

Sent 04/02/79

FORM NRC-313 I (6-78) 10 CFR 30		U.S. NUCLEAR REGULATORY COMMISSION		1. APPLICATION FOR: (Check and/or complete as appropriate) 3/31/79 3L	
APPLICATION FOR BYPRODUCT MATERIAL LICENSE INDUSTRIAL				a. NEW LICENSE	
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.				b. AMENDMENT TO: LICENSE NUMBER	
				c. RENEWAL OF: LICENSE NUMBER X 34-06686-02	
2. APPLICANT'S NAME (Institution, firm, person, etc.) The Firestone Tire & Rubber Co. TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION			3. NAME OF PERSON TO BE CONTACTED REGARDING THIS APPLICATION Dr. J. O. Tveekrem (216) 379-7427 TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION		
4. APPLICANT'S MAILING ADDRESS (Include Zip Code) The Firestone Tire & Rubber Co. Central Research Laboratory S. Main & Wilbeth Rd. Akron, OH 44317			5. STREET ADDRESS WHERE LICENSED MATERIAL WILL BE USED (Include Zip Code) (a) Research Pilot Plant Rear 381 W. Wilbeth Rd. (b) Central Research Laboratory S. Main & Wilbeth Rd.		
(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. Mr. W. M. Cole			Manager, Process Development		
b. Dr. M. W. Hayes			Group Leader, Analytical Services		
c.					
7. RADIATION PROTECTION OFFICER Dr. J. O. Tveekrem			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					
L I N E NO.	ELEMENT AND MASS NUMBER A	CHEMICAL AND/OR PHYSICAL FORM B	NAME OF MANUFACTURER AND MODEL NUMBER (If Sealed Source) C	MAXIMUM NUMBER OF MILLICURIES AND/OR SEALED SOURCES AND MAXIMUM ACTI- VITY PER SOURCE WHICH WILL BE POSSESSED AT ANY ONE TIME D	
(1)					
(2)		See attached sheet			
(3)	License Fee Information NEXT PAGE				
(4)	OR				
DESCRIBE USE OF LICENSED MATERIAL E					
(1)	used to measure the energy and intensity of fluorescent x-rays				
(2)	level detector				
(3)	electron capture detectors for gas chromatographs				
(4)	electron capture detectors for gas chromatographs				

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PDR

* Postmarked 3/27/79

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)	Detector Cryostat Subsystem	Kevex Corp.	3000P
(2)	Level Detector	Texas Nuclear Corp.	5100
(3)	Gas Chromatograph	Wilkins Inst. F & M	600-B or A500B 810
(4)	Gas Chromatograph	Perkin Elmer Corp.	009-0282

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)	Ionization Gauge	Picker	642-081	1	gamma	0-30,000 cpm
(2)	Geiger Counter	Precision	107C	1	gamma	0-.04-20 mr/hr
(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> <div style="text-align: center;">See attached sheet</div>

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): _____ 	Searle-Analytic Inc.	<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 type="checkbox"/> a. LABORATORY FACILITIES, PLANT FACILITIES, FUME HOODS (Include filtration, if any), ETC. <input type="checkbox"/> b. STORAGE FACILITIES, CONTAINERS, SPECIAL SHIELDING (fixed and/or temporary), ETC. <input type="checkbox"/> c. REMOTE HANDLING TOOLS OR EQUIPMENT, ETC. <input type="checkbox"/> d. RESPIRATORY PROTECTIVE EQUIPMENT, ETC.

14. WASTE DISPOSAL
a. NAME OF COMMERCIAL WASTE DISPOSAL SERVICE EMPLOYED <div style="text-align: center;">None</div>
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. <div style="text-align: center;">See attached sheet</div>

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.

