NRC Form 313 I (12-81) 10 CFR 30

U.S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE
INDUSTRIAL

1. APPLICATION FOR: *(Check and/or complete as appropriate)*

- a. NEW LICENSE
- b. AMENDMENT TO: LICENSE NUMBER
- c. RENEWAL OF: LICENSE NUMBER — X 52-15968-01

See attached instructions for details.

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.

2. APPLICANT'S NAME *(Institution, firm, person, etc.)*

TII Industries, Inc.

TELEPHONE NUMBER: AREA CODE – NUMBER EXTENSION

(809) 870-2700

3. NAME AND TITLE OF PERSON TO BE CONTACTED REGARDING THIS APPLICATION

Greg Cortés

TELEPHONE NUMBER: AREA CODE – NUMBER EXTENSION

(809) 870-2700

4. APPLICANT'S MAILING ADDRESS *(Include Zip Code)*
(Address to which NRC correspondence, notices, bulletins, etc., should be sent.)

P.O. Box 433
Toa Alta, Puerto Rico 00758

5. STREET ADDRESS WHERE LICENSED MATERIAL WILL BE USED *(Include Zip Code)*

Road 165 Km. 1.6
Toa Alta Ind. Sub. Div.
Toa Alta, Puerto Rico 00758

(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
(See Items 16 and 17 for required training and experience of each individual named below)

	FULL NAME	TITLE
a.	Nelson Torres	Department Supervisor
b.	Milton Torres	Department Supervisor
c.	Santiago Gómez	Consultant

Applicant... Check No. 012468 A. Amount, Fee Category $60. Type of Fee Renewal Date Check Rec'd 4/16/84 Received By Brown

7. RADIATION PROTECTION OFFICER

Greg Cortés

Attach a resume of person's training and experience as outlined in Items 16 and 17 and describe his responsibilities under Item 15.

8. LICENSED MATERIAL

LINE NO.	A. ELEMENT AND MASS NUMBER	B. CHEMICAL AND/OR PHYSICAL FORM	C. NAME OF MANUFACTURER AND MODEL NUMBER *(If Sealed Source)*	D. MAXIMUM NUMBER OF MILLICURIES AND/OR SEALED SOURCES AND MAXIMUM ACTIVITY PER SOURCE WHICH WILL BE POSSESSED AT ANY ONE TIME
(1)	3H	Sealed Devices		40 Ci
(2)	3H	Gas Mix		1240 Ci
(3)				
(4)				

DESCRIBE USE OF LICENSED MATERIAL

(1) See attached list

(2)

(4)

RECEIVED BY LFMB Date 6/25/84 Jane 4 II Brown

Orig. To... Action Compl. 7/16/84

3A Applicant... Check No. 012307 Amount, Fee Category $400 Type of Fee Renewal Date Check Rec'd 6/26/84 Received By Brown

8507030594 850613
REG2 LIC30
52-15968-01 PDR

NRC FORM 313 I (12-81)

1757

* Changed to 3P upon issuance per request dtd 7/9/84

Postmarked 6/18/84

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)			
(2)	N/A		
(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)	Liq. Scint. Counter	Nuclear Enterprises	LSC-2	1	Beta	38 to 10^6 CPM
(2)	Air Monitor	Johnston Labs.	Triton 955B	2	Beta	1-10,000 uCi/M^3
(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.

12. PERSONNEL MONITORING DEVICES

TYPE (Check and/or complete as appropriate.) A	SUPPLIER (Service Company) B	EXCHANGE FREQUENCY C
☐ (1) FILM BADGE		☒ MONTHLY
☐ (2) THERMOLUMINESCENCE DOSIMETER (TLD)		☐ QUARTERLY
☐ (3) OTHER (Specify): Bio Assay	In house or P.R. Nuclear Center	☐ OTHER (Specify): See attached Sect. 15

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

☒ a. LABORATORY FACILITIES, PLANT FACILITIES, FUME HOODS (Include filtration, if any), ETC. See attached

☒ b. STORAGE FACILITIES, CONTAINERS, SPECIAL SHIELDING (fixed and/or temporary), ETC. See attached

☐ c. REMOTE HANDLING TOOLS OR EQUIPMENT, ETC.

☐ d. RESPIRATORY PROTECTIVE EQUIPMENT, ETC.

14. WASTE DISPOSAL

a. NAME OF COMMERCIAL WASTE DISPOSAL SERVICE EMPLOYED

Teledyne Isotopes Westwood, New Jersey

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.

SEE ATTACHED

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.

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.

    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.

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)*
Renewal 3 A	c. NAME *(Type or print)*
(1) LICENSE FEE CATEGORY: By product material	d. TITLE
(2) LICENSE FEE ENCLOSED: $400 .00	e. DATE

8E - Gas mixtures in pressurized cylinders containing tritium and diluted with Argon and hydrogen will be procured from a licensed commercial source.

The tritium containing cylinders are installed on backfill machines and used to fill our devices thru a small copper filling tube attached to a manifold.

The manufacturing sequence to produce those devices consists of first hydrogen brazing sub-assemblies consisting of metallized ceramic cylinders joined to metallic end caps and center shells. The sub-assemblies are then leak checked at 70 psig by immersing in "freon" and looking for bubbles. Two hundred leak check devices are placed on a high vacuum manifold and evacuated to a maximum pressure of 5×10^{-5}mm of mercury prior to baking. They are then vaccum baked at 500°C and the pressure of the devices and the entire manifold system again monitored. The pressure at this point will be no greater than 10^{-5}mm of mercury prior to any attempt at backfilling with the radioactive gas mixture thus insuring leak tight integrity before gas enter into the device. The devices are backfilled with the hydrogen gas mixture at a pressure much lower than atmospheric and cold welded with a specially design tool. The gas remaining in the manifold is then evacuated and exhausted into a stack outside the building roof. The manifold is pressurized with Argon prior to reloading.

The machine gas handling manifold system consists of a completely closed loop. The manifold and tubes are kept below atmospheric pressure at all times whenever hydrogen^3 is employed. In the event of a system leak, the atmosphere is drawn into the system, thereby precluding an outflow of hydrogen^3 into the work area.

Although physical differences exist in our product line, without exceptionthey all consist of at least 2 metal electrodes and a ceramic insulator joined together under high temperature so that a hermetically sealed gas envelope is formed.

All tubes distributed under part 32.14 will generally fit outline drawing 955035 have a maximum volume of 10cc and contain no more than 1 millicurie of ^{3}H.

All devices are tested immediately after manufacture to determine if they meet breakdown specifications.

After meeting acceptance criteria devices are placed in bond for a long enough period to allow a leak rate of 1×10^{9} std cc/sec or more to change the internal pressure and thus the breakdown characteristics of the device. Devices are

100% checked after removal from bond to insure that they meet specification.

All rejected devices are recorded and denoted in the daily production log.

11b The air monitoring units will be calibrated using a calibration source supplied with the instruments.

