



UNION CARBIDE CORPORATION
P. O. BOX 8361, SOUTH CHARLESTON, W. VA. 25303

PMS File No.: 8476542

Mr. Paul R. Guinn
U.S. Nuclear Regulatory Commission
Materials Radiation Protection
101 Marietta 54, N.W.
Suite 2906
Atlanta, Ga. 30303

Applicant...	00306L	Date: March 16, 1984
Check No...	40-3K	
Amount/Fee...	\$40-3K	
Type of Fee...	Renewal	
Date Check Recd...	4/12/84	
Received By...	Brown	

4/84 3K

Dear Mr. Guinn,

Our USNRC license 47-00260-02 expires April 30, 1984. We would like to make several revisions to our license. We currently hold three licenses 47-00260-02, -06 and -09 which we would like to combine into one license. The -02 license is a broad scope license for use of sealed sources, the -06 is a broad scope license for unencapsulated material and the -09 license permits us to use Am 241:Be for testing steel vessels for carbon build-up. I propose revising the -02 license authorized uses to encompass the activities covered by the other two licenses and to let those two licenses lapse.

We have experienced significant changes in our organization and business objectives in the last few years. Our name has changed to the Process Measurement Systems organization of the Union Carbide Engineering & Technology Services Division. We are still based at our Technical Center in So. Charleston, WV, and provide services to the Technical Center's Engineering and Research & Development organizations as well as to other Union Carbide facilities across the country.

Our new Engineering and Technology Services Division was organized to market its skills and technology to non-Union Carbide clients on a worldwide basis. As a result of this, we would like to be able to also offer our skills and knowledge in the application and installation of nuclear gauging devices to our non-Union Carbide clientele. I am therefore seeking to revise our license to permit us to install nuclear gauging devices at any facility properly licensed to possess and use that particular material and device.

We have also perceived a market for using our nuclear gauging technology to make spot analyses of material level and density in process vessels. This activity involves using a portable radiation source and detector to make field analyses of process level and/or density. This technique is very useful in such activities as locating a material plug in a pipe, defining the material level in a vessel, or identifying the improper operation of a distillation column. The attached procedure was developed to assure the propriety and safety of such operations. We would like to be able to offer this service as well as the carbon build-up detection service offered on our -09 license to non-Union Carbide clients of our Division.

47-00260-02

Information in this record was deleted
in accordance with the Freedom of Information
Act, exemptions 6
FOIA 2007-0179

D-7

We have purchased a Troxler Laboratory Model 3216 Roof Moisture Gauge. A representative of Troxler has demonstrated the use of the device to us. We would like to be licensed to use this device under our broad scope license.

The reorganization of our Division has included personnel changes which will affect our Radioactive Materials Committee. The chairman of the committee and RPO has changed from J. H. Brubaker to M. L. Green. F. P. Straccia and D. G. Allport have been replaced on the committee by J. A. Boggess and W. S. Kennedy. The pertinent biographical information on committee members has been updated and attached to this letter.

I have updated and revised the Technical Center Radiological Control Manual. A copy is attached with the significant revisions underlined in red. A check to cover the fee for license renewal is also attached to this letter.

This letter and revised Technical Center Radiological Control Manual supersedes all previous documents. We will continue to operate in accordance with this document, our existing three licenses, except as modified by this document, and all applicable NRC regulations and license conditions.

If you have any questions or comments on the changes in our license please call me on (304) 747-5314.