Applicant...	244650/246978
Check No.	244650/246978
Amount/Fee Category	50.00 (1)
Type of Fee	Renewal
Date Check Received	APR 3 1979
Received By	Thorn

18. CERTIFICATE
(This item must be completed by applicant)

4/20/79

RECEIVED BY LFMB	
Date	APR 3 1979
Log	Apr 2 1979
By	Thorn
Orig To	
Action Compl	4/23/79

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)
\$50.00	James O. Tveekrem
(1) LICENSE FEE CATEGORY:	c. NAME (Type or print)
	JAMES O. TVEEKREM
(2) LICENSE FEE ENCLOSED: \$ 50.00	d. TITLE
	ASSOCIATE SCIENTIST
	e. DATE
	March 23, 1979

8. Licensed Material

<u>Line No.</u>	<u>Element and Mass Number</u>	<u>Chemical and/or Physical Form</u>	<u>Name of Mfr. and Model No.</u>	<u>Max. Number of Millicuries at any one time</u>
(1)	Iron-55	Sealed Source	Kevex Corp. Model No. 0112	50
(2)	Cesium-137	" "	Searle-Analytic Model 5179, Amer- sham/Searle Model 850233, 850263, 850213; 3M Corp. Model 4P6M, 4P6E, 4F6S, 4F3D	100
(3)	Titanium Tritide Hydrogen-3	Foil	Radiation Research	500 (2 sources of 250 ea)
	"	Foil	U.S. Radium Lab 508-1	400 (2 sources of 200 ea)
(4)	Nickel-63	Foil	New England Nuclear Corp. NER-002 or Nuclear Radiation Development Corp. Model N1001	15

11b. Calibration of Instruments

Instruments are performance checked and calibrated with Cs137 or calibration disc supplied with instrument when used but at least once every three months.

ADDENDA FOR

(1) Iron 55, Model 0112 Source Holder

- Item 13. Adequate shielding is provided by the construction of the instrument. The safety shutter is kept closed when the instrument is not in use.
- Item 14. No waste disposal involved. When use of the source is discontinued, it will be returned to the Kevex Corp. for disposal.
- Item 15. The source holder is leak tested according to the recommendations and procedures supplied by the Kevex Corp.

Cesium-137, Model 5179 Source Holder

- Item 13. Adequate shielding is provided by the construction of the instrument. The shutter is locked in the "closed" position at such times as the gauge is not properly installed. When work must be done on the vessel being monitored, the Radiation Protection Officer will be present to assure that the shutter is in the "closed" position before such work begins.
- Item 14. No waste disposal is involved. In the event that the gauge is damaged or its use discontinued, it will be returned to the manufacturer for removal of the by-product material.
- Item 15. The source holder is tested for leakage and contamination at least once every six months by Dr. J. O. Tveekrem and/or Dr. K. R. Lucas in accordance with manufacturer's instructions. A .0014 C Cs137 Standard is used to calibrate a Picker Lab Monitor to ascertain if contamination level is below .005 microcuries. A permanent record of such tests is maintained.

(3) Titanium Tritide Hydrogen-3

Item 13. Effluent gas from the gas chromatographs will be piped into a hood at temperatures above 150°C and temperature control mechanisms limit foil temperatures from exceeding 225°C.

Item 14. No waste disposal is involved. In the event of discontinued use of these detectors, they will be returned to the suppliers:

F & M Scientific Corp., Avondale, PA
Wilkins Inst. & Research, Inc., Box 313
Walnut Creek, CA

(4) Nickel-63

Item 13. Adequate shielding is provided by the construction of the instrument.

Item 14. No waste disposal involved. When use of the source is discontinued, it will be returned to the manufacturer for disposal.

Item 15. The source holder is leak tested according to the recommendations and procedures specified by the manufacturer every six months.

RADIATION PROTECTION COMMITTEE

A Radiation Protection Committee has been in existence since 1970, although its personnel has changed since that time due to termination of employment and death. Its present personnel include:

Dr. J. O. Tveekrem - Radiation Protection Officer (see attached resume)

Dr. K. R. Lucas - B.S. Chemistry, Univ. of Pittsburgh, 1961;
Ph.D. Analytical Chemistry, Univ. of Ill., 1966
(see attached resume)

Mr. F. J. Ravagnani - B.S. Physics, Bowling Green State Univ., 1963;
M.S. Plasma Physics, Ohio State Univ., 1965.
(see attached resume)

The Radiation Protection Committee has and will continue to review all procedures involving the purchase, use, storage, safety, and disposal of radioisotopes in accordance with CFR, Title 10, Part 20.

