

BABCOCK

DISPLAY PRODUCTS, INC.

June 23, 1987

U.S. Nuclear Regulatory Commission
Material Licensing Branch
Division of Fuel Cycle and Material Safety
Washington, DC 20555

Subject: NRC Material License No. 04-23504-01E
(Docket No. 030-22279)

Gentlemen:

The subject license No. 04-23504-01 was issued to Babcock Display Products, Inc., 1051 South East Street, Anaheim, California 92805.

An amendment to the subject license is requested to reflect changes in personnel and contractual services. The changes are as follows:

- 1) Designation of Elias J. Lara as the Radiation Safety Officer (Statement of Training and Experience Attachment 2).
- 2) Change of Calibration of Instruments by a service company to Calibration by applicant. Attachment 7-A details methods, frequency, and standards used.
- 3) Change to contractual services for technical support for the radiation safety program, from Beckman Instruments, Inc. to a private consultant, Paula Barton, Occupational Health and Safety Consultant.

Submitted is an application for an amendment and a check of \$60.00 for the license fee. We would appreciate a review of this application with a favorable ruling.

Should you have further questions concerning this application, you may contact Mr. Elias Lara at (714)491-5196.

Respectfully,

BABCOCK DISPLAY PRODUCTS, INC.

W. Brady
Walter Brady
General Manager

Log	Jul-1-1987
Permit	
Check No.	6943
Amount	\$60
Fee	31
Tax	And
Date	7/18/87
By	7/18/87
WB/rfw	

Check # 6943
Attachments - 2 Sets

30-22279

520251

Radiologic Health Branch
744 P Street
Sacramento, California 95814

STATEMENT OF TRAINING AND EXPERIENCE

(Use additional sheets as necessary)

Instruction: Every individual proposing to use radioactive material is required to submit a Statement of Training and Experience in duplicate to the address given above. Physicians should request Form RH 2000 A when applying for human use authorizations.

1. Name of proposed user: Dan R. Boyd Position title: President
Babcock Display
Address: 1051 S. East Street City: Anaheim Products, Inc.
Zip: 92805
To be included on Lic. No. 4388-30 in name of Babcock Display Products, Inc.
2. Description of proposed use

3. Training:

- a. High School Graduate: Yes X No _____ Purdue University Indiana University
b. College or University: Name and location West Lafayette, Ind. Indianapolis, Ind.
AA Ind. Eng.
Years completed 6 Degree LLB Course of study Industrial Engineering/Law
c. Education specifically applicable to use of radioactive material

Radiation Safety Training will be provided by February 28, 1985.

4. Experience:

- a. List experience with radioactivity beginning with most recent
(1) Dates: From Oct. 2, 1984 to Present
Title and duties: President. Oversees all phases of production, quality control,
engineering, sales, marketing and finance.
Employer: Babcock Display Products, Inc Address: 1051 S. East St., Anaheim, CA 92805
(2) Dates: From _____ to _____
Title and duties: _____

Employer: _____ Address: _____
(3) Dates: From _____ to _____
Title and duties: _____

Employer: _____ Address: _____

- b. Radioactive materials previously used. Cite typical radioisotopes in appropriate box and key to Part 4.a above:

	Quantities Handled			
	Microcuries	Millicuries	Curies	Kilocuries
Sealed sources	Displays containing 30 UCI Kr-85			
Unsealed alpha emitters				
Unsealed beta-gamma emitters				
Neutron sources				

- c. Describe procedures similar to those proposed in Part 2 with which you have had experience. Indicate months or years for each and key to Part 4.a above.

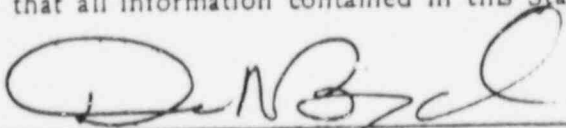
10/2/84 to present: as noted under duties in paragraph 4 (a) (1).

- d. Indicate which types of facilities you have used and key to Part 4.a.

- () Ordinary Chemical laboratories None
 () "Controlled Area" (Type B) laboratories
 () Glove boxes
 () Shielded glove boxes
 () Caves with remote manipulators
 () Field operations with portable equipment

5. Certificate:

I hereby certify that all information contained in this Statement is true and correct.