Yours truly,



M. L. Green, RPO
Process Measurement Systems
ENGINEERING & TECHNOLOGY SERVICES DIV.

MLG/pl

Attachments

Doc. 0148C

KEYWORDS: PMS, RADIOLOGIAL, LICENSE, NRC, RENEWAL, MLG

NRC Form 313 I (12-81) 10 CFR 30		U.S. NUCLEAR REGULATORY COMMISSION		1. APPLICATION FOR: <i>(Check and/or complete as appropriate)</i>	
APPLICATION FOR BYPRODUCT MATERIAL LICENSE INDUSTRIAL				<input type="checkbox"/> a. NEW LICENSE	
<i>See attached instructions for details.</i> Completed applications are filed in duplicate with the Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety, and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555 or applications may be filed in person at the Commission's office at 1717 H Street, NW, Washington, D. C. or 7915 Eastern Avenue, Silver Spring, Maryland.				<input checked="" type="checkbox"/> b. AMENDMENT TO: LICENSE NUMBER 47-00260-02	
				<input checked="" type="checkbox"/> c. RENEWAL OF: LICENSE NUMBER 47-00260-02	
2. APPLICANT'S NAME <i>(Institution, firm, person, etc.)</i> Union Carbide Corp., Engineering & Technology Services Div., Process Measurement Systems TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION (304) 747-5000			3. NAME AND TITLE OF PERSON TO BE CONTACTED REGARDING THIS APPLICATION Michael L. Green - Staff Engineer TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION (304) 747-5314		
4. APPLICANT'S MAILING ADDRESS <i>(Include Zip Code)</i> <i>(Address to which NRC correspondence, notices, bulletins, etc., should be sent.)</i> Bldg. 740 P. O. Box 8361 South Charleston, WV 25303			5. STREET ADDRESS WHERE LICENSED MATERIAL WILL BE USED <i>(Include Zip Code)</i> 3200-3300 Kanawha Turnpike So. Chas., WV 25303		
(IF MORE SPACE IS NEEDED FOR ANY ITEM, USE ADDITIONAL PROPERLY KEYED PAGES.)					
6. INDIVIDUAL(S) WHO WILL USE OR DIRECTLY SUPERVISE THE USE OF LICENSED MATERIAL <i>(See Items 16 and 17 for required training and experience of each individual named below)</i>					
FULL NAME			TITLE		
a. To be used by individuals designated by the Radiation Safety Committee					
b. Michael L. Green			Chairman		
c.					
7. RADIATION PROTECTION OFFICER Michael L. Green			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.	ELEMENT AND MASS NUMBER	CHEMICAL AND/OR PHYSICAL FORM	NAME OF MANUFACTURER AND MODEL NUMBER <i>(If Sealed Source)</i>	MAXIMUM NUMBER OF MILLICURIES AND/OR SEALED SOURCES AND MAXIMUM ACTIVITY PER SOURCE WHICH WILL BE POSSESSED AT ANY ONE TIME	
(1)	Any byproduct material with atomic numbers 1-83, excluding alpha emitters	Any		300 curies	
(2)	Americium-241	Sealed Sources		25 curies	
(4)	Total Possession Limit =			325 curies	
DESCRIBE USE OF LICENSED MATERIAL E					
(1)	Radioactive material in the form of sealed sources to be used for: 1) development, application, installation, & maintenance of measurement & control devices; 2) field analysis of process density and level, 3) location of carbon in steel vessels, 4) sample analysis in gas chromatography units and instrument calibration. Unencapsulated materials will be used in research and development as defined in Section 30.4(q) of 10 CFR 30.				
8409180022 840731 NMS LIC30 47-00260-02 PDR					

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)	NRC-approved source holders as supplied					
	by commercial vendors except for a few					
	small ≤ 1 mCi special form Cs-137 sources					
	which are kept in lead pigs.					

10. RADIATION DETECTION INSTRUMENTS						
LINE NO.	TYPE OF INSTRUMENT A	MANUFACTURER'S NAME B	MODEL NUMBER C	NUMBER AVAILABLE D	RADIATION DETECTED (alpha, beta, gamma, neutron) E	SENSITIVITY RANGE (milliroentgens/hour or counts/minute) F
(1)	See Technical	Center Radiological Control Manual, Chapter XI,				
(2)		"Radiation Physics Laboratory"				
(3)						
(4)						

11. CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10	
<input type="checkbox"/> a. CALIBRATED BY SERVICE COMPANY NAME, ADDRESS, AND FREQUENCY	<input checked="" type="checkbox"/> b. CALIBRATED BY APPLICANT <i>Attach a separate sheet describing method, frequency and standards used for calibrating instruments.</i> See Radiological Control Manual, Chapter VIII

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

13. FACILITIES AND EQUIPMENT (Check where appropriate and attach annotated sketch(es) and description(s).)	
<input checked="" type="checkbox"/> a. LABORATORY FACILITIES, PLANT FACILITIES, FUME HOODS (Include filtration, if any), ETC.	
<input checked="" type="checkbox"/> b. STORAGE FACILITIES, CONTAINERS, SPECIAL SHIELDING (fixed and/or temporary), ETC.	
<input checked="" type="checkbox"/> c. REMOTE HANDLING TOOLS OR EQUIPMENT, ETC.	
<input type="checkbox"/> d. RESPIRATORY PROTECTIVE EQUIPMENT, ETC. See Radiological Control Manual, Chapter XI	

14. WASTE DISPOSAL	
a. NAME OF COMMERCIAL WASTE DISPOSAL SERVICE EMPLOYED Chem Nuclear, Inc., Barnwell, SC	
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. Sealed sources will be returned to manufacturer whenever possible. We do not currently have any unencapsulated materials on hand.	

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:

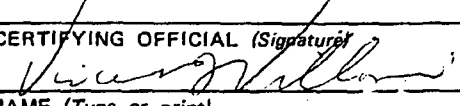
15. **RADIATION PROTECTION PROGRAM.** Describe the radiation protection program as appropriate for the material to be used including the duties and responsibilities of the Radiation Protection Officer, control measures, bioassay procedures (if needed), day-to-day general safety instruction to be followed, 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 <i>(See Section 170.31, 10 CFR 170)</i> <p align="center">\$110.00</p>	b. CERTIFYING OFFICIAL (Signature)  c. NAME (Type or print) <p align="center">V. F. Villani</p>
(1) LICENSE FEE CATEGORY: 3L	d. TITLE <p align="center">Director of Engineering & Tech. Serv.</p>
(2) LICENSE FEE ENCLOSED: \$ 110.00	e. DATE March 16, 1984

ATTACHMENT 1

PROCEDURES FOR FIELD ANALYSIS OF LEVEL AND DENSITY

"Field Analysis" means the use of process nuclear gauge hardware and/or sensitive laboratory electronic devices to make level and density measurements of a non-permanent or investigative nature. The source holder and detector are not permanently mounted to the structure but are hand-held or controlled by nuclear application technicians. The radiation sources used are source-source holder combinations such as those supplied by Ohmart Corporation or Texas Nuclear Corporation for process level and density gauges. Typical source holders used are Texas Nuclear 5192 or 5176, and Ohmart SR-1 or SHLG-1. Characteristically, these all are lead filled steel vessels with a lockable on-off shutter and tightly collimated beam ports (5° to 10°). An exception to this general rule are a couple of small (≤ 1 mCi) special form encapsulated sources which have been placed in fabricated lead pigs. All source holders have less than 5 mr/hr fields at 12" from their surface except for the directed radiation beam. Sources are normally selected to produce radiation fields of 1 to 10 mr/hr at the detector.

This work will be performed or supervised by senior nuclear applications personnel, normally the RPO or his alternate. All participating personnel will wear film badges. Auxiliary personnel occasionally required by work site conditions such as hoist operators or chemical safety monitors will be briefly instructed as to the nature and hazards of the activity, issued pocket dosimeters and kept out of any radiation fields. All other personnel will be cleared from the area. Operations will be conducted in a manner consistent with all requirements of 10 CFR Part 20.

The radiation source will be kept under the supervision of UCC nuclear applications personnel at all times during use. During short work breaks, it will be locked in the OFF position and secured to the structure. When not in use, the source will be stored in the facility's radioactive materials storage area. If the facility does not have a storage area, a temporary storage area will be created and posted with signs such that the material is inaccessible to unauthorized personnel. After the source is placed in the storage area, the area perimeter will be surveyed to assure that the area is in compliance with 10 CFR Part 20.

