National Semiconductor

333 WESTERN AVENUE
SOUTH PORTLAND, ME 04106

Tel – 207-775-8100

U.S. Nuclear Regulatory Commission
Region 1
Nuclear Materials Safety & Safeguard Branch
631 Park Ave.
King of Prussia, PA 19406
Attn: Mr James Joyner

Log	Jan 9
Remitter	
Check No.	1072
Amount	$ 60 See 1100
Fee Category	3P
Type of Fee	AMD
Date Check Rec'd.	1/26/89
Date Completed	1/26/89
By:	

94 also

Dear Mr Joyner:

This letter is a formal request to change the corporation and RSO's name on license numbers 18-13451-02 and 18-13451-03.

Fairchild Semiconductor Corporation was purchased by National Semiconductor Corporation in 1987. Fairchild Semiconductor Corporation no longer exists as a business entity. Any part of the licenses that refer to Fairchild Semiconductor Corporation should be changed to National Semiconductor Corporation. National Semiconductor shall obey the Fairchild licensing agreements. The address (333 Western Avenue, South Portland, ME 04106) remains unchanged.

Also, change the RSO's name on above mentioned licenses from Richard A. Dyer to John W. Gerback Jr.. Richard Dyer has left the corporation. On license number 18-13451-03, please list Mike Maher and John Gerback as "co RSOs". Their qualifications are listed below.

John has been employed at National Semiconductor for three years (starting at the Danbury (Ct) facility and then at South Portland) as a Safety Engineer/Industrial Hygienist. He graduated from the University of New Haven with a B.S. in Occupational Safety and Health, including course work in Radiation Safety. He attended New York Medical College, completing 30 out of 45 for a Master of Public Health Degree concentrating in Occupational Health. In May, John will attend a forty hour Radiation Safety Officer Class at the University of Texas. The enrollment receipt is attached.

Mike Maher graduated from City College of New York with a B.S.E.E. Since 1980, he has specialized in Semiconductor Radiation Hardness Programs. He has been employed at General Electric and Westinghouse Electric Corp. He was responsible for obtaining and operating (on a daily basis) the Gamma Cell since 1987. Training on the Gamma Cell including 16 hours, on August 19/20 1987 by AECL trainer Paul Clarke. No certificate was given. Training included Operation, Emergency Procedures, General Safety and Radiation Safety. In addition to this training, he recieved training on radiation safety from the site RSO (included). Enclosed is a copy of the Certificate of Acceptance, which he signed.

The necessary licensing fees are included with this letter.

I believe this material with enclosures satisfies our comittment of January 11, 1987. I expect a one day turnaround on your part as you indicated was doable. Our Gamma Cell remains shut down thus stopping milatary product shipments pending your action. We will call you Monday the 16th to confirm.

Thanking you in advance for your cooperation.

Sincerely,

Todd Smith
H.R. Manager

41685

RECEIPT / ENROLLMENT

Title: Radiation Safety Officers Course

Date: May 15-19, 1989

Location: Library Entrance To Lecture Hall
7:30 - 7:55 a.m.

Activity Codes:

[redacted]

The University of Texas
Health Science Center at San Antonio
Medical School
Continuing Education Services
7703 Floyd Curl Drive
San Antonio, Texas 78284-7980

THE UNIVERSITY OF TEXAS · PRAESIDIUM · DISCIPLINA · CIVITATIS · HEALTH SCIENCE CENTER AT SAN ANTONIO

043-66-7626 — SOCIAL SECURITY NUMBER

ENG-SAFETY DEPT — SPECIALTY

Name: JOHN GERBACK

Address: 333 WESTERN AVE/SLOT 0104

City, State & Zip: SOUTH PORTLAND, ME 04106

PAID BY: Paid by NATIONAL SEMICONDUCTOR

Check Amt: $750.00 Check Number: 20311515 Check Date: 11/23/88 Acct. #: STOBO000079

Ciro V. Sumaya
CIRO V. SUMAYA, M.D.
ASSOCIATE DEAN
CONTINUING MEDICAL EDUCATION

John's
Committment
to RSC Class

CERTIFICATE OF ACCEPTANCE

This certificate is authorized by ATOMIC ENERGY OF CANADA LIMITED, RADIOCHEMICAL COMPANY, and shall be deemed as the official record of acceptance and acquisition of the equipment described herein.

MODEL GC-220 SERIAL No. 225 ACCEPTANCE DATE Aug 19/87

I, MICHAEL CHRISTOPHER MAHER (full name)
being a duly appointed representative of,

Organization name Fairchild Semiconductor Corp.

Organization address 333 Western Avenue

South Portland, Maine U.S.A. 04106

hereinafter referred to as the 'customer', do hereby receive and accept the commissioned equipment supplied and installed by

ATOMIC ENERGY OF CANADA LIMITED (AECL).
(or authorized representative)

The equipment is as described and agreed to in one or more of the following:

AECL Approved Specification No. 86-IPQ-246 Dated Aug 19/87

Representative/Customer Order No. DC 83685 Dated Aug 19/87

AECL Order No. 57210 A Dated 1987 June 30

Having accepted the said equipment as completed and operational, and in accordance with the approved specifications provided for the equipment, I do hereby acknowledge receipt of the operating key(s) for the equipment from the AECL representative.
I acknowledge that the AECL Warranty begins on the above noted acceptance date.
Any outstanding items will be specified on the reverse side of this document. Satisfactory arrangements have been made with the AECL representative for the completion of said items by the dates indicated.

Signed Michael C. Maher
Title Staff Engineer
Customer Fairchild Semiconductor Corp.
Date Aug. 19, 1987

AECL/Auth. Rep.
Signed P. Clark
Company AECL-RCC
Date Aug 19 87

Atomic Energy
of Canada Limited
Radiochemical Company

QA-016-1

Maher Internal Training

FAIRCHILD
A Schlumberger Company

SAFETY MEETING ATTENDANCE SHEET

MEETING TOPIC: Radiation Safety Training

DATE: 8/21 TIME: 3 - 4 PM LENGTH OF M[illegible]

MEETING LEADER: RIP DYER

Commercial 220

PERSONNEL IN ATTENDANCE

	EMPLOYEE NAME (PRINT)	BADGE NO.	ORGN. NO.	SIGNATURE
1.	JOHN JANNEY 10-50	84196	66-95	[signature]
2.	Bob Wright 01-09	40353	6670	[signature]
3.	MIKE MAHER 10-50	184173	66-96	[signature]
4.	SHARON WILBE 01-09	82760	6636	[signature]
5.	KEVIN LALIBERTY 01-09	83921	6636	[signature]
6.	Owen Gallagher	80477	6676	[signature]
7.	Bob Humphreys 10-50	45929	66-95	[signature]
8.	Kevin O'Connor 10-50	83844	66-96	[signature]
9.	DAVE WATSON 10-03	43082	66-59	[signature]
10.				
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SUBJECT:

COMMENTS:

Course taught at National Semiconductor

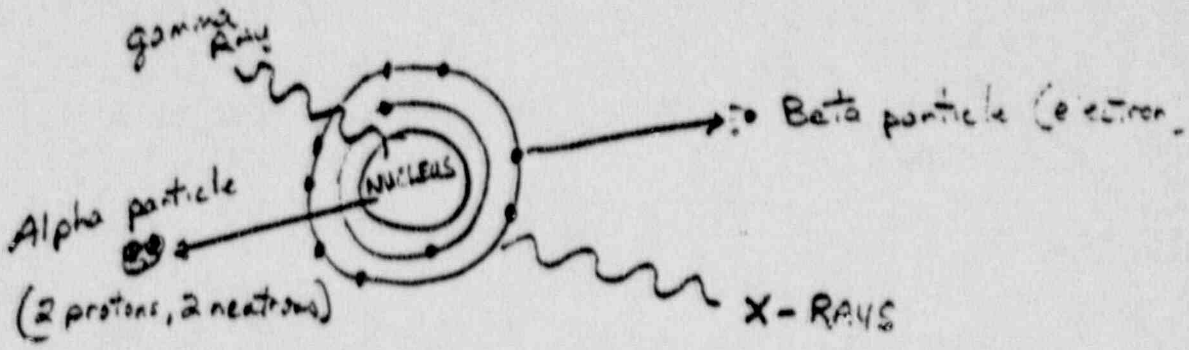
RADIATION SAFETY OUTLINE

I. Fundamentals of Radiation

A. What is Radiation?

Emission of energy from the atom either in the form of electromagnetic energy (x-rays, gamma rays) or sub-atomic particles (alpha, beta).

Radioactive decay of an atom:



B. What is the Penetrating Ability of Radiation?

Order in increasing penetrating ability:

Radiation	Penetrating Ability	Example at Fairchild
Alpha	Thin piece of paper	
Beta	10 ft. of air, few mm of Al	Krypton-85
X-rays	Few inches of lead or concrete	Ion-Implanter
Gamma	Thick concrete	Cobalt-60, Cesium-137

C. Shielding

HVL -- half value layer -- necessary shielding to reduce to half the original radiation value.

TVL -- reduce to 1/10 original value.

Radioactive Atom \ Material	Lead (mm)		Concrete (in)	
	HVL	TVL	HVL	TVL
Cobalt-60	12	40	2.45	8.1

D. Units of Radiation

Curie -- Amount of radioactive material in which 37 billion atoms will disintegrate each second. 3×10^{10} atoms disintegrate each second.

Half-life -- Time taken for the amount of radioactive material to be reduced to half its initial value.

Substance	Half-life
Cobalt-60	5.24 years
Krypton-85	10.7 years
Carbon-14	5760 years

Rad -- Radiation absorb dosage.

Roentgen -- Measure of ionization produced by X or gamma rays in a specified volume of air.

Rem -- Roentgen equivalent in man-measure of relative biologic dose or dose equivalent -- this is necessary due to the different degrees of effect from different radiation sources. Measurements are related to a common unit.

E. Maximum Acceptable Occupational Radiation Doses

Systems	Rems/year	mrem/year
Whole body	5	5,000
Hands, forearms, feet, ankles	75	75,000

F. Background Radiation

	mrem/yr.
Average natural background per year from cosmic rays, soils and rocks	70 to 150
Chest X-ray	27
Stomach X-ray	500
G.I. Tract X-ray	22,000
Max -- occup. exposure	5,000
Living in a brick house	15
Living with someone that uses a plutonium pacemaker	7.5
A 6,000 mile jet plane trip	4
Radioactive fallout	0-10

Other interesting facts:

If you live in Denver, Colorado you will average 3X the radiation exposure than sea level dwellers.
If you live in India or Brazil you will be exposed to 200 to 800 mrems a year from the soil.
On February 23, 1956 radiation levels at 35,000 ft. were at 100 mrems/hr. due to giant solar flares.

G. **Biological Effects of Radiation**

Primary harmful consequences of radiation are due to the energy absorbed by the cells and tissues. This absorbed energy produces chemical decomposition of the molecules present in living cells. Mechanism is ionization and excitation of the atoms in human tissue.

H. Controlling and Limiting Radiation Dose

Key words: Time, Distance & Shielding

1) Time -- Time spent in a radiation field. Double the time, doubles the dose received. Spend 1/2 the time and you reduce the dose by 1/2.

2) Distance -- Inverse square law for reduction of radiation applies for gamma, x-rays and neutron radiation.

$$\frac{I_1}{I_2} = \frac{(R_2)^2}{(R_1)^2}$$

I_1 Radiation Intensity at distance R_1
I_2 Radiation Intensity at distance R_2

Example:

3 ft. away you read 5 mrems/hr. -- what would you read at 6 ft. away?

$$\frac{5}{X} = \frac{(6)^2}{(3)^2}$$

Therefore doubling the distance reduces the exposure by 1/4.

$$\frac{5}{X} = \frac{36}{9}$$

$$36X = 45$$
$$X = 1.25 \text{ mrems}$$

3) Shielding -- Most important method. Must understand how material attenuate in absorbing materials. Energy is lost by three methods:

a) photoelectric
b) compton effects
c) pair production

TABLE 3.5

SUMMARY OF EFFECT RESULTING FROM ACUTE WHOLE BODY EXTERNAL EXPOSURE OF RADIATION TO MAN

DOSE LEVELS	Effects
0-25 rem	No detectable clinical effects Delayed effects may occur.
25-100 rem	Slight transient reductions in lymphocytes and neutrophils. Disabling sickness not common, exposed individuals should be able to proceed with usual duties. Delayed effects possible, but serious effects on average individual very improbable.
100-200 rem	Nausea and fatigue, with possible vomiting above 125 rem. Reduction in lymphocytes and neutrophils with delayed recovery. Delayed effects may shorten life expectance in the order of one percent.
200-300 rem	Nausea and vomiting on first day. Latent period up to two weeks or perhaps longer. Following latent period symptoms appear but are not severe: loss of appetite, and general malaise, sore throat, pallor, diarrhea, moderate emaciation. Recovery likely in about 3 months unless complicated by poor previous health, superimposed injuries or infections.

TABLE 3.5 SUMMARY OF EFFECTS RESULTING FROM ACUTE WHOLE BODY EXTERNAL EXPOSURE OF RADIATION TO MAN (Continued)

Dose Levels	Effects
300-600 rem	Nausea, vomiting and diarrhea in first few hours. Latent period with no definite symptoms, perhaps as long as one week. Hair loss, loss of appetite, general malaise, and fever during second week, followed by hemorrhage, purpura, inflammation of mouth and throat, diarrhea, and emaciation in third week. Some deaths in 2 to 6 weeks. Possible eventual death to 50% of the exposed individuals for about 450 rem with no medical treatment.
600-1000 rem	Nausea, vomiting and diarrhea in first few hours. Short latent period with no definite symptoms in some cases during first week. Diarrhea, hemorrhage, purpura, inflammation of mouth and throat, fever toward end of first week. Rapid emaciation and death as early as the second week with possible eventual death of up to 100% of exposed individual with no medical treatment.
Over 1000 rem	Death, even with treatment, results from destruction of the lining of the small intestine.

II. Radiation Monitoring Instrumentation

A. Survey Instruments

1. Ionization chambers
2. Geiger-Mueller Instrument
3. Proportional Survey Inst.
4. Scintillation Survey Inst.

B. Personnel Instruments (Dosimeters)

1. Film Badges
2. Pocket Dosimeter
3. TLD Devices Thermoluminescent Dosimeters

III. **Emergency Response**

A. Obtain a GM counter outside the area at either Gammacell or Tracer-flo.

B. Check the calibration date and battery function test.

C. Check for the radiation level on the outside room walls. Do not enter the room unless all reading levels on the outside wall is below 2 mrems/hr.