The calibration source consists of a gas cylinder containing tritiated methane of known specific activity. A measured volume of the specific activity gas at a preset pressure is released into the monitor which in essence calibrates it.

The calibration source of the liquid scintillation counter consists of a set of ^{14}C & ^{3}H reference standards of known activity.

Calibrations will be performed semi annually.

13a

Attached is BP 1000-01 which shows the location of TII manufacturing facilities at its site in Toa Alta.

Outlined are the specific controlled areas within these manufacturing facilities showing its proximity to the other operations.

Also attached is BP 1000-031E which is a plan view showing location of all equipment and storage facilities in the controlled area within the main manufacturing facility. Shown are the 6 backfill machines on which many of our devices are made. The exhaust from each of the vacuum pumps is plumbed to a plenum chamber and stack on the roof with a calculated air movement of 10,000 CFM. Calculations on maximum tritium emissions are shown in section 14.

Attached too is BP 1000-03 which shows the roof plan over the controlled areas. These delineate stack and blower locations exhaust lines from air pumps inlet air sources to the building either through air conditioning system or windows and doors. In no case will emission points be any closer than 25 ft. to any entry point to the building.

13b

Product inventory will be stored within locked cabinets prior to distribution. Access to these facilities will be by authorized personnel

Gas cylinders containing hydrogen gas mixed with other gases will be stored in locked fire retardant cabinets located within the controlled area. The construction of the cabinets includes steel walls filled with dry insulation reinforced with wire mesh. Each drawer is separately insulated from each other being ocmpletely enclosed to seal against the entry of fire. The file cabinets have been granted a D label by Underwriters Labs certifying that they can withstand exposure to 1700°F. In addition it can be exposed to 2000°F temperatures for 1/2 hr with no accumulation of explosive gases inside. The filled gas cylinder will be supported within the drawers in cradles such as shown in the enclosed Drawing T0016-010. The cabinets are manufactured by Watson Mfg. Co. model A 41407 and Mosler Co. model A 755855. Access to these is by authorized personnel only.

14b

.) Backfilling Electron Devices

Tritium will be incorporated into our devices using pressurized gas cylinders from a commercial source. After filling the devices, the remaining gas in the tube manifold system will be exhausted to a plenum chamber on the roof with a blower system of 10,000 CFM. The maximum amount of gas that will be exhausted is as follows:

$$\frac{\text{Bottle}}{\frac{2300 \times 1140}{22}} = \frac{\text{Manifold}}{\frac{850 \times 40}{X}}$$

$$x = \frac{850 \times 40 \times 22}{2300 \times 1140} = .285 \text{ Ci/Station}$$

$10{,}000 \text{ CFM} = 2.8 \times 10^{8} \text{ Cm}^3/\text{min}$

The maximum anticipated instantaneous discharge for six stations would be:

$6 \times .285 = 1.71 \text{ Ci}$

$$\frac{17.1 \times 10^{5} \text{ uCi}}{2.8 \times 10^{8} \text{ Cm}^3} = 6.11 \times 10^{-3} \text{ uCi/cm}^3$$

The above figure surpasses the maximum allowable concentration denoted in Appendix B, Table II of 10 CFR Part 20 on an instantaneous basis.

However, if we take the weekly discharge of 2.85×10^{5} uCi each multiplied by 240, we arrive at a total of 6.84×10^{7} uCi total for the week. This activity will be diluted by the plenum chamber moving 10,000 CFM of air. Thus 10,000 x 60 min. x 168 hrs. x 28,320 $= 2.85 \times 10^{12} \text{Cm}^3$ air/wk.

Then $$\frac{6{,}84 \times 10^{7} \text{ u Ci}}{2.85 \times 10^{12} \text{cm}^3} = 2.4 \times 10^{-5} \text{ uCi/cm}^3$$

The above figure is approximately 60% of the average maximum allowable concentration of 3H that can be discharged according to 10CFR part 20.

SECTION 15

The Radiation Protection Program will consist of the following:

1) Routine

All concerned employees will undergo a training program, emphasizing good work habits, personal cleanliness and thorough housekeeping and will be issued a radiation protection manual (a copy of which is enclosed). *Note - though the manual was written for distribution to employees working in an agreement state such as New York, the same information can be used by employees working in a facility whose jurisdiction comes under the Nuclear Regulatory Commission.

Individuals involved in operations which utilize at any one time, more than 100 millicuries of Hydrogen -3 in a noncontained form other than metallic foil shall have bioassays performed prior to and within one week following a single operation and at weekly intervals for continuing operations.

Tritium shall not be used in such a manner as to cause any individual to receive a radiation exposure such that urinary excretion rates exceed 28 microcuries of tritium per liter when average over a calendar quarter.

Urinalysis shall be performed at weekly intervals on all individuals who work in the controlled areas in which tritium is used. If the average concentration of tritium in urine for any single individual during a calendar quarter is less than 10 microcuries per liter, urinalysis may be performed on that individual at monthly intervals for the following calendar quarter and may continue at monthly intervals so long as the average concentration in the calendar quarter remains below 10 microcuries per liter. The urine specimen shall be collected on the same day of the week insofar as possible.

A report of an average concentration in excess of the limit specified for any individual for a calendar quarter shall be filed within 30 days of the end of the quarter with Mr. Santiago Gomez Radiation Safety Consultant. The report shall contain the results of all urinalysis for the individual during the calendar quarter, the cause of the excessive concentrations and the corrective steps taken or planned to assure against a reocurrence.

Any individual receiving such an exposure will be immediately relieved of his job assignment and steps taken to initiate bioassay procedures, such as outlined under "Emergency Conditions" below.

No individual working with Hydrogen $^{-}3$ shall be permitted to be terminated without submission of a urine sample.

Monitoring of controlled areas will be done on a continuing basis by means of air monitors with alarm points set to indicate when values exceeding those shown in Table I, Appendix B, part 20, 10 CRF 20 are reached.

Good personal hygiene will be encouraged and thorough washing of the hands in facilities designated will be mandatory.

Wipe samples will be used to monitor surface contamination on floors, walls, tabletops, etc., both in the controlled and uncontrolled areas on a regular basis. The maximum permissible level for removable surface contamination in uncontrolled areas will be 5,000 pCi/100 cm.^{2}. Good housekeeping practices will be used to try to keep levels on exposed surfaces below 40,000 pCi/100 cm2 in controlled areas. In addition, wipe samples will also be taken on an "as needed" basis when work is done on material or devices whose external surface is contaminated. All these wipes will be done by the Radiation Safety Officer, or his designate.

2) Emergency Conditions

If the audible alarm on the Tritium "sniffer" at any time, sounds in the work area, the area will be immediately evacuated. The area supervisor, wearing protective clothing, will re-enter the area, close or cover the leaking source and reset the "sniffer". Any leak source will be found through the employment of the "sniffer". Employees in the affected area when the alarm sounds may be required to initiate bioassay procedures.

a) Inbibe liquids

b) Produce a urine sample within 1 hour after the alarm

c) Produce another urine sample within 24 hours after the alarm.