ATTACHMENT 2

RADIATION SAFETY COMMITTEE

The following people are current members of the Radiation Safety Committee. An amendment to this license will be necessary to alter this list.

J. H. Brubaker		Management
C. R. Landfried		Nucleonics Applications
M. L. Green	(RPO)	Nucleonics Applications
H. C. Cavender		Purchasing
J. A. Boggess	(ALT.RPO)	Radiation Safety
W. S. Kennedy		" "

Each person's training and experience are on the following pages.

USER TRAINING

Proposed users of radioactive material controlled by this license must complete the Technical Center Radiation Protection Officer's Training Course. Completion of the course and successful completion of the subsequent examination is considered an acceptable level of knowledge by the Radiation Safety Committee for an individual to assume user duties.

The RPO Training Course Manual was submitted for review with our letter of February 8, 1979. It is substantially unchanged with the exception of minor additions and updating of regulations.

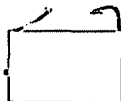
M. L. GREEN

<u>TYPE OF TRAINING</u>	<u>WHERE TRAINED</u>	<u>DURATION OF TRAINING</u>	<u>ON THE JOB</u>	<u>FORMAL COURSE</u>
a. Principles and practices of radiation protection	University of Kentucky	9 Months	No	Yes
	University of Kentucky	3 Months	Yes	No
	Mound Lab. (AEC)	39 Months	Yes	No
	University of Cincinnati	8 Months	No	Yes
	Union Carbide Corporation	6 Months	Yes	No
b. Radioactivity measurement standardization and monitoring techniques and instruments	University of Kentucky	9 Months	No	Yes
	University of Kentucky	3 Months	Yes	No
	Mound Lab. (AEC)	39 Months	Yes	No
	University of Cincinnati	8 Months	Yes	No
	Union Carbide Corporation	6 Months	Yes	No
	Harvard School of Public Health (4-84)	1 week	No	Yes
c. Mathematics and calculations basic to the use and measurement of radioactivity	University of Kentucky	9 Months	No	Yes
	University of Cincinnati	8 Months	No	Yes
	Union Carbide Corporation	3 Months	Yes	No
d. Biological effects of radiation	University of Kentucky	5 Days	No	Yes
	Mound Lab. (AEC)	39 Months	Yes	No

<u>EXPERIENCE (M. L. GREEN)</u>				
<u>ISOTOPE</u>	<u>MAXIMUM AMOUNT</u>	<u>WHERE EXPERIENCE GAINED</u>	<u>DURATION OF EXPERIENCE</u>	<u>TYPE OF USE</u>
U-238	Kilograms	University of Kentucky	3 Months	Sub-Critical Reactor
Classified	Classified	Monsanto Research Corp- oration	39 Months	Classified
Cs-137	Curies	Union Carbide Corporation	13 Years	Gauging
Ra-226	m Curies	Union Carbide Corporation	3 Years	Gauging
Xe-133	m Curies	Union Carbide Corporation	6 Months	Tracer
Cs-137	m Curies	Union Carbide Corporation	6 Months	Tracer
Am-241	Curies	Union Carbide Corporation	10 Years	Testing & Gauging
C-14	m Curies	Union Carbide Corporation	5 Years	Tracer Studies

EDUCATION

B.S.



