius.

The tests to which the prototypes were subjected are described below:

After assembly into a system, the first test was to use the typical source material of the proper millicurie strength to determine radiological pattern and thus assure meeting the safety requirements. Several sources were used to make sure that individual variation in sources did not create any hazard. Tests were made on both the C-Frame type of system and the O-Frame.

As mentioned in a previous item, the source holder and shutter mechanism itself were functionally tested over a period and showed no signs of wear or deterioration. Random parts were tested with various sources to determine interchangeability of parts and sources in any one assembly.

The component electrical parts in the source system are conservatively used and have all been tested under similar conditions by their manufacturers to give a minimum of 100,000 operations. Field experience with this type of design has shown no malfunctions in over two years of use.

In-plant tests were made on the effects of heavy vibrations, shock, moisture, and continuous operation. No noticeable affect could be found under the worst conditions likely to exist in the field. These tests have been confirmed by the existing units in the field. As previously mentioned, this source holder and measuring head have survived functioning after being torn off their mountings.

J. Services provided the customer:

1. Installation of the equipment in the customer's factory (supervision only).

2. Maintenance and repair of the whole Beta Gauge, including the source holder.

3. Replacement of defective parts.

4. Installation of modified parts.

5. Wipe testing of sources and checking of the source shutter mechanism.

K. Quality Control Specifications

The Quality Control Department will maintain an in-process inspection of all fabricated items for this Beta Gauge. All parts must conform to engineering drawings before release for assembly. All workmanship must be first quality.

After final assembly all parts shall fit together and function properly. A quality control inspector will check the system mechanically and electrically for functioning. Danger labels and name plates shall be securely attached in the correct locations as designed on the engineering drawings. All name plates shall be clearly readable.

After acceptance by the quality control inspector the system will be completely checked again by the Systems Engineering Department with a source in the source holder. A radiation pattern will be made on each gauge to assure meeting radiological standards. The original pattern will be filed in the Systems Engineering Dept. files with copies being made available to the interested parties.

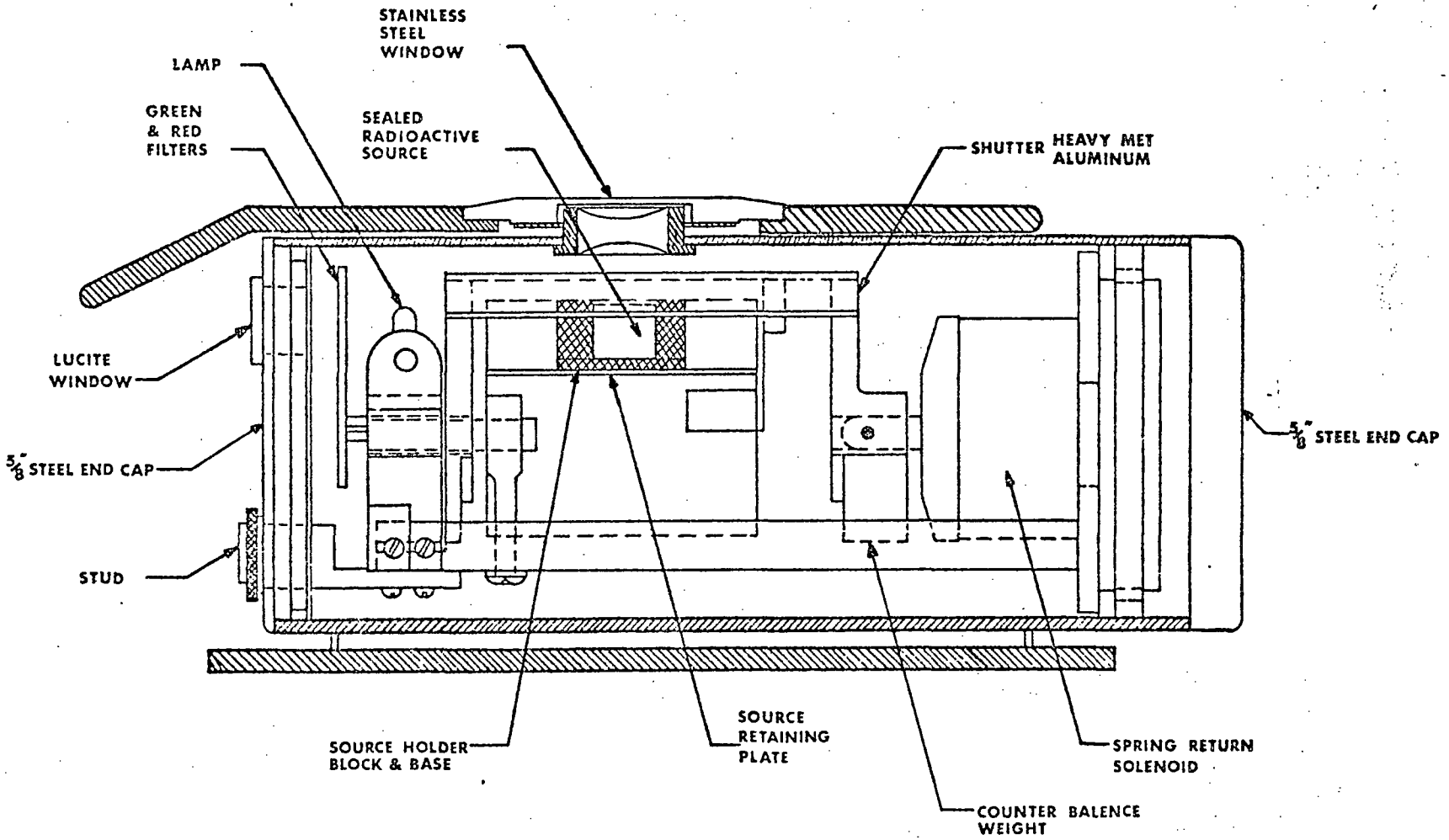
During final calibration, the source holder and warning lights will be functionally tested at least 100 times for proper "on" - "off" operation. Before releasing the system for shipping, the Quality Control inspector will again check the general functioning of the system and will especially check the source shield operation.

No shipments can be made unless the Quality Control Department is satisfied with the quality of the workmanship and operation. No source housing can be shipped without being released by the radiological safety officer who will check for proper licensing, etc.

A complete file will be kept on each system showing customer, location, application, serial number, engineering drawings, and other pertinent information.

L. Radiological Safety Section of Manual

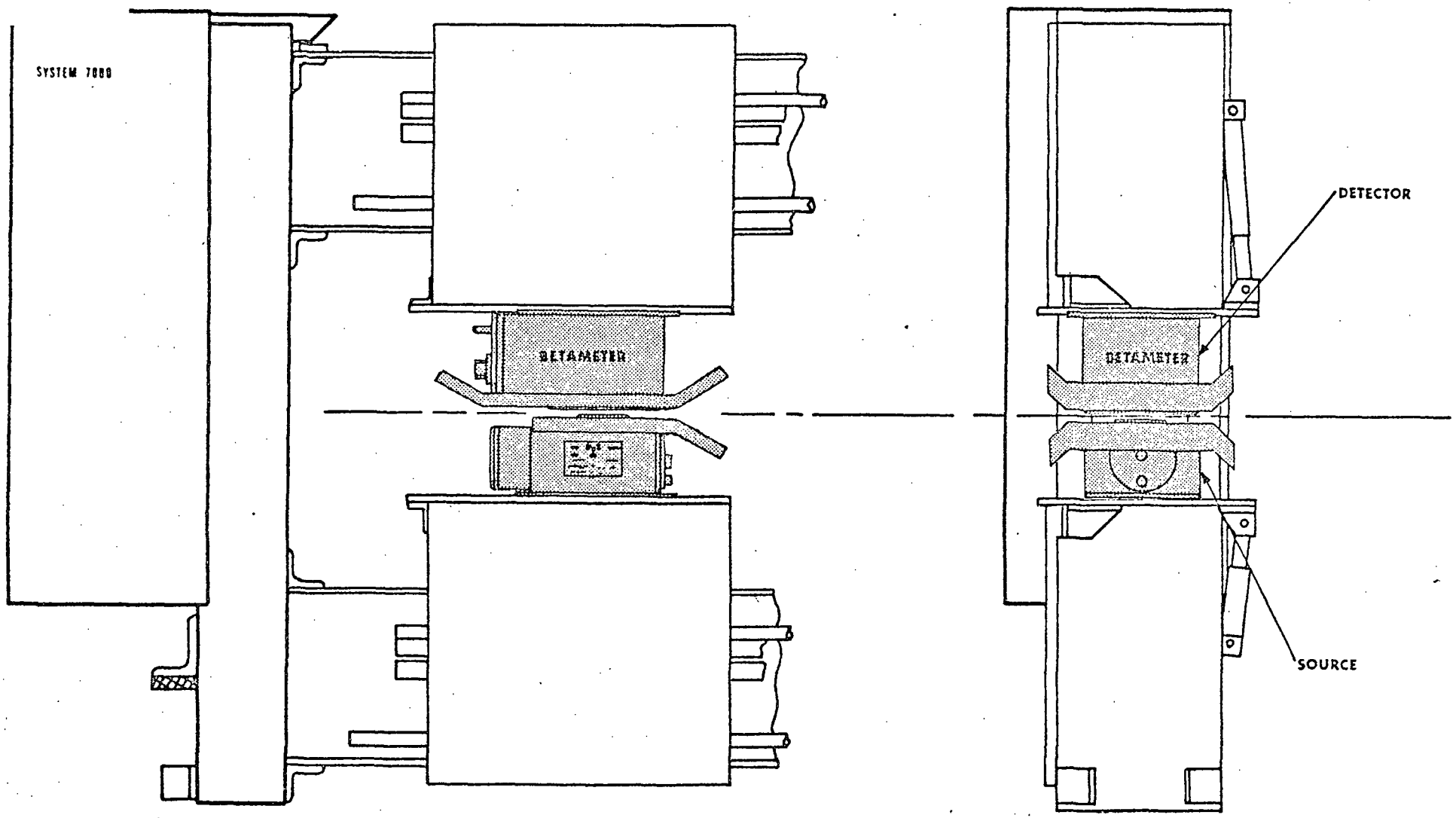
Enclosed. (Appendix B).



ART 202 003

SENTROL SYSTEMS MODEL TB1 BETA GAUGE
BETAMETER SOURCE HOLDER ASSEMBLY

132-010

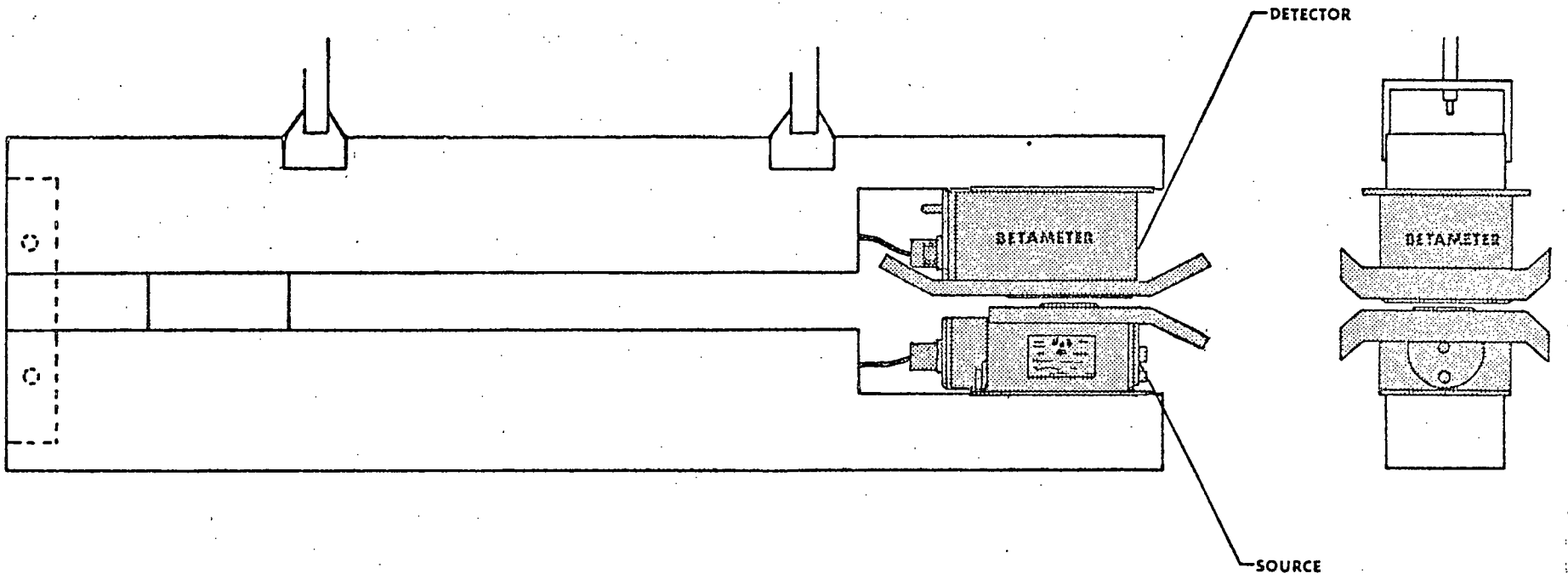


ART 132 010

SENTROL SYSTEMS MODEL TB1 BETA GAUGE

O-FRAME SENSOR MOUNTING

044 - 001



ART 044 001

SENTROL SYSTEMS MODEL TB1 BETA GAUGE

C-FRAME SENSOR MOUNTING

RADIATION PATTERN

ate of Survey 4-10-75
u tomer
d ress
(Location
urvey Meter Eberline E-120
hecked by AB

