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RADIATION TRAINING MANUAL

FOR CERTIFIED PYR-A-LARM SERVICE TECHNICIANS

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1. INTRODUCTION

Pyrotronics has historically performed, with its own technicians, the functions required to inspect, test, commission, service, and repair Pyr-A-Larm Smoke and Fire Detection Systems sold by its distributors. Substantial increases in sales and great travel distances involved are imposing physical and economic handicaps to future development and growth. Realizing these facts, Pyrotronics, in early 1963, instituted a program of training qualified distributor technicians.

At that time, Pyrotronics was furnishing fire detection units containing Radium 226 as the radioactive source material for ionizing the air within the detector, a function necessary to provide the fastest fire detection ever developed. There were no governmental regulations except in a few states, governing the handling and installation of detectors.

In the late fall of 1963, Pyrotronics introduced Models F5A and F3.5A Detectors, and in the fall of 1964 the Model F5B Detector. These units substituted a recently developed byproduct material, Americium 241, for the Radium 226. The external radiation field of these detectors was reduced to about 1/10 that of the older models and was even less than that of most luminous dial wristwatches. This was a great improvement. However, the installation and handling of devices containing Americium comes within the regulations of the Atomic Energy Commission and requires a specific license by that body or an Agreement State. Pyrotronics is so licensed.

To minimize the obstacles to future growth and development, qualified distributors must be able to install, test, and service the fire detectors containing Americium, in addition to installing, testing, and servicing the electrical and electronic portions of the fire alarm installation. To perform such functions, the distributor must qualify for a specific license from the Atomic Energy Commission, or when located within an agreement state, from the state. One requirement for obtaining such license is for the distributor's technicians and their supervisor to undergo a training course in radiation, particularly in regard to the functions pertaining to the handling, installation, and service of Fire Detectors.

This training course is especially designed to fulfill this requirement. The course will be conducted by certified instructors who have satisfactorily completed the Pyrotronics Course - "RADIATION TRAINING FOR INSTRUCTORS".

2. PRINCIPLE OF DETECTOR OPERATION

Air which is normally an insulator can be made conductive by ionizing it. Some years ago, it was observed that products of combustion will effect the conductivity of this ionized air. Our detector applies this simple observation to produce the worlds best fire detector.

The practical application of this principle uses two ionization chambers, connected in series with the point between them connected to the trigger of a cold cathode tube. The chambers are electrically balanced and when products of combustion are permitted to enter one of the chambers, the unbalanced condition triggers the tube and energizes the alarm relay.

The second chamber is protected, but not sealed, thus the electrical balance is maintained within practical limits over a wide range of environmental changes in temperature, pressure, humidity, and air pollution, such as a room full of cigarette smoke.

The use of radioactive material to produce the desired ionization of the air is the most practical method known. The Radium 226 used in the old F3 and F5 was best at that time. When the Americium 241 became commercially available, we felt it was better and began using it.

3. BASIC PRINCIPLES OF RADIATION PROTECTION

3.1 INTRODUCTION

The routine handling of any device containing radioactive material requires certain basic precautions in order to insure a high degree of radiation protection. The needed safeguards depend primarily on the amount and type of radioactive material present. Thus a radium dialed watch requires minimum precautions while devices containing large amounts of radioactive materials, such as used for industrial radiography require extensive safeguards and should be operated only by qualified persons thoroughly familiar with the associated hazards and the means of controlling them.

The purpose of the present course is to outline the basic principles of radiation safeguards with emphasis on those required in the servicing of fire detectors containing Americium 241 and to prove the validity of our statements concerning the low hazard levels of Pyr-A-Larm.

3.1.1. RADIOACTIVE MATERIALS

Soon after the discovery of x-Rays in 1895, it was found that

certain naturally occurring elements, such as radium also emitted similar penetrating, ionizing rays. It was found later that the emission of the rays was associated with the disintegration of the nucleus of the atom.