D. If the outside walls readings are below 2 mrems per hour enter the room. Take another reading on entry if levels are below 2 mrems on entry proceed to check equipment for problems if readings are between 2 and 10 mrems/hr. on entry make a quick check of problem. If levels exceed 10 mrems/hr. upon entry evacuate area.

E. If any of these problems exist:

1. Above 2 mrems/hr. outside of the room

2. Above 10 mrems/hr. just inside the room

you must evacuate the room and quickly determine the extent of a safe zone less than .5 mrems/hr. All rooms adjacent to the radiation area must be checked. If any spot in any room is above .5 mrems/hr. the room must be closed and locked. Security will assist in cording areas off for all employees and visitors. After a thorough building check cord off the roof and outside areas within this .5 mrems/hr. reading.

F. Have security contact the RSO, Radiation Hardness Engineer, AECL and Publicover Security immediately for response and support.

Course Materials used at National

FUNDAMENTALS OF IONIZING RADIATION

Ionizing radiation can be a complex subject. At the risk of over-simplifying some basic physical principles and ignoring others, the purpose of this handout is to present you with enough information so that you realize the problems involved and know when to call upon your supervisor or radiation safety officer for assistance.

Throughout history, man has been exposed to radiation, first by naturally occurring radiation, later by man-made radiation. You may be exposed to radiation from the sun and outer space, radioactive materials are present in the earth, in the food you eat and in the houses you live in. This naturally occurring radiation produces what is called "background" radiation. Background radiation varies, depending on where you live and at what elevation you live.

In addition to natural radiation, humans have been exposing themselves to man-made radiation since the mid 1800's. Human use and abuse of radiation officially dates back to December 1895 when Wilhelm Conrad Roentgen announced the discovery of X-rays. Within a decade it became apparent that this type of radiation could be either beneficial or harmful depending on its use and control, and that protection measures were necessary.

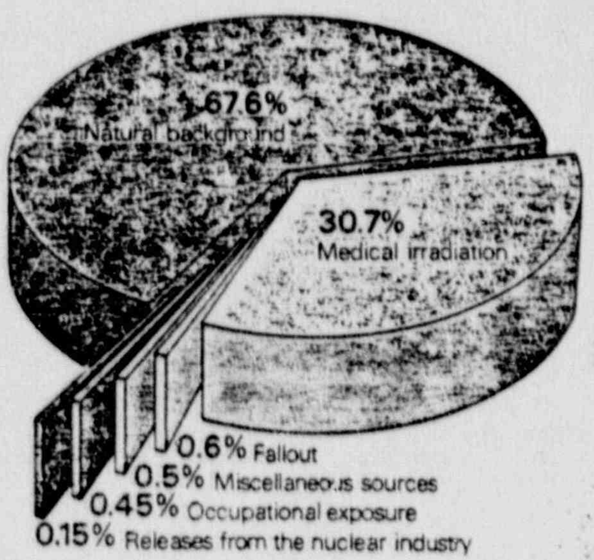


FIGURE 4.
THIS DIAGRAM SHOWS THAT:

- the major contribution to the average dose is from natural background radiation
- the largest man-made contribution is from the medical uses of radiation
- the nuclear power industry is a small contributor to the average radiation dose.

Adapted from National Radiological Protection Board publication NRPB-R77.

There are four basic factors which must be considered when addressing radiation safety:

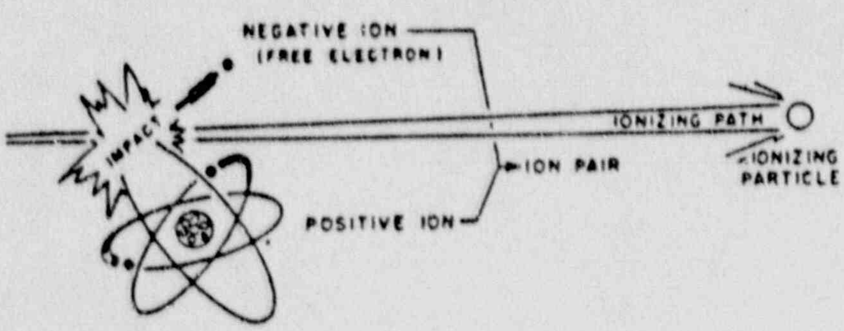
1. Radioactive materials emit energy which can damage living tissue.

2. There are five different kinds of radioactivity that will be reviewed and there must be an understanding of their characteristics in order to recognize safety problems. The types of radiation that will be reviewed are alpha, beta, X radiation (X-ray), gamma and neutrons.

3. Radioactive materials can be hazardous in two different ways. Certain types can be hazardous even when located some distance away from the body. These are external hazards. Other types are hazardous only when they get inside the body by virtue of breathing, eating or through broken skin. These are referred to as internal hazards.

4. Tools are available for evaluating possible radiation hazards. Meters or other devices are used for measuring radiation levels and estimating doses.

The first factor makes it necessary for people to be concerned about ionizing radiation. Like electricity, it is a hazard you can neither see nor feel. At the time of exposure to ionizing radiation an individual is unable to sense the absorption of energy and equate this to the amount of tissue damage. A practical example of this is a sunburn. In most cases one does not feel the effects of the sun immediately. The pain of the burn is delayed, usually until you've been out of the sun for some time. Unfortunately, this delayed type of reaction gives radiation a mysterious quality which is frightening to some people. In actuality many radioactive materials are far less hazardous to handle and use than many things you use daily, such as your automobile. Nevertheless, radioactive materials do emit energy, that, when absorbed by living tissue, produces damage by a process called ionization.



Your body is made up of cells which contain atoms. Each atom has a specific amount of electrons orbiting it. In essence, ionization occurs when electrons are forcibly ejected from their orbits. The greater the exposure to ionizing radiation, the more electrons displaced, and the more physical damage to cells containing the atoms that have lost electrons.

The five types of radioactivity that we are concerned with are alpha, beta, gamma, X-ray and neutrons. The first four are the most important since neutron sources usually are not used in ordinary manufacturing operations.

ALPHA PARTICLES

Of the five types of radiation mentioned, alpha particles are the least penetrating. Their range is at most about 4 inches in air; they are stopped by a film of water, paper-thin material and skin.

If alpha emitters are kept outside the body, little damage results since alpha particles cannot penetrate the outermost dead layer of skin. Internally, it is a hazard because of its ionizing ability through very short distances in soft tissue. Once inside the body; in the lungs, stomach or open wound; there is no thick layer of skin to protect the organs and damage results. The types of resultant tissue damage remains the same whether internal or external. What differs is the method of protection that must be taken.

Alpha emitting particles must not be allowed to contaminate food or be handled carelessly so that they may be ingested or contaminate open cuts. The radioactive material emitting alpha particles must be handled in a local exhausted station if there is a chance that they may become airborne.

BETA RADIATION

Beta particles do not penetrate to the depth that X-rays or gamma radiations of similar energy, but they have considerably more penetrating power than alpha particles. Their maximum range in wood is about 1.5 inches, and they can penetrate into the body .1 to .5 inches. Common beta radiation have a range in air less than 30 ft., and can be stopped by the walls of a room, or .25 to .5 inches of aluminum.