Type Gauge TB-1
Gauge Serial #
Type of Source ^{90}Sr
Strength 20 mc.
Source Serial #
Send Pattern to

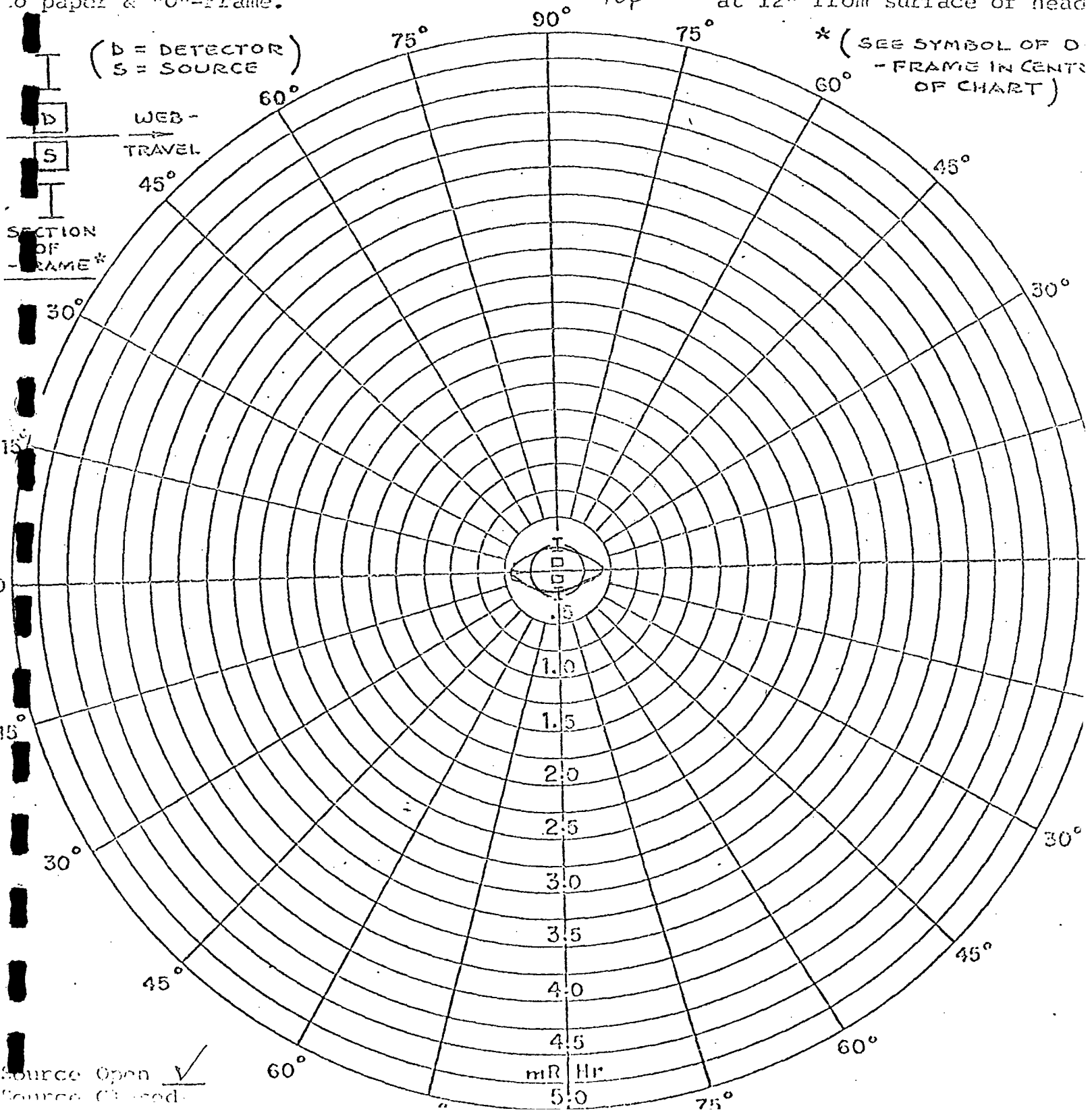
Manufacturer SENTRO
Model # TB 1
Model # 3 FIL
Pattern sent to

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

nd View: At right angles
o paper & "O"-Frame.

END VIEW — Top

Pattern - Radiation Level
at 12" from surface of head



Source Open ✓
Source Closed

RADIATION PATTERN

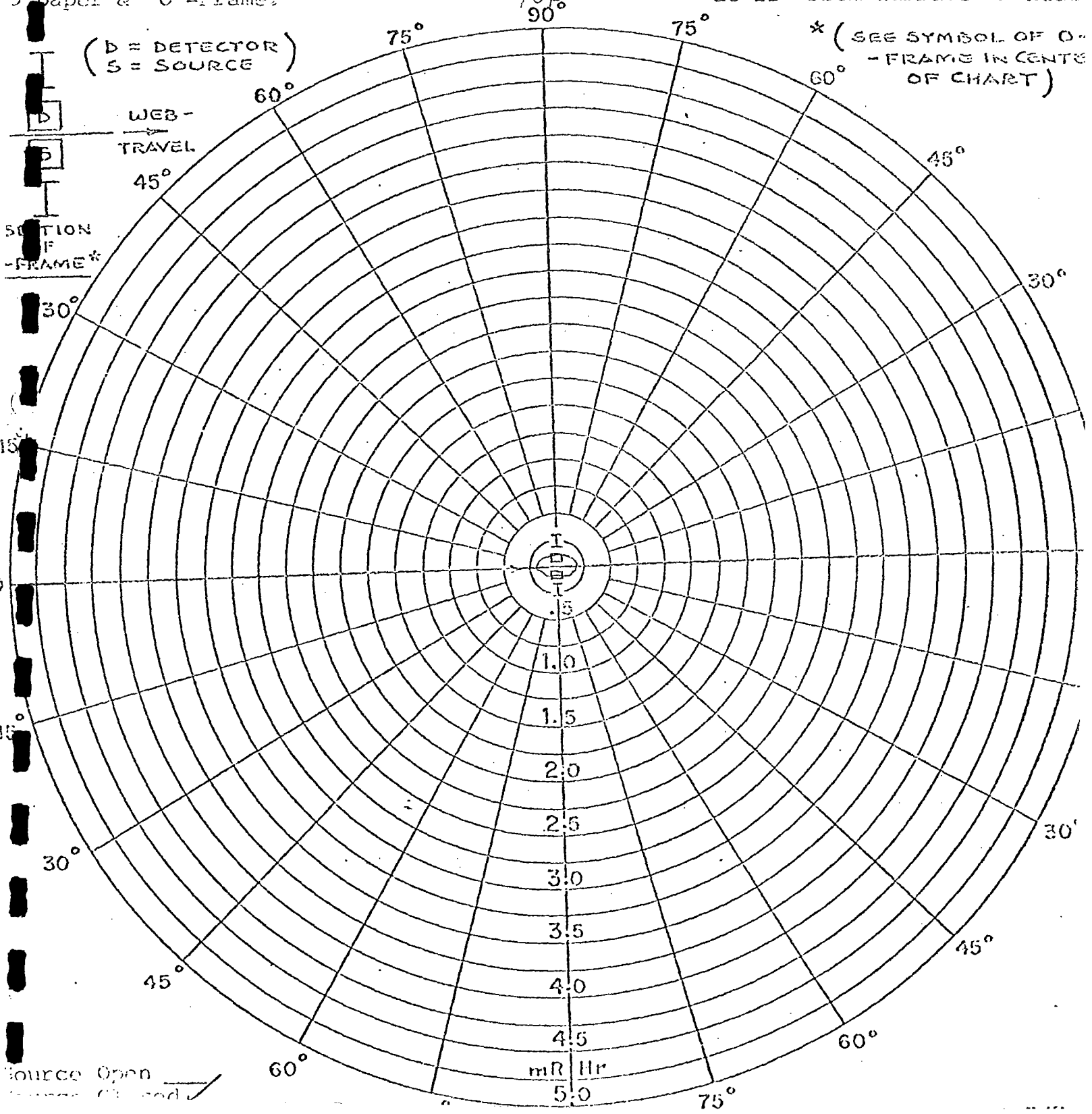
of Survey 4.10.75 | Type Gauge TB1 | Manufacturer SENTROL
omer | Gauge Serial # | Model # TB1
ess | Type of Source ^{90}Sr
Location | Strength 20 mc
ey Meter Ebeville E-120 | Source Serial # | Model # 3F1L
ked by AB | Send Pattern to | Pattern sent to

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

d View: At right angles
paper & "O"-Frame.

END VIEW
Top

Pattern - Radiation Level
at 12" from surface of head

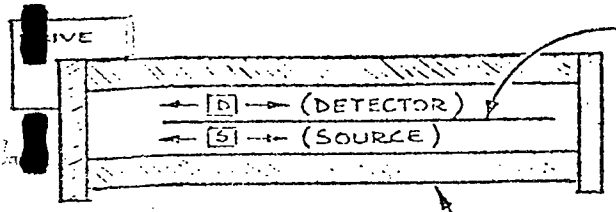


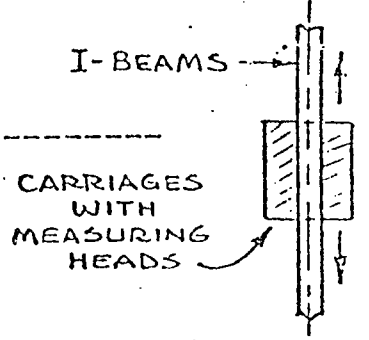
Source Open

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.