 Signature of proposed user

2/13/85

 Date

744 P Street

Sacramento, California 95814

19001 2.2 115

(Use additional sheets as necessary)

style. *Waters*

- 1994-1995

- ИЗДАТЕЛЬСТВО

Distance between the two points is 1000 units.

- 1950

- 1997

Ordinary Time (1)

- © 1994 by John Wiley & Sons, Inc.

- 1991, 1992, 1993

141142

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3. East Street

fied processes

Harbor Blvd.,

1947-1948

b. ⁸⁵ Radioactive materials previously used. Cite typical radioisotopes in appropriate box and key to Part 4.a above:

Quantities Handled

	Microcuries	Millicuries	Curies	Kilocuries
Sealed sources	Displays containing 30 uCi	KR-85		
Unsealed alpha emitters				
Unsealed beta-gamma emitters		KR-85 Gas 3 mCi/l		
Neutron sources				

c. Describe procedures similar to those proposed in Part 2 with which you have had experience. Indicate months or years for each and key to Part 4.a above.

July 1970 to 1972: As a supply officer and 1st Lt., USNR, on board USS PLUCK (MSO-464), I was responsible for the following:

- 1) Controlled Substances (Medicinal)
- 2) Ammunition and Firearms
- 3) Classified Material

d. Indicate which types of facilities you have used and key to Part 4.a.

- () Ordinary Chemical laboratories
- (x) "Controlled Area" (Type B) laboratories
- () Glove boxes
- () Shielded glove boxes
- (x) Caves with remote manipulators
- () Field operations with portable equipment

5. Certificate:

I hereby certify that all information contained in this Statement is true and correct.

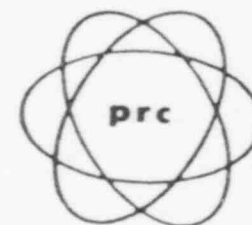
Eliot J. Lan
Signature of proposed user:

9-25-86
Date



Pacific Radiation Corporation

Certificate



Awarded to:

Elias Lara

For: **Successful completion**
of a 40 hour course,
RADIATION PROTECTION TECHNOLOGY

Rd Solchick

Instructor

this 27th day of March 1987



NRC Form 313 I (12-81) 10 CFR 30		U.S. NUCLEAR REGULATORY COMMISSION	
APPLICATION FOR BYPRODUCT MATERIAL LICENSE INDUSTRIAL		1. APPLICATION FOR: <i>(Check and/or complete as appropriate)</i>	
<i>See attached instructions for details.</i> Completed applications are filed in duplicate with the Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety, and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555 or applications may be filed in person at the Commission's office at 1717 H Street, NW, Washington, D. C. or 7915 Eastern Avenue, Silver Spring, Maryland.		<input type="checkbox"/> a. NEW LICENSE	
		<input checked="" type="checkbox"/> b. AMENDMENT TO: LICENSE NUMBER	
		<input type="checkbox"/> c. RENEWAL OF: LICENSE NUMBER	
2. APPLICANT'S NAME <i>(Institution, firm, person, etc.)</i> BABCOCK DISPLAY PRODUCTS, INC. TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION (714) 491-5121		3. NAME AND TITLE OF PERSON TO BE CONTACTED REGARDING THIS APPLICATION Elias J. Lara TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION (714) 491-5196	
4. APPLICANT'S MAILING ADDRESS <i>(Include Zip Code)</i> <i>(Address to which NRC correspondence, notices, bulletins, etc., should be sent.)</i> 1051 S. East Street Anaheim, CA 92805		5. STREET ADDRESS WHERE LICENSED MATERIAL WILL BE USED <i>(Include Zip Code)</i> 1051 S. East Street Anaheim, CA 91805	
(IF MORE SPACE IS NEEDED FOR ANY ITEM, USE ADDITIONAL PROPERLY KEYED PAGES.)			
6. INDIVIDUAL(S) WHO WILL USE OR DIRECTLY SUPERVISE THE USE OF LICENSED MATERIAL <i>(See Items 16 and 17 for required training and experience of each individual named below)</i>			
FULL NAME		TITLE	
a. Dan R. Boyd		President, Babcock Display Products, Inc.	
b.			
c.			
7. RADIATION PROTECTION OFFICER Elias Lara (R.S.O.) Dan McNaughton (Asst. R.S.O.)		Attach a resume of person's training and experience as outlined in Items 16 and 17 and describe his responsibilities under Item 15. See new Attachments 2,3	
8. LICENSED MATERIAL			
LINE NO.	ELEMENT AND MASS NUMBER A	CHEMICAL AND/OR PHYSICAL FORM B	NAME OF MANUFACTURER AND MODEL NUMBER <i>(If Sealed Source)</i> C
			MAXIMUM NUMBER OF MILLICURIES AND/OR SEALED SOURCES AND MAXIMUM ACTI- VITY PER SOURCE WHICH WILL BE POSSESSED AT ANY ONE TIME D
(1)	Krypton - 85	Gas	N.A.
(2)			30 microcuries per
(3)			display. Possession and
(4)			use authorization as per
			California Specific License
DESCRIBE USE OF LICENSED MATERIAL E			
(1)	By-product material to be used for the commercial distribution of cold cathode		
(2)	discharge devices as described in 10CFR30, 3Q.15 and Attachment #4. The commercial		
(3)	distribution is pursuant to the regulations as published in 10CFR32, 32.14, 32.15 &		
(4)	32.16. See existing license Attachments 4,5 &6 for compliance to referenced		
(4)	sections.		