If wipe samples, at any time, denote contamination levels greater than those stated above on floors, walls, etc. this area shall be scrubbed down with water until the contamination level is brought within acceptable limits.

Any time personnel involved in the cleanup of spills, washdowns of contaminated areas or have worn Tritium contaminated clothing, emergency bio-assay procedures will be mandatory.

3) Radiation Safety Officer

It shall be the responsibility of the Radiation Safety Officer to:

a) Conduct all surveys, check and tests

b) Maintain and calibrate instrumentation used on (a) above

c) Keep record of all required surveys and tests

d) Keep record of all transfer, receipt and disposal of radiactive material

e) Record the results of all bio-assays

f) Record exposure dosages on any individuals required to be reported to the Commission

g) Report any incidents as per Par. 20.403, 20.405 and 20.409 of Part 20, Title 10 of the Code of Federal Regulations.

The Radiation Safety Consultant will conduct a visitation at least twice annually to audit the operation and insure that the program is being carried out.

TII INDUSTRIES, INC.
P. O. BOX 433, RD 165 KILOMETER 1.06
TOA ALTA, PUERTO RICO 00758
(809) 870-2700, (809) 726-4362 TELEX 3450376

June 14, 1984

'84 JUN 21 P2:50

Radioisotopes Licensing Branch
Div. of Fuel Cycle and Material Safety
U.S. Nuclear Regulatory Commission
Washington D.C. 2055

REF: Lic Num. 52-15968-01

Dear Gentlemen:

Enclosed is completed form NRC-B13-I with attachments plus a check for $400.00 to cover the fee for the renewal application of the above referenced license.

Your expeditions handling of this request would be appreciated.

Very truly yours,

TII INDUSTRIES, INC.

Raul Pelegrina
Plant Manager

RP/il

17707
17707

NRC Form 313 I (12-81) 10 CFR 30

U.S. NUCLEAR REGULATORY COMMISSION

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6. INDIVIDUAL(S) WHO WILL USE OR DIRECTLY SUPERVISE THE USE OF LICENSED MATERIAL
(See Items 16 and 17 for required training and experience of each individual named below)

	FULL NAME	TITLE
a.	Nelson Torres	Department Supervisor
b.	Milton Torres	Department Supervisor
c.	Santiago Gómez	Consultant

7. RADIATION PROTECTION OFFICER

Greg Cortés

Attach a resume of person's training and experience as outlined in Items 16 and 17 and describe his responsibilities under Item 15.

8. LICENSED MATERIAL

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(3)				
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	E DESCRIBE USE OF LICENSED MATERIAL
(1)	See attached list
(2)	
(3)	
(4)	

177.7

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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)			
(2)	N/A		
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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
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☐ 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.

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Outlined are the specific controlled areas within these manufacturing facilities showing its proximity to the other operations.

Also attached is BP 1000-031E which is a plan view showing location of all equipment and storage facilities in the controlled area within the main manufacturing facility. Shown are the 6 backfill machines on which many of our devices are made. The exhaust from each of the vacuum pumps is plumbed to a plenum chamber and stack on the roof with a calculated air movement of 10,000 CFM. Calculations on maximum tritium emissions are shown in section 14.

Attached too is BP 1000-03 which shows the roof plan over the controlled areas. These delineate stack and blower locations exhaust lines from air pumps inlet air sources to the building either through air conditioning system or windows and doors. In no case will emission points be any closer than 25 ft. to any entry point to the building.

13b

Product inventory will be stored within locked cabinets prior to distribution. Access to these facilities will be by authorized personnel

Gas cylinders containing hydrogen gas mixed with other gases will be stored in locked fire retardant cabinets located within the controlled area. The construction of the cabinets includes steel walls filled with dry insulation reinforced with wire mesh. Each drawer is separately insulated from each other being ocmpletely enclosed to seal against the entry of fire. The file cabinets have been granted a D label by Underwriters Labs certifying that they can withstand exposure to 1700°F. In addition it can be exposed to 2000°F temperatures for 1/2 hr with no accumulation of explosive gases inside. The filled gas cylinder will be supported within the drawers in cradles such as shown in the enclosed Drawing T0016-010. The cabinets are manufactured by Watson Mfg. Co. model A 41407 and Mosler Co. model A 755855. Access to these is by authorized personnel only.

14b

) Backfilling Electron Devices

Tritium will be incorporated into our devices using pressurized gas cylinders from a commercial source. After filling the devices, the remaining gas in the tube manifold system will be exhausted to a plenum chamber on the roof with a blower system of 10,000 CFM. The maximum amount of gas that will be exhausted is as follows:

$$\frac{2300 \text{ cm}^3 \text{ Bottle} \times 1140 \text{ mm Hg}}{22} = \frac{850 \text{ cm}^3 \text{ Manifold} \times 40 \text{ mm Hg}}{X}$$

$$x = \frac{850 \times 40 \times 22}{2300 \times 1140} = .285 \text{ Ci/Station}$$

285mCi/Station

200 tubes

$$10{,}000 \text{ CFM} = 2.8 \times 10^8 \text{ Cm}^3/\text{min}$$

The maximum anticipated instantaneous discharge for six stations would be:

$$6 \times .285 = 1.71 \text{ Ci}$$

$$\frac{17.1 \times 10^5 \text{ uCi}}{2.8 \times 10^8 \text{ Cm}^3} = 6.11 \times 10^{-3} \text{ uCi/cm}^3$$

The above figure surpasses the maximum allowable concentration denoted in Appendix B, Table II of 10 CFR Part 20 on an instantaneous basis.

However, if we take the weekly discharge of 2.85×10^5 uCi each multiplied by 240, we arrive at a total of 6.84×10^7 uCi total for the week. This activity will be diluted by the plenum chamber moving 10,000 CFM of air. Thus 10,000 x 60 min. x 168 hrs. x 28,320 $= 2.85 \times 10^{12}$ Cm^3 air/wk.

Then $$\frac{6{,}84 \times 10^7 \text{ u Ci}}{2.85 \times 10^{12} \text{ cm}^3} = 2.4 \times 10^{-5} \text{ uCi/cm}^3$$

The above figure is approximately 60% of the average maximum allowable concentration of 3H that can be discharged according to 10CFR part 20.

5 x 6 x 8

cycles every 1 hour

SECTION 15

The Radiation Protection Program will consist of the following:

1) Routine

All concerned employees will undergo a training program, emphasizing good work habits, personal cleanliness and thorough housekeeping and will be issued a radiation protection manual (a copy of which is enclosed). *Note - though the manual was written for distribution to employees working in an agreement state such as New York, the same information can be used by employees working in a facility whose jurisdiction comes under the Nuclear Regulatory Commission.

Individuals involved in operations which utilize at any one time, more than 100 millicuries of Hydrogen -3 in a noncontained form other than metallic foil shall have bioassays performed prior to and within one week following a single operation and at weekly intervals for continuing operations.