This property is called radioactivity; its rate decreases with time; the rate of decrease varies with the individual radioisotope. For instance, the activity of radium will decrease to one half in about 1600 years; this period is called the half-life. The activity will decrease to one quarter in about 3200 years, and so forth.

Radium emits three distinct types of radiation:-

ALPHA, BETA AND GAMMA RAYS, each having different characteristics.

ALPHA RAYS, or particles, are readily absorbed; they are completely stopped by a few inches of air, or the dead layer of the skin. They represent, therefore, no health hazard as long as the source does not gain entrance into the human body.

BETA RAYS, or particles, are more penetrating than alpha particles, and over exposure to them may cause injuries of the skin and other superficial tissue.

GAMMA RAYS, are similar to x-Rays and very much more penetrating than beta particles. Over-exposure may cause injuries to both superficial and deep-seated tissue.

The type of radiations emitted varies with different radioactive elements.

Americium 241 emits only alpha rays and gamma rays of relatively low penetration and has a half life of 458 years.

UNITS

As defined by law--"Radiation" means gamma rays and x-Rays, alpha and beta particles, neutrons, protons, high-speed electrons, and other nuclear particles, but not sound or radio waves, or visible infrared, or ultraviolet light.

The unit of radioactivity is the Curie, it corresponds to the activity of one gram of radium, or 3.7×10^{10} disintegrations per second. Subunits are the millicuries, 1/1000 or a curie, and the microcurie 1/1,000,000 of a curie. The activity of the radium on a watch is generally less than a microcurie while the activity of the cobalt 60 used for industrial radiography may be several hundred curies.

X- and gamma Ray measurements are expressed in roentgens (R), or the subunit, the milliroentgen (mr), 1/1000 R. The roentgen is based upon the ability of radiation to ionize air. Various instruments are available for the measurement of radiation and those used for protection surveys are usually calibrated in milliroentgens per hour (mr/hr.).

Alpha and beta radiation are measured in rads. The rad is the unit of absorbed dose and corresponds to 100 ergs per gram.

There are two basic classifications of Radiation exposure:-

a. Exposure to Radiation from External sources.

b. Exposure to Radiation from Internal sources.

These are simple to understand if we recognize there is nothing mysterious about radioactive materials. They are chemical compounds with physical and chemical characteristics just like any other compound. They are special because they also exhibit the phenomena of spontaneous disintegration. It is this disintegration process that produces the ionizing radiation.

Such a material becomes an internal source of radiation exposure when it gets inside our body. This can occur through eating, breathing, or open wounds.

3.1.2 BIOLOGICAL EFFECTS OF RADIATION

The exposure of man to ionizing radiation is nothing new. Mankind has always been exposed to cosmic rays and radiations from radioactive materials inherently present in the environment and in the human body. The level of background radiation depends on a number of factors such as altitude, latitude, composition of soils and rocks, and of building materials. This is illustrated in Table I, which also gives comparisons with other sources of radiation exposure.

The use of radiation for medical and industrial purposes has greatly increased in recent years. It is important, therefore, that every effort be made to minimize the possible hazard. Just as in a much earlier era people acquired the knowledge to use fire and avoid its danger, so must the present generation learn to apply radiation with minimum risk to health.

It is today well established that over-exposure to radiation can cause various injuries, these include:-

Damage to blood forming organs.
Production of malignancies.
Possible reduction in fertility and lifespan.
Genetic changes affecting future generations.

Due to the extremely low activity of the Americium 241 and Radium 226 in the fire detectors, most of the above types are of academic interest only. The whole body dose received by technicians in connection with the routine servicing of the detectors is extremely small.

The principal hazard associated with Americium 241 is the possibility of even a minute part of it gaining entrance to the human body, where its alpha radiation may cause serious injuries to bone, kidneys and other critical organs. The National Committee on Radiation Protection has, therefore, recommended a very low maximum permissible "body burden"; it is 0.3 microcurie for the total body. Any quantity of Americium 241, retained in the body above this value, is considered hazardous.

To prevent any radioactive material entering the body, the following precautions should be taken in servicing the fire detectors:-

1. Never touch the Americium 241 foil. The radioactive material might be transferred from the fingers to the mouth through smoking or eating.

