

FORM NRC-313 I (3-80) 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				<div style="text-align: center;"> </div>	
<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.				<div style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> a. NEW LICENSE </div> <div style="border: 1px solid black; padding: 2px;"> <input type="checkbox"/> b. AMENDMENT TO LICENSE NUMBER </div> <div style="border: 1px solid black; padding: 2px;"> <input type="checkbox"/> c. RENEWAL OF LICENSE NUMBER <div style="font-size: 1.5em; font-weight: bold; margin-top: 5px;">L6106377</div> </div>	
2. APPLICANT'S NAME <i>(Institution, firm, person, etc.)</i> Northwest and Alaska Fisheries Center National Marine Fisheries Service Department of Commerce TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION (206) 442-1438 (FTS:399-1438)			3. NAME AND TITLE OF PERSON TO BE CONTACTED REGARDING THIS APPLICATION Walton W. Dickhoff, Ph.D. TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION (206) 442-1438		
4. APPLICANT'S MAILING ADDRESS <i>(Include Zip Code)</i> <i>(Address to which NRC correspondence, notices, bulletins, etc., should be sent.)</i> NMHFC, NMFS, CZ&ES Division 2725 Montlake Blvd. E. Seattle, Washington 98112			5. STREET ADDRESS WHERE LICENSED MATERIAL WILL BE USED <i>(Include Zip Code)</i> Northwest and Alaska Fisheries Center 2725 Montlake Blvd. East Seattle, Washington 98112		
(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. Walton W. Dickhoff, Ph.D.			Biologist		
b. Penny Swanson, M.S.			Research Assistant		
c. Erika Plisetskaya, Ph.D.			Senior Research Scientist		
7. RADIATION PROTECTION OFFICER Walton W. Dickhoff			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 A	CHEMICAL AND/OR PHYSICAL FORM B	NAME OF MANUFACTURER AND MODEL NUMBER <i>(If Sealed Source)</i> 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)	Carbon-14	Any form		5 mCi for all forms	
(2)	Hydrogen-3	Any form		5 mCi for all forms	
(3)	Iodine-125	Any form		10 mCi for all forms	
(4)	Iodine-131	Any form		2 mCi for all forms	
	Phosphorus-32	Any form		2 mCi for all forms	
DESCRIBE USE OF LICENSED MATERIAL E					
(1)	The hydrogen-3 and carbon-14 will be used in the form of labeled amino acids and				
(2)	hormones for <u>in vitro</u> studies of fish tissues and for the measurement of hormone				
(3)	concentration in fish blood by radioimmunoassay (RIA) technique. Iodine-125 and				
(4)	iodine-131 will be used for the radiolabeling of protein hormones for use in RIA (cont'd)				

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)	na		
(2)			
(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)	Gamma counter	Micromedic	4/200	1	gamma	50 cpm
(2)	Liquid scintillation	Packard	300 C	1	beta, gamma	50 cpm
(3)	Survey meter	Nuclear Chicago	Model 2650	1	gamma	0.01 mr/hr
(4)						

11. CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10

<input type="checkbox"/> a. CALIBRATED BY SERVICE COMPANY NAME, ADDRESS, AND FREQUENCY	<input type="checkbox"/> b. CALIBRATED BY APPLICANT Attach a separate sheet describing method, frequency and standards used for calibrating instruments. Internal standard for scintillation counter gamma standard available for survey meter
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12. PERSONNEL MONITORING DEVICES

TYPE (Check and/or complete as appropriate.) A.	SUPPLIER (Service Company) B.	EXCHANGE FREQUENCY C.
<input type="checkbox"/> (1) FILM BADGE <input type="checkbox"/> (2) THERMOLUMINESCENCE DOSIMETER (TLD) <input checked="" type="checkbox"/> (3) OTHER (Specify): <u>Thyroid scan by University of Washington Radiation Safety personnel</u>		<input type="checkbox"/> MONTHLY <input checked="" type="checkbox"/> QUARTERLY <input type="checkbox"/> OTHER (Specify): _____

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

- ☒ a. LABORATORY FACILITIES, PLANT FACILITIES, FUME HOODS (Include filtration, if any), ETC.
☐ b. STORAGE FACILITIES, CONTAINERS, SPECIAL SHIPPING (Fixed and/or temporary), ETC.
☐ c. REMOTE HANDLING TOOLS OR EQUIPMENT, ETC.
☐ d. RESPIRATORY PROTECTIVE EQUIPMENT, ETC.

