030-20383

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)
L + L 23222

X a. NEW LICENSE

b. AMENDMENT TO LICENSE NUMBER

c. RENEWAL OF LICENSE NUMBER

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.)
David L. Barto
Alaska Department of Fish and Game
TELEPHONE NUMBER: AREA CODE – NUMBER EXTENSION
(907) 747-6239

3. NAME AND TITLE OF PERSON TO BE CONTACTED REGARDING THIS APPLICATION
David L. Barto
TELEPHONE NUMBER: AREA CODE – NUMBER EXTENSION
(907) 747-6239

4. APPLICANT'S MAILING ADDRESS (Include Zip Code)
(Address to which NRC correspondence, notices, bulletins, etc., should be sent.)
Alaska Department of Fish & Game
P.O. Box 510 - 304 Lake Street, Rm. 103
Sitka, Alaska 99835

5. STREET ADDRESS WHERE LICENSED MATERIAL WILL BE USED (Include Zip Code)
U.S. Forest Service - Water & Soil Laboratory
2116 Halibut Point Road
Sitka, Alaska 99835

(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.	David L. Barto	Fishery Biologist
b.		
c.		

RECEIVED BY LFMB
Date 3/26/85
Log March IV
By Braun
Orig. To 3/28/85
Action Control

7. RADIATION PROTECTION OFFICER
David L. Barto

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

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)	Carbon-14	Sodium Salt		10m Ci
(2)				
(3)				
(4)				

8511010168 850731
REG5 LIC30 PDR

	E DESCRIBE USE OF LICENSED MATERIAL
(1)	Nutrient cycling: Primary production of aquatic systems
(2)	Nutrient cycling: Determination of nutrient status of phytoplankton by uptake
(3)	measurements
(4)	

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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)	N.A.	N.A.	N.A.
(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)	Liquid Scintillation	Packard Instrument Co.	Tri-carb 3255	1	Beta	1-2 cpm
(2)						
(3)						
(4)						

11. CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10

☒ a. CALIBRATED BY SERVICE COMPANY

NAME, ADDRESS, AND FREQUENCY

Packard Instrument Corp.
Upon installation

☐ 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	Eberline P.O. Box 2108 Santa Fe, NM 87501 (505) 471-3232	☒ MONTHLY
☒ (2) THERMOLUMINESCENCE DOSIMETER (TLD) wrist		☐ QUARTERLY
☐ (3) OTHER (Specify): _____		☐ OTHER (Specify):

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.

☒ b. STORAGE FACILITIES, CONTAINERS, SPECIAL SHIELDING (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

NA

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.

SECTION 11. Calibration of instruments listed in Item 10.

Liquid Scintillation Spectrophotometer

1) The initial alignment and calibration of the instrument was performed by a field service supervisor representing the Packard Instrument Co. At that time, we were supplied with sealed standard for ^{14}C, ^{3}H and a blank. The ^{14}C standard (at 107,900 DPM) is used to calibrate the counting efficiency and S.C.R. before each set of samples are analyzed. Our results for each year of use were:

Year	Sealed standard (CPM)	Efficiency (%)
1980	97,253	90.13
1981	97,351	90.22
1982	97,174	90.06
1983	97,359	90.23

Thus, we feel that the equipment is functioning (relative to this standard) very consistently from the date of purchase to the present date.

2) We have used the analysis of the activity provided by the supplier for each lot of the ^{14}C to determine counting efficiency by internal standardization. The analysis of the ^{14}C activity is claimed by the supplier to be between the limits of + 5% at the 2σ confidence level. We used a primary standard of 20.91 μCi/ml or 46.42 x 10^6 dpm/ml. We then prepared secondary standards at concentration of 928,404 dmp/ml. To each of several scintillation vials, we added 0.1 mls of the 2^{o} standard (92,840 dpm) to 10 mls of scintillation fluor, and obtained an average return of 82,168 cpm. Our sample counting efficiency was then determined to be 89.58% (i.e., 83,168 cpm/92,840 dpm).

