MELPAR, INC. 7700 ARLINGTON BOULEVARD, FALLS CHURCH, VIRGINIA 22046
A SUBSIDIARY OF WESTINGHOUSE AIR BRAKE COMPANY

WABCO

20 February 1967

Atomic Energy Commission
Washington, D. C.

Attention: Mr. Robert E. Brinkman, Isotopes Branch
Division of Licensing and Regulations

Subject: Byproduct Material License No. 45-7548-1 (G67)
Supplementary Application

Gentlemen:

Enclosed find supplementary application executed in duplicate to amend Melpar's Byproduct Material License No. 45-7548-1 (G67) by adding users as follows:

$^{14}_{c}$ $^{32}_{p}$ $^{3}_{H}$ $^{35}_{S}$	Frank Aldrich Fred Hymes
110, $^{111}_{Ag}$	Frank Aldrich
$^{3}_{H}$ (foil)	J. R. Finkel Joseph Paljug K. J. Krost
$^{63}_{Ni}$	Joseph Paljug Sam Brody J. R. Finkel K. J. Krost

Very truly yours,

MELPAR, INC.

Austin G. Roe
House Counsel

b8

Form AEC-313
8-64
10 CFR 30

UNITED STATES ATOMIC ENERGY COMMISSION

SUPPLEMENTARY APPLICATION FOR BYPRODUCT MATERIAL LICENSE

Form approved.
Budget Bureau No. 38-R027

INSTRUCTIONS.—Complete Items 1 through 16 if this is an initial application or an application for renewal of a license. Information contained in previous applications filed with the Commisson with respect to Items 8 through 15 may be incorporated by reference provided references are clear and specific. Use supplemental sheets where necessary. Item 16 must be completed on all applications. Mail two copies to: U.S. Atomic Energy Commission, Washington, D.C., 20545, Attention: Isotopes Branch, Division of Materials Licensing. Upon approval of this application, the applicant will receive an AEC Byproduct Material License. An AEC Byproduct Material License is issued in accordance with the general requirements contained in Title 10, Code of Federal Regulations, Part 30, and the Licensee is subject to Title 10, Code of Federal Regulations, Part 20.

1. (a) NAME AND STREET ADDRESS OF APPLICANT. *(Institution, firm, hospital, person, etc. Include ZIP Code.)*

Melpar, Inc.
7700 Arlington Blvd.
Falls Church, Virginia 22046

(b) STREET ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED. *(If different from 1 (a). Include ZIP Code.)*

2. DEPARTMENT TO USE BYPRODUCT MATERIAL

Research Division

3. PREVIOUS LICENSE NUMBER(S). *(If this is an application for renewal of a license, please indicate and give number.)*

45-7548-1 (G67)
(including amendments)

4. INDIVIDUAL USER(S). *(Name and title of individual(s) who will use or directly supervise use of byproduct material. Give training and experience in Items 8 and 9.)*

See attached sheet labeled
"Schedule 4"

5. RADIATION PROTECTION OFFICER *(Name of person designated as radiation protection officer if other than individual user. Attach resume of his training and experience as in Items 8 and 9.)*

No change

6. (a) BYPRODUCT MATERIAL. *(Elements and mass number of each.)*

See attached
"Schedule 4"

(b) CHEMICAL AND/OR PHYSICAL FORM AND MAXIMUM NUMBER OF MILLICURIES OF EACH CHEMICAL AND/OR PHYSICAL FORM THAT YOU WILL POSSESS AT ANY ONE TIME. *(If sealed source(s), also state name of manufacturer, model number, number of sources and maximum activity per source.)*

No change

7. DESCRIBE PURPOSE FOR WHICH BYPRODUCT MATERIAL WILL BE USED. *(If byproduct material is for "human use," supplement A (Form AEC-313a) must be completed in lieu of this item. If byproduct material is in the form of a sealed source, include the make and model number of the storage container and/or device in which the source will be stored and/or used.)*

No change

(Continued on reverse side)

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 *(Use supplemental sheets if necessary)*

8. TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COURSE (Circle answer)
a. Principles and practices of radiation protection	See attached sheets -		Yes No	Yes No
b. Radioactivity measurement standardization and monitoring techniques and instruments	#1 - Fred Hymes #2 - Joseph Paljug		Yes No	Yes No
c. Mathematics and calculations basic to the use and measurement of radioactivity	#3 - Sam Brody #4 - Frank Aldrich		Yes No	Yes No
d. Biological effects of radiation	#5 - K. J. Krost #6 - J. R. Finkel		Yes No	Yes No