Tritium shall not be used in such a manner as to cause any individual to receive a radiation exposure such that urinary excretion rates exceed 28 microcuries of tritium per liter when average over a calendar quarter.

Urinalysis shall be performed at weekly intervals on all individuals who work in the controlled areas in which tritium is used. If the average concentration of tritium in urine for any single individual during a calendar quarter is less than 10 microcuries per liter, urinalysis may be performed on that individual at monthly intervals for the following calendar quarter and may continue at monthly intervals so long as the average concentration in the calendar quarter remains below 10 microcuries per liter. The urine specimen shall be collected on the same day of the week insofar as possible.

A report of an average concentration in excess of the limit specified for any individual for a calendar quarter shall be filed within 30 days of the end of the quarter with Mr. Santiago Gomez Radiation Safety Consultant. The report shall contain the results of all urinalysis for the individual during the calendar quarter, the cause of the excessive concentrations and the corrective steps taken or planned to assure against a reocurrence.

Any individual receiving such an exposure will be immediately relieved of his job assignment and steps taken to initiate bioassay procedures, such as outlined under "Emergency Conditions" below.

No individual working with Hydrogen $^{-}3$ shall be permitted to be terminated without submission of a urine sample.

Monitoring of controlled areas will be done on a continuing basis by means of air monitors with alarm points set to indicate when values exceeding those shown in Table I, Appendix B, part 20, 10 CRF 20 are reached.

Good personal hygiene will be encouraged and thorough washing of the hands in facilities designated will be mandatory.

Wipe samples will be used to monitor surface contamination on floors, walls, tabletops, etc., both in the controlled and uncontrolled areas on a regular basis. The maximum permissible level for removable surface contamination in uncontrolled areas will be 5,000 pCi/100 cm.^{2}. Good housekeeping practices will be used to try to keep levels on exposed surfaces below 40,000 pCi/100 cm2 in controlled areas. In addition, wipe samples will also be taken on an "as needed" basis when work is done on material or devices whose external surface is contaminated. All these wipes will be done by the Radiation Safety Officer, or his designate.

2) Emergency Conditions

If the audible alarm on the Tritium "sniffer" at any time, sounds in the work area, the area will be immediately evacuated. The area supervisor, wearing protective clothing, will re-enter the area, close or cover the leaking source and reset the "sniffer". Any leak source will be found through the employment of the "sniffer". Employees in the affected area when the alarm sounds may be required to initiate bioassay procedures.

a) Inbibe liquids

b) Produce a urine sample within 1 hour after the alarm

c) Produce another urine sample within 24 hours after the alarm.

If wipe samples, at any time, denote contamination levels greater than those stated above on floors, walls, etc. this area shall be scrubbed down with water until the contamination level is brought within acceptable limits.

Any time personnel involved in the cleanup of spills, washdowns of contaminated areas or have worn Tritium contaminated clothing, emergency bio-assay procedures will be mandatory.

3) Radiation Safety Officer

It shall be the responsibility of the Radiation Safety Officer to:

a) Conduct all surveys, check and tests

b) Maintain and calibrate instrumentation used on (a) above

c) Keep record of all required surveys and tests

d) Keep record of all transfer, receipt and disposal of radiactive material

e) Record the results of all bio-assays

f) Record exposure dosages on any individuals required to be reported to the Commission

g) Report any incidents as per Par. 20.403, 20.405 and 20.409 of Part 20, Title 10 of the Code of Federal Regulations.

The Radiation Safety Consultant will conduct a visitation at least twice annually to audit the operation and insure that the program is being carried out.

Gregorio Cortés Jiménez
Calle 9 X-6 Flamboyán Gardens
Bayamón, Puerto Rico 00619
Tel. 787-5321

(809)

PERSONNAL DATA :

Age : 49
Date of Birth : January 27, 1930
Birth Place : Aguadilla, P.R.
Marital Status: Married 4 childrens
Owner of my own car & home

Dependents : 4
Height : 5'6"
Weight : 153 Lbs.
Health : Excellent
Citizen : U. S. A.

EDUCATION :

Grade School - 8 years - Adams Junior High
High School - 4 years - Aguadilla Senior High
College - 2 years - University of P.R.
Vocational - Pierce Radio & Television School in New York City. Graduate in 1960.
Subjects taken- Radio, AM, FM, Brocast, B & W & Color Television. Graduated from RCA Home Study Course on transistors.
Tomás Ongay Voc. High School - Here I studied semiconductors.

Besides I have taken various courses and attended various seminars on management, Supervision, Labor Laws, Time & Motion, etc.

WORK EXPERIENCE : January 1966 - 1973

Employed by Curtis Mathes of Puerto Rico. In 1966 I started as a Technician after moving from the States to the Island. Because of previous experience I was promoted to quality control work four months later. On this job I had five persons under my control.

In September 1966 I was promoted to Board Line Supervisor with seventy persons under me. On this job we assembled and tested all printed boards used in Television sets.

1777

In 1967 I was transfered to take charge of the Coil Winding Department with two shifts employing around 130 persons. I had the opportunity of working in coil design and manufacture.

I was promoted to Assistant Production Manager in 1968. I had under me five Departments which include all the operation from assembling the printed board all the way to the consumer test and acceptance of a color T. V. Set. I was directly responsible for 7 Supervisors and around 400 employees. My responsibilities include the coordination of seven production lines and meeting their respective production and quality goals.

In 1969 I was promoted to Production Manager. This job included all production at our Plant in Puerto Rico. On this job I had eleven Supervisors and around 500 employees at the peak of the season. I worked very closely with material and quality control.

In 1972 I was promoted to Assistant Plant Manager. My duties consisted in assisting the Plant Manager in most all aspects of his work as Plant Manager. Working very closely with scheduling, cost, profit, personnel, etc.

From January 1974 to August 1978 I was Plant Manager for TII Industries, Inc., Toa Alta, P.R. responsible for the plants daily production with 200 employees under my direct supervision. Closely supervised the Tube Department. I retained all production records.

Attended radiation seminar at the National Institute for Occupational Safety and Health in Cincinnati, Ohio in 1974.

Monitored all the requirements set forth by the N.R.C. concerning our Tube Department.

From August 1978 to present, I am the Process Engineer for the Tube Department. I insure that the process is carried out as per the specifications set forth by the company. I review all records concerning the Tube manufacturing process.

HOBBIES & INTERESTS:

Include electronics, swimming, basketball and home repairs.

REFERENCES FURNISHED UPON REQUEST.

TII Industries, Inc.
Toa Alta, P.R.

GREGORIO CORTES

PROCESS ENGINEER

AGE: 49

LENGTH OF SERVICE: 5 YRS.