Like alpha emitters, beta emitters are generally classified as internal hazards, although they can be classified as external hazards because they can produce burns when in contact with the skin. They require the same precautions as do alpha emitters if they can become airborne.

X RADIATION

X radiation is most commonly thought of as electromagnetic radiation produced by an X-ray machine. When high speed electrons are slowed down upon strking a target, they lose energy in the form of X-rays. It is the energy of the electrons that determines the penetrating ability of the X-rays.

X radiation emitters are considered external hazards. These types of materials may be located some distance from the body and emit radiation that will produce ionization as it passes through the body. The methods of protection are to limit the amount of time you are exposed, work at a safe distance away from the source, and the use of proper barrier, or a combination of all three. Simply radiation protection is dependent upon Time, Distance and Shielding.

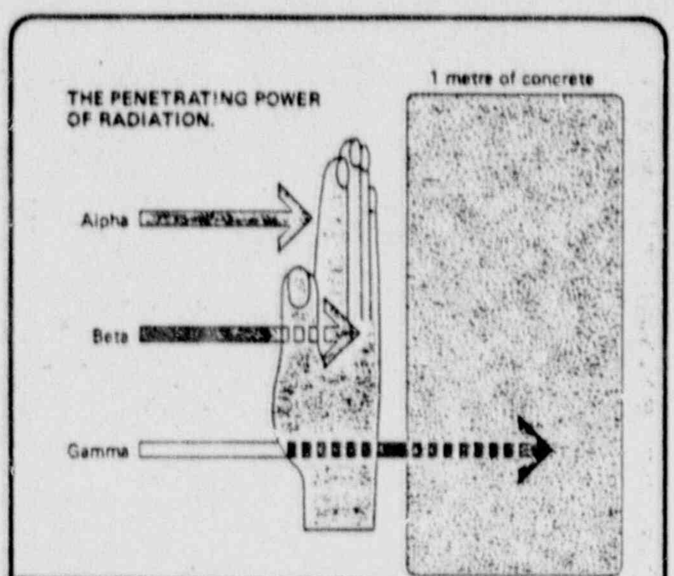
GAMMA RADIATION

Gamma radiation is similar to, and for the most part indistinguishable from X radiation. The major difference between the two types is that gamma rays originate from the nucleus of the atom, while X-rays originate outside the nucleus.

Like X-rays, because of their deep penetrating power gamma rays are considered an external hazard. The same basic principles, Time, Distance and Shielding, apply to protection from gamma radiation exposure.

NEUTRONS

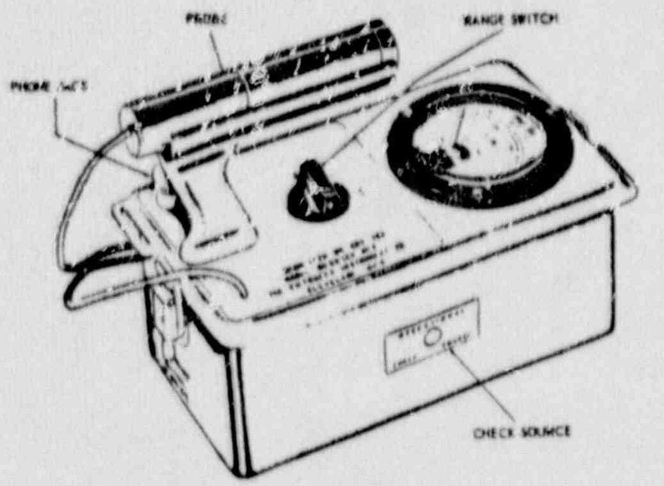
Neutron sources are not normally used in ordinary operations. Neutrons can have both long and short ranges in air, depending upon the method in which they are produced and their amount of kinetic energy. The average distance of absorption in human tissue may vary from .25 inches to several inches, depending upon the neutron energy.



MONITORING INSTRUMENTS

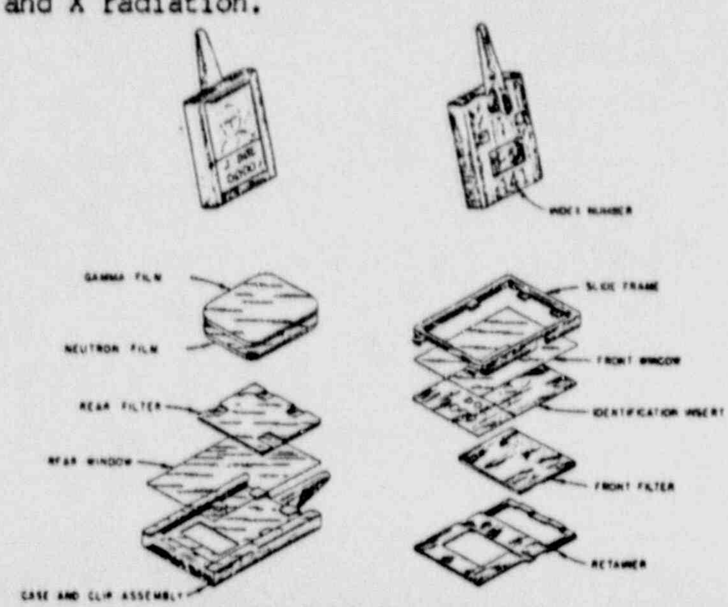
Geiger-Mueller Survey Meter

There is a variety of meters available to measure the various kinds of radiation. None is universally applicable and selection of the most appropriate type is of great importance. Also, it is equally important that the meters are correctly and periodically calibrated. We use Geiger-Mueller counters for radiation survey measurements because it is capable of detecting very low levels of radiation. It uses an ionization chamber but is filled with a special gas (usually argon or helium). When subjected to radiation an interaction occurs within the tube between the gas and the radiation. A pulse of current is generated for each interaction. It is this pulse that is measured and recorded, expressed as millirems/hr. While being extremely sensitive to low intensities of radiation, the Geiger-Mueller cannot differentiate between the different types of radiation without the use of external absorbers.



Film Badges

Film badges are worn on the outer clothing and will allow an estimate of an accumulated dose of radiation to the whole body or to just a part of the body. Radiation interacts with the silver atoms in a photographic film, exposing the film. The amount of darkening of the film is compared to a control film which has not been exposed to radiation to determine the amount of radiation exposure. Alpha radiation cannot be measured with film badges because the alpha particles will not penetrate the paper used to cover the film to exclude light. But, the badges will give a good indication of beta, gamma, neutron, and X radiation.



Exploded view of a radiation film badge. Front view is at upper left, rear view at upper right.