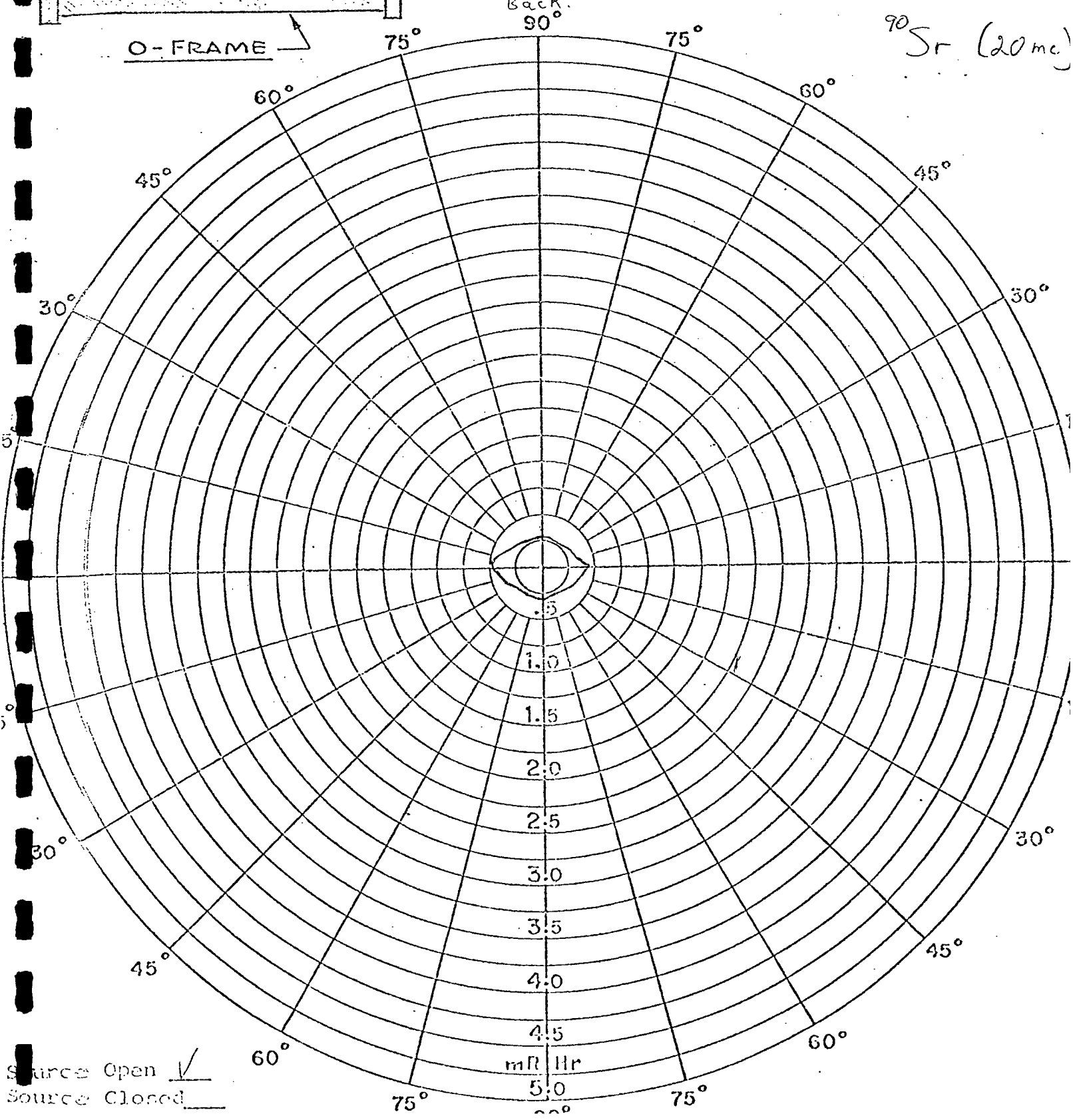




Top View (✓)
Front Side View ()
Back.

Pattern: Radiation Level at 12" from surface of head.

^{90}Sr (20 mc)

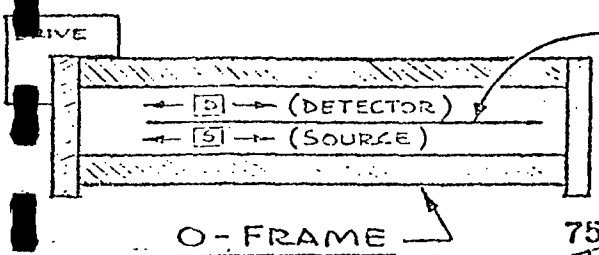


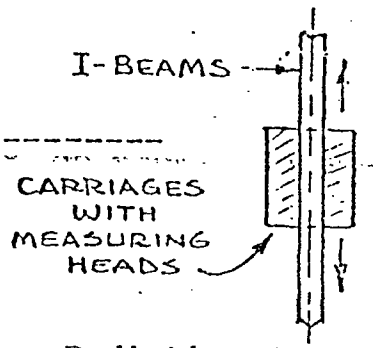
Source Open ✓
Source Closed ___

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.



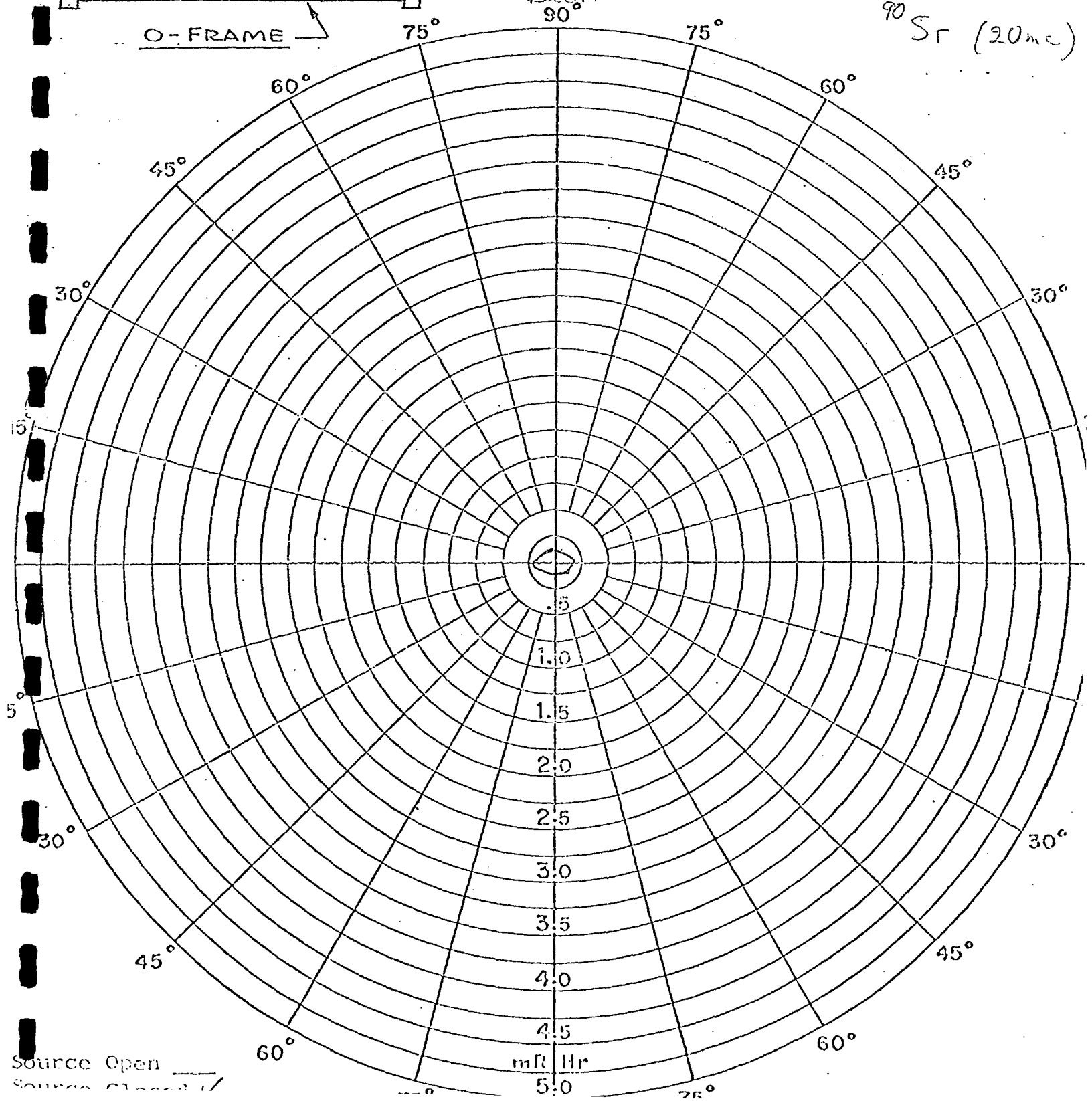


Top View (✓)
Side View ( )

Pattern: Radiation Level at 12" from surface of head.

Back.

^{90}Sr (20mc)



Source Open ___

Source Closed ✓

RADIATION PATTERN

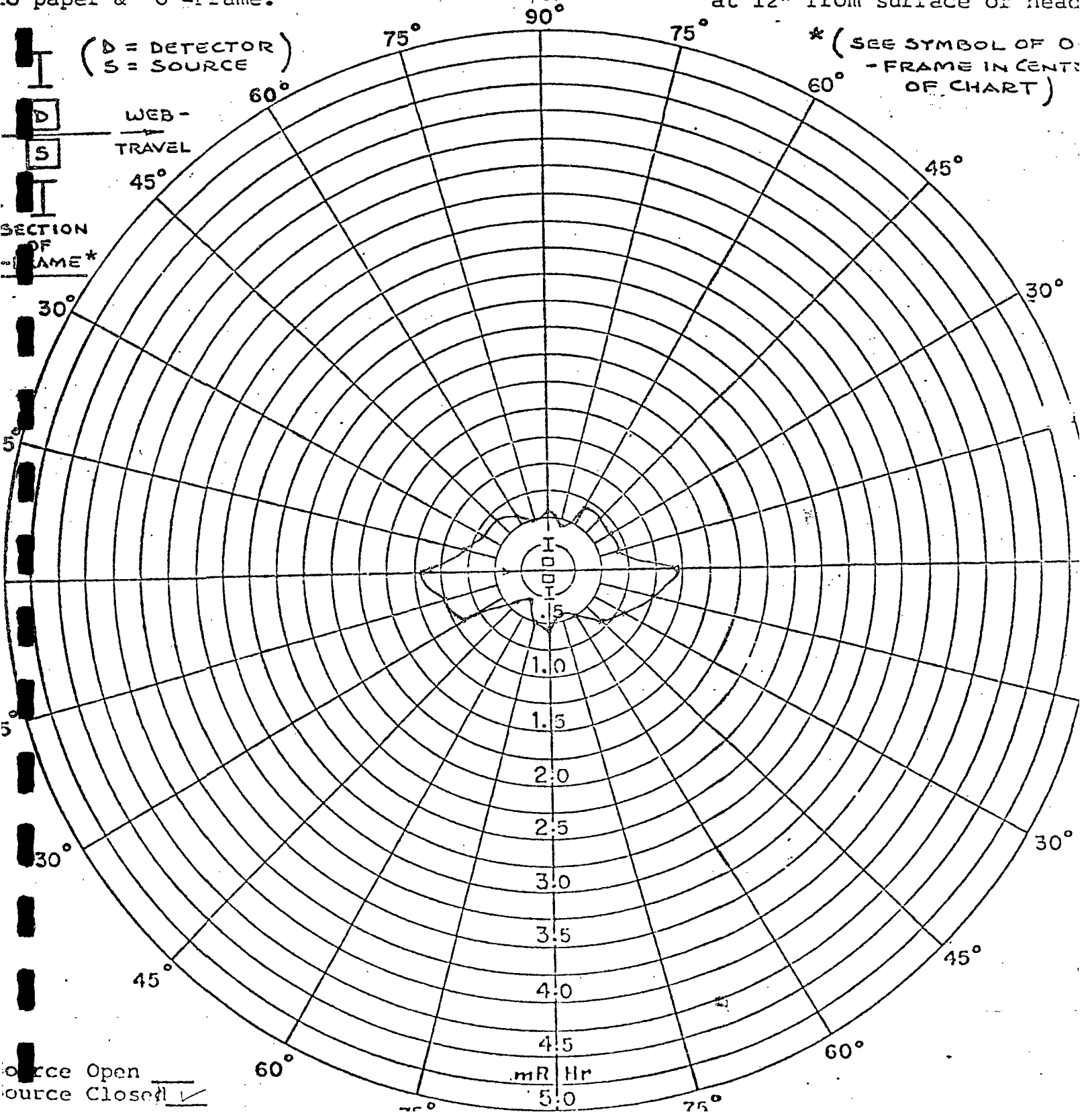
Date of Survey 4/14/75 | Type Gauge TR 1 | Manufacturer SENTRO
Customer | Gauge Serial # | Model # TR 1
Address | Type of Source ^{85}Kr
Gauge Location | Strength 500 mc
Survey Meter Eberline PRD | Source Serial # | Model # AAC 4035 DR
Checked by AB | Send Pattern to | Pattern sent to

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 & "O"-Frame.