SCHOOLING:

A) Principles & 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

Formal Course
1 week
National Inst.
for Occupational
Safety & Health
Cinn., Ohio
5/6 - 5/10/74

Experience with radioactive material:

A)	H_3 Gas	25 Curies	Telecommunications Industries, Inc. Copiague, New York	1 month	Gas Ionization Surge Arresters
B)	H_3 Gas	900 Curies	TII Industries, Inc. Toa Alta, P.R.	4 1/2 yrs.	Gas Ionization Surge Arresters

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Public Health Service

GREGORIO CORTES

has completed the course IONIZING RADIATION

conducted by the

DIVISION OF TRAINING

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

from May 6, 1974 *to* May 10, 1974

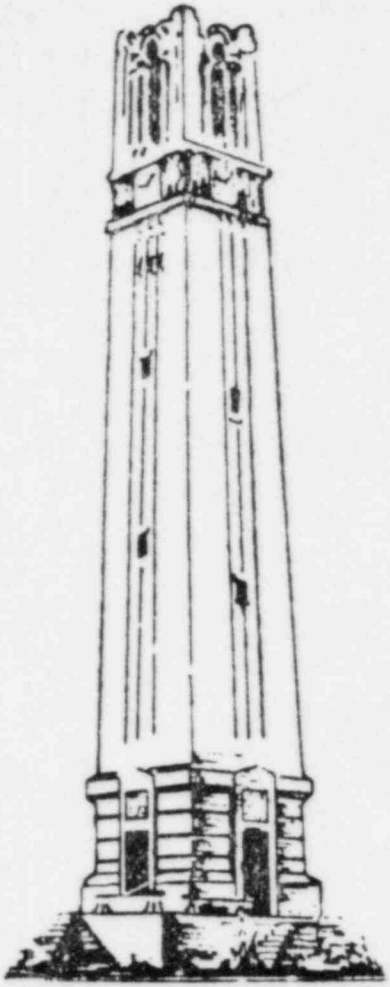
Marcus M. Key, M.D., Director
National Institute
for Occupational Safety and Health

Jeremiah Lynch, Director
Division of Training

William E. Murray
Course Director

NORTH CAROLINA STATE UNIVERSITY

AT RALEIGH



Presents this certificate to

GREGORIO CORTES

For participation in

THE PRACTICE OF LIQUID SCINTILLATION COUNTING
Short Course
May 19 - 21, 1980

Jack L. Stevens
CHANCELLOR

W. L. Turner
VICE CHANCELLOR FOR EXTENSION
AND PUBLIC SERVICE

Larry K. Monteith
DEAN OF THE SCHOOL

A CONTINUING EDUCATION PROGRAM
OF THE SCHOOL OF ENGINEERING

Oklahoma State University

DIVISION OF ENGINEERING TECHNOLOGY AND ARCHITECTURE
OKLAHOMA STATE UNIVERSITY

This is to certify that

Gregorio Cortes

Has successfully completed the

Radiation Safety Instrumentation and Compliance Seminar

conducted by Oklahoma State University
and in recognition thereof is hereby awarded this certificate.
Given at Oklahoma City, *Oklahoma this* 6th *day of* January
in the year of 1983.

Howard M. Johnson
Howard M. Johnson, Ph.D.

R. P. Rosecrans
R. P. Rosecrans, Coordinator

- R E S U M E -

NAME: MILTON R. TORRES ORTIZ

PERSONAL DATA:

Social Security Number: 103-54-4946

Sex: Male

Date of Birth: November 12, 1957
Arecibo, Puerto Rico

Marital Status: Married, 2 children

Address: A C-16 Jardines de Vega Baja
Vega Baja, Puerto Rico 00763

Tel: 858-3477

EDUCATION:

Fort Hamilton School
Brooklyn, New York 11220

1973-1976 (Diploma)

Technological Institute
Manati, Puerto Rico

Associate Degree in Electronics

1981-1984

LICENSES OWNED:

Drivers License #1541580

Goverment License #USAR-257-78

Own Car

Explosive License #111-3110-4871

cont.....

WORK EXPERIENCE:

1) T.I.I. Industries
P.O. Box 433
Toa Alta, Puerto Rico 00758

Tel: 870-2700

Electroplating Supervisor

1980-1984 (at present)

Duties: Inventory control, analysis of plating solution, personnel daily reports and general supervision.

2) Motorola Portavoz de P.R., Inc.
P.O. Box 4538
Vega Baja, Puerto Rico 00763

Tel: 858-1600

Cycle Counter Clerk
Card Deck #34

1980

Duties: Inventory and material control.

3) Aerospace System, Inc.
Road 686 Km. 15.5
Vega Baja, Puerto Rico 00763

Tel: 858-2330
858-3590

Performed and Supervised Electroplating
Explosive License

1978-1979

Duties: Supervised silver plating operation, inventory of material and storeage.

4) US Army Garrison
Fort Buchanan, Puerto Rico
Department of The Army

USAR-Student-Material Supplyman Course

1976-1978

cont.....

5) National Shoes, Inc.
5320 5th Avenue
Brooklyn , New York 11220

Duties: Salesman, Supply Clerk and Record Keeping, Performed year round inventory.

1973-1976

6) Tom McAm, Shoes, Inc.
1320 13th Avenue
Brooklyn, New York 11220

Duties: Salesman, Stock Clerk (Part Time)

1975-1976

REFERENCES:

1) Mrs. Angela Siaca
Reparto Sobrino
Marginal #40
Vega Baja, Puerto Rico 00763

2) Mrs. Yolanda Lavandero
CC-49 Conde Street
Levittown, Puerto Rico 00950

Tel: 784-7553

3) Mr. Miguel Rivera
Calle P-017
Jardines de Vega Baja
Vega Baja, Puerto Rico 00763

MILTON R. TORRES ORTIZ

DEPARTMENT OF THE ARMY

CERTIFICATE OF TRAINING

This is to certify that

SP4 MILTON R. TORRES
103-54-4946

has successfully completed

THE NBC DEFENSE OFFICER/NCO COURSE (80 HRS)

Given at 2979th USAR SCHOOL
FORT BUCHANAN, P.R.

ANIBAL SANCHEZ
COL., FC USAR
COMMANDANT

THE FOLLOWING CRITICAL PHASES WILL BE INCLUDED IN THIS COURSE

Phase I-A Survival in a Chemical Environment

Phase I-B Survival en a Nuclear Environment

Phase I-C Survival in a Biological Environment

Phase II-A Chemical Equipment and Maintenance

Phase II-B Nuclear Equipment and Maintenance

Phase II-C Logistics

Phase III-A Mission-Oriented Protective Posture (MOPP)

Phase III-B Nuclear/Chemical Predictions

Phase III-C Radiological Monitoring, Surveys, and Operational Aspects of Fallout

Phase III-D Smoke Operations

Phase III-E Unit Decontamination

Phase III-F Unit Training

Felix C. García

FELIX C. GARCIA
MAJ, FA, USAR
Dir Enl Crs.

PERSONAL SUMMARY

Nelson Torres
33 Calle Palmer
Toa Alta Puerto Rico 00758

Age: 27
Height: 5' 8"
Weight: 150 pounds

EDUCATION BACKGROUND

Was graduated from Metropolitan Vocational High School 1968 Electrician Major.