MAXIMUM PERMISSIBLE DOSE EQUIVALENT FOR OCCUPATIONAL EXPOSURE

Combined whole body occupational exposure	
Annual limit	5 rems
Long-term accumulation	(N-18) x 5 rems, where N is age in years
Skin	15 rems in any one year
Hands	74 rems in any one year (25/qtr)
Forearms	30 rems in any one year (10/qtr)
Other organs, tissues and organ systems	15 rems in any one yar (5/qtr)

Emergency dose limits--Life saving:

Individual (older than 45, if possible)	100 rems
Hands and forearms	200 rems, additional (300 rems total)

Emergency dose limits--Less urgent:

Individual	25 rems
Hands and forearms	100 rems, total

RADIATION UNITS

UNIT	SYMBOL	DEFINITION
Curie	Ci	Radioactive material producing 3.7×10^{10} dis/sec
Roentgen	R	Amount of x-radiation producing 2.58×10^{-4} Coulombs of charge in 1 kg of dry air, or 83 ergs/gm of air
Radiation	rad	Amount of radiation causing 100 ergs/gm absorption in tissue or other material
Quality factor	Q	Biological "weighting factor" to account for different abilities of different radiations to product biological injury
Dose equivalent man	rem	rem = (Q) x (rad)
Milirem	mrem	mrem = 1/1000 rem

AVERAGE PERSONAL RADIATION DOSE*

We live in a radioactive world — always have. Radiation is all about us as a part of our natural environment. It is measured in terms of millirems (mrems). The annual natural average dose per person is 180 mrems, but it is not uncommon for any of us to receive far more than that in a given year. This is not dangerous. As an example, exposure to 5,000 mrems a year is allowed for those who work with and around radioactive material.

	Common Sources of Radiation	Your Annual Dose (mrems)
WHERE YOU LIVE	**Location:** Cosmic radiation at ***sea level***	26
	For your elevation (in feet) — add this number of mrem	______
	Elevation — mrem 1000-2 4000-15 7000-40 2000-5 5000-21 8000-53 3000-9 6000-29 9000-70	
	Elevations of some U.S. cities (in feet): Atlanta 1050; Chicago 595; Dallas 435; Denver 5280; Las Vegas 2000; Minneapolis 815; Pittsburgh 1200; St. Louis 455; Salt Lake City 4400; Spokane 1890. (Coastal cities are assumed to be zero, or sea level.)	
	Ground: U.S. average	26
	House Construction: For stone, concrete or masonry building, add 7	______
WHAT YOU EAT, DRINK, AND BREATHE	Food Water Air **U.S. Average**	24
	Weapons test fallout	4
HOW YOU LIVE	**X-ray and radiopharmaceutical diagnosis**	
	Number of chest x-rays ______ × 10	______
	Number of lower gastrointestinal tract x-rays ______ × 500	______
	Number of radiopharmaceutical examinations ______ × 300	______
	(Average dose to total U.S. population — 92 mrem)	
	Jet plane travel: For each 2500 miles add 1 mrem	______
	TV viewing: For each hour per day ______ × 0.15	______
HOW CLOSE YOU LIVE TO A NUCLEAR PLANT	**At site boundary:** average number of hours per day ______ × 0.2	______
	One mile away: average number of hours per day ______ × 0.02	______
	Five miles away: average number of hours per day ______ × 0.002	______
	Over 5 miles away: . . . . None	______
	Note: Maximum allowable dose determined by "as low as reasonably achievable" (ALARA) criteria established by the U.S. Nuclear Regulatory Commission. Experience shows that your actual dose is substantially less than these limits.	
	My total annual mrems dose ______	

Compare your annual dose to the U.S. annual average of 180 mrems.

One mrem per year is equal to: Increasing your diet by 4%.
Taking a 5-day vacation in the Sierra Nevada mountains.

*Based on the "BEIR Report-III"—National Academy of Sciences, Committee on Biological Effects of Ionizing Radiation, "The Effects on Populations of Exposure to Low Levels of Ionizing Radiation," National Academy of Sciences, Washington, DC, 1980.