3) Finally, we used the sample channels ratio method to determine sample counting efficiency, and a quench correction of quenched samples (Table A). We prepared two standard curves, one covers the low S.C.R. values (0 to 0.05) and the second covers the higher S.C.R. values (0.06 to 0.3). Our regression equation for the high S.C.R. values was:

$$\hat{Y} = 24.497\ (X) + 92.70$$

$$r = 0.99$$

Where: Y = Efficiency (%)

X = S.C.R. ratio

Known standards containing 94,840 dpm resulted in an average of 83,168 cpm with a 0.292 S.C.R.

Carbon-14 Procedure: Calibration (continued)

Counting efficiency can be derived by three methods: (1) by an internal standard (2) by (S.C.R.) sample channels ratio method or (3) by external standard ratio (ESR) method. Researchers[1, 2] have shown that the S.C.R. methods is the more accurate for our application.

Table A

Sample number	Time (min.)	Gross (Red Channel	Gross (Green Channel)	C.P.M. (Red)	C.P.M. (Green)	S.C.R.
1.0	1.0	68,021	231	68,021	231	.003
2.0	2.66	200,473	36,757	73,366	1,382	.018
3.0	1.0	75,023	2,523	75,023	2,523	.033
4.0	1.0	79,500	3,975	79,500	3,975	.050
5.0	1.0	78,168	7,970	78,668	7,970	.101
6.0	2.48	200,181	32,252	80,718	13,005	.161
7.0	2.45	200,560	46,762	81,862	19,087	.233
8.0	2.44	200,470	51,899	82,160	21,270	.258
9.0	2.40	200,037	59,357	83,348	24,732	.296

A series of quenched standards was developed (Table A) by formulating solutions of known disintegrations per minute (dpm) and counting (cpm) the solutions after each addition of quenching agent. This efficiency correction curve can then be used to make corrections of samples (see text).

Using the regression equation listed above, the coutning efficiency equalled 89.85%. Thus, 83,168 cpm/0.8985 equals a dpm of 92,563 or a recovery of 99.7%. In conclusion, we feel we have standardized or calibrated our Packard scintillation counter to provide precise values for any unknown 14_C sample either in relative or absolute terms and/or quenched or unquenched.

[1] Koboyashi and D. V. Mandsley, "Biological Applications of Liquid Scintillation Counting". Academic Press. N. Y. 1974.

[2] E. T. Bush, Anal. Chem. 35:1034 (1963).

Item #14 Waste Disposal

Carbon -14 disposal will consist of:

1. Liquid waste (at $\leq$0.05 μ Ci/gm) will be returned to the lake system (remote site lake) i.e., 69-828 μ Ci/lake per sampling period.

or

2. Liquid waste (at $\leq$0.05 μ Ci/gm) will be disposed of down a specified sink not to exceed 1 Ci/yr.

and

3. Solid wastes (e.g. vials and filters) will be buried at a sanitary disposal site (<0.0225 μ Ci/filter) as will disposal items i.e., gloves, absorbent materials.

and

4. Liquid scintillation fluor (toluene based) will be allowed to evaporate at marked area from sealed vessels.

Calculations of Carbon 14 Activity for Waste Disposal:

$NaHCO_3$ (sodium bacarbonate) is packaged in sealed glass ampoules containing 1.1 ml distilled sterile aqueous solution, pH 9.5. Its concentration is 23 microcuries in 1.1 ml aqueous solution or 20.91 microcuries per ml.

A precise analysis of the activity in each lot of ^{14}C is provided by supplier of the isotope. The true activity is claimed to be between the limit of $\pm$5% at the 98% confidence level.