9. EXPERIENCE WITH RADIATION. *(Actual use of radioisotopes or equivalent experience.)*

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
		See attached sheets #1 through #6		

10. RADIATION DETECTION INSTRUMENTS. *(Use supplemental sheets if necessary.)*

TYPE OF INSTRUMENTS (Include make and model number of each)	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY RANGE (mr/hr)	WINDOW THICKNESS (mg/cm²)	USE (Monitoring, surveying, measuring)
No Change					

11. METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED ABOVE.

No Change

12. FILM BADGES, DOSIMETERS, AND BIO-ASSAY PROCEDURES USED. *(For film badges, specify method of calibrating and processing, or name of supplier.)*

No Change

INFORMATION TO BE SUBMITTED ON ADDITIONAL SHEETS IN DUPLICATE

13. FACILITIES AND EQUIPMENT. Describe laboratory facilities and remote handling equipment, storage containers, shielding, fume hoods, etc. Explanatory sketch of facility is attached. (Circle answer) Yes No

No change

14. RADIATION PROTECTION PROGRAM. Describe the radiation protection program including control measures. If application covers sealed sources, submit leak testing procedures where applicable, name, training, and experience of person to perform leak tests, and arrangements for performing initial radiation survey, servicing, maintenance and repair of the source.

No change

15. WASTE DISPOSAL. If a commercial waste disposal service is employed, specify name of company. Otherwise, submit detailed description of methods which will be used for disposing of radioactive wastes and estimates of the type and amount of activity involved.

No change

CERTIFICATE (This item must be completed by applicant)

16. THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATE ON BEHALF OF THE APPLICANT NAMED IN ITEM 1, 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.

Date February 20, 1967

By: MELPAR, INC.
Applicant named in item 1

Dr. P. E. Ritt
Vice President, Research
Title of certifying official

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.

* U.S. GOVERNMENT PRINTING OFFICE : 1964 O—745-381

SCHEDULE 4

Elements/Mass Number and Individual Users of Each

$^{14}_{c}$ $^{32}_{p}$ $^{3}_{H}$ $^{35}_{S}$	Frank Aldrich Fred Hymes
$^{110, 111}_{Ag}$	Frank Aldrich
$^{3}_{H}$ (foil)	J. R. Finkel Joseph Paljug K. J. Krost
$^{63}_{Ni}$	Joseph Paljug Sam Brody J. R. Finkel K. J. Krost

Data with Respect to the Training and Experience of

FRED HYMES

Reference: Items 8 & 9, Form AEC-313

Item 8

	Type of Training	Where	Duration	On the Job	Formal Course
a.	Principles & practices of radiation protection	W. Va. University	1½ years	yes	yes
b.	Radioactivity measurement standardization & monitoring techniques & instruments	W. Va. University	1½ years	yes	yes
c.	Mathematics & calculations basic to the use & measurement of radioactivity	Marshall University	3 years	yes	yes
		W. Va. University	1½ years	yes	yes
d.	Biological effects of radiation	W. Va. University	6 months	no	yes

Item 9 - Experience with Radiation

Isotope	Max. Amt.	Where	Duration	Type of Use
C^{14}	5 mc	W. Va. University	1½ years	In vivo

Marshall University, B.S. Chem.
West Virginia University, M.S., Biochemistry
West Virginia University, Ph.D., Biochemistry

Data with Respect to the Training and Experience of

JOSEPH W. PALJUG

Reference: Items 8 & 9, Form AEC-313

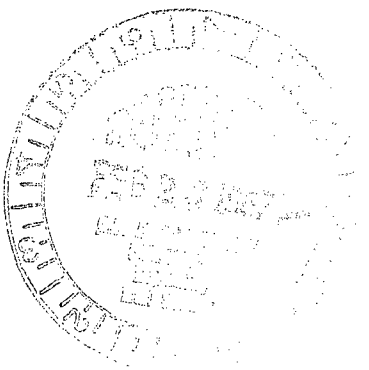
Item 8

	Type of Training	Where	Duration	On the Job	Formal Course
a.	Principles & practices of radiation protection	W & J College	1 year	no	yes
b.	Radioactivity measurement standardization & monitoring techniques & instruments	W & J College	1 year	no	yes
c.	Mathematics & calculations basic to the use & measurement of radioactivity	W & J College	1 year	no	yes
d.	Biological effects of radiation	W & J College	1 year	no	yes