END VIEW

Pattern - Radiation Level at 12" from surface of head



Source Open ___
Source Closed ✓

RADIATION PATTERN

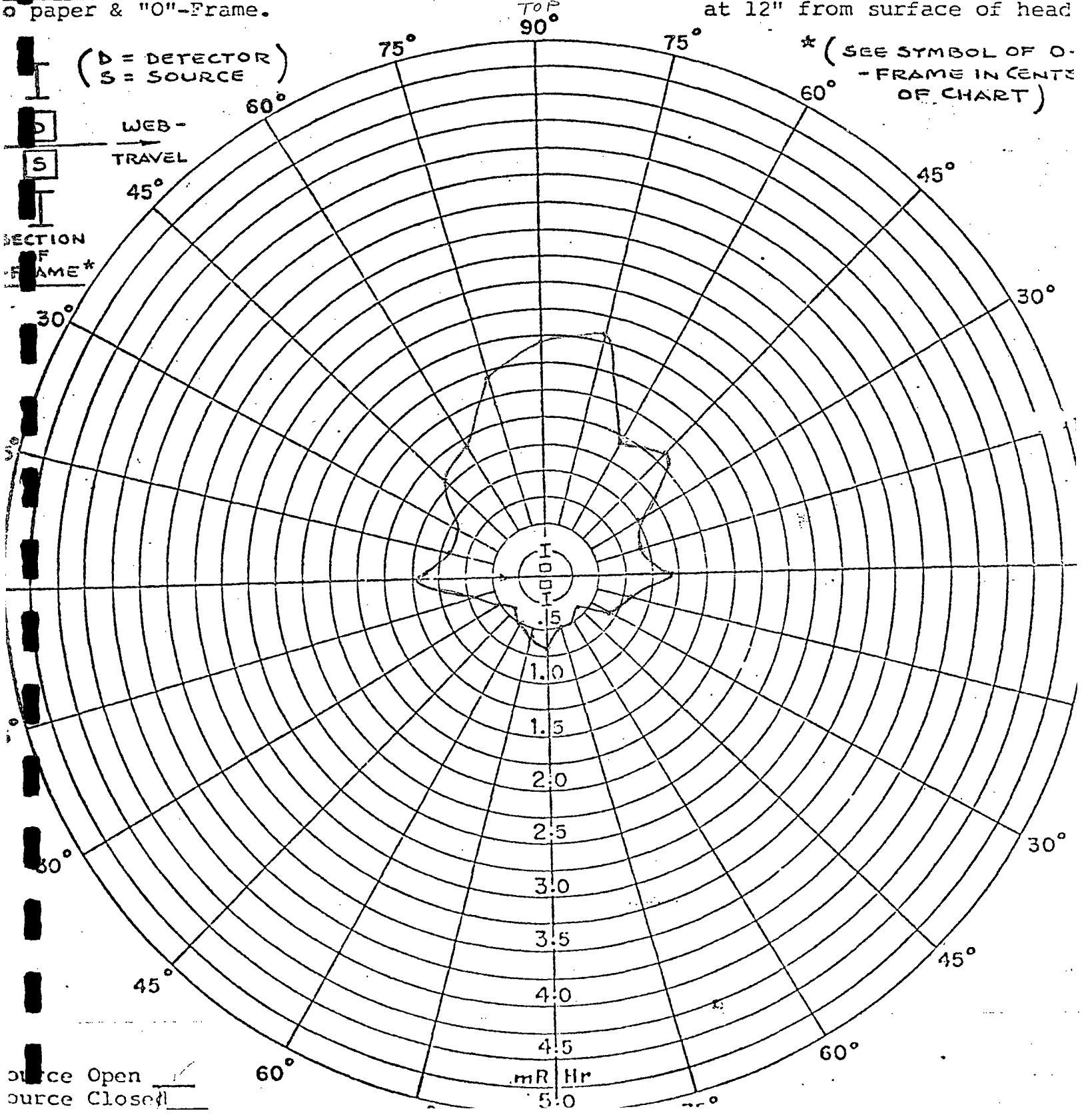
ate of Survey 4/10/74 | Type Gauge TB 1 | Manufacturer SENTROL
ustomer | Gauge Serial # | Model # TB 1
dress | Type of Source 85 Kr
ge Location | Strength 500 mc
urvey Meter Victoreen 440 | Source Serial # | Model # AAC 4005 7 15
hecked by AR | Send Pattern to | Pattern sent to

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

n View: At right angles o paper & "O"-Frame.

END VIEW

Pattern - Radiation Level at 12" from surface of head

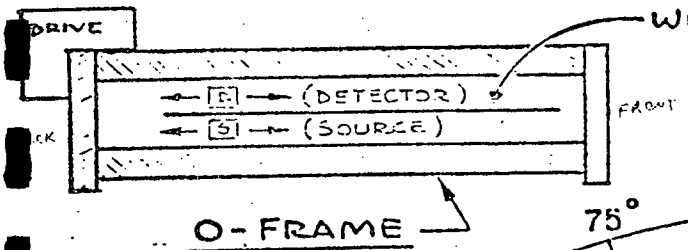


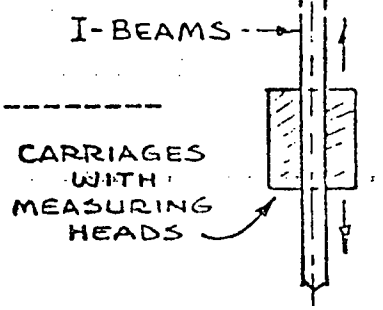
ource Open ✓
ource Closed

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.

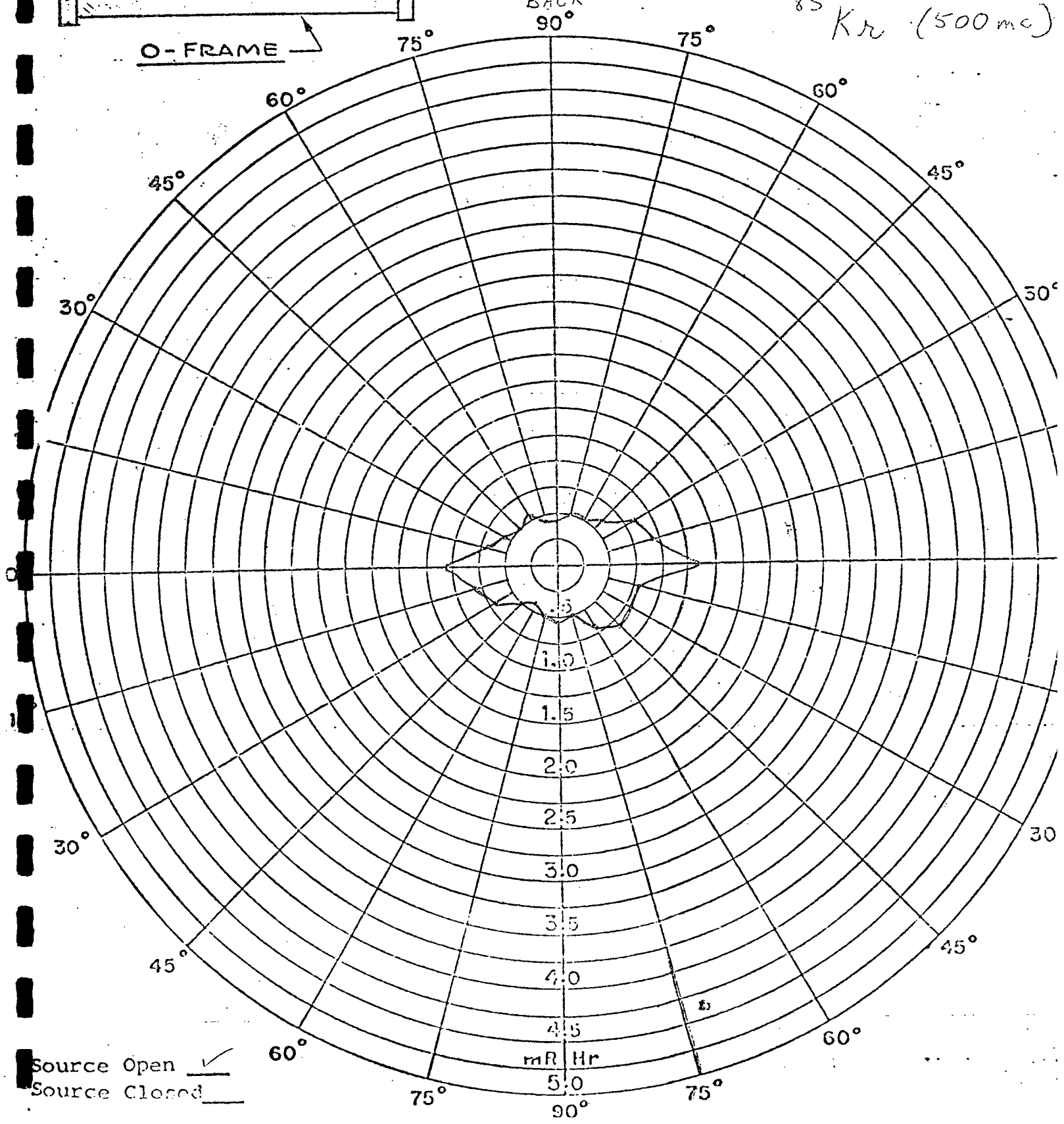




Top View (✓)
Side View ( )

Pattern: Radiation Level at 12" from surface of hea

^{85}Kr (500 mc)

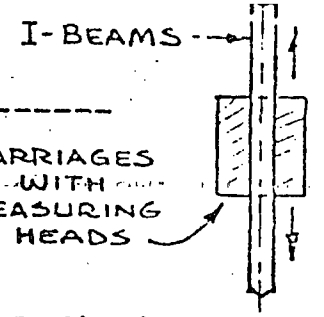


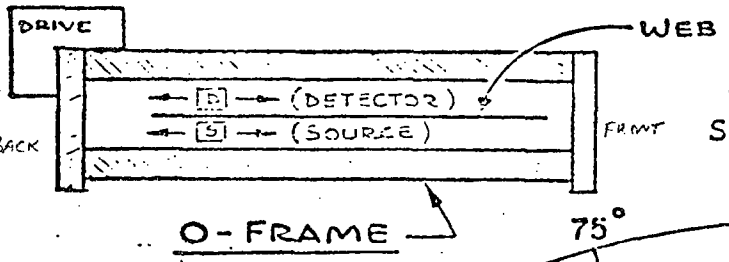
Source Open ✓
Source Closed ___

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.

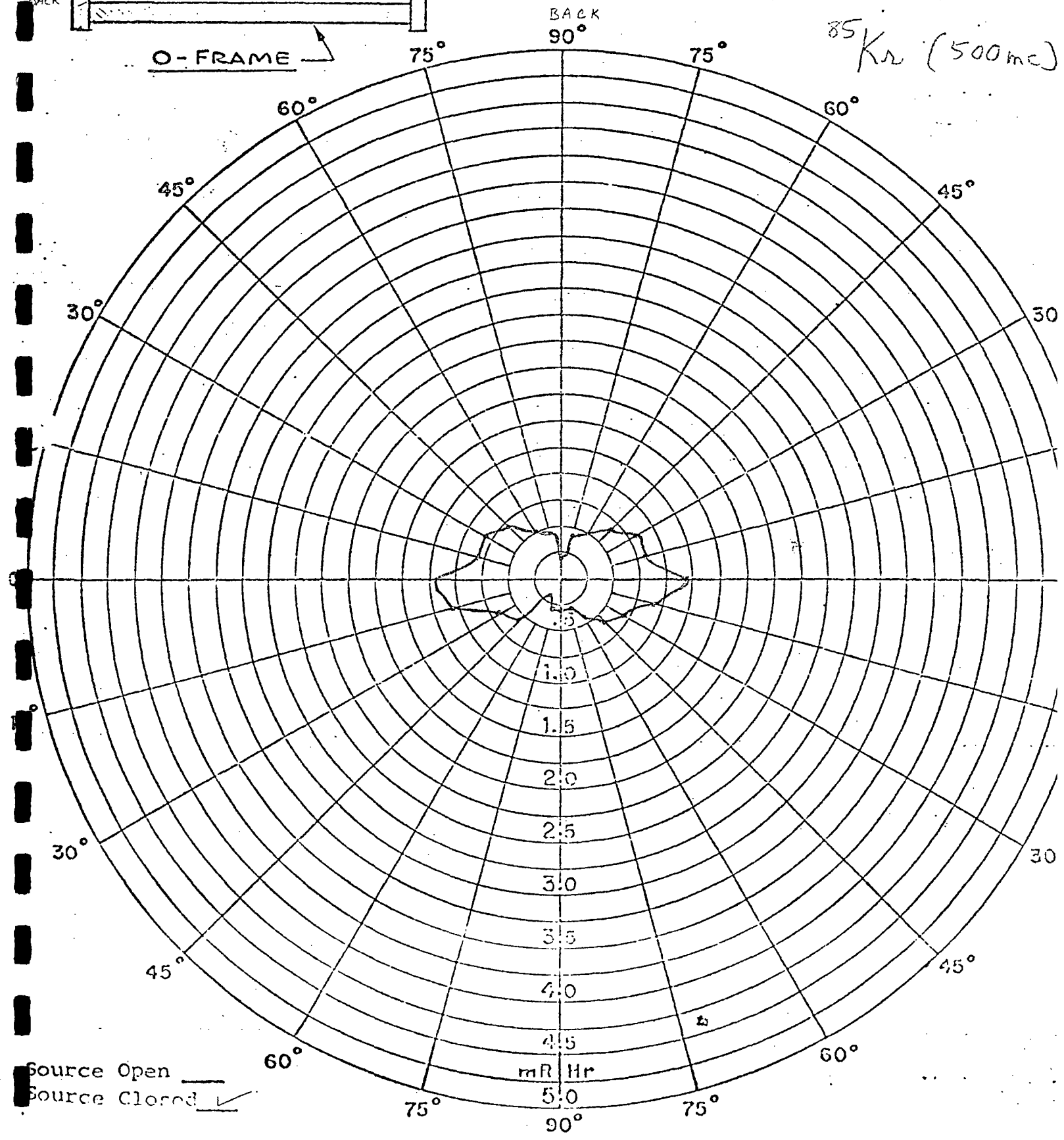




Top View (✓)
Side View ( )

Pattern: Radiation Level at 12" from surface of he

85 Kv (500 mc)



Source Open ___
Source Closed ✓

RADIATION PATTERN: SOURCE ONLY

Date of Survey 5/9/75
Customer
Address
Gage Location
Survey Made by Victoreen 440
Checked by A.R

Type Gauge TBI
Gauge Serial #
Type of Source ^{85}Kr
Strength 500 mc
Source Serial #
Send Pattern to

Manufacturer SYSTEM SENTRY
Model # TBI
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 & "O"-Frame.