9. STORAGE OF SEALED SOURCES

LINE NO.	CONTAINER AND/OR DEVICE IN WHICH EACH SEALED SOURCE WILL BE STORED OR USED. A.	NAME OF MANUFACTURER B.	MODEL NUMBER C.
(1)	N.A.		
(2)			
(3)			
(4)			

10. RADIATION DETECTION INSTRUMENTS

LINE NO.	TYPE OF INSTRUMENT A	MANUFACTURER'S NAME B	MODEL NUMBER C	NUMBER AVAILABLE D	RADIATION DETECTED (alpha, beta, gamma, neutron) E	SENSITIVITY RANGE (milliroentgens/hour or counts/minute) F
(1)	See existing license Attachment 7					
(2)						
(3)						
(4)						

11. CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10

☐ a. CALIBRATED BY SERVICE COMPANY

NAME, ADDRESS, AND FREQUENCY

☒ b. CALIBRATED BY APPLICANT

Attach a separate sheet describing method, frequency and standards used for calibrating instruments.

See new Attachment 7A

12. PERSONNEL MONITORING DEVICES

TYPE (Check and/or complete as appropriate.) A	SUPPLIER (Service Company) B	EXCHANGE FREQUENCY C
<input checked="" type="checkbox"/> (1) FILM BADGE <input type="checkbox"/> (2) THERMOLUMINESCENCE DOSIMETER (TLD) <input type="checkbox"/> (3) OTHER (Specify): _____ _____ _____	R.S. Landauer Jr. & Co.	<input type="checkbox"/> MONTHLY <input type="checkbox"/> QUARTERLY <input type="checkbox"/> OTHER (Specify): _____ _____ _____

13. FACILITIES AND EQUIPMENT (Check where appropriate and attach annotated sketch(es) and description(s).)

- ☒ a. LABORATORY FACILITIES, PLANT FACILITIES, FUME HOODS (Include filtration, if any), ETC. See existing license
☐ b. STORAGE FACILITIES, CONTAINERS, SPECIAL SHIELDING (fixed and/or temporary), ETC. Attachment 8
☐ c. REMOTE HANDLING TOOLS OR EQUIPMENT, ETC.
☐ d. RESPIRATORY PROTECTIVE EQUIPMENT, ETC.

14. WASTE DISPOSAL

a. NAME OF COMMERCIAL WASTE DISPOSAL SERVICE EMPLOYED

b. IF COMMERCIAL WASTE DISPOSAL SERVICE IS NOT EMPLOYED, SUBMIT A DETAILED DESCRIPTION OF METHODS WHICH WILL BE USED FOR DISPOSING OF RADIOACTIVE WASTES AND ESTIMATES OF THE TYPE AND AMOUNT OF ACTIVITY INVOLVED. IF THE APPLICATION IS FOR SEALED SOURCES AND DEVICES AND THEY WILL BE RETURNED TO THE MANUFACTURER, SO STATE.

Kr-85 waste gas will be dispersed into the atmosphere as authorized by our California License.