2. Never dispose of fire detectors except through an agency specifically licensed for this purpose.

TABLE I - COMPARISON OF YEARLY EXPOSURES

Natural background radiation	mr
San Francisco	120
New York	135
Denver	300
Pocos de Caldas Brazil	7,000
Wearing a radium dialed watch (small part of the body)	3,000
Additional exposure from living in a stone house, compared with a wooden one.	40-60
Maximum permissible exposure for radiation workers.	5,000
Maximum permissible exposure for non-radiation workers.	500
From Americium 241 while servicing fire detector on a full time basis less than	50

3.2 RADIOACTIVE MATERIAL IN THE PYR-A-LARM DETECTOR

The type and quantities of radioactive materials used in the Pyr-A-Larm Detectors are listed below:-

F3 -	20 Micrograms	-	Radium Sulphate
F5 -	40 Micrograms		
F3.5A	80 Microcuries	-	Americium Oxide
F5A	130 Microcuries		Americium Oxide
F5B	80 Microcuries		Americium Oxide

We use a foil made by the U S Radium Corporation and it is sold under the trade name Ionotron Foil. This is a so called sealed source which means that the radioactive material is enclosed in such a manner that it is not subject to free dispersal.

The foil that we use is in effect a radioactive sandwich. The radioactive material is in powdered form which is mixed with gold powder and formed into a small compact or billet. This compact is then placed between a sheet of silver and a sheet of gold and is rolled into a foil under rather high heat and pressure conditions.

The foil that we use is approximately 3/4 inches wide and only about 1/4 inch of this is radioactive, the inactive portion being used to fasten the foil. The foil is fastened inside the inner chamber of all detectors, the outer chamber foil is fastened on the foil disc of the F5, F5A and F5B Models. It is fastened on the center post of the F3 and F3.5A Models.

Obviously, this construction makes the foil completely inaccessible without disassembly of the unit. The foil has been thoroughly tested in the laboratories of the U S Radium Corporation and in commercial laboratories, at the expense of Pyrotronics, and found to have an extremely high degree of integrity. Therefore, we can say that for all practical purposes, the danger of exposure to radiation from internal sources is highly improbable from our detector.

The evaluation of the Pyr-A-Larm Detector as a source of external radiation is best presented by the Survey Summary Table II.

The first term we use in considering the hazards of radiation from internal sources is "contamination". This means the uncontrolled presence of these radioactive compounds, usually as small particles in the dust or surfaces around us or floating in the air we breathe.

When a detector is disassembled for cleaning, we are exposed to the possibility of contamination and, therefore, careless handling could result in exposure to internal sources. Once inside the body, the chemical compound is treated in what one might call a normal fashion. In the case of the radium sulphate which is used in our old F3 and F5 Detector, the body treats the compound as it would calcium and the radium ends up in the bone structure. Since the blood is made in the marrow of the bone, the emission of alpha particles, in such close association with these blood forming cells, may destroy the cells and cause lukemia.

The lungs represent the critical organ for the insoluble Americium Oxide used in our detectors and when ingested the gastro intestinal tract and lower large intestine become the critical organ.

TABLE II

SUMMARY OF RADIATION SURVEYS OF THE PYR-A-LARM DETECTORS

Detector, Model Number and Type of Radiation Measured
Readings are maximum values mr/hr

Distance Inches	RADIUM				AMERICIUM				
	F3		F5		F3.5A		F5A		F5B
	β,γ	γ	β,γ	γ	α,β,γ	γ	α,β,γ	γ	γ
0	30	6	100	7	1.5	.14	2.5	.25	1.3
1	12	2.5	45	4	.15	.07	.50	.08	—
2	7.2	1.5	32	2	.14	.04	.40	.05	.9
3	-	-	-	-	.12	.04	.25	.05	—
4	2.4	.6	18	1.2	.10		.25		.2
5	-	-	-	-	.07		.20		—
6	1.3	.4	12	.8	.02		.18		.1
7	-	-	-	-			.15		—
8	.96	.22	8	.5			.13		—
10	.66	.17	4	.35			.10		—
12	.54	.13	3.2	.22			.07		.04
14	.3	.12	2.3	.18			.07		
16	.12	.1	1.6	.15					
20	.09	.06	1.2	.1					
24	.03	.04	.7	.01					

Obviously, radioactive materials like all other things taken into the body are not completely absorbed and only a small portion is retained. This is particularly true of the insoluble compounds used in our detectors.