14. WASTE DISPOSAL

- a. NAME OF COMMERCIAL WASTE DISPOSAL SERVICE EMPLOYED
Liquid Waste Disposal Co. PO Box 46018, Seattle, WA
- 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.

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 in 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) Exempt from fees
as per Title 10 CFR 170.11 (a) (5)

b. **CERTIFYING OFFICIAL (Signature)**

c. **NAME (Type or print)**

B F JONES

(1) **LICENSE FEE CATEGORY:**

d. **TITLE**

Dir. NWAFC

(2) **LICENSE FEE ENCLOSED: \$**

e. **DATE**

5-9-85

Item 8 (continued)

and in the form of radioiodinated thyroid and steroid hormones for use in RIA. Phosphorus-32 will be used to study the uptake of phosphorus by fish tissues.

Item 11 (continued)

Both the scintillation counter and gamma counter have standards with instrument. The Nuclear Chicago survey meter is calibrated by Radiation Safety, University of Washington, Seattle, at intervals of once per year.

Item 13.

The majority of the work with materials containing carbon-14 and hydrogen-3 and phosphorus-32 will be performed in room 309 (Appendix) of the Coastal Zone and Estuarine Studies Division, NMFS, 2705 Montlake Blvd. E., Seattle. This room is relatively isolated from the other laboratories and the room is kept locked when not in use. Radioactive samples and compounds will be used in a fume hood (radioactivity type) that will be installed (indicated in appendix) and on the benches and table tops. All work surfaces will be covered with absorbent pads that will be replaced weekly or if found to be contaminated. All uses of free (unbound) iodine-125 and iodine-131 will be in the radioactivity fume hood. Radioactive material will be stored surrounded by lead in the fume hood or in lead containers in the refrigerator in room 309. The refrigerator and hood will be clearly marked with signs and labels indicating "Caution Radioactive Materials". In addition Rooms 301 and 303 (Appendix) will be used for preparation of animal tissues that have been exposed to gamma or beta emitters. The maximal amount of radioactivity per batch of samples (tissues) will be less than 100 μ Ci. In all rooms all sinks are of stainless-steel construction. Floor is of sealed tile and lab bench tops are of formica. The rooms will be kept locked when not in use. All rooms will be marked with signs indicating "Caution Radiation Area". Liquid radioactive wastes will be placed in five gallon chemical-resistant plastic pails containing diatomaceous earth. Solid wastes (gloves, pipettes, test tubes, etc.) will be packed in plastic-lined cardboard boxes marked "Low specific activity radioactive wastes" and will not exceed 50 μ Ci total radioactivity.

Item 15. Radiation Protection Program

The Radiation Safety Officer will take responsibility for testing, record keeping, and supervision of use of radioisotopes. Hydrogen-3, carbon-14 and Phosphorus-32 : All work areas and equipment will be checked for beta radiation by wiping the accessible surfaces of each source with a piece of filter paper that has been soaked in a dilute solution of nonionic detergent. The filter paper will be counted by licensee using a Packard 300 C liquid scintillation counter. The test shall be capable of detecting the presence of 0.001 microcuries of radioactive material in the test sample. If a test reveals the presence of 0.001 microcuries or more of removable contamination, the source in question shall be immediately removed from use and shall be either decontaminated or disposed of in accordance with NRC regulations. Records of swipe tests shall be kept in units of microcuries and maintained for inspection by the NRC.