Item 9 - Experience with Radiation

Isotope	Max. Amt.	Where	Duration	Type of Use
H_3	1.7 curies	Melpar, Inc.	2 years	Ionization Detector
Ni_{63}	.09 curies	Melpar, Inc.	2 months	Ionization Detector

Wash. & Jeff. College - B.A., Physics



Data with Respect to the Training and Experience of

SAM S. BRODY

(Reference: Items 8 & 9, Form AEC-313)

Item 8. Sam S. Brody, Applied Chemist

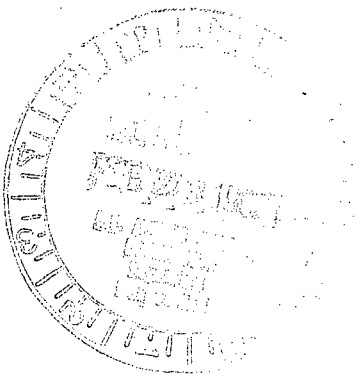
B.S. - Chemistry - University of Chattanooga
M.S. - Organic Chemistry - University of Tennessee

Type of Training	Where	Duration	On the Job	Formal Course
a) Principles.....	Melpar, Inc.	2 yrs.	yes	no
b) Radioactivity...	Familiar with concepts but has not used instruments			
c) Mathematics.....	M.S.Chemistry, Univ. of Tenn.,E.I.Dupont, Orange, Texas	1 yr.	yes	yes
d) Biological.....	Melpar, Inc.	2 yrs.	yes	no

Item 9. Experience with Radiation

Isotope	Max. Amt.	Where	Duration	Type of Use
H^3 Tritium	1 curie	Melpar, Inc.	2 yrs.	Electron capture ionization detector

(See also statement attached)



SAM S. BRODY, Organic and Analytical Chemist has a BS degree in Chemistry from the University of Chattanooga, (b)(6) and a MS degree in Organic Chemistry from the University of Tennessee, (b)(6)

Prior to joining Melpar, Mr. Brody was employed as a Development Chemist by E. I. DuPont De Nemours and Co. in Beaumont and Orange, Texas for 6 1/2 years, 1956-1963. His work at DuPont included research and development associated with nylon intermediates including: mechanism studies on the decomposition of hydroperoxides; mechanism studies on the nitric acid oxidation of adipic acid precursors; exploratory research on new routes to synthesis of nylon intermediates with a strong emphasis on catalyst scouting and vapor phase reactions; process development and plant assistance during the "start up" of a caprolactan plant; and analytical development in conjunction with all of the aforementioned.

Mr. Brody's analytical development experience included the use of liquid-liquid chromatography for the analyses of monobasic and dibasic acids, use of ion exchange resins, the use of ultraviolet, visible and infrared spectroscopy, flame photometry, wet chemical analyses, and gas chromatography for quantitative and qualitative analyses. His gas chromatography experience has been extensive and covers almost every area of the field.

E/6

Mr. Brody is a member of the American Chemical Society and Sigma Xi. He has one publication, "Structure and Reactions of Gossypol. V. Methylapogossypol hexamethyl ether and 2, 3-dimethoxy-4-isopropyl-5-allyltoluene," by D. A. Shirley, S. S. Brody and W. C. Sheehan, J. Or. Chem., 22, 495 (1957).

Mr. Brady's work at Melpar has been as Senior Chemist and as Supervisor of Detector and Kits Branch.

Page # 4

Data with Respect to the Training and Experience of

DR. FRANK L. ALDRICH

(Reference: Items 8 & 9, Form AEC-313)

Item 8. Dr. Frank L. Aldrich, Senior Scientist

Type of Training	Where	Duration	On the Job	Formal Course
a) Principles.....	Baylor University	6 mo.	no	yes
	College of Medicine	1 1/2 yrs.	yes	no
	Hines V.A.Hospital, Ill.	1 yr.	yes	no
	Purdue University	6 mo.	yes	no
	Melpar, Inc.	2 yrs.	yes	no
b) Radioactivity...	Same as 8(a)			
c) Mathematics....	Same as 8(a)			
d) Biological.....	Same as 8(a)			

Training - 1. Course in Radiation Safety, Rice Institute, Houston, Texas, 1950.
2. Instruction in procedures and hazards in the isotope laboratory by Dr. J. H. Gast, Baylor University College of Medicine, who had been trained at Oak Ridge.