Radium offers one additional hazard because of its daughter product Radon 222.

This gas is itself radioactive and obviously, as any gas, can be inhaled thus causing a condition of exposure to radiation from an internal source.

The ionotron foil which we use in these detectors has such a high degree of integrity that the amount of radon emanation is far below that which one would normally expect from our specific quantity of radium. Tests have been made by reliable sources and all tests indicate that the detector presents no internal radiation hazard with an air change of 5000 cubic feet per hour per detector. This is approximately the volume of a 17 ft. cube.

One change per hour is considered an extremely low value in any building, therefore, we need be concerned with this hazard only in the event that we are enclosing the detector in a sealed vault. In this case, it would be advisable to ventilate the vault before the personnel enter into it. This makes the room livable and provides more than enough air change to render our detector completely safe. Our detector is perfectly safe in any room suitable for human habitation.

In summary we may say when installed as recommended in habitable areas, Pyr-A-Larm does not represent a radiation hazard. We may also say that when the detector is serviced as recommended, exposure is far below permissable levels.

4. ATOMIC ENERGY ACT OF 1954 AS AMENDED

This act charges the Atomic Energy Commission with the responsibility of protecting the radiological health of the population.

How much radiation is safe? This question must be answered before protection can be accomplished. AEC is quided by NCRP and others in arriving at this answer.

Since our senses do not respond to this form of energy dissipation, we must depend on some artificial means for detecting it. Coal miners faced with a similar problem use canaries to detect CO. In terms of the entire population such detecting means are not practical. The rules and regulations must then be based on preventing population exposure. This forces recognition of the simple fact that the only person who can control the hazard is the person in physical possession of it.

The AEC fulfills its responsibilities in health and safety through the promulgation of rules and regulations and licensing. One of the prime considerations in licensing is the qualifications of the person who uses or is responsible for the use of the radioactive material, regulations and rules establish licensing requirements and safety standards. We need not be nuclear scientists to use the material.

Subsection 274 (b) of the Act permits the AEC to transfer certain responsibilities for radiological health of the population to a state by agreement with the governor of that State. States which have exercised the privileges of this section are called Agreement States.

A general license is obtained without any application procedure. The purchase of certain authorized products together with the total fulfillment of obligations on the part of the specific licensee (manufacturer or distributor) from whom the device was purchased makes one a general licensee. Being born a citizen carries obligations of citizenship and in like manner the status of general licensee carries obligations.

The obligations are carefully detailed in CFR, 10, Sec. 30,31.5, 20.402 & 20.403. They may be summarized as follows : -

A GENERAL LICENSEE

* 1. Must have the device tested for leakage at time of installation.
2. Cannot handle the radioactive material and can only transfer to a specific licensee.
3. Must have the device tested for leakage as specified on the label.
4. Must maintain records of the above tests.
5. Must notify the Director of the appropriate Atomic Energy Commission Regional Compliance Office upon the theft or loss of any radioactive material.
6. Must register the system in accordance with local regulations.
7. Must not dispose of the material except through a properly licensed organization.
8. Must not remove labels.

* Note : Pyrotronics' Inc. has been granted an exception to this requirement.

A SPECIFIC LICENSE

A specific license is in effect authorization to use or handle radioactive material and to carry the associated responsibilities. In our case, the hazards are relatively small and satisfactory completion of the Pyrotronics' Training Program is accepted as evidence of qualification to carry out the responsibilities.