Iodine-125 and iodine-131: All work areas and equipment will be checked for gamma radiation contamination by the use of a survey meter or by swabbing technique. Investigators working with these compounds will have their thyroid areas checked for radioactivity by personnel at Radiation Safety Division, University of Washington. Records of all tests for contamination will be maintained for inspection.

Item 16. Formal Training in Radiation Safety

Walton W. Dickhoff, Ph.D. Training obtained at University of California, Berkeley, 1971. Three lectures covering radiation physics, Biological effects of radiation and radiation protection.

Erika Plisetskaya, Ph.D. Training obtained at Dept. Environmental Health and Safety, University of Washington, Seattle, 1982. Four lectures on basic radiation physics, biological effects, protection procedures and radiation safety rules and regulations.

Penny Swanson, M.S. Passed Radiation Safety Exam at University of Wisconsin, Madison, 1980, one lecture on radiation research techniques Univ. of Wisconsin. Attended two-day workshop on laboratory safety (including radiation safety) at University of Washington, 1982.

Item 17. Experience

Walton W. Dickhoff: 1970 to 1975: On-the-job training as research assistant at University of California, Berkeley, Dept. Physiology/Anatomy. Used approximately 0.5 to 2.0 mCi each maximal amounts at any given time of carbon-14, hydrogen-3, iodine-125, iodine-131, phosphorus-32 and sodium-22. Carbon-14 and hydrogen-3 were used in animal studies in vivo and in vitro of amino acid incorporation into animal protein. Iodine-isotopes were used for labeling proteins for use in radioimmunoassays. Phosphorus-32 and sodium-22 were used to study in vivo animal tissue uptake and excretion of these ions in closed systems. Animals used for these studies included fish, amphibians, reptiles, rodents and birds.

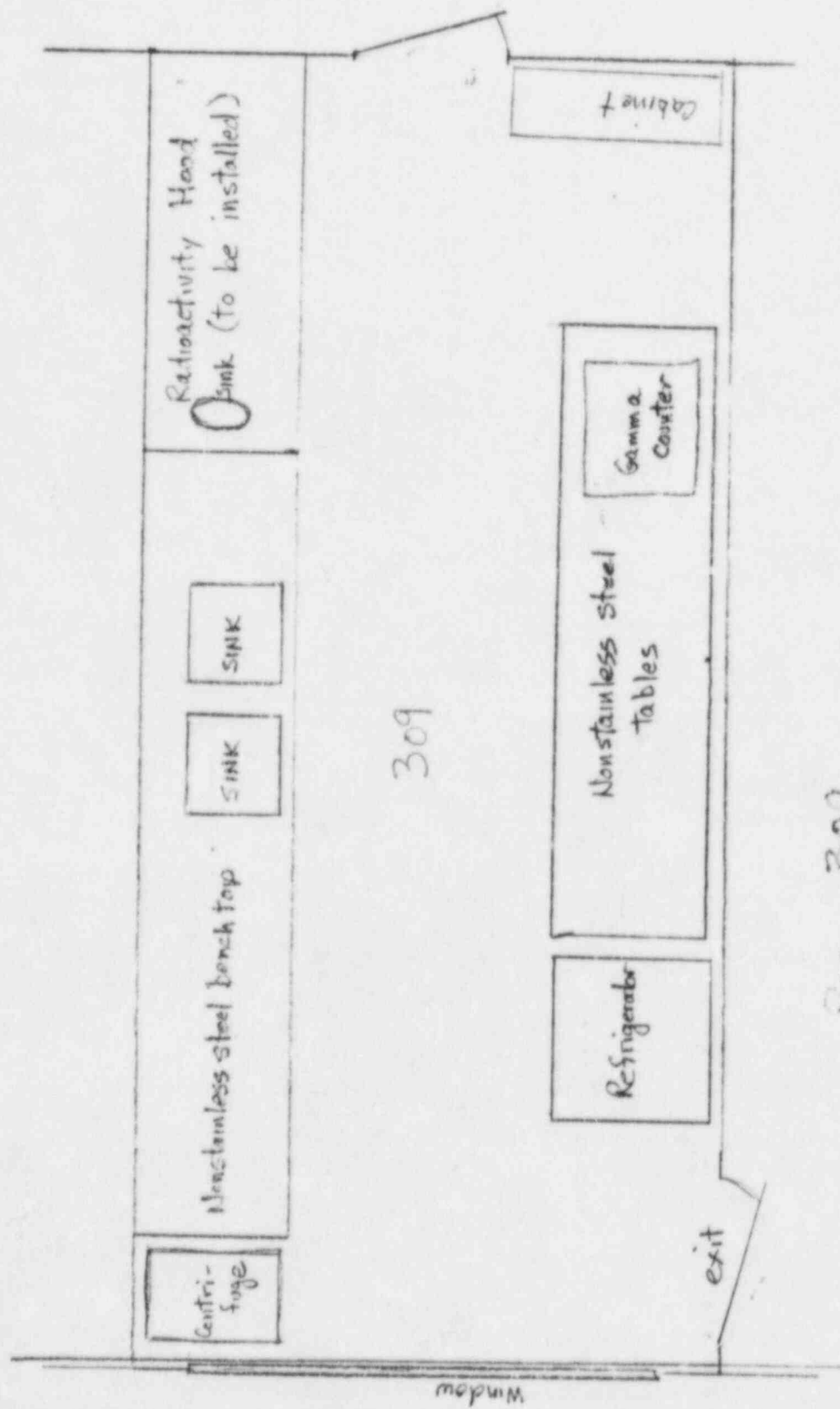
1975 to 1985: On-the-job training as research associate at the University of Washington, Seattle. Used carbon-14, hydrogen-3, iodine-125, iodine-131 and phosphorus-32 for the purposes outlined above. Approximate amounts: carbon-14, 2 mCi; hydrogen-3, 2 mCi; iodine-125, 2 mCi; iodine-131, 3, mCi; phosphorus-32, 2 mCi, as maximal amounts at any given time.