United States Air Force:

1- Tele-communication System Control Specialist Technician School
2- Communications Electronics Repairman
3- Circuit Conditioning School
4- Management Course For Military And Civilian Supervisors
5- OJT Trainer Supervisor Course

University of Lowell:

Basic Radiological Health Course
May 29 - June 9, 1978

EMPLOYMENT BACKGROUND

March, 1969 To September 1976 - Tele-communication System Control Technician Supervisor United States Air Force.

Test Equipment Used:

1- Oscilloscope
2- Distortion And Noise Meters
3- Digital Distortion Analyzer
4- VU Meters
5- Spectrum Analyzers
6- Delay Measurement Meters
7- Frequency Meters
8- Milliammeters
9- Time Base Generator
10-VTVM
11-Impedance Bridge
12-Harmonic Distortion Analyzer

Dutys And Tasks

1- Assign Personnel To Duty Positions
2- Conduct Shift Change Briefing
3- Coordinate Circuits, Channel, Or Trunk Allocations With Subscribers
4- Coordinate With DCA On Technical Problems

Duty And Tasks (Continued)

5- Maintain Circuit Files
6- Conduct Facility Rating Training
7- Concuct OJT
8- Maintain Circuit Parameter Test Report Forms
9- Maintain Master Station Log Forms
10- Maintain Quality Control Logs
11- Activate Or Test New Circuits Or Equipment
12- Analyze Cause Of Circuit Failures
13- Analyze Quality Of Digital Signals
14- Adjust Echo Suppressors
15- Adjust Line Amplifiers
16- Perform Adjustment On Amplitude Equalizers
17- Perform Adjustment On Delay Equalizers
18- Perform Composite Signal Transmision Level Tests
19- Direct Activation, Rearrangements, Or Deletions Of Circuits
20- Monitor Display Status Boards

Perform The Following Tests:

1- Envelope Delay Distortion
2- Frequency Response
3- Harmonic Distortion
4- Impulse Noise
5- Link Performance Assessment Trend Analyses
6- Maximum Allowable Channel Noise (Idle Channel Noise)
7- Phase Jitter
8- Single Tone Iterferences Tests
9- Terminal Impedance
10- Trend Analysis On Wideband Systems
11- Quality Assurance Tests On Microwave Systems
12- Fault Isolation On Cable Systems

February 19, 1979

NELSON TORRES - TECHNICAL SUPERVISOR

TII INDUSTRIES, INC.
TOA ALTA, PUERTO RICO

JOB DESCRIPTION & DUTIES

Employed from : May 1977 to present

I Responsible for the performance and reliability of all vaccum and electronic equipment in the tube department area.

a- Diagnose electronic or mechanical problems.

b- Recommend best method to perform repair, whether temporary in order to maintain equipment working until such time that equipment can be stopped or if equipment has to be stopped immediately for repairs.

c- Supervise all work done before equipment is turned on after repairs.

d- Keep a log on repairs and preventive maintenance on every piece of equipment.

e- Establish preventive maintenance program and make sure it is carried out.

f- Perform inventory of spare parts and properly mark them as to which machine, part number and supplier. Order any needed parts.

g- Perform calibration on such equipment as meters, Tritium monitor, etc.

h- Responsible for the storing and changing of Tritium gas cylinders.

I- Responsible to supply urine samples from personnel and wipe samples from the machinery whenever they are requested.

j- Must make sure safety precautions are carried out in the controlled Backfill area and report any discrepancies.

K- Responsible for three technicians under him.

Radiological Sciences & Protection

UNIVERSITY OF LOWELL

Awards this certificate to

NELSON TORRES

in recognition of the satisfactory completion of

Basic Radiological Health Course

May 29 - June 9, 1978

John B Duff
President, University of Lowell

Kenneth W. Skrable
Program Director

Toa Alta, P.R.

NELSON TORRES

ELECTRONICS SUPERVISOR

AGE: 28 years

LENGTH OF SERVICE: 2 yrs.

SCHOOLING:

A) Principles & Practices of Radiation Protection

B) Radioactivity measurement Stadardization, and Monitoring Techniques and Instruments

C) Mathematics and calculations basic to the use and measurement of radioactivity

D) Biological effects of radiation

Formal Course
2 weeks
Lowell University,
Lowell, Mass.
5/29 - 6/9/78

Experience with radioactive material:

A)	H_3 Gas	900 Curies	TII Industries, Inc. Toa Alta, P.R.	2 yrs.	Gas Ionization Surge Arresters

C U R R I C U L U M V I T A E

Photo

I.- PERSONAL DATA

Name: GOMEZ F. (last) SANTIAGO (first)

Business address: Universidad Industrial de Santander
Dpto. Física
Bucaramanga.-Colombia.

Residence address in U.S.: Calle Cabo Roberto Rivera #1154
Urb. San Agustín
Río Piedras, Puerto Rico, (00923)

Mailing address: Calle 31 # 31-41
Bucaramanga.-Colombia. Phone: 54898

Citizenship: Colombian

Place and date of birth: Zapatoca (Sder), Colombia -July 16- 1928

Height: 5' 8''

Weight: 162 pounds

Social Security Number: 584-92-1334

Resident Visa: Class SA-1 Number A-31-220-601

Marital status: Married

II.- EDUCATION

a) General Studies. (Biginning with Secundary School)

Institution (name and location)	Major	Dates attended	Degree
Seminario Claretiano -Bogotá	Humanities	1943-1947	———
Instituto de la Salle-Bogotá	Sciences	1955-1956	Bach.
Seminario M.Claretiano-Bogotá	Philosophy	1948-1950	Lic.

Seminario M.Claretiano-Manizales	Theology	1951-1954	Lic.
Universidad Nacional - Bogotá	Math.	1958-1959	----
Cath. University -Washington	Phys.	1959-1960	----

b) Post-graduate Studies.

Institution (name and location) -	Major -	Dates attended -	Degree
Cath. University - Washington	Phys.	1960-1962	M.Sc.
Univ.of Pto. Rico - San Juan	Rad.Health	1972-1973	M.Sc.

III.- SPECIALIZATION AND SEMINARS

Name, location and date.-	Courses.-
FOM.-Lab.voor Massascheiding Amsterdam 1965-1966	Experimental Physics Training.
Rutgers Univ.- New Brunswick, N.J. 1962.	PSSC Summer Course
Interam.Inst.of Phys.- Tunja (Col) 1964	University Professors Training on PSSC.
Interam.Inst.of Phys.- Cali (Col) 1965	University Professors Training on PSSC.
Methodology and Philosophy of Modern Education - Bucaramanga - 1969.	Lectures given by Prof. J. Sandefur (KSTC).
Coldness applications in Tropical Countries - Bucaramanga - 1970	Faculty Seminar.
Plasma Physics - Bucaramanga - 1971	Faculty Seminar.
PRNC - Mayaguez, P.R. 1972	Applications of Nuclear techniques to Agriculture.
National Inst. for occupational Safety and Health - San Juan, P. R. 1973	Recongnition, evaluation a Control of occupational hazards.
Medical Physics Field Training PRNC - San Juan, P.R. 1973	Summer course on Radiologi Health studies.