For Pyr-A-Larm Distributors, the responsibilities may be summarized as follows : -

1. Proper storage - awaiting installation.
2. Wipe testing at intervals as specified on the label.
3. Proper storage at job site, to prevent theft, etc.
4. Notification and distribution of Excerpts of CFR, Title 10, Parts 20-30 and 31 to general licensees.
5. Maintain record of leak tests.
6. Notification of loss, theft and accidents.
7. Disposal through properly licensed organization.
8. Report of transfers of detectors.
9. Comply with all terms and conditions of his specific license.

5. <u>OPERATING AND EMERGENCY PROCEDURES</u>

5.1 Functions of Field Technicians

5.1.1 <u>Installation Procedure</u>

This procedure to be followed by Pyrotronics Servicemen or other properly qualified by Training and Certification as employees of an organization licensed to perform this activity.

1. Inspect boxes at job site to assure that no damage has occurred during shipment. If damaged - follow disposal procedure.

2. Establish proper storage area to assure that detectors awaiting installation will be safe from theft and that no one will be exposed to radiation from the stored units.

3. Wipe test detectors before installing them in the bases. Follow wipe test procedure.

4. Perform electrical test and check sensitivity.

5. Install detector in its base, install locking shell and secure it with special wrench.

6. If any detectors must remain in overnight storage at the job site, they must be protected from theft or damage.

5.1.2 Wipe Test Procedure

These wipe test procedures are to be followed by the Pyr-A-Larm servicemen in the employ of Pyrotronics or a Pyrotronics distributor.

These servicemen must hold a Certificate from Pyrotronics indicating that they have satisfactorily completed the Pyrotronics Training Course or be qualified by the appropriate regulatory agency.

Material Required

Filter Papers
Wetting agent Alconox or Equivalent Detergent
Envelopes

Wipe Test of External Surface of the Detector

1. Record the detector serial number, customer's name and address, the name of the person making the test, date and location of detector on an envelope. This is the most important step. If a wipe indicates a leaky unit, it is this information that directs us to it for replacement.

2. Job Record Form. The detector serial number and location should be recorded on the Job Record Form at this time. The purpose being to provide a record of the number of wipes taken, so that we may have a cross check between this report and the wipe test evaluation.

3. Moisten center of filter paper with detergent solution (one or two drops).

4. (a) Wipe the outer surface of the detector with the moistened filter paper, this means that portion of the detector extending below the outer locking shell.

   Wipe the side screen and ribs first and then the bottom screen rib. It is only necessary to remove the dust from the detector. This is not a scrubbing operation. Care must be exercised to prevent the filter paper from being torn.

   (b) Procedure for Air Duct Type Detectors

   General:-

   Wipe the outer surface of the detector assembly and the pick up tubes at the places where contamination is most likely to be found.

Air Duct Type Detectors Used in a Positive Pressure System

For air duct type detectors used in a positive pressure system wipe around the seal between the sampling chamber gasket and the detector shell. However, if it is an extremely high pressure system also wipe at the intersection of the shell and the detector base. If accessible also wipe the tube which turns the sample air to the duct. A wipe of that portion of the tube and mounting plate closest to the sample chamber should be sufficient (approximately 12 inches of tube).

Air Duct Type Detectors Used in a Negative Pressure System

For air duct type detectors used in a negative pressure system wipe both tubes at that portion of the tube and mounting plate closest to the sample chamber. (approximately 12 inches of tube).

If the air sampling chamber is removed for any reason then the inside of the chamber and the detector shall be wipe tested using the standard procedure. However, this procedure need not be repeated at intervals shorter than that specified on the label.

5. Place the filter paper in the plastic or paper envelope prepared for it. Only one swab shall be placed in each envelope.

6. Return all swabs to Pyrotronics, Inc., A Subsidiary of Baker Industries, Inc.,2343 Morris Avenue, Union, New Jersey, (07083), or to other approved laboratory that is specially licensed by the Atomic Energy Commission or Agreement State, to perform this function. All packages shall be shipped by express.

5.1.3 Detector Cleaning Procedure

Throughout the operation, the serviceman must maintain the care and consideration he would use when handling a contaminated product.