INFORMATION REQUIRED FOR ITEMS 15, 16 AND 17

Describe in detail the information required for Items 15, 16 and 17. Begin each item on a separate page and key to the application as follows:

15. **RADIATION PROTECTION PROGRAM.** Describe the radiation protection program as appropriate for the material to be used including the duties and responsibilities of the Radiation Protection Officer, control measures, bioassay procedures (*if needed*), day-to-day general safety instruction to be followed, etc. If the application is for sealed source's also submit leak testing procedures, or if leak testing will be performed using a leak test kit, specify manufacturer and model number of the leak test kit.
See new Attachment 9.
16. **FORMAL TRAINING IN RADIATION SAFETY.** Attach a resume for each individual named in Items 6 and 7. Describe individual's formal training in the following areas where applicable. Include the name of person or institution providing the training, duration of training, when training was received, etc. See new Attachments 1, 2 & 3. Reference existing license Attachment 11
 - a. Principles and practices of radiation protection.
 - b. Radioactivity measurement standardization and monitoring techniques and instruments.
 - c. Mathematics and calculations basic to the use and measurement of radioactivity.
 - d. Biological effects of radiation.
17. **EXPERIENCE.** Attach a resume for each individual named in Items 6 and 7. Describe individual's work experience with radiation, including where experience was obtained. Work experience or on-the-job training should be commensurate with the proposed use. Include list of radioisotopes and maximum activity of each used. See new Attachments 1, 2, 3 and existing license Attachment 11.

18. CERTIFICATE

(This item must be completed by applicant)

The applicant and any official executing this certificate on behalf of the applicant named in Item 2, certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Part 30, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.

WARNING.—18 U.S.C., Section 1001; Act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

a. LICENSE FEE REQUIRED
(See Section 170.31, 10 CFR 170)

b. CERTIFYING OFFICIAL (Signature)

c. NAME (Type or print)

(1) LICENSE FEE CATEGORY: 3-I

d. TITLE

(2) LICENSE FEE ENCLOSED: \$ 60.00

e. DATE

Radiologic Health Branch
744 P Street
Sacramento, California 95814

STATEMENT OF TRAINING AND EXPERIENCE

(Use additional sheets as necessary)

Instruction: Every individual proposing to use radioactive material is required to submit a Statement of Training and Experience in duplicate to the address given above. Physicians should request Form RH 2000 A when applying for human use authorizations.

1. Name of proposed user: Daniel W. McNaughton Position title: Quality Engineer
Address: 1051 So. East Street City: Anaheim Zip: 92805
To be included on Lic. No. 4388-30 in name of Babcock Display Products, Inc.

2. Description of proposed use

Use Krypton 85 gas for research and development and for manufacturing planar gas discharge displays.

3. Training:

- a. High School Graduate: Yes x No
- b. College or University: Name and location Mesa Community College, Arizona State University
Year: completed 2 Degree Course of study Quality Engineering
- c. Education specifically applicable to use of radioactive material
Radiation Safety, one day course, Arizona State University, 1981
X-Ray Technology for Non Destructive Testing, MCC, 1980
Annual Radiation Safety courses during employment by Beckman Instruments, Inc.
Topics covered: Basics of atomic physics, radiation units and interaction;
biological effects of radiation; radiation instrumentation; procurement and
inventory control; film badge; Kr-85 handling and emergency procedures.
Radiation and Safety Training Course, February 5, 6, 1985 given by Beckman HRS office

4. Experience: David Han instructor.

- a. List experience with radioactivity beginning with most recent

(1) Dates: From March 1984 to Present

Title and duties: Quality Engineer Receiving inspection of radioactive
gas. Inprocess inspection, area radiation audits, radiation qualification,
calibration of radiation measuring instruments. Acting Assistant RSO

Employer: Beckman Industrial Corporation Address: 2500 Harbor Blvd., Fullerton, CA 92634

(2) Dates: From 1976 to Feb. 1984

Title and duties: Quality Engineer Receiving inspection of radioactive gas.
Inprocess inspection, area radiation audits, radiation qualification, calibration of
radiation measuring instruments.

Employer: Beckman Instruments, Inc. Address: 2500 Harbor Blvd., Fullerton, CA 92634

(3) Dates: From to

Title and duties:

Employer: Address:

- b. Radioactive materials previously used. Cite typical radioisotopes in appropriate box and key to Part 4.a above:

	Quantities Handled			
	Microcuries	Millicuries	Curies	Kilocuries
Sealed sources	Kr-85-NES.STD 15.4 uCi			
Unsealed alpha emitters	Displays 30 uCi			
Unsealed beta-gamma emitters		Kr-85 gas - 3 mCi/l	Kr-85 cylinders 3 Ci/1000l	
Neutron sources				

- c. Describe procedures similar to those proposed in Part 2 with which you have had experience. Indicate months or years for each and key to Part 4.a above.