IV.- PUBLICATIONS AND RESEARCH

Title.-	Bibliographical data.-
Eter o Movimiento Absoluto.	Revista V. y Letras Manizales, Colombia- 1952
Facetas filosóficas del Número.	Revista V. y Letras Manizales, Colombia- 1953
Génesis del pensamiento matemático.	Revista V. y Letras Manizales, Colombia- 1953
Characteristics of A.C. Magnetic Fields as distorted by mu-metal shields.	Cath. University of America, Washington, D.C. 1962
Conferencia de Física III- Ondas y Partículas.	Universidad Industrial de Santander-Bucaramanga-1970
Efectos de la radiación gama en los constitutivos bioquímicos del plátano.	PRNC - Mayaguez, P.R. 1972
Estudio del efecto combinado de radiación gamma y N_6-Bensyl-Adenine en la preservación del mango Mayaguezano.	PRNC - Mayaguez, P.R. 1972
Trazado de curvas isodósicas en fantoma expuesto a radiación de Co-60 en una Unidad de Teleterapia utilizando TLD.	PRNC - San Juan,P.R. 1973
Estudio y evaluación de riesgos ocupacionales por exposición a la radiación ionizante.	PRNC - San Juan, P.R. 1973
Aspectos generales en el establecimiento de Plantas Nucleares.	Universidad de Puerto Rico Escuela de Medicina - 1973

V.- MEMBERSHIP IN PROFESSIONAL OR SCIENTIFIC SOCIETIES

Asociación Colombiana de Física.

ACEACE (Asociación Colombiana para el Avance de la Ciencia).

Health Physics Society, P.R.

AAPM (American Association of Physicists in Medicine).

VI.- EXPERIENCE

1) Title of position: Full time Titular Professor.
Dates: August 1973
Employer and address: UIS.- Bucaramanga - Colombia.
Description of work: Professor of Medical Physics and coordinator of new courses of Radiological Health at the School of Medicine.

2) Title of position: Lecturer at School of Medicine.
Dates: Oct. - Dec. 1973
Employer and address: UIS.- Bucaramanga - Colombia.
Description of work: Nine lectures on Physics of Radiation and applications in Nuclear Medicine and Therapy.

3) Title of position: Vice-director of Air Quality Control Program.
Dates: Jan. 1974
Employer and address: UIS & Western Kentucky University Department of Investigations . UIS.-Bucaramanga - Colombia.
Description of work: Determination of Atmospheric Pollution Level of Bucaramanga and environs using five stations containning Paper Tape Sampler and Pollen Count. H.Vol. Sampler....etc.

4) Title of Position: Researcher.
Dates: Jan. - July 1972
Employer and address: PRNC - Mayaguez, P. R.
Description of work: Plantain and mangoes preservation by radiation.

5) Title of Position: Coordinator of studies.
Dates: 1971-1972
Employer and address: UIS.- Bucaramanga-Colombia.
Description of work: Coordinator of the degree of licentiate in physics.

6) Title of Position: Part time professor of physics.
Dates: 1972-1973
Employer and address: University of Puerto Rico, San Juan.
Description of work: Professor of General Physics Lab. at the

Department of General Studies.

7) Title of position: Full time Associate Professor.
Dates: 1967-1971
Employer and address: UIS.-Bucaramanga - Colombia.
Description of work: Professor of Physics III for Engineers. Contain: Harmonic motion.Ondulatory motion.Acustic and electro magnetic waves.Geometrical and physical Optics. Elements of Quantum Physics. Atomic and nuclear physics. Level: Physics for students of science and engineering. (Halliday & Resnick) General Physics (Sears & Zemansky) - Berkeley Physics Courses.

8) Title of position: Full time Assistent Professor.
Dates: 1963-1966
Employer and address: UIS.- Bucaramanga - Colombia.
Description of work: Professor of General Physics for Engineers Contain: Particle kinematics. Particle dynamics. Work and energy. Rotational kinematics and dynamics. Momentum. Fluid statics and dynamics. Heat and themodynamics. Level: Physics for students of science and engineering (Halliday & Resnick) - General Physics (Sears & Zemansky).

VII.- REFERENCES

Full name:	Address:	Business or occu
Doctor Peter Paraskevoudakis	Bureau of Radiological Health 1901 Chapman Avenue Rockville, Maryland (20852)	Director of Divi of Radioactive M rials and Nuclea Medicine.
Doctor Carlos F. Guerra	UIS.- Bucaramanga Colombia.	President of the University.
Doctor E. Theodore Agard	Pto.Rico Nuclear Center Caparra Heights Station San Juan, P. R (00935)	Director Medical Physics Program.

Signature, Santiago Gómez F.

UNIVERSIDAD NACIONAL DE COLOMBIA

FACULTAD DE MATEMATICAS

SECRETARIA

REFERENCIA

AL CONTESTAR CITESE ESTE NUMERO

El suscrito Secretario de la Facultad de Matemáticas

H a c e c o n s t a r:

Que el R. P. SANTIAGO DE JESUS GOMEZ FIGUEROA obtuvo en el año de 1958 las siguientes calificaciones en las materias cursadas en esta Facultad:

Algebra.....	3.4	(tres, cuatro)
Geometría Analítica y Trigonometría...	3.9	(tres, nueve)

Según dato suministrado por la Facultad de Ingeniería, en las materias cursadas allí obtuvo las siguientes notas finales:

Física.....	3.6	(tres, seis)
Inglés.....	4.3	(cuatro, tres)
Química.....	3.9	(tres, nueve)

Nota aaprobatoria: 3.0 (tres, cero) = Calificación de Cero (0) a cinco (5)

Bogotá, agosto 11 de 1959.

Eduardo Caro Cayzedo
Secretario

SECRETARIO FACULTAD DE MATE. TICAS

UNIVERSIDAD NACIONAL DE COLOMBIA

FACULTAD DE MATEMATICAS

SECRETARIA

REFERENCIA

AL CONTESTAR CITESE ESTE NUMERO

Bogotá, Agosto 31 de 1.959

EL SE.OR SECRETARIO DE LA FACULTAD DE MATEMATICAS Y ESTADISTICA

H A C E C O N S T A R :

que el Reverendo Padre Santiago de Jesus Goñez asistió regularmente a las clases de Cálculo, Geometría Vectorial y Física general que se dictaron durante el primer periódo.