Material Required

1. Bench cover paper
2. Disposable plastic gloves.
3. Soft Camel Hair Brush
4. Gauze cleaning pads.
5. Cleaning detergent.

Unnecessary disassembly and cleaning of detectors is to be avoided. However, when this operation is necessary the following procedure must be followed:-

1. Opening of Detector Head

Unscrew bayonnet ring, remove outer chamber and foil carrying disc. Do not disassemble further. Parts are not interchangeable, therefore, do not mix them with those of other detectors.

2. Cleaning of Center Pin - For F5, F5A and F5B Models

Wipe center pin with clean, lint-free gauze pad moistened with detergent. (Alconox, Radiacwash or equivalent).

IMPORTANT:- Take care that no lint is brought into the air gap between the chambers. If the detector contains an insulating disc., remove the disc and dispose of it.

3. Cleaning of Foil Carrying Disc.

a. Unnecessary cleaning of the foil carrying disc is to be avoided.

b. Grip disc with tweezers or forceps and dip in detergent bath. Remove adhering dirt with brush. Rinse in clean second bath. Baths must be replaced after 50 discs have been cleaned.

c. Important.

DO NOT touch radioactive foils.

DO NOT allow the tweezers or forceps to touch the foils in any way as this might damage them and permit leakage to occur.

4. Cleaning of Outer Chamber - Model F5, F5A and F5B

a. Lightly Soiled.
Wipe inside and outside with moistened cloth.
b. Heavily Soiled.
Submerge chamber in detergent bath.
Remove dirt with brush. Let dry on clean surface.

5. Reassembly of Detector Head

Check if center pin is tight; insert foil carrying disc., into chamber, inscription "Radioactive" facing down, i.e., in direction of wire screen. Be sure that ring is laying flat and does not shift during reassembly. Reinsert plug part, set up bayonet ring and tighten firmly by turning in a clockwise direction.

6. Cleaning pads used in the operation and the used detergent must be placed in proper waste containers for disposal by burning. (See note below)

Model F3 and F3.5A Detectors.

1. Opening of Detector Head

Unscrew bayonet ring, remove outer chamber and foil carrying disc. Do not disassemble further. Parts are not interchangeable. Therefore, do not mix them with those of other detectors.

2. For - F3 and F3.5A Detector Models

Clean outer chamber by emersing in detergent. Use camel hair brush to push dirt away from center post. (Clean from inside). Do not touch radioactive foil which is mounted on the center post of the chamber.

3. Wipe collector surface, bottom of inner chamber with detergent moistened gauze taking extreme care to avoid any lint or other foreign matter from spanning or partially spanning the gap between the chamber and the outer shell.

NOTE:- If an insulator disc is present, remove the disc and dispose of it.

4. Reassemble unit by replacing outer chamber.

5. Cleaning pads and detergent wash solution must be placed in the waste container and disposed of by burning. (See note below)

5.2 Disposal Procedure

5.2.1 Waste Material used in cleaning the detectors, gauze pads, old brushes and insulation should be handled in proper waste containers. After evaluation of the wipes these materials may be disposed of by burning if free of contamination.

Liquids - The detergent cleaning baths should be disposed of by emptying into the sewer with at least a 10 to 1 ratio of water.

NOTE:- If the evaluation report indicates a contamination above .005 microcuries, all waste material and detergent must be considered contaminated and disposed of through a licensed disposal organization.

5.2.2 Damaged or leaky detectors.

These units may be disposed of through a local licensed disposal

organization or placed in a plastic bag -properly packed and returned to Pyrotronics, Inc., 2343 Morris Avenue, Union, New Jersey 07083, by Express shipment.

<u>NOTE</u>:- Please mark the package "Defective Units" - Attention - Engineering Department.

5.3 <u>Emergency Procedures</u>

For purposes of this manual "Emergency" means any situation or condition under which one may reasonably question the integrity of the radioactive foil or control of the material has been lost.