Specific Activity:

$$20.91\ \mu Ci/ml \times 2.22 \times 10^6\ dpm/\mu Ci = 46,420,200\ dpm/ml$$

Since 0.25 ml's $NaHCO_3$ were injected into each sample bottle containing 100 ml's of lake water:

$$(0.25\ ml\ NaHCO_3)\ (46,420,200\ dpm/ml) = 11,605,050\ dpm\ per\ 100\ ml's\ lake\ H_2O$$

or a concentration of:

$$(0.25\ ml\ NaHCO_3)\ (20.91\ \mu Ci/ml) = 5.2275\ \mu Ci\ per\ 100\ ml's\ lake\ water.$$

After filtration of the lake water containing the 5.2275 μ Ci $NaHCO_3$ there is a residue activity remaining on the 25 mm filter of approximately 50,000 dpm (most extreme case) and thus, a concentration of 0.0225 μ Ci per 10 gram of medium or 0.00225 microcuries per gram of medium. Therefore, the filtrate concentration 11,605,050 dpm - 50,000 dpm = 11,555,050 dpm is 5.205 microcuries in 100 ml's aqueous solution or 0.052 microcuries per ml aqueous solution.

Item #14 Waste Disposal (continued)

Further after the liquid scintillation cocktail was evaporated off, we retested the used vial plus the used filter for activity. We found after repeated testing that used vials + filters contained an average of 4,473 cpm of ^{14}C or 0.003 μ Ci of ^{14}C. Thus, our used vials + filters will be disposed of (after the fluor is evaporated off) irregardless of the level of activity i.e., <0.05 μ Ci ^{14}C. This is according to the NRC (Nuclear Regulatory Commission) 10 CRF part 20 on Bio-Waste Disposal (paragraph 20.303).

Radiation Protection Program Item #15 for D. L. Barto

Laboratory, field research sites and storage rooms will be marked with appropriate 'Caution Radioactive Materials' signs. Radioactive materials will be handled by experienced personnel, and after use be diposed of as per Section 14.

Laboratory logs will be kept of quantities of radiation obtained, used and manner of diposal (decay, sanitary sewer, etc.). Radiation decontaminants are available, and protective materials both for personnel and working areas will be used. For example, protective clothing and gloves will be worn by research personnel along with lab bench protection consisting of absorbent pads with a liquid proof barrier in contact with bench top. Radioactive solid waste receptacles will be provided and marked with appropriate warning lables.

After completing a work task the areas will be cleaned by a decontamination wash (along with maintaining the existing personnel film badge program). The latter program will be reported on a montly basis along with monthly records of personnel monitoring and work area decontamination.

Isotopes will be stored in a lockable laboratory refrigerator marked with 'Radioactive Materials Present' signs, and stored in ampoulus within sealed steel cans.

Field experiments will take place in closed vessels (isotope concentrations do not to exceed 0.05 μ Ci/gm) within isolated lake systems. Materials in contact with radioactive material will be of a one use disposible nature to minimize contamination and repeated contact with lab personnel. Disposal of solid wastes will be at a land disposal site with all activity <0.05 μ Ci/gm. Scintillation cocktail will be evaporated off and vials disposed of per above.

Each employee handling the carbon-14 isotope will be furnished with the attached information concerning the handling of radioisotope by-products.

Instruction to Personnel Handling Radioisotope Byproduct Materials

(1) While conducting experiments which utilize byproduct materials (carbon -14 and/or phosphorus 32), you will be required to use protective gear so marked i.e., a laboratory coat/apron plus vinyl gloves. In addition, any transfer of the material in liquid form will require the use of automatic pipetts and/or syringes. In essence, use prudent judgement in avoiding the possibility of direct contact of the material with your person.

(2) Use of byproduct material will be confined to the laboratories sample preparation room using glassware so designated. Byproduct materials will be stored in a lockable refrigerator marked as containing radioactive materials. Use and storage areas are both located within the sample preparation room and are marked as containing radioactive materials (9" x 12" radioactive materials" caution signs on exterior doors). Signs conform to CFR 20 regulations concerning color and appropriate warning.