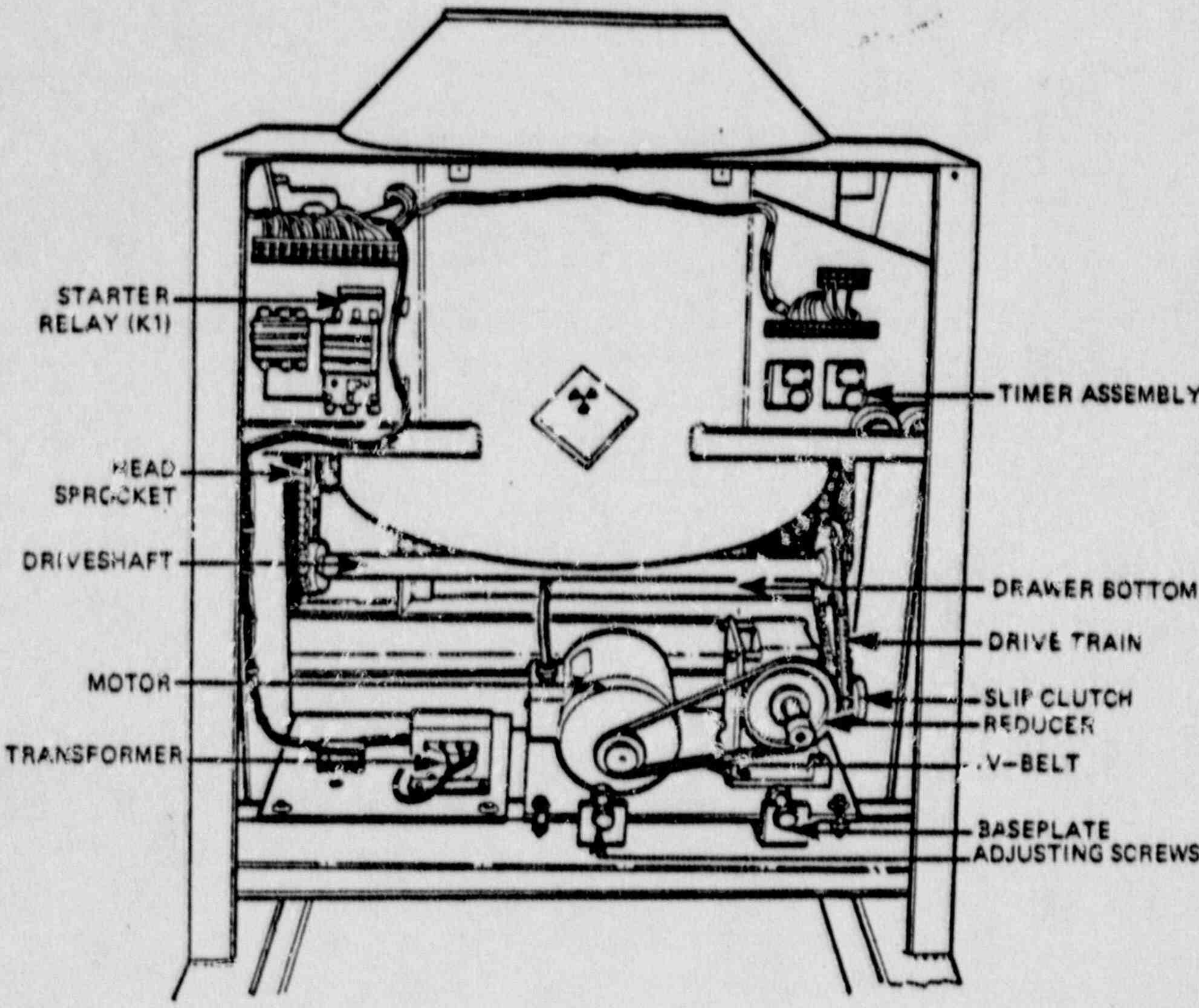


Fig. 1-6. Rear of Unit

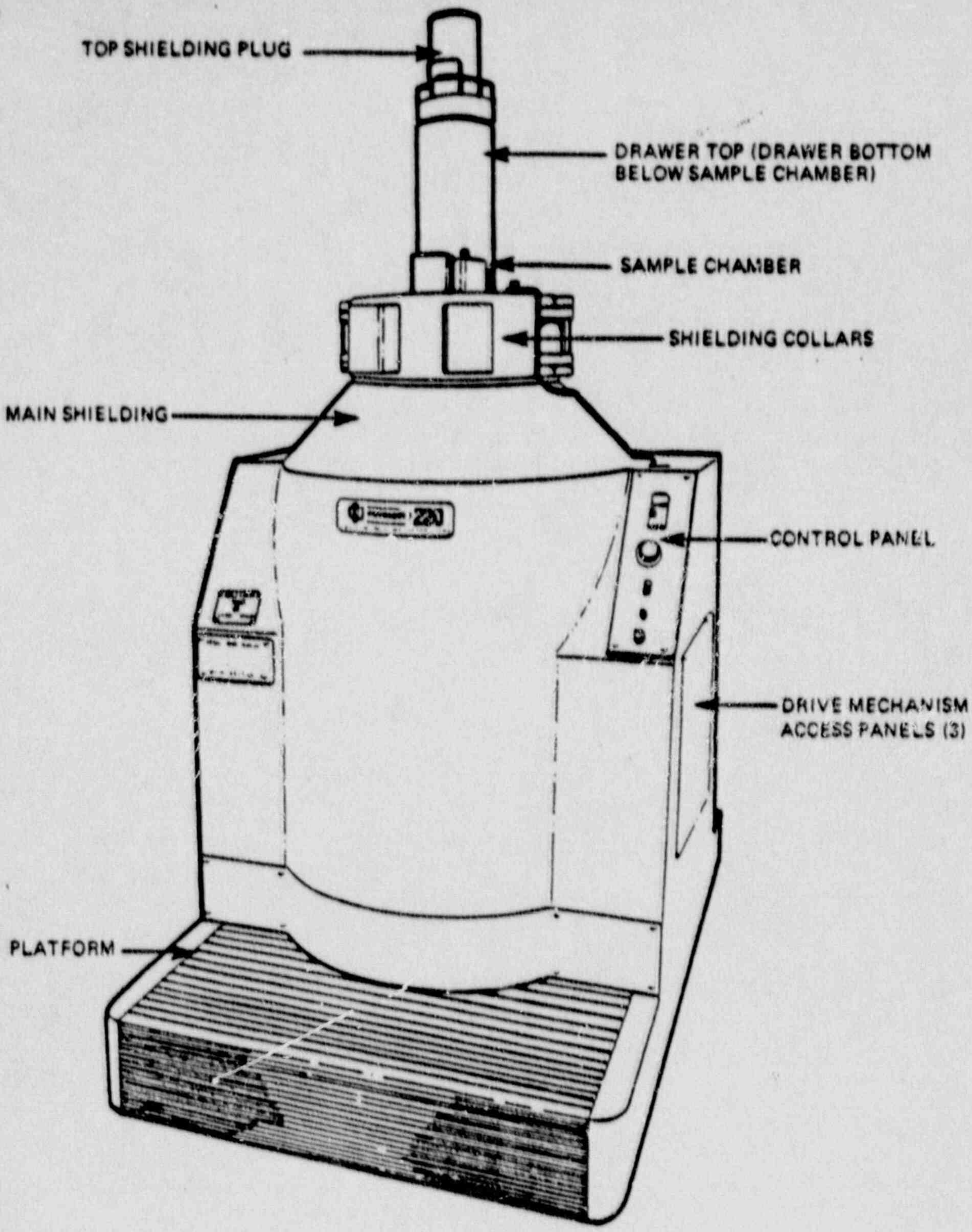


Fig. 1-1. Overall View of Gammacell 220

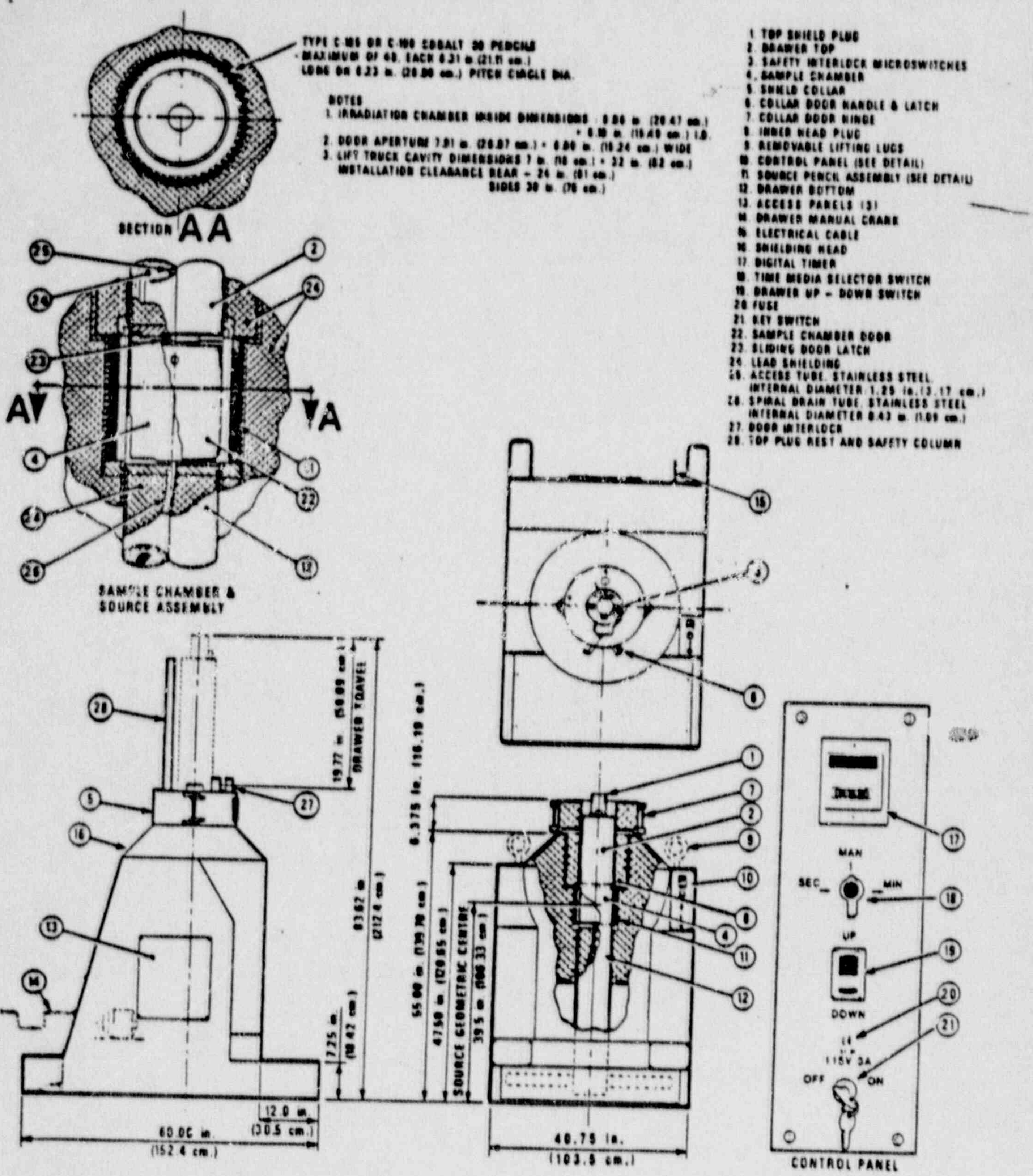


Fig. 1-2. General Dimensions

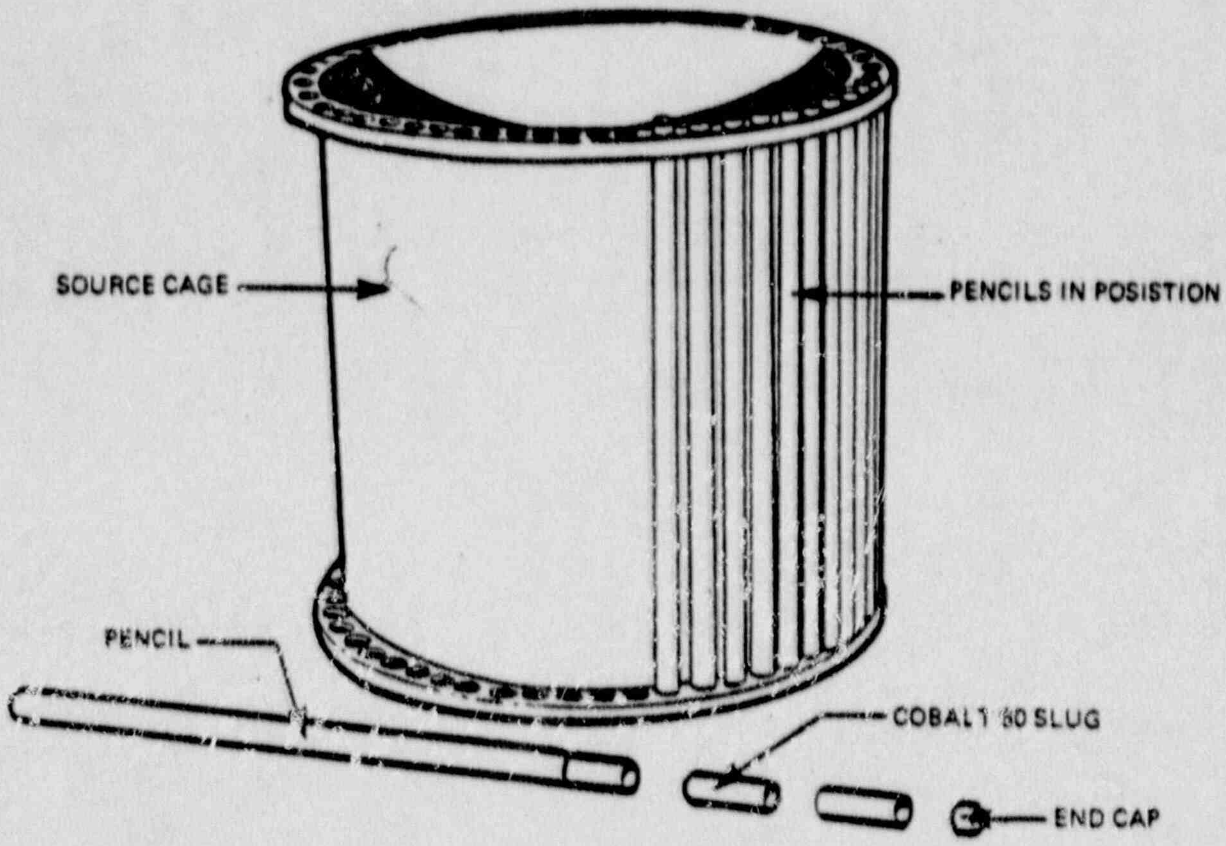


Fig. 1-3. Source Pencils and Cage

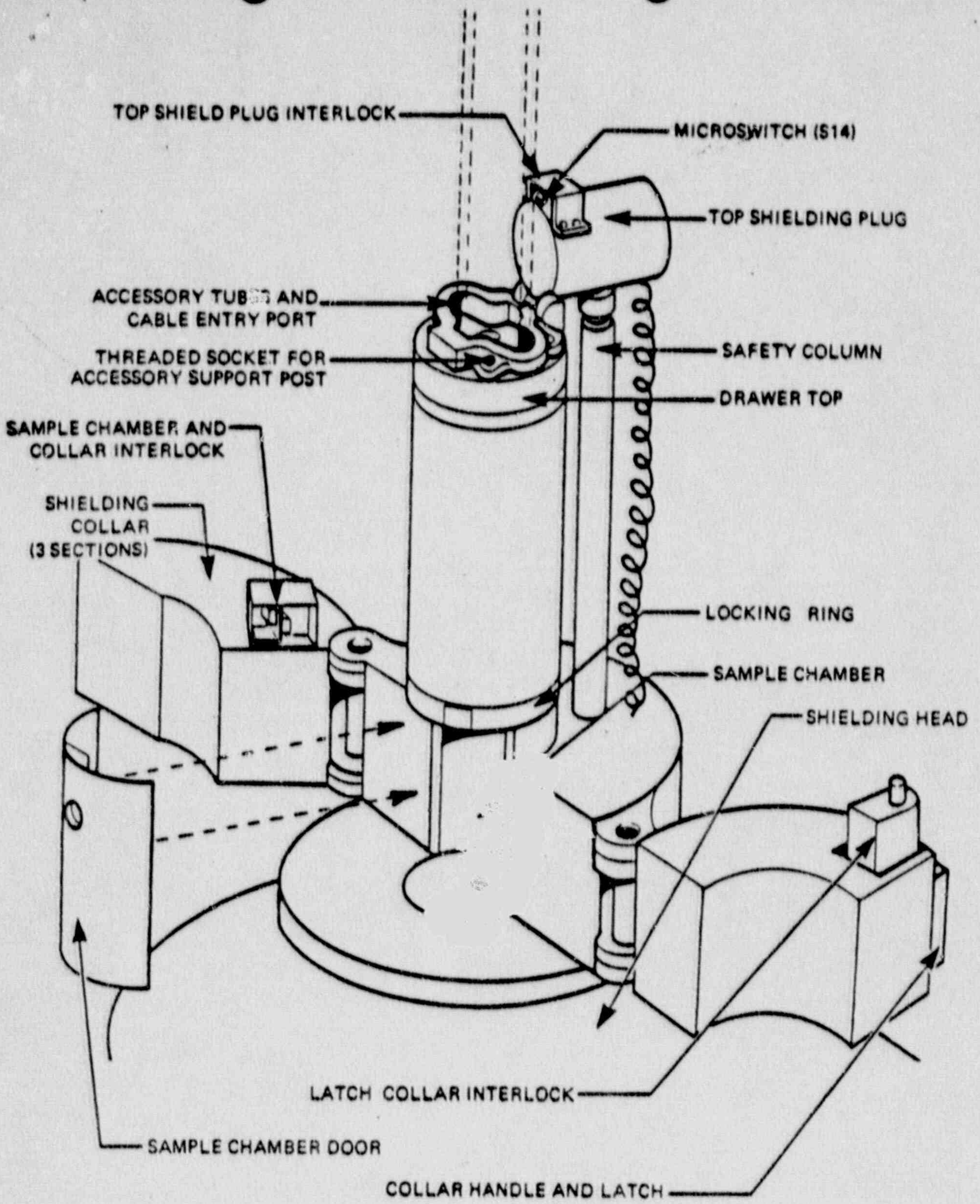


Fig. 1-4. Collar and Sample Chamber

JUL 0 8 1988

National Semiconductor Corporation
ATTN: Mr. Richard A. Dyer
Radiation Safety Officer
333 Western Avenue
South Portland, ME 04106

Gentlemen:

Letter Dated May 17, 1988, for Amendment to Materials Licenses 18-13541-02 and 18-13541-03 and our Request for the License Fee Dated June 7, 1988.