5.3.1 In the event of loss or theft of the detector, the user must report the loss as directed in Sec. 20.402 - CFR, Title 10, Chapter I, Part 20.

5.3.2 In the event of a severe fire or mechanical damage to the detector which renders the integrity of the foil questionable, rope off the area suspected of contamination and report the incident as directed in Section 20.403 - CFR - Title 10, Chapter I, Part 20.

APPENDIX D

UNITED STATES ATOMIC ENERGY COMMISSION

COMPLIANCE OFFICES

Region	ADDRESS	TELEPHONE DAYTIME	TELEPHONE NIGHTS & HOLIDAY
I Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.	Region I, Division of Compliance, USAEC 376 Hudson Street New York, New York 10014	212-989-1381	212-989-1000
II Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Panama Canal Zone, Puerto Rico, South Carolina, Tennessee, Virginia, Virgin Islands, and West Virginia.	Region II, Division of Compliance, USAEC 50 Seventh Street, Northeast Atlanta, Georgia 30323	404-873-6146	404-873-6146
III Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin.	Region III, Division of Compliance, USAEC Suite 410, Oakbrook Professional Building Oak Brook, Illinois 60523	312-654-1680	312-739-7711
IV Colorado, Idaho, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah, and Wyoming.	Region IV, Division of Compliance, USAEC 10395 West Colfax Ave Denver, Colorado 80215	303-297-4211	303-237-5095
V Alaska, Arizona, California, Hawaii, Nevada, Oregon, Washington and U.S. territories and possessions in the Pacific.	Region V, Division of Compliance, USAEC 2111 Bancroft Way Berkeley, California 94704	415-841-5620	415-841-5620

INTERORGANIZATION CORRESPONDENCE

FROM W K Groome DATE December 10, 1965

TO W F Keller SUBJECT

This will acknowledge receipt of the B-166 Radiation Training Tests by the following men:-

Frank Modica	Monsanto Co.
L F Roehl	Wm. J. Roehl, Inc.
Myron J Bernard	Sachs Electric Co.
William Reckel	Monsanto Co.
L C Weger	Monsanto Co.

The test grades indicate that these men have a sufficient knowledge of the radiation aspects associated with the Pyr-A-Larm Detector to be considered fully qualified for detector installation, maintenance and test.

This statement should be sufficient for them to qualify for an AEC License. To assist them in obtaining the AEC License, we have enclosed a format covering the application form itself, the supplementary data sheets and suggested cover letter. This format was, of course, made for distributors and both Monsanto and Sachs Electric may find it necessary to deviate from the format in certain items. Unfortunately, our supply of AEC Forms has been exhausted and replacements have not yet arrived. I suggest that you write directly to AEC in Washington,DC., and ask for the application forms.

I trust that this information will be of some service to you, if we can be of any further help, please do not hesitate to call.

W Groome

WKG/h
Encl:-

cc: G. F. Clark

A/140

74565

NRC FORM 782 U.S. NUCLEAR REGULATORY COMMISSION

MATERIALS DATA INPUT — INDUSTRIAL, MEDICAL, SOURCE, SPECIAL NUCLEAR

A. TYPE OF ACTION AND IDENTIFICATION CODES

NEW LICENSE	AMENDMENT / RENEW LICENSE	AMENDMENT TO TERMINATE	VOID	DOCKET NUMBER	MAIL CONTROL NUMBER	CHANGE NAME ADDRESS X Box
1 NEW LICENSE AND NEW LICENSEE	XX OTHER AMENDMENT	CLERICAL CHANGE NO AMENDMENT	4	030-[redacted] 12015	12688	X

B. INDICATIVE INFORMATION

INDIVIDUAL LICENSEES

NAME (Last, First, Middle)

NAME (Last, First, Middle) I4 C5

NAME (Last, First, Middle) 11/24/82 11/23/82

3 ORGANIZATION	ORGANIZATION NAME (Alphabetic Sequence): Monsanto ~~Industrial Chemicals~~ Company			
4 LICENSEES	DEPARTMENT OR BUREAU: Electronics Division			
5 ADDRESS	BUILDING, STREET: 501 Old Highway 79, P.O. Box 8	CITY: St. Peters	STATE: MO	ZIP CODE: 63376