~~END~~ SIDE VIEW

Pattern - Radiation Level β^- at ~~END~~ SIDE from surface of head

1m * (SEE SYMBOL OF O-FRAME IN CENTER OF CHART)

(D = DETECTOR
S = SOURCE)

D
WEB - TRAVEL
S

SECTION OF O-FRAME*

90°
75°
60°
45°
30°

.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0

mR Hr X40

Source Open ✓
Source Closed

BES-7/72

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

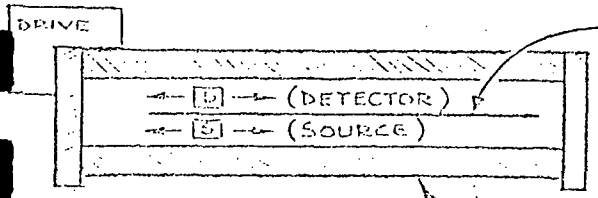
I-BEAMS

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

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

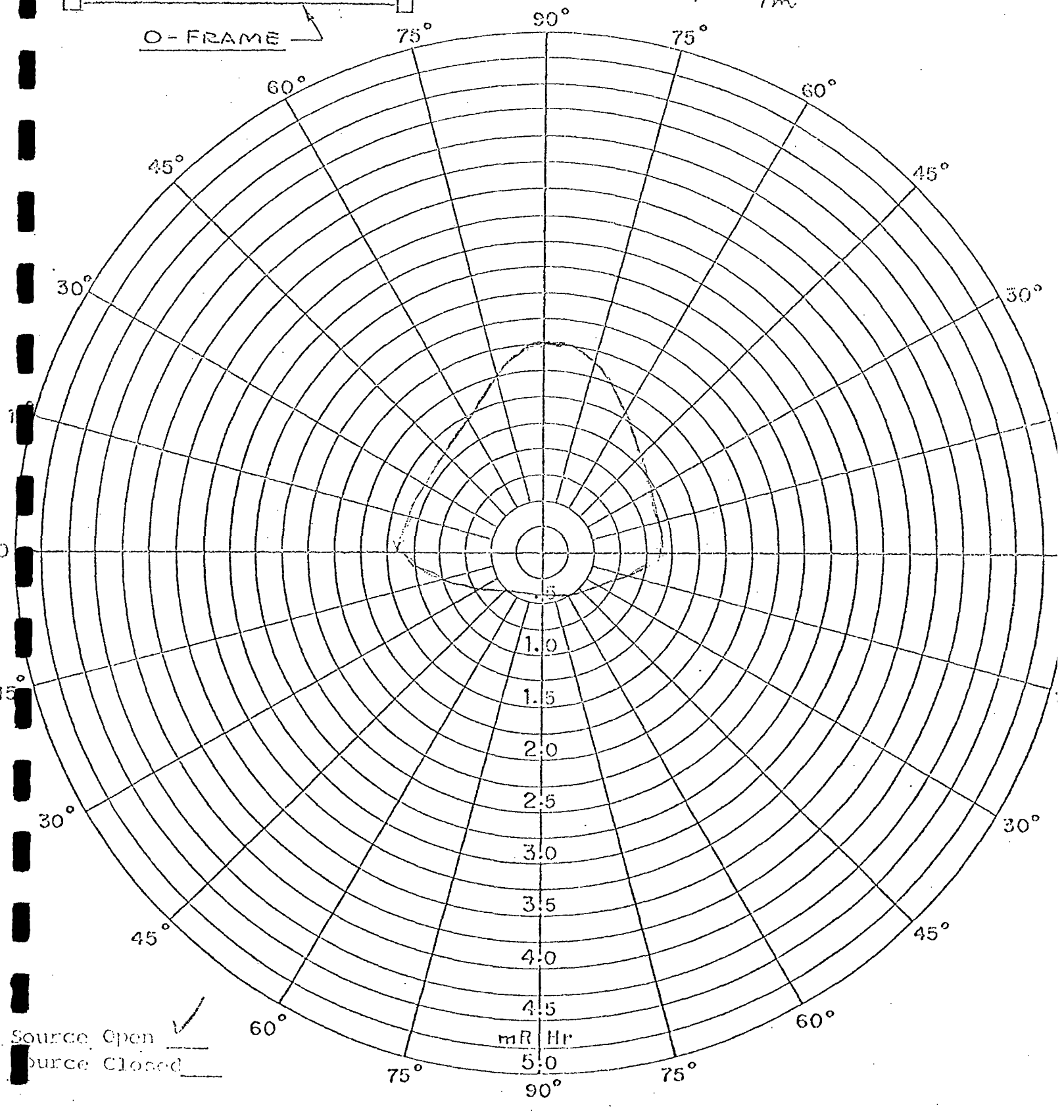
^{85}Kr

CARRIAGES WITH MEASURING HEADS



Top View ( )
Side View (✓)

Pattern: ✓ Radiation Level
at 12" from surface of head
1m



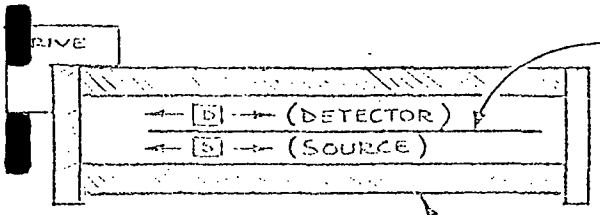
Source Open ✓
Source Closed ___

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.

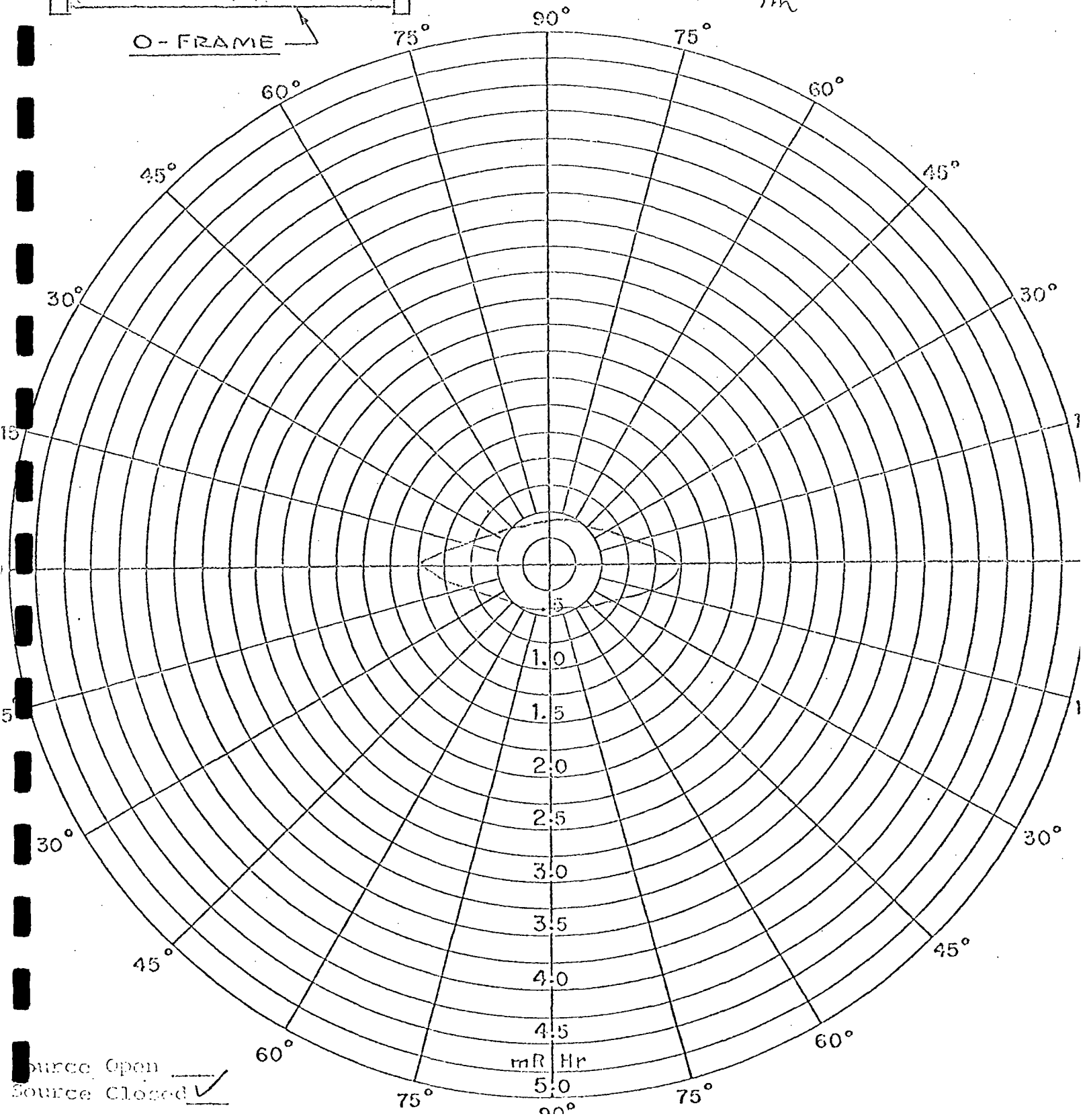
85/Kr



O-FRAME

Top View ( )
Side View ( )

Pattern: Radiation Level at ~~12"~~ 1m from surface of head.



Source Open ____
Source Closed ✓

RADIATION PATTERN SOURCE ONLY

Date of Survey 5/9/75
Customer
Address
Gage Location
Survey Meter Victoreen 440
Checked by Alex Barbara

Type Gauge TBI
Gauge Serial #
Type of Source 90Sr
Strength 20 mc
Source Serial #
Send Pattern to

Manufacturer SOURCE
Model # TBI
Model # 3511
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 & "O"-Frame.