This refers to the subject application and our letter (copy enclosed) in which we notified you that amendment fees totalling $180 are required.

Please be advised that, unless we hear from you within 30 days from the date of this letter, we will consider your application as being abandoned.

The submission of any future applications with the prescribed fee would not be affected by this action.

Sincerely,

Signed by:
Glenda Jackson

Glenda Jackson
License Fee Management Branch
Division of Accounting and Finance
Office of Administration and
Resources Management

Enclosure:
Letter dated 6/7/88

cc: Region I

DISTRIBUTION:
Pending Fee File
ARM/DAF R/F
LFMB R/F (2)
DW/REJ/NSC
CONTROL NUMBER 108932 and 108933

OFFICE:	ARM/LFMB	ARM/LFMB
SURNAME:	MMessier:rej	GJackson
DATE:	7/6/88	7/6/88

OFFICIAL RECORD COPY ML 10

National Semiconductor Corporation JUN - 7 1988
ATTN: Mr. Richard A. Dyer
Radiation Safety Officer
333 Western Avenue
South Portland, ME 04106

Gentlemen:

This refers to your letter dated May 17, 1988, for an amendment to Materials Licenses 18-13541-02 and 18-13541-03.

Amendment fees totalling $180 are required as specified in fee Categories 3P ($60) and 3E ($120) of §170.31, 10 CFR 170, copy enclosed. Payment should be made to the U.S. Nuclear Regulatory Commission and mailed to my attention at our Washington, D.C. address.

Your application will be processed by the Region I Licensing staff located at 475 Allendale Road, King of Prussia, Pennsylvania 19406. The fee, however, is required prior to issuance of the amendments. When submitting the fee, please refer to CONTROL NUMBERS 108932 and 108933.

Sincerely,

Signed by:
Glenda Jackson

Glenda Jackson
License Fee Management Branch
Division of Accounting and Finance
Office of Administration and
Resources Management

Enclosure:
10 CFR 170

cc: Region I

DISTRIBUTION:
Pending Fee File
ARM/DAF R/F
LFMB R/F (2)
DW/RI/NSC

OFFICE:	ARM/LFMB	ARM/LFMB
SURNAME:	SKimberley:rej	GJackson
DATE:	6/ 7 /88	6/ 7 /88

OFFICIAL RECORD COPY ML 10

National Semiconductor

333 WESTERN AVENUE
SOUTH PORTLAND, ME 04106

Tel – 207-775-8100

030-19159

May 17, 1988

RECEIVED
'88 MAY 26 A9:57

U.S. Nuclear Regulatory Commission
Region 1
Nuclear Materials Safety & Safeguards Branch
631 Park Avenue
King of Prussia, PA 19406

Attn: Mr. John E. Glenn Ph.D.

Dear Mr. Glenn:

This letter is a formal request to change the corporation name on license #18-13541-02 and license #18-13541-03. Fairchild Semiconductor Corporation was purchased by National Semiconductor Corporation in October of 1987. Fairchild Semiconductor Corporation no longer exists as a business entity. All parts of each license when referring to Fairchild should change to National's responsibility. The corporate name and address should be listed as National Semiconductor Corporation, 333 Western Avenue, South Portland, ME 04106.

Thank you.

Sincerely,

Richard A. Dyer

Richard A. Dyer
Radiation Safety Officer

RD:jv

Fee Unpaid

Withdrawn / Abandoned

RECEIVED-REGION 1
1988 MAY 20 PM 1:31

Log	May 22
Remitter	
Check No.	
Amount	
Fee Category	3P
Type of Fee	AMD
Date Check Rec'd.	
Date Completed	
By:	

OFFICIAL RECORD COPY ML 10

108932

5-20-88

BETWEEN:

LICENSE FEE MANAGEMENT BRANCH, ARM
AND
REGIONAL LICENSING SECTIONS

(FOR LFMS USE)
INFORMATION FROM LTS

PROGRAM CODE: 03120
STATUS CODE: 0
FEE CATEGORY: 3P
EXP. DATE: 19920131
FEE COMMENTS:

LICENSE FEE TRANSMITTAL

A. REGION

1. APPLICATION ATTACHED
   APPLICANT/LICENSEE: NATIONAL SEMICONDUCTOR CORPORATION
   RECEIVED DATE: 880520
   DOCKET NO: 3019159
   CONTROL NO.: 108932
   LICENSE NO.: 18-13541-02
   ACTION TYPE: AMENDMENT

Do Not Issue
milestone 06 entered Jn 12/12/88

2. FEE ATTACHED
   AMOUNT: 0
   CHECK NO.: 0

3. COMMENTS

SIGNED BP
DATE 5/29/88

B. LICENSE FEE MANAGEMENT BRANCH (CHECK WHEN MILESTONE 03 IS ENTERED /✓/)

1. FEE CATEGORY AND AMOUNT: 3P

2. CORRECT FEE PAID. APPLICATION MAY BE PROCESSED FOR:
   AMENDMENT ✓
   RENEWAL
   LICENSE

3. OTHER

SIGNED
DATE

Fee Unpaid
Withdrawn/Abandoned

(FOR LFMS USE)
INFORMATION FROM LTS

BETWEEN:

LICENSE FEE MANAGEMENT BRANCH, ARM
AND
REGIONAL LICENSING SECTIONS

PROGRAM CODE: 03120
STATUS CODE: 0
FEE CATEGORY: 3P
EXP. DATE: 19920131
FEE COMMENTS: ____________________

LICENSE FEE TRANSMITTAL

A. REGION

1. APPLICATION ATTACHED
APPLICANT/LICENSEE: NATIONAL SEMICONDUCTOR CORPORATION
RECEIVED DATE: 890112
DOCKET NO: 3019159
CONTROL NO.: 110095
LICENSE NO.: 18-13541-02
ACTION TYPE: AMENDMENT

2. FEE ATTACHED
AMOUNT: $180.00*
CHECK NO.: 1072

3. COMMENTS
* $60.00 for this Amendment
See mail Control 110094

SIGNED R. J. Brown
DATE 89/01/13

B. LICENSE FEE MANAGEMENT BRANCH (CHECK WHEN MILESTONE 03 IS ENTERED /✓/)

1. FEE CATEGORY AND AMOUNT: 3P $60

2. CORRECT FEE PAID. APPLICATION MAY BE PROCESSED FOR:
AMENDMENT ✓
RENEWAL ______
LICENSE ______

3. OTHER ______________________________

SIGNED S. Kimberly
DATE 1/26/89

PA 1/13