6	TYPE OF APPLICANT	U.S. GOVERNMENT AGENCY / INDIVIDUAL LICENSEE / ORGANIZATIONAL LICENSEE	DATE REQUEST RECEIVED	INSTITUTION CODE	PENDING PROG CODE	ACTUAL PROG CODE
	333		10/04/82	16931		03717

SECONDARY PROGRAM CODES (As required)

#1	#2	#3	#4	#5
	applied for change, 1/21			

7	LICENSE NUMBER	DATE LICENSE ISSUED OR ACTION COMPLETED	EXPIRATION DATE
	24-16931-[redacted] 02E	APR 18 1983	

C. STATISTICAL INFORMATION

MEDICAL CATEGORY	FOR HUMAN USE ONLY	FOR HUMAN AND NONHUMAN USE	FOR NONHUMAN USE ONLY

POSSESSION OF THE MATERIAL IS AUTHORIZED IN ONE OF THE FOLLOWING AREAS

AND/OR IN THE STATE(S), TERRITORY(IES), COUNTRY CHECKED (At right)

X SAME AS STATE IN ADDRESS — ALL STATES — ALL NON AGREEMENT STATES

AL ALABAMA	GA GEORGIA	MD MARYLAND	NJ NEW JERSEY	SC SOUTH CAROLINA	WY WYOMING
AK ALASKA	HI HAWAII	MA MASSACHUSETTS	NM NEW MEXICO	SD SOUTH DAKOTA	
AZ ARIZONA	ID IDAHO	MI MICHIGAN	NY NEW YORK	TN TENNESSEE	AS AMERICAN SOMOA
AR ARKANSAS	IL ILLINOIS	MN MINNESOTA	NC NORTH CAROLINA	TX TEXAS	CZ CANAL ZONE
CA CALIFORNIA	IN INDIANA	MS MISSISSIPPI	ND NORTH DAKOTA	UT UTAH	GU GUAM
CO COLORADO	IA IOWA	MO MISSOURI	OH OHIO	VT VERMONT	PR PUERTO RICO
CT CONNECTICUT	KS KANSAS	MT MONTANA	OK OKLAHOMA	VA VIRGINIA	VI VIRGIN ISLANDS
DE DELAWARE	KY KENTUCKY	NB NEBRASKA	OR OREGON	WA WASHINGTON	
DC WASHINGTON DC	LA LOUISIANA	NV NEVADA	PA PENNSYLVANIA	WV WEST VIRGINIA	CN CANADA
FL FLORIDA	ME MAINE	NH NEW HAMPSHIRE	RI RHODE ISLAND	WI WISCONSIN	

D. POSSESSION LIMITS OF SOURCE AND SPECIAL NUCLEAR MATERIALS AND TRITIUM

SOURCE MATERIAL CEILING	G GRAMS / Kg KILOGRAMS	SNM CEILING	G GRAMS / Kg KILOGRAMS	IF FOR POWER REACTOR ("X" here)

*MATERIAL	AMOUNT	UNIT	CONFIG	ENRICH	*MATERIAL	AMOUNT	UNIT	CONFIG	ENRICH
U5 = U235		G / Kg	S / UNS				G / Kg	S / UNS	
U3 = U233		G / Kg	S / UNS				G / Kg	S / UNS	
PU=Plutonium		G / Kg	S / UNS				G / Kg	S / UNS	
UR=Uranium		G / Kg	S / UNS				G / Kg	S / UNS	
TH=Thorium		G / Kg	S / UNS				G / Kg	S / UNS	
		G / Kg	S / UNS				G / Kg	S / UNS	
		G / Kg	S / UNS				G / Kg	S / UNS	

H3-Tritium		CURIES / MILLICURIES / MICROCURIES	RIS CODES	A/180

*Use two-digit codes S-SEALED, UNS-UNSEALED

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