~~END~~ VIEW
SIDE

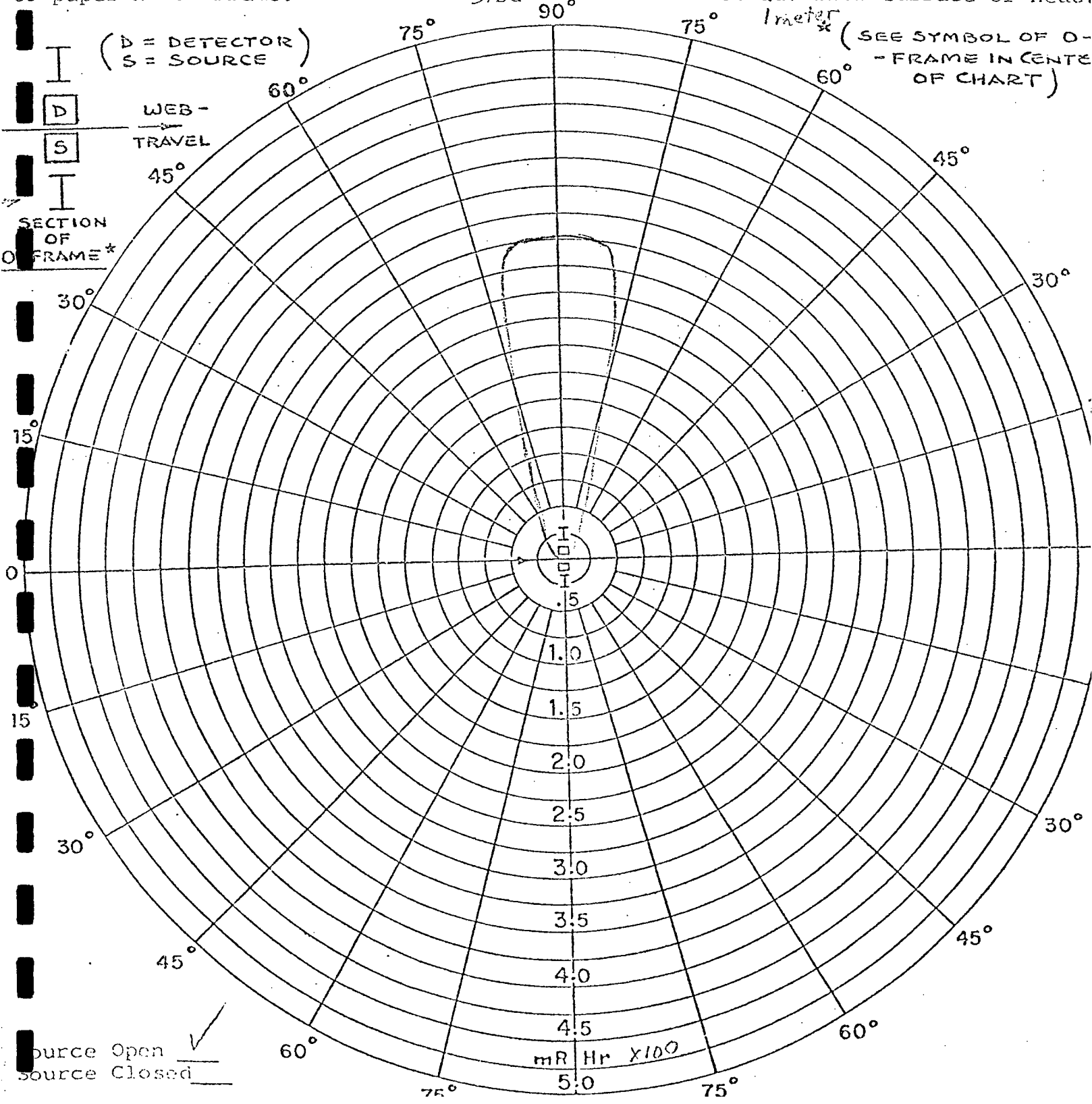
Pattern β^- - Radiation Level at 12" from surface of head.
1 meter*

(D = DETECTOR
S = SOURCE)

D
WEB - TRAVEL
S

SECTION OF O-FRAME*

(SEE SYMBOL OF O-FRAME IN CENTER OF CHART)

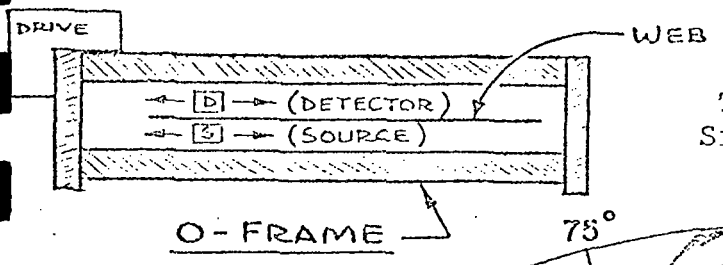


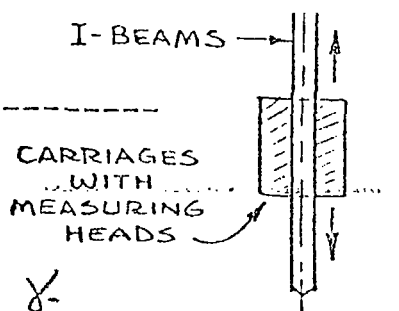
Source Open ✓
Source Closed

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.

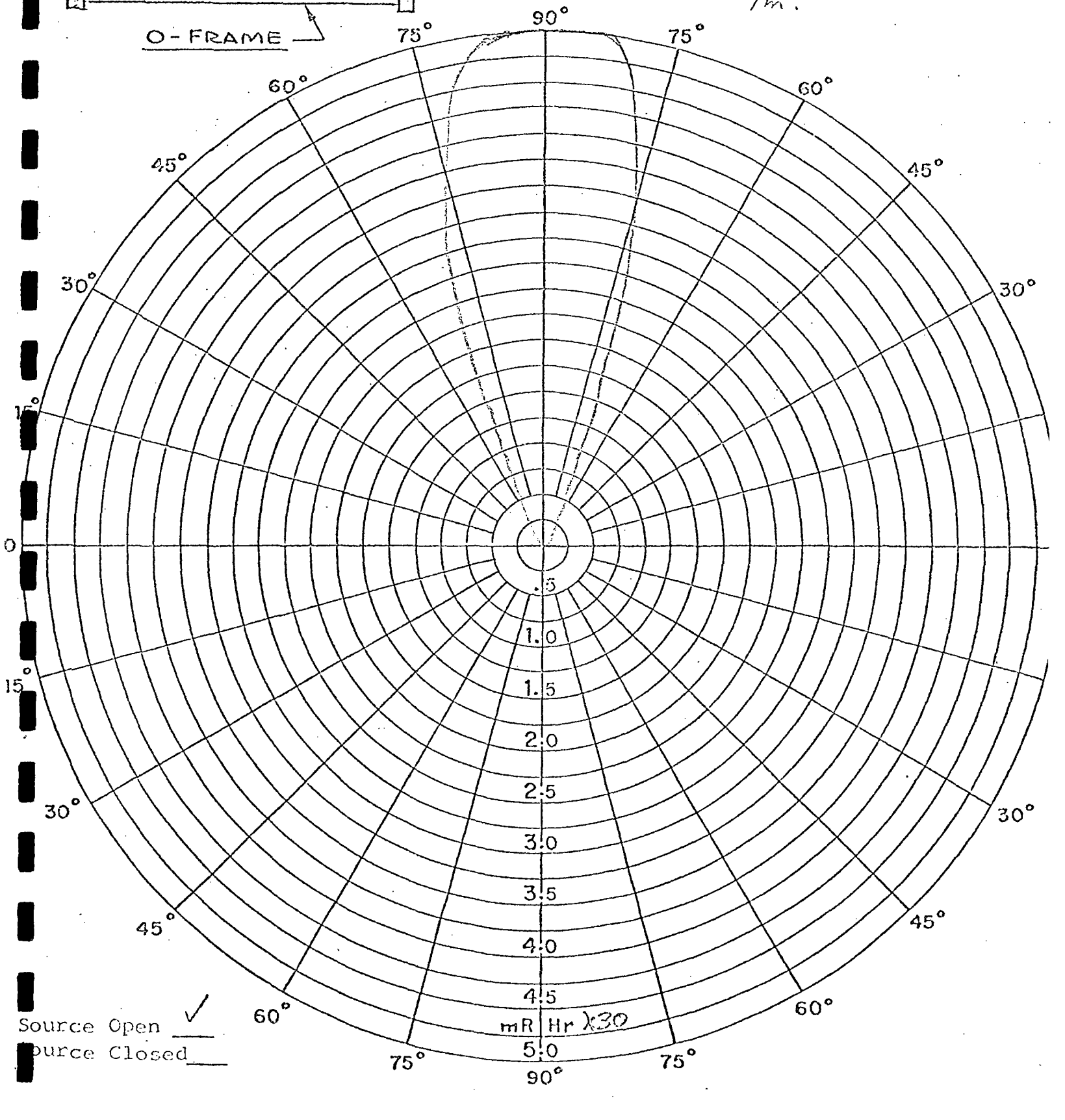




^{90}Sr

Top View ( )
Side View (✓)

Pattern: Radiation Level at ~~12"~~ 1m. from surface of head



Source Open ✓

Source Closed ___

RADIATION PATTERN

Date of Survey _____ Type Gauge _____ Manufacturer _____
Customer _____ Gauge Serial # _____ Model # _____
Address _____ Type of Source ^{90}Sr
Gage Location _____ Strength _____
Survey Meter _____ Source Serial # _____ Model # _____
Checked by _____ Send Pattern to _____ 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 & "O"-Frame.

END VIEW

Pattern - Radiation Level at 12" from surface of head

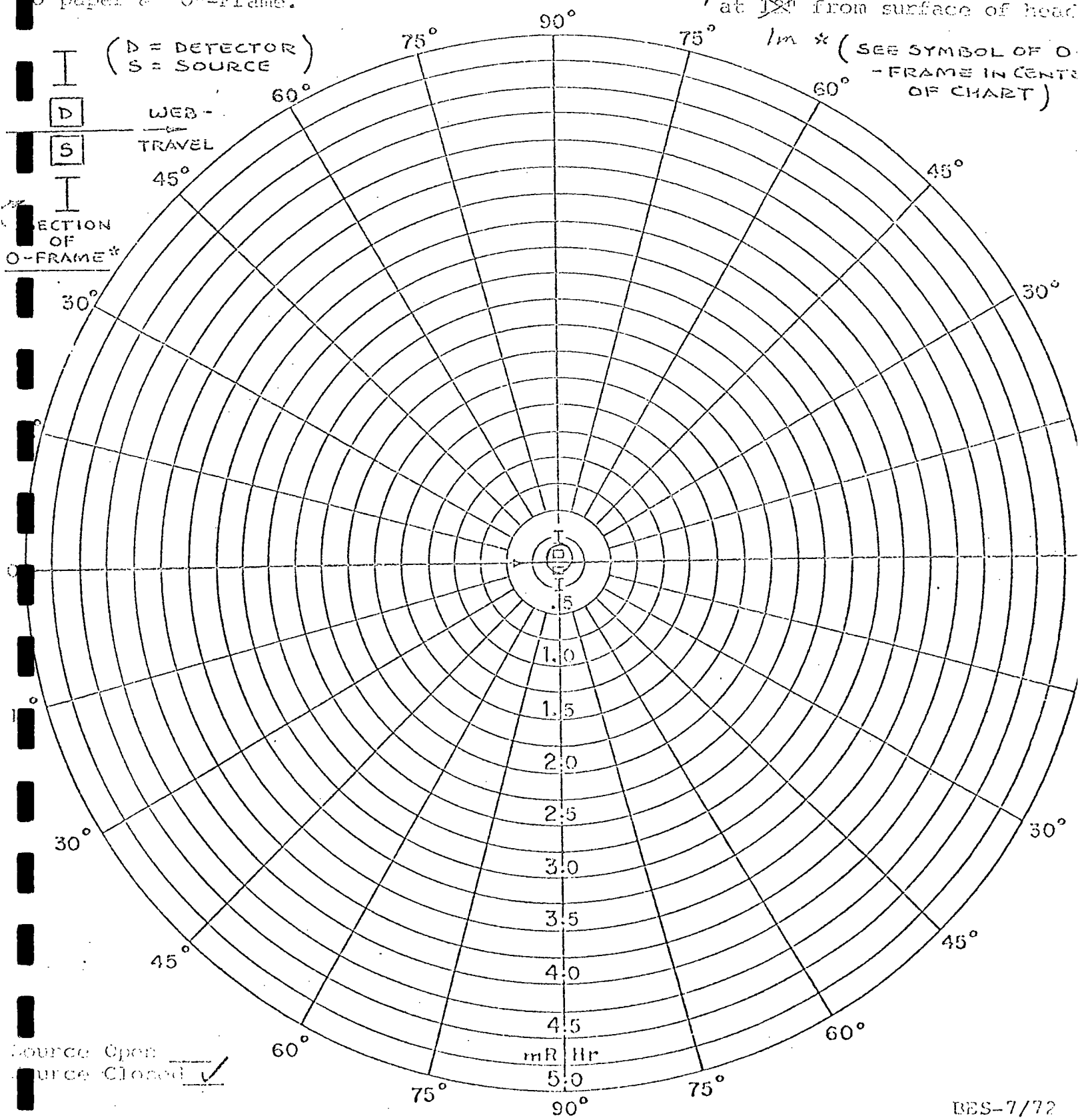
1m * (SEE SYMBOL OF O-FRAME IN CENTER OF CHART)

(D = DETECTOR
S = SOURCE)

D
S

WEB - TRAVEL

SECTION OF O-FRAME*



Source Open ____
Source Closed ✓

BES-7/72

APPENDIX A

LABELS FOR SEALED SOURCES

SENTROL MANUFACTURING STANDARDS

SPECIFICATION SHEET

SPECIFICATION FOR SEALED SOURCES

Minnesota Mining & Manufacturing Co. sealed 20 mCi Strontium 90 source.