Item 9. Experience with Radiation

Isotope	Max.Amt.	Where	Duration	Type of Use
C^{14}	Millicuries	Hines V.A.Hosp., Ill.	1 yr.	Tracer Work
C^{14}	Millicuries	Purdue University	6 mos.	Tracer Work
C^{14}	Millicuries	Melpar, Inc.	1 1/2 yrs.	Tracer Work
I^{131}	Millicuries	Baylor University	6 mos.	Tracer and Therapeutic work
P^{32}	Millicuries	Baylor University	6 mos.	Tracer Work
S^{35}	Millicuries	Baylor University	6 mos.	Tracer Work
H^{3}	Millicuries	Melpar, Inc.	6 mos.	Tracer Work

Experience - 1950-1953

1. Preparing and standardizing I^{131} for tracer and therapeutic use on thyroid patients.
2. Use of P^{32} in bond metabolism studies.
3. Use of S^{35} in preparing S^{35} labeled sodium thiosulfate and metabolism work.

Publications:

"A Study of the Synthesis and Isolation of Sodium Thiosulfate," M. S. Thesis, Baylor University College of Medicine, 1953.

"The Use of Silicones in Preparing Radioactive Samples for Measurements," W. J. Wingo, J. H. Gast and F. L. Aldrich, Science, 115, 714 (1952).

1953-1954:

Using C^{14} labeled amino acids in various studies at Hines V.A. Hospital, Hines, Illinois.

1955-1956:

Synthesis of Carboxyl C^{14} labeled p-Nitrophenyl acetate, its reaction with chyrmotrypsin, isolation and measurement of products. This work involved reaction in a vacuum manifold. (cf. "Acetylchyrmotrypsin", A. K. Balls and F. L. Aldrich, Proc. Natl. Acad. Sci. U.S., 41, 190 (1955).

1961-1965:

Biosynthesis of H^3- and C^{14}- labeled nucleic acids; use of C^{14} labeled hydrazines in metabolic studies.

Sheet #5

Data with Respect to the Training and Experience of

KENNETH JOHN KROST

Reference: Items 8 & 9, Form AEC-313

Item 8

	Type of Training	Where	Duration	On the Job	Formal Course
a.	Principles & practices of radiation protection	Melpar, Inc. Florida State Univ.	2 yrs. 1 qr.	yes yes	yes yes
b.	Radioactivity measurement standardization & monitoring techniques & instruments	Florida State Univ.	1 qr.	yes	yes
c.	Mathematics & calculations basic to the use & measurement of radioactivity	Melpar, Inc. use in cross section ionization detectors	2 yrs.	yes	
d.	Biological effects of radiation	Florida State Univ.	"	no	yes

Item 9 - Experience with Radiation

Isotope	Max. Amt.	Where	Duration	Type of Use
N 63	1 Curie/in	Melpar, Inc.	2 yrs.	Cross section ionization detectors
tritium	1 Curie/in	" "	"	"

B.S. in Chem. - Univ. of Minn.
M.S. in Chem. - Fla. State U.

(b)(6)

Ex 6

Data with Respect to the Training and Experience of

J. R. FINKEL

Reference: Items 8 & 9, Form AEC-313

Item 8

	Type of Training	Where	Duration	On the Job	Formal Course
a.	Principles & practices of radiation protection	Purdue Univ.	2½ yrs.	yes	yes
b.	Radioactivity measurement standardization & monitoring techniques & instruments	" "	2½ yrs.	yes	yes
c.	Mathematics & calculations basic to the use & measurement of radioactivity	" "	2½ yrs.	yes	yes
d.	Biological effects of radiation	" "	2½ yrs.	yes	yes

Item 9 - Experience with Radiation

Isotope	Max. Amt.	Where	Duration	Type of Use
CO-60	10,000 C	Aerojet-General Corp. Azusa, Cal.	2½ yrs.	R & D
C-14	3 C	"	"	"
H-3	3 C	"	"	"
Po-210	250 mc	"	1 yr.	"
Ra-226	3 C	"	"	"
Kr-85	500 mc.	"	"	"
Cs-137	2000 C	"	"	"

+ about 15 others.

B.S. Chem - Roosevelt Univ., Chicago, Ill., Ex. 6

2½ yrs. Post Grad., Purdue Univ., Ind.