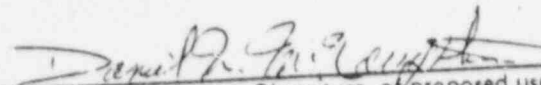
1976 - present: As Quality Engineer have performed: receiving inspection of Kr-85 gas cylinders; inprocess inspection of filled displays and gas; area radiation monitoring surveys; licensing qualifications of filled displays; calibration of radiation monitoring instruments.

- d. Indicate which types of facilities you have used and key to Part 4.a.

- (x) Ordinary Chemical laboratories
- (x) "Controlled Area" (Type B) laboratories
- () Glove boxes
- () Shielded glove boxes
- () Caves with remote manipulators
- (x) Field operations with portable equipment

5. Certificate:

I hereby certify that all information contained in this Statement is true and correct.


Signature of proposed user

February 12, 1985
Date

BECKMAN

BECKMAN INSTRUMENTS, INC.

CERTIFICATE OF ACHIEVEMENT

This is to certify that

DAN McNAUGHTON

has completed a course in

FACILITY RADIATION SAFETY OFFICER
TRAINING



February 6, 1985

Dated

David Han

David Han
Corporate Radiation
Safety Officer

J. Palmerino

Joseph J. Palmerino, Manager
Environmental Health &
Radiation Safety Office

ATTACHMENT 6

INSTRUMENT CALIBRATION

A. GENERAL

Instruments used in conjunction with the radioactive material described in this application will be calibrated according to the manufacturer's recommendation or as specifically stated below.

B. RADIATION PROTECTION INSTRUMENTS

1. Radiation monitoring and survey instruments (portable geiger counters and area monitors) will be calibrated by a California State approved Calibration service using calibration sources with calibration traceable to NBS. Each instrument will be calibrated at two positions on each range.

- a. Calibration will be performed semiannually.

- b. Instruments will be calibrated to $\pm 10\%$.

2. Radioactive material concentration monitors (flow through ion chamber) will be calibrated by Babcock Display Products, Inc.'s Quality Assurance Department using Tritium and/or Krypton 85 with calibration traceable to NBS. Each range will be calibrated (see Section D below).

- a. Calibration will be quarterly.

- b. Instruments will be calibrated to $\pm 20\%$.

C. RELATED EQUIPMENT

The Quality Assurance Department will calibrate in accordance with acceptable methods all equipment which is directly related to personnel protection at intervals recommended by the manufacturer, as dictated by its use, or as required by the Radiation Safety Officer.