The following information must be engraved on each source.

Source Type
Source Strength
ANSI Classification
Radioactive Symbol
Date of Manufacture
Serial No.
Model no.

Source construction will be as shown in Minnesota Mining and Manufacturing Co. Drawing B1921-612.

SPECIFICATION FOR SEALED SOURCES

American Atomics Corp. sealed 500 mCi Krypton 85 source.

The following information must be engraved on each source:

Source Type
Source Strength
ANSI Classification
Radioactive Symbol
Date of Manufacture
Serial Number
Model Number

Source construction will be as shown in American Atomics Corp. Drawing #40057B.

APPENDIX B

SAFETY REGULATIONS FOR USERS

OF

RADIOACTIVE ISOTOPES

1.1.0 SAFETY REGULATIONS FOR USERS OF RADIOACTIVE ISOTOPES

1.1.1 General

All rules, regulations, radiation profile reports, wipe test or inspection reports, licenses, etc., must be maintained in a separate file at all times while the source is in the possession of the user. An individual in the user's plant must be familiar with the use of the file as well as with the rules and regulations governing the use of radioactive materials in the user's country. Sentrol Systems Inc. may be consulted if the user has any questions regarding safety,applications, licensing, etc., of radioactive materials, and Sentrol Systems Inc. training courses in radiation techniques, handling, usage, and licensing are available.

The Sentrol Systems Inc. Beta Gauge source and source housing have been designed and tested to ensure safe and reliable operation. The radioactive source material is hermetically sealed and mounted in a source holder. This assembly is fitted in a steel container which has gaskets sealing all jointed parts and connectors. A thin stainless steel 'window' in the steel housing allows the radiation to be emitted while preventing entry of contaminants such as dust, dirt, etc.

When the source is closed, a thick metal shutter comes between the sealed source and the window, and absorbs the emitted radiation. A 'Green' light in the source housing indicates this condition. When the source is open (shutter not between source and window), radiation is emitted through the source housing window and the light will be 'Red'. If a power failure should occur, the source shutter will automatically close.

The source should be closed when the external window or sensor is being cleaned.

INTERNAL MAINTENANCE OR SERVICING OF

THE SOURCE HOUSING MAY BE CARRIED OUT

ONLY BY A LICENSED SENTROL SYSTEMS

INC. REPRESENTATIVE.

1.1.2 Source Inspection

Semi-annual wipe tests and shutter inspections for Strontium 90 or source shutter inspections for Krypton 85 must be made by licensed personnel, usually by Sentrol Systems Inc. Technical Representatives.

1.1.3 Administrative Requirements Pertaining to United States Regulations

All transactions in radioactive materials in the U.S.A. must be carried out in accordance with regulations issued by the U.S. Nuclear Regulatory Commission in Title 10 Code of Federal Regulations, Part 20 or by similar regulations issued by the appropriate regulatory authorities on the agreement States.

Copies of Title 10, part 20 may be obtained from:

The U.S. Nuclear Regulatory Commission,
Washington, D.C. 20545.

Copies of the regulations for agreement states can be obtained from the appropriate authorities. Sentrol will be pleased to provide the names and addresses for the various agreement States should the customer wish to obtain the information.

All users of radioactive materials must be fully aware of the various provisions of these regulations.

The Radiation Protection Divisions will advise prospective users regarding health requirements and will review plans and blueprints of proposed installations at any time. Publications dealing with the health and safety requirements of radiation work may also be obtained by writing to:

The National Council for Radiation Protection,
P.O. Box 4867,
Washington, D.C. 20008.

NCRP Report #30 Safe Handling of Radioactive Materials

Note: All customers must obtain a specific license.before they can receive the Sentrol Systems Model TB1 Beta Gauge. The Radiation Safety Officer for Sentrol Systems Inc. will provide all the assistance the customer requires to obtain the necessary license.

1.1.4 Source Labels

Labels on all source housings indicate the type of radioactive material, activity in mCi, serial number, and the date of installation. These labels must not be removed. If lost, they must be replaced promptly.

1.1.5 Radiation Profile

A radiation profile is made after the equipment has been installed. This survey will establish the distance from the source where the level of radiation falls below the 0.25 mv/hr level. At this level any worker may work for a full 8-hour period without requiring any special monitoring devices.

Copies of this information are given to the customers who should maintain the profiles on file together with the record of the six-month source wipe and/or shutter inspection.

1.1.6 EMERGENCY PROCEDURES

Suggested Procedures in the Event of an Accident

Because of the design of the sealed sources and the housing in which it is contained within the gauge, the likelyhood of damage to the sources is very remote, but if it is damaged then we suggest that the following steps be taken:

1. First clear the area of people and notify the Radiation Safety Officer.

2. Notify the U.S. Nuclear Regulatory Commission and/or the appropriate State authorities in an agreement State, to obtain expert assistance in clean-up and decontamination.

3. Permit no person to resume work in the area until a survey has been made, and approval of the Radiation Safety Officer has been secured.

4. Prepare a complete history of the accident as required by the Regulatory Authorities and -

   In the U.S.A.

   Notify the Radiation Safety Officer, 2957 Alt Boulevard, Grand Island, New York 14072. Telephone: 716-773-7525.

   In Canada

   Notify the Radiation Safety Officer, 4401 Steeles Ave. West, Downsview, Ontario M3N 2S4. Telephone: 416 - 661-7000.

Procedure to be followed if damage is suspected to:

a) Krypton 85 Source

The case of a leaking Krypton 85 source is an exception. Since Krypton is a noble gas and is non-reactive in the biological system, the best method is to clear the area

of the leaking gas by excess ventilation. Krypton is the only radioisotope used by Sentrol that falls into this category. If the rupture of the source is caused by fire or explosion then the only action which can normally be taken is to clear the area of people.

A leak from a Krypton 85 source will be indicated by a rapid decrease in the signal from the Beta Gauge. If this occurs the gauge should be taken out of service, the area cleared, and the Radiation Safety Officer informed.

b) Strontium 90

Strontium 90 if ingested will be taken up by the body and stored in the bone marrow. With a half life of 28 years this could be an extremely serious situation.

If a sealed Strontium 90 source is inadvertently ruptured or severely damaged, do not attempt to remove or repair it.

To prevent the possible spread of contamination, the source housing should be covered with plastic and then sealed with tape. The area must be segregated by being roped off. All personnel who have been in the vicinity of the spill should be held at the barrier surrounding the segregated area until it is possible to monitor them for possible contamination.

No one should re-enter the area except under the direction of the Radiation Safety Officer.

APPENDIX C

LABELS FOR SOURCE HOUSING

TYPE OF SOURCE

DATE

STRENGTH

MILLICURIES

CAUTION: RADIOACTIVE MATERIALS

MODEL SERIAL

THIS RECEIPT, POSSESSION, USE, AND TRANSFER OF THIS DEVICE, MODEL....., SERIAL Nº.....ARE SUBJECT TO A GENERAL LICENSE OR THE EQUIVALENT AND THE REGULATIONS OF THE U.S. NUCLEAR REGULATORY COMMISSION OR OF A STATE WITH WHICH THE NRC ENTERED INTO AN AGREEMENT FOR THE EXERCISE OF REGULATORY AUTHORITY.

REMOVAL OF THIS LABEL IS PROHIBITED.

CAUTION – RADIOACTIVE MATERIAL

SENTROL SYSTEMS INC., GRAND ISLAND N.Y. 14072

This device, exempt from licensing pursuant to New York State Industrial Code Rule 38-5.2b (5) has been manufactured and distributed by Sentrol Systems Inc. pursuant to New York State License No.

This device shall not be transferred, abandoned, or disposed of except by transfer to a person specifically licensed or authorized to receive such a device by the New York State Industrial Commissioner, the United States Nuclear Regulatory Commission, or appropriate regulatory agency of another agreement state.

Operation of this device shall be immediately suspended, until any necessary repairs have been made, if there is any indication of possible failure of or damage to the shielding or containment of the radioactive material.

Installation, repair, maintenance, replacement, relocation, testing, ultimate disposal, or other service involving the radioactive material, its shielding and containment shall be performed only by persons specifically licensed to perform such services on this device by the Industrial Commissioner, the United States Nuclear Regulatory Commission, or appropriate regulatory agency of another agreement state.

This device shall be tested for leakage of radioactive material and for proper functioning of the "off-on" mechanism and indicator at intervals specified by the U.S. Nuclear Regulatory Commission or other agreement states when used under their respective jurisdictions. If this device contains only Krypton 85 as the radioactive source, testing for leakage is not necessary; only the "off-on" mechanism need be tested.

Removal of this label is prohibited by regulations of the Nuclear Regulatory Commission.

BASIC RADIATION EXAMINATION

SenTrol
SYSTEMS, INC.
SENSORS/CONTROLS FOR THE PROCESS INDUSTRIES

BASIC RADIATION EXAMINATION

PRINT NAME: _____ DATE: _____

Please answer questions in the space provided below each question.

1. How does γ emission differ from α and β emissions?

2. What are some of the uses of the BETA SOURCE?

3. What are the three basic factors involved in protection against GAMMA RADIATION?

4. Why is it necessary to make wipe tests on gauges?

5. When must leak tests be carried out? Give 3 answers.

6. (a) What quantity of radioactive material must leakage tests be capable of detecting?

   (b) What action must be taken if such a quantity is detected?

2957 ALT BLVD., GRAND ISLAND, N.Y.
14072 (716) 773-7525

7. (a) What is the Maximum Permissible Occupational Dose for a Radiation Worker for one year?

   (b) What is the Maximum Permissible Dose for the general public (no film badge, etc.) for one year?

8. What action would you take to remove skin contamination?

9. Why is it necessary to protect radioactive materials from fires?

10. (a) What six pieces of information must be shown on the label on source containers? (Equipment that sources are installed in.)

    (b) When, for shipping, is a white I label used?

11. Which of the following is the most penetrating in lead (please encircle):

    gamma-rays beta particles or alpha particles

12. Define half-value layer.

13. Define half-life.

14. What type of shielding should be used to minimize Bremsstrahlung, when using energetic beta sources?

15. Describe a shielding system for fast neutrons.

16. (a) Name a suitable material other than a metal for shielding gamma radiation.

(b) For a given attenuation of gamma radiation, please encircle which of the following metals should be used to design the lightest weight container?

Lead Iron Heavy Met or Depleted Uranium

17. (a) If I = 1024 mR/Hr. at a distance of 2 yards, what will the intensity be at 8 yards, if a shield of 8 half value layers is interposed between the source and the detector? Show calculations--do rough work on the back of the previous page.

(b) What will the dose be if an individual is exposed to this intensity for 1/2 hour?

18. What agency regulates the use of radioactive material in your area? Please state the province or state that your plant occupies.

19. What is the function of compliance inspectors?

20. What are the 3 most important considerations in shipping of radioactive materials?

21. What is required before a mill employee may be permitted to perform source inspections or source wipes and otherwise maintain a BETAMETER with respect to Radioactive Sources?

PRINT NAME _____

SIGNATURE _____

GJL:mef
4/3/75

TYPICAL ANSWERS TO BASIC RADIATION EXAMINATION

1. γ is a photon or bundle of energy with no mass or change. γ is most penetrating.

   - alpha particle has a double + charge and has 1840 times the mass of a beta particle with a single charge.

2. Measuring the mass per unit or basis weight of thin materials, i.e. paper, plastic, rubber, metal foils, etc.

3. TIME - DISTANCE - SHIELDING

4. To detect for source leakage which will INSURE PERSONAL SAFETY and is required by law.

5. Every 6 months (In field or storage)
   BEFORE INSTALLATION
   (Moved from one site to another)
   When an abnormal situation arises
   (fire, explosion, etc.)

6. a) .005 uc

   b) - Take device out of service
      - Notify Radiation Safety Officer
      - Clerk for contamination (surrounding area)
      - Report to the U.S. Nuclear Regulatory Commission or Appropriate State authority.