Item 17 (continued)

Experience

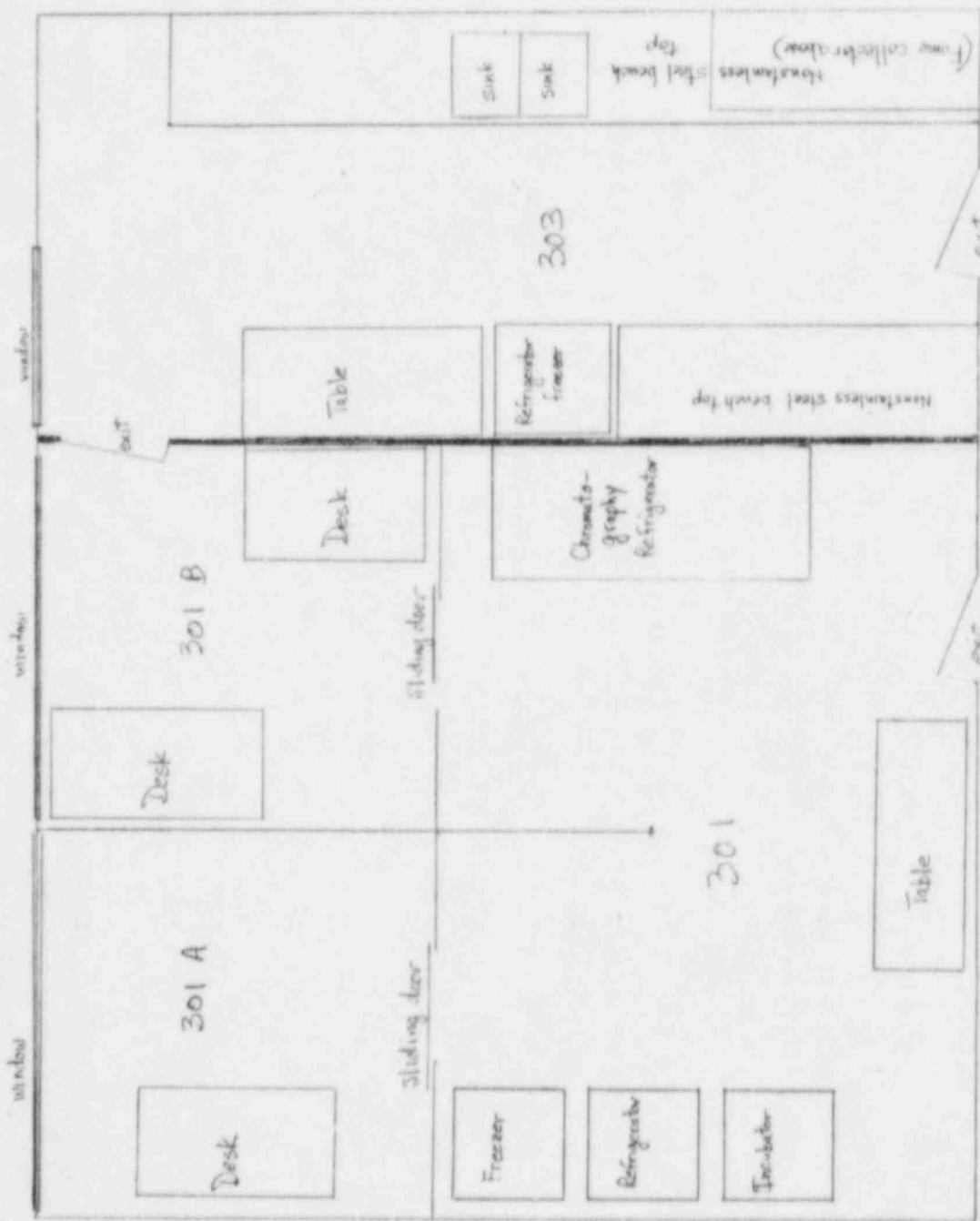
Erika Plisetskaya: 1981 to 1985: On-the-job training as research associate in the Department of Zoology, University of Washington, Seattle. Used carbon-14 and hydrogen-3 in animal studies in vivo and in vitro of amino acid incorporation into animal protein. Iodine-125 was used for labeling protein for use in radioimmunoassay. Used 0.2 mCi of C-14 and H-3 and 1.0 mCi of I-125 at any given time.

Penny Swanson: 1978-1980: On-the-job training as NIH trainee in the Endocrinology and Reproductive Physiology Program, University of Wisconsin, Madison. Hydrogen-3 and carbon-14 amino acids and sulfur-35 methionine for in vitro studies of protein synthesis. Used iodine-125 for labeling proteins for use in radioimmunoassays. 1980 to 1982: On-the-job training as research specialist at the Aquaculture Research Laboratory, University of Wisconsin, Madison. Used hydrogen-3 labeled uridine, thymidine and leucine for in vitro and in vivo studies of nucleic acid and protein synthesis in fish. 1982 to 1985: On-the-job training as research assistant in the Department of Zoology, University of Washington, Seattle. Used hydrogen-3 labeled steroid hormones for radioimmunoassay. Used hydrogen-3 thymidine for in vitro studies on DNA synthesis by fish tissues. Used iodine-125 labeled thyroid and protein hormones for radioimmunoassay. Used approximate amounts of 0.2 mCi of hydrogen-3, carbon-14 and sulfur-35 as maximal amounts at any given time. Used 2.0 mCi of iodine-125 as maximal amounts at any given time.



Room 309

Scale 1 cm = 1 ft.



Room 303

Room 301

Scale 1cm = 0.65 ft

NOTE TO: License Fee Management Branch, ADM

FROM: Region 5

SUBJECT: VOIDED APPLICATION

Control Number

18969

Applicant

Dept of Commerce

Date Voided

8/8/85

Reason for Void

this facility already holds

NRC license. An amendment

will be issued rather than a new license

<sup>Control
No.</sup>
(17068)

Signature

fr

Attachment:
Application

ok L FMB