D. KR-85 AIR MONITOR FLOW THROUGH ION CHAMBERS

1. Purpose - to calibrate continuous air monitors for Kr-85

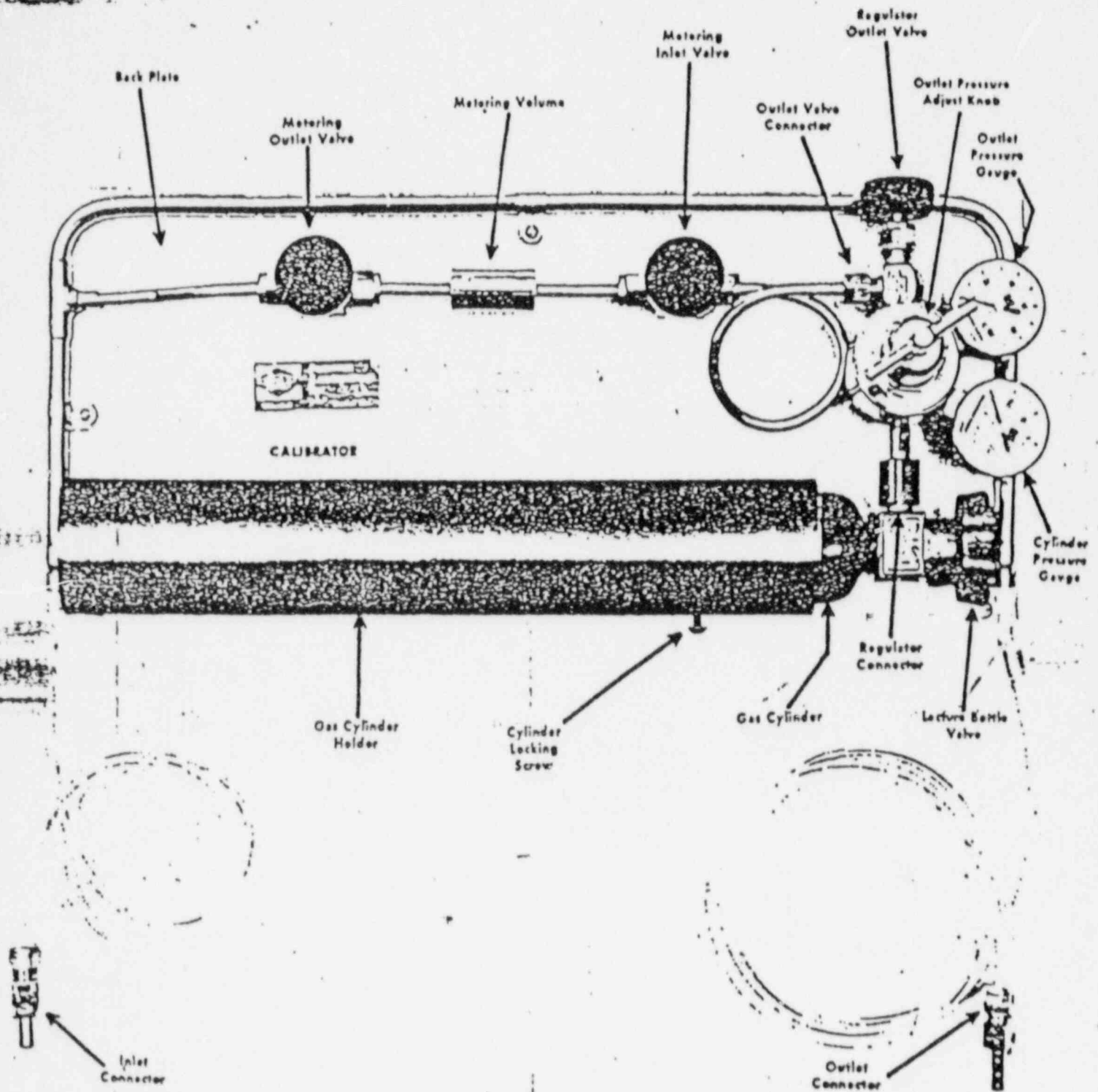
2. Method - Closed loop calibration - circulate a known volume of tritium gas which has been calibrated to NBS standards, through the known volume of the closed system. This will provide a known concentration for calibration of the flow through ionization air monitors to tritium. To obtain Kr-85 readings, apply the manufacturer's conversion factor of 0.125. (This factor was calculated, then verified experimentally by Johnston Laboratories.)
3. Equipment and Standards
 - a. Johnston Laboratories, Inc. Calibrator, Model CL-1 see Figure A.
 - b. Tritiated methane of known specific activity traceable to NBS std.
 - c. Standard volume and instrument for calibration and calibrator volume - see Figure B.
4. Procedure
 - a. Calibration of tritium gas - is done by the manufacturer with traceability to NBS standards.
 - b. Calibration of the air monitor -
 - (1) Using the standard volume of the Tritium Calibrator, CL-1, a known quantity of tritiated methane will be valved into the closed system.
 - (2) After waiting sufficient time for a stable reading which indicates the gas has mixed in the recirculating system, note the reading and then calculate the correction factor.
 - (3) Repeat second time. If identical, proceed with the next step.
 - (4) Repeat with the various ranges as required to complete calibration. (Repeat each range twice.)
 - (5) Scales that are not feasible to be calibrated with Kr-85 gas or tritium gas because of the activity involved will be

ATTACHMENT 6

checked for correct indication on the gamma scale with a Cs-137 sealed source traceable to NBS. (This procedure was recommended by Johnston Laboratories.)

- c. Alternate Calibration Method - a method of calibration which is equivalent in accuracy may be used in lieu of the above procedure..

Figure A ATTACHMENT 6



CALIBRATOR

MODEL CL-1

JOHNSTON LABORATORIES, INC.

Figure B ATTACHMENT 6

EQUIPMENT SETUP