7. a) 5 REM
   b) .5 REM

8. Wash with soap and warm water, but insure skin is not broken.

9. Fires can damage source containers and spread radioactive material over large areas.

10. a) 1. Type of radioactive material
    2. Strength of radioactive material
    3. Serial No. of the source
    4. Serial No. of the device that contains the radioactive material (source)
    5. Model No. of the radioactive material (source)
    6. Date of source manufacture.

    b) When the surface level of the package is less than .5 mrem/hr.

11. Gamma rays

12. The thickness of a given material which will reduce the intensity of the radiation to 1/2 its original value.

13. The amount of time required for half the radioactive atoms to disintegrate.

14. Low Z Type material (aluminum plastic)

15. - 1st layer - paraffin, etc.
    - 2nd layer - cadium or boron
    - 3rd layer - lead

16. a) Concrete
    b) Depleted Uranium

17. a) .25 MR/HR
    b) .125 MR

18. _____

19. To make sure all State and/or Federal Regulations are maintained.

20. 1. Packaging
    2. Labelling
    3. Certification

21. - Qualified and accepted by the Nuclear Regulatory Commission, or Agreement State.

    - Film Badge

    - Geiger Counter

    - Means for measuring swats.

SenTrol
SYSTEMS, INC.
SENSORS/CONTROLS FOR THE PROCESS INDUSTRIES

RADIATION PROTECTION COURSE

GIVEN TO: _____ ON _____

SCOPE:

1. To familiarize the student with basic fundamentals of radiation protection and biological effects.
2. Radioactive source installation of sealed sources.
3. Source wipe procedures of sealed sources.

SUBJECTS TAKEN:

1. Basic Math and Physics Review
   - Part A. Mathematics
   - Part B. Introduction to Radiation
2. Atomic Structure and Radioactivity.
3. Basic Radiation Physics.
4. Industrial Uses of Radioisotopes and Associated Hazards.
5. Physical Methods of Controlling Radiation Hazards.
6. Detection of Leakage from Sealed Sources.
7. Routine and Emergency Procedures.
8. Survey Instruments.
9. Biological Effects of Radiation.
10. Licensing and Regulation.
11. Shipping Regulations.
12. Forms and Labels.

THIS IS TO CERTIFY that the above-named individual has taken the subjects listed above and has successfully passed an examination. He is fully qualified to perform radioactive source wipes of sealed sources, as well as radioactive source inspections and installation of sealed sources.

_____

Radiation Safety Officer

2957 ALT BLVD., GRAND ISLAND, N.Y.
14072 (716) 773-7525

RESUMES

BIOGRAPHICAL NOTES - G. J. LEIGHTON

EDUCATION:	British Institute Engineering Technology 1936-39.
	R.A.F. College, Cranwell 1944-45.
	B.S.E.E. Equivalent.
EXPERIENCE:	
1975 - Present:	Sentrol Systems Inc., Product Manager for paper machine systems, including the following sensors: infrared moisture gauge, micro-wave moisture gauges and color measuring gauge.
1973 - 1975:	Electronic Automation Systems, Inc., Product Manager for paper machine systems, including the following sensors: infrared moisture gauge, micro-wave moisture gauges, color measuring gauge, and flaw inspection systems. Currently investigating sensors for the food processing industry.
1963 - 1973:	Electronic Automation Systems, Inc., Senior Project Engineer. Responsible for the design of industrial control systems, using measuring devices utilizing nuclear energy, micro-waves, and infrared techniques. Also provided technical sales assistance.
1960 - 1963:	Curtiss-Wright Corporation, Electronics Div. Senior Engineer, transferred from Canadian Curtiss-Wright to Electronics Div. Involved in both project engineering and technical sales presentations.
1956 - 1960:	Canadian Curtiss-Wright Ltd., Oakville, Canada. Senior Development Engineer. Study of special geometries for industrial Beta-gauges, plus work on composite effects encountered in Gamma radiation type density gauges.

RESUME

CHARLES F. GOODSOLE
99 Idlewood Drive
Tonawanda, N.Y. 14150

716-692-0029

Experience Record

1964 to Present: Electronic Automation Systems, Inc.
Grand Island, New York

1973 to Present: Field Services Manager

Responsible for managing all field services support in the U.S., including training, technical support, documentation, parts ordering and drafting.

In addition was responsible for managing all service accounts in the Mid-West United States (Pennsylvania to Minnesota). Twelve persons reported to me during this time.

1967 to 1973: Systems Engineer

Responsible for the engineering specifications, production, check-out, and installation of analog and digital process control systems for the Pulp and Paper Industry.

These systems included a Basis Weight Betameter, three different moisture gauges, caliper gauge, optical flaw inspection system, and a pulp brightness gauge. The last five systems were 32K mini-computer systems controlling the complete paper machine, on which I was the Project Leader of a three-man project team.

1964 to 1967: Chief Draftsman

Responsible for all drafting requirements including machine lay-in drawings, master schematics, assembly drawings and blueprint facilities.

Experience Record (cont'd)

1963 to 1964: J. H. Williams Company - Buffalo, N.Y.

Maintenance Dispatcher

Responsible for dispatching maintenance men to repair equipment used in the manufacturing of drop forgings and industrial tools.

Kept detailed records of all work performed and made weekly reports of all pending repairs to be made.

Education

1964 University of Buffalo
Electrical Engineering

1961 to 1963: Erie County Technical Institute
Electrical Technology

Military Service

None - Classification 3A

Early Background

Grew up on Grand Island, N.Y. Educated in public schools and prepared for college at Riverside High School in Buffalo. Played two years of varsity football and track.

Outside Activities

- Usher Chairman at Church
- Member of ISA

Personal Interests

Enjoy Football, hockey, golf, sport cars.

Personal Data

Age: 31 Height: 6'1" Weight: 185 lbs.
Married - 2 children - Excellent health

References

Personal references will be forwarded upon request.

CHARLES F. GOODSOLE

TRAINING AND EXPERIENCES WITH RADIO-ACTIVITY

Formal Training

Attended the Basic Radiation Protection Course provided by Electronic Automation Systems Inc.

Subjects covered:

1. Basic Math and Physics Review
2. Atomic Structure and Radio-activity
3. Basic Radiation Physics
4. Industrial Uses of Radioisotopes and Associated Hazards
5. Physical Methods of Controlling Radiation Hazards
6. Detection of Leakage from Sealed Sources
7. Routine and Emergency Procedures
8. Survey Instruments
9. Biological Effects of Radiation
10. Licensing and Regulation
11. Shipping Regulations
12. Forms and Labels

Practical experience

As Chief Draftsman for EAC from 1964 to 1967 he became very familiar with the designs of the source housing and shutter mechanism.

As a Systems Engineer from 1967 to 1973, he was responsible for all aspects of quality assurance of the Betameter. As Field Service Manager from 1973 to the present he had to ensure that has field personnel properly handled all situations concerning the radio-active sources and that all incidents were correctly reported.

Radio-active materials worked with:

Krypton 85
Strontium 90
Ruthenium 106
Promethium 147
Cesium 137

HUGH H. LAVERIE

TRAINING AND EXPERIENCE WITH RADIO-ACTIVITY

Formal Training

1964 — Joined Industrial Nucleonics Corp. Columbus Ohio as a Field Service Engineer. At this time he received a 3-day radiological course given by Don Stevens covering the following subjects:

1. Basic Radiation Protection in Industrial Uses.
2. Leakage detection from Sealed Sources
3. Fundamental Physics of Betaguage
4. Health Precautions

In 1969 was appointed Area Service Manager at which time was given a further 5-day course covering Emergency source handling procedures covering both beta and gamma sources.

Practical Experience

As a Field Service Engineer was responsible for installing, providing radiation surveys, source wiping and general maintenance on Industrial Nucleonics Betagauges and Density Gauges.

Sources worked with:

Krypton 85
Strontium 90
Cesium 137
Cobalt 60

1973 — Joined Electronic Automation Systems Inc. as Area Sales Manager.

1975 — Was appointed Regional Sales Manager Eastern U.S.A.

TRAINING AND EXPERIENCE WITH RADIO-ACTIVITY

Formal Training

1965 Joined Industrial Nucleonics Corp. Columbus Ohio as a Field Service Engineer. At this time he received a 3-day radiological course given by Don Stevens covering the following subjects:

1. Basic Radiation Protection in Industrial Uses.
2. Leakage detection from Sealed Sources
3. Fundamental Physics of Betagauge
4. Health Precautions

In 1968 was appointed Area Service Manager at which time was given a further 5-day course covering Emergency source handling procedures covering both beta and gamma sources.

Practical Experience

As a Field Service Engineer was responsible for installing providing radiation surveys, source wiping and general maintenance on Industrial Nucleonics Betagauges and Density Gauges.

Sources worked with:

Krypton 85
Strontium 90
Cesium 137
Cobalt 60

1973 Joined Electronic Automation Systems Inc. as Area Service Manager. At this time took the EAS Radiation Protection Course covering the following subjects:

1. Basic Math and Physics Review
2. Atomic Structure and Radioactivity
3. Basic Radiation Physics
4. Industrial Uses of Radioisotopes and Associates Hazards
5. Physical Methods of Controlling Radiation Hazards
6. Detection of Leakage from Sealed Sources

7. Routine and Emergency Procedures

8. Survey Instruments

9. Biological Effects of Radiation

10. Licensing and Regulation

11. Shipping Regulations

12. Forms and Labels

Duties include supervision of field personnel in all radioactive source areas such as source wiping, radiation surveys and emergency procedures and reporting.

1975 Presently employed by Sentrol Systems Inc. as Area Service Manager.

ADDITIONAL INFORMATION FOR

GENERAL LICENSE

EXISTING EAS EQUIPMENT TO BE SERVICED AS

PER COVERING LETTER

EAS SERIAL #	EAS GAUGE MODEL	SEALED SOURCE MODEL, ISOTOPE AND QUANTITY CONTAINED IN SOURCE			
K6	LAB-501-USRC	USRC LAB-501	Strontium 90	6	mCi
K15	LAB-501-USRC	USRC LAB-501	Ruthenium 106	15	mCi
* K18	LAB-501-USRC	USRC LAB-501	Strontium 90	18	mCi
	3FIL-3M	3M 3FIL	Strontium 90	18	mCi
K20	LAB-501-1-USRC	USRC LAB-501-1	Krypton 85	20	mCi
	LAB-321-2-USRC	USRC LAB-321-2	Krypton 85	20	mCi
	LAB 501	USRC LAB-501	Strontium 90	20	mCi
	3FIL-3M	3M 3FIL	Strontium 90	20	mCi
	3A1Y-3M	3M 3A1Y	Strontium 90	20	mCi
K30	LAB-501-USRC	USRC LAB-501	Ruthenium 106	30	mCi
K40	LAB-321-2-USRC	USRC LAB-321-2	Krypton 85	40	mCi
K50	LAB-501-1-USRC	USRC LAB-501-1	Krypton 85	50	mCi
K75	LAB-746-USRC	USRC LAB-746	Promethium 147	75	mCi
K300	LAB-501-3-USRC	USRC LAB-501-3	Krypton 85	300	mCi
K500	3E4L-3M	3M 3E4L	Krypton 85	500	mCi
	3E4S-3M	3M 3E4S	Krypton 85	500	mCi
K5000	LAB-746-USRC	USRC LAB-746	Promethium 147	5000	mCi
Basis Wt.	Profilograph EA-BC/PR-1	USRC LAB-707	Strontium 90	10	mCi
		USRC LAB-323A	Krypton 85	30	mCi

* Licensee's Series K18 source holder authorized to contain a maximum of three 6 mCi sources.

AMENDMENT #2

Basis Wt. Profilograph	Mark II SS	3M 3FIL	Strontium 90	20	mCi
		3M 3E4S	Krypton 85	500	mCi
		USRC LAB-323A	Krypton 85	500	mCi

AMENDMENT #3

K500	40057-AAC	AAC 40057	Krypton 85	500	mCi

AMENDMENT #5

K20	40092A/3-AAC	AAC 40092A/3	Krypton 85	20	mCi
K40	40092A/12-AAC	AAC 40092A/12	Krypton 85	40	mCi
K500	40092A/3-AAC	AAC 40092A/3	Krypton 85	500	mCi
K500	40092A/12-AAC	AAC 40092A/12	Krypton 85	500	mCi
Basis Weight	Profilograph EA-BC/PR-1	AAC 40092A/3	Krypton 85	500	mCi

AMENDMENT #8

K500	40057-AAC	AAC 40057B	Krypton 85	500	mCi

APPENDIX C

TRAINING MANUAL

EA 7000 Process Control System