Physics - University of Kentucky

MLG/pl
#0148C

J. A. BOGGESS

<u>TYPE OF TRAINING</u>	<u>WHERE TRAINED</u>	<u>DURATION OF TRAINING</u>	<u>ON THE JOB</u>	<u>FORMAL COURSE</u>
a. Principles & practices of radiation protection	Union Carbide Corp.	8 years	Yes	No
	UCC RPO School	1 week	Yes	Yes
	Army CBR Training	2 weeks	No	Yes
b. Radioactivity measurement standardization & monitoring techniques & instruments	Union Carbide Corp.	8 years	Yes	No
	UCC RPO School	1 week	Yes	Yes
	Army CBR Training	2 weeks	No	Yes
c. Mathematics & calculations basic to the use & measurement of radioactivity	Union Carbide Corp.	8 years	Yes	No
	UCC RPO School	1 week	Yes	Yes
	Army CBR Training	2 weeks	No	Yes
d. Biological effects of radiation	Union Carbide Corp.	8 years	Yes	No
	UCC RPO School	1 week	Yes	Yes
	Army CBR Training	2 weeks	No	Yes

EXPERIENCE (J. A. BOGGESS)

<u>ISOTOPE</u>	<u>MAXIMUM AMOUNT</u>	<u>WHERE EXPERIENCE GAINED</u>	<u>DURATION OF EXPERIENCE</u>	<u>TYPE OF USE</u>
Cs-137	Curies	Union Carbide Corp.	17 years	Density and Level Gauge, Tracer
Co-60	Curies	Union Carbide Corp.	11 years	Density and Level Gauge
Ra-226 & daughters	Millicuries	Union Carbide Corp.	11 years	Density and Level Gauge, R&D
C-14	m Curies	Union Carbide Corp.	8 years	R&D Tracer
H-3	m Curies	Union Carbide Corp.	6 years	Tracer
Xe-133	m Curies	Union Carbide Corp.	3 months	Tracer
Kr-79	m Curies	Union Carbide Corp.	3 months	Tracer
Sr-90	m Curies	Union Carbide Corp.	8 years	R&D
Au-198	m Curies	Union Carbide Corp.	1 year	Tracer
I-131	m Curies	Union Carbide Corp.	3 months	Tracer
Cs-131	m Curies	Union Carbide Corp.	3 months	Tracer
Rb-86	m Curies	Union Carbide Corp.	3 months	Tracer
Am-241-Be	m Curies	Union Carbide Corp.	9 years	Carbon Measurement

W. S. KENNEDY

<u>TYPE OF TRAINING</u>	<u>WHERE TRAINED</u>	<u>DURATION OF TRAINING</u>	<u>ON THE JOB</u>	<u>FORMAL COURSE</u>
a. Principles & practices of radiation protection	Union Carbide Corp. W. Va. Tech U. S. Air Force	9 years 1 month 4 years	Yes No Yes	No Yes No
b. Radioactivity measurement standardization & monitoring techniques & instruments	Union Carbide Corp.	9 years	Yes	No
c. Mathematics & calculations basic to the use & measurement of radioactivity	Union Carbide Corp. W. Va. Tech	9 years 3 months	Yes No	No Yes
d. Biological effects of radiation	Union Carbide Corp. U. S. Air Force	9 years 4 years	Yes Yes	No No

EXPERIENCE (W. S. KENNEDY)

<u>ISOTOPE</u>	<u>MAXIMUM AMOUNT</u>	<u>WHERE EXPERIENCE GAINED</u>	<u>DURATION OF EXPERIENCE</u>	<u>TYPE OF USE</u>
Cs-137	Curies	Union Carbide Corp.	9 years	Density & level gauge
Ra-226	m Curies	Union Carbide Corp.	9 years	Density & level gauge
Co-60	m Curies	Union Carbide Corp.	9 years	Density & level gauge
C-14	m Curies	Union Carbide Corp.	9 years	R&D
H-3	Curies	Union Carbide Corp.	2 years	R&D
Sr-90	Curies	Union Carbide Corp.	2 years	Density & level gauge
I-131	Microcuries	Union Carbide Corp.	2 years	R&D
Po-210-Bi	Curies	Union Carbide Corp.	1 year	Carbon Detection
Am-241-Bi	Curies	Union Carbide Corp.	9 years	Carbon Detection
Cd-109	Microcuries	Union Carbide Corp.	2 years	Counting Standardi- zation
Ba-133	Microcuries	Union Carbide Corp.	2 years	Counting Standardi- zation
Cl-36		Union Carbide Corp.	2 years	Counting Standardi- zation

Mr. Kennedy also participates in instructing a one-week short course in radiation protection for Union Carbide Corporation.