EDUARDO CARO CALLEDO

SECRETARIO

SECCION

THE CATHOLIC UNIVERSITY OF AMERICA

ON THE RECOMMENDATION OF THE FACULTY OF

THE GRADUATE SCHOOL OF ARTS AND SCIENCES

THE TRUSTEES OF THE CATHOLIC UNIVERSITY OF AMERICA
BY VIRTUE OF THE AUTHORITY VESTED IN THEM BY THE
CONGRESS OF THE UNITED STATES HAVE CONFERRED UPON

SANTIAGO GOMEZ FIGUEROA

THE DEGREE OF

MASTER OF SCIENCE

TOGETHER WITH ALL HONORS, RIGHTS, AND PRIVILEGES
PERTAINING THERETO IN RECOGNITION OF THE FULFILLMENT
OF ALL REQUIREMENTS FOR THIS DEGREE.
GIVEN IN WASHINGTON, D.C., NOVEMBER 29, 1962.

Clarence C. Walton
PRESIDENT

Catherine R. Rich

DUPLICATE

Colombia

U. NAC. UNIV. NACIONAL
INDIA

Major Subject

Minor Subject

Dissertation Title Approved

Dissertation Approved 4-17-52

Major Comprehensive Exam Passed 12-25-52 Oral

Compiled language requirements: French

Comprehensive Examinations Passed

Final Oral

German

Others

Major

1st minor

2nd minor

ly 16, 1928

CANDIDACY FOR DEGREE. DATE:

Department No.	Course No.	DESCRIPTION OF COURSE	Grade 1st	Grade 2nd	Grade Sum	Credit Hours 1st	Credit Hours 2nd	Credit Hours Sum
Phy	501	Introduction to Modern Physics	C	E		4	4	
Math	203	Analytical Geometry & Calculus III		D			4	
Phy	512	Sound		B			4	
PHYS	57	FOUNDATIONS OF PHYSICS	1			3		2
1 PHYS	5	INTER ELECT & MAGNETISM	S					
61 PHYS	5	PHYSICS PRO SEMINAR	S					
61C E	5	APPLIED MATHEMATICS		A			3	
61 PHYS	5	ELECTRONICS		C			4	
061s ENGR	525	Applied Math with Engr.			3			3
61 PHYS	57	ATOMIC PHYSICS	B			3		
062 PHYS	576	ATOMIC PHYSICS		C			3	
1962		DISSERTATION	-			6		

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THIS STUDENT IS ENTITLED TO A STATEMENT OF GOOD STANDING

Puerto Rico Nuclear Center

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U. S. Atomic Energy Commission

by this

Certificate

does declare that

MR. SANTIAGO GOMEZ

has successfully completed its program in

APPLICATION OF NUCLEAR TECHNIQUES TO AGRICULTURE
(FOOD PRESERVATION)

offered during the period

JANUARY 12 – JULY 31, 1972.

Witness our hand and seal.

PUERTO RICO NUCLEAR CENTER · AEC-UPR ·

Lawrence A. Richards

Acting Director, Puerto Rico Nuclear Center

James K. Koo

Head of Division

AUCTORIBUS · PROFESSORIBUS · QUIBUS · HOC · MUNUS · COMMISSUM · EST

CURATORES

UNIVERSITATIS · PORTORICENSIS

Santiago Gómez Figueroa

AD · GRADUM

Magistri Scientiarum Radiologicae Valetudinis

ADMISERE · EIQUE · OMNIA · JURA · HONORES · PRIVILEGIA · AD · HUNC GRADUM · PERTINENTIA · CONCESSERE .

IN · CUIUS · REI · TESTIMONIUM · NOS · HUIUS · UNIVERSITATIS · RITE CONSTITUTI · MAGISTRATUS · HUIC · DIPLOMATI · NOMINA · NOSTRA SUBSCRIPSIMUS · ET · NOSTRAE · UNIVERSITATIS · SIGILLUM APPONI · CURAVIMUS .

DATUM · IN · URBE RIO PIEDRAS PUERTO · RICO · DIE TRICESIMO PRIMO MENSIS JULII ANNO · DOMINI · MCMLXXIII

PRAESES

PRAESES · CURATORUM

DECANUS

CANCELLARIUS

ADMITTED FROM Catholic University of America, Wash. D.C. DATE Aug. 1972

ADMITTED TO Master in Radiological Health

BASIS FOR ADMISSION: B.S.

TRANSFERRED TO:

DATE AND PLACE OF BIRTH July 16, 1929, Colombia SEX: M

PARENT OR GUARDIAN:

H. S. GRADES PERCENTILE ENTRANCE EXAM PERCENTILE

DEGREES OR DIPLOMAS ISSUED:
MASTER OF SCIENCE IN RADIOLOGICAL HEALTH
JULY 31 1973

UNIVERSITY OF PUERTO RICO
MEDICAL SCIENCES CAMPUS
Record of

GOYZ Figueroa, Santiago 93-360

Calle 31 # 31-41 Bucaramanga, Colombia S.A.

CONCENTRATION:

COURSE NUMBER & TITLE	GRADES 1ST SEM	GRADES 2ND SEM	GRADES SUMMER	SEM HRS CR	HONOR POINTS
1972-1973					
[illegible] Fundamentals on Public Health Administration	B			2	6
[illegible] Statistical Methods	A			3	12
[illegible] Environmental Health	A			3	12
[illegible] Radiation Physics	B			2	6
PRHC 505 Radiation Chemistry	C			2	4
PRHC 510 Radiation Biology	B			2	6
PRHC 520 Radiation Detection	A			2	8
[illegible] Basic Electronics	B			2	6
[illegible] Industrial Hygiene and Accident Prevention		W		-	-
[illegible] Seminar in Radiological Health		P		6	12
[illegible] Radiation Dosimetry		A		4	16
[illegible] Radiation Effects on Mammals and Humans		B		4	12
PRHC [illegible] Radiation Hazards and Protection		A		2	8
[illegible] X-Ray Protection		A		1	4
PRHC [illegible] Decontamination and Waste Management		A		1	4
PRHC [illegible] Laws and Regulation in Radiological Health		B		3	9
PRHC [illegible] Radioactivity of the Environmental		B		2	6
PRHC [illegible] Safety on Reactor Operations		A		1	4
PRHC 550 Industrial Hygiene		C		2	4
1973-1974					
PRHC 500 Field Practice			S	6	-

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UNIT OF CREDIT: 1 SEM HR CR = 1 HR OF RECITATION OR 3-4 HRS OF LAB OR 2 HRS OF LANGUAGE DRILL PER WK DURING A SEM (17 WKS)

GRADES: A-EXCELLENT B-GOOD C-SATISFACTORY D-PASSING BUT DEFICIENT F-FAILURE W-WITHDREW OFFICIALLY P-PASSED (NOT CONSIDERED FOR GRADE INDEX) NR-NO GRADE REPORTED E-PROVISIONAL GRADE H-SATISFACTORY WORK IN HONOR COURSE S-SATISFACTORY I-INCOMPLETE

REMARKS:

IN GOOD STANDING

CERTIFIED AS CORRECT: AUG 1 DATE

Gladys Torres de Rosa
REGISTRAR

NOT VALID WITHOUT SEAL & SIGNATURE

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