Names and phone numbers of committee members are posted clearly in areas where radioisotopes are used for quick notification in case of a radiation problem or accident.

All personnel working with radioisotope material, as well as with x-rays, wear a Nuclibadge provided by Searle-Analytic. The badges are processed monthly and a file is maintained of the monthly reports to determine accumulative exposure for each individual.

Sealed sources are leak tested at six-month intervals according to manufacturer's recommendations by the Radiation Protection Officer. The analysis of the test is carried out by either the Radiation Protection Officer or by ICN Pharmaceuticals, Inc., Health Physics Services (using Model No. LTI wipe kit).

RESUME

Dr. James O. Tveekrem - Radiation Protection Officer

Training:

Ph.D. - Iowa State Univ., 1963
Major - Analytical Chemistry
Minors - Physical Chemistry and Physics

Main training in x-ray, UV, visible and IR spectroscopy.
Formal graduate course in nuclear and radiochemistry.
This included nuclear reactions, theory of radioactive decay and growth, interactions of radiation with matter (biological and non-biological), radiation detection and measurement, radiochemical experimental techniques and tracer studies.

Experience:

Twenty-three years overall experience at Ames Lab of USAEC at Iowa State Univ., Brookhaven National Lab, Firestone Radiation Research and Firestone Central Research.

Areas of interest have been analytical spectroscopy, high temperature chemistry and polymer physics. Experience at Ames Lab and Brookhaven National Lab in working with Uranium and Uranium halides and oxides. Considerable experience at Firestone with high energy (1.5 MeV) electron accelerators. Radiation protection officer for six years at Firestone Radiation Research and five years at Firestone Central Research. Responsible for leak testing of Cs137 sealed source for past five years.

RESUME

Dr. K. R. Lucas
Radiation Protection Committee

Training:

B.S. Chemistry, University of Pittsburgh, 1961
Ph.D. Analytical Chemistry, University of Illinois, 1966
Graduate courses and laboratory in x-ray analysis

Experience:

Nine years practical experience with x-ray diffraction
and energy and wavelength dispersive x-ray spectroscopy.

RESUME

Mr. F. J. Ravagnani
Radiation Protection Committee

Training:

B.A. Physics, Bowling Green State Univ., January, 1963
M.S. Plasma Physics, Ohio State Univ., June, 1965
Thesis "Electron Energy Analyzation in a Deuterium Plasma"
Formal graduate courses in Nuclear Physics, Modern
Physics, and Advanced Nucleonics

Experience:

Research in gamma spectroscopy of nuclear decay modes of
irradiated samples. Ten years experience at Firestone
in x-ray radiography in non-destructive testing of tires.

RESUME

Dr. M. W. Hayes

Training:

B.S. Chemistry, University of Cincinnati, 1963
Ph.D. Analytical Chemistry, University of Cincinnati, 1968

Experience:

1968-1972 Work in analytical applications of mass spectrometry,
and in analytical applications of gas chromatography
in the rubber industry as a Research Scientist.

1972-present Supervisor of analytical section dealing with
instrumental methods development and applications.

Dr. Hayes has been instructed in the safe use of the equipment
under his control by the Radiation Protection Officer and by the
Radiation Protection Committee.

RESUME

Mr. W. M. Cole

Training:

B.S. Chemical Engineering, Purdue University, 1961
M.S. Chemical Engineering, Akron University, 1972

Experience:

1961-1964 Supervisor Synthetic Pilot Plant
1964-1968 Project Engineer Synthetic Pilot Plant
1969-1970 Senior Chemical Engineer Synthetic Pilot Plant
1970-1973 Scientist, Research Scientist Research Pilot Plant
1973-1977 Group Leader Research Pilot Plant
1977-present Manager, New Process Development

Mr. Cole has been instructed in the safe use of the equipment under his control by the Radiation Protection Officer and by the Radiation Protection Committee.