J. H. BRUBAKER

<u>TYPE OF TRAINING</u>	<u>WHERE TRAINED</u>	<u>DURATION OF TRAINING</u>	<u>ON THE JOB</u>	<u>FORMAL COURSE</u>
a. Principles and practices of radiation protection	Union Carbide Corp. RPO School	2 weeks	Yes	Yes
b. Radioactivity measurement standardization & monitoring techniques & instruments	Union Carbide Corp. RPO School	2 weeks	Yes	Yes
c. Mathematics & calculations basic to the use and measurement of radioactivity	Union Carbide Corp. RPO School	2 weeks	Yes	Yes
	Univeristy of Florida	9 months	No	Yes
d. Biological effects of radiaton	Union Carbide Corp.	2 weeks	Yes	Yes

EXPERIENCE

<u>ISOTOPE</u>	<u>MAXIMUM AMOUNT</u>	<u>WHERE EXPERIENCE GAINED</u>	<u>DURATION OF EXPERIENCE</u>	<u>TYPE OF USE</u>
Cs-137	Curies	Union Carbide Corp.	8 years	Process Gauging
Ra-226	m Curies	Union Carbide Corp.	8 years	Carbon Detection

EDUCATION

<u>Degree</u>	<u>College or Univerisity</u>	<u>Date Acquired</u>	<u>Major</u>
AA	Hershey Junior College	<div></div>	Science
BS	University of Florida		Physics
MS	University of Florida		Astronomy-Physics

C. R. LANDFRIED

<u>TYPE OF TRAINING</u>	<u>WHERE TRAINED</u>	<u>DURATION OF TRAINING</u>	<u>ON THE JOB</u>	<u>FORMAL COURSE</u>
a. Principles and practices of radiation protection	Union Carbide Corp.	15 years	Yes	No
b. Radioactivity measurement standardization & monitoring techniques & instruments	Union Carbide Corp.	15 years	Yes	No
c. Mathematics & calculations basic to the use and measurement of radioactivity	Union Carbide Corp.	15 years	Yes	No
d. Biological effects of radiation	Union Carbide Corp.	15 years	Yes	No

EXPERIENCE

<u>ISOTOPE</u>	<u>MAXIMUM AMOUNT</u>	<u>WHERE EXPERIENCE GAINED</u>	<u>DURATION OF EXPERIENCE</u>	<u>TYPE OF USE</u>
Cs-137	Curies	Union Carbide Corp.	18 years	Density & Level
Co-60	Curies	Union Carbide Corp.	18 years	Gauge Tracer Density & Level
Ra-226 & Daughters	m Curies	Union Carbide Corp.	18 years	Gauge Density & Level
C-14	m Curies	Union Carbide Corp.	10 years	Gauge, R&D R&D Tracer
H-3	m Curies	Union Carbide Corp.	8 years	Tracer
Xe-133	m Curies	Union Carbide Corp.	12 months	Tracer
Kr-79	m Curies	Union Carbide Corp.	5 months	Tracer
Po-Be-210	Curies	Union Carbide Corp.	2 years	Gauging
Sr-90	m Curies	Union Carbide Corp.	15 years	R&D
Am-Be-241	Curies	Union Carbide Corp.	3 years	Gauging

Mr. Landfried also participates in instructing a 1-week short course in radiation protection for Union Carbide Corporation.

H. C. CAVENDER

Mr. Cavender has no formal training or experience with radioactive materials. His sole purpose for sitting on the Committee is to provide a direct link between the Committee and the Purchasing Department. He has all responsibility for processing purchase orders for radioactive material controlled by this license.

TECHNICAL CENTER
RADIOLOGICAL CONTROL MANUAL

*See Revision dated
July 1984*



PROCESS MEASUREMENT SYSTEMS

ENGINEERING & TECHNOLOGY SERVICES