(3) Each user will be issued personnel monitoring devices which consist of thermoluminesence wrist dosimeters. Records of personnel monitoring results (monthly) are kept in the office of the radiation protection officer with the monitoring service being provided by:

Eberline
P.O. Box 2108
Santa Fe, New Mexico 87501
(505) 471-3232

(4) Byproduct waste disposal will follow the procedures outlined below:

Byproduct Waste Disposal

Carbon -14 disposal will consist of:

1. Liquid waste at ≤ 0.05 μ Ci/gm) will be returned to the lake system (remote site lake) i.e., 69-828 μ Ci/lake per sampling period.

or

2. Liquid waste at ≤ 0.05 μ Ci/gm) will be disposed of down a specified sink not to exceed 1 Ci/yr.

and

3. Solid wastes (e.g. vials and filters) will be buried at a sanitary disposal site (<0.0225 μ Ci/filter) as will disposable items e.g. gloves, absorbent materials, and pipette tips.

and

4. Liquid scintillation fluor (toluene based) will be allowed to evaporate off from capped plastic vials.

(5) You are required to follow good radiation safety practices which include but are not limited to the following:

(a) Use of byproduct material is restricted to the area so designated under Item 2 above.

(b) Smoking (already banned from the lab) and the consumption of food and beverages is prohibited in the designated use area.

(c) Contaminated areas will be cleaned using the decontaminants provided (e.g. "Count-off" from New England Nuclear) with solid wastes being disposed of in the marked solid waste containers. Please note that the potentially contaminated areas may be, but not necessarily stained yellow or blue due to the addition of iodine to all liquid reaction vessels.

(6) Records of byproduct material use, transfer and/or disposal will be kept and maintained within the laboratory. Each record will be updated following an experiment which includes the appropriate location of the experiment, byproduct material used, its quantity, method of disposal, and resultant total amount of byproduct remaining within the laboratory. Current byproduct use record sheets are located within the designated used area, and all permanent records are located in the office of the radiation protection officer.

(7) EMERGENCY PROCEDURES - these instructions are required reading for all persons located within the limnology laboratory regardless of whether you are or are not actively working with byproduct materials.

(a) Upon the contamination of a work area with carbon -14 in liquid form, apply sodium bicarbonate to the spill, notify the radiation protection officer and subsequently clean the area with decontaminate scrubs. Decontaminate materials are located within the designated use area.

(b) Upon contaminating your person, wash the affected area with an alkaline detergent and copious amounts of water. Use may be made of decontaminate scrubs e.g. Dri-Contrad. Notify the radiation protection officer.

(c) Wipe tests will be used as described below to ensure that the area has been decontaminated:

i) Monitor bench tops, floors, etc., for contamination through use of 2.4 cm absorbent pads wiped over an area of 100 cm^2. Wipes will will be monitored for activity using the Packard Liquid Scintillation counter (model #3255). Use glass vials containing 15 mls of Aquasol II fluor and count for 20 minutes.

(d) No entry will be allowed to contaminated areas until screening has cleared the area. As the designated use area has its own water supply and disposal area as well as a separate entry/exist door, personnel pass through will not be allowed until the area is cleared by the radiation protection officer.

(e) Please notify at least one of the following persons after initial containment of the spill:

David L. Barto
525 Monestary Street, Apt. #4
Sitka, Alaska 99835
(907) 747-8730 (home)
(907) 747-6239 (office)

Daniel Logan
719 Sirstad - Box 223
Sitka, Alaska 99835
(907) 747-6843 (home)
(907) 747-6671 (office)

(8) Procedures for picking up, receiving and opening packages containing byproduct materials:

(a) Upon placing an order for carbon -14 indicate that upon arrival of the material at the airport the radiation protection officer is to be notified by calling 747-6239 from 8:00 a.m. to 4:30 p.m. or 747-8730 either before or after these hours.

(b) Upon receiving a call that materials are present at the airport, pick up the container(s) within one working day.

(c) As each package will contain no more than 10 mCi of carbon -14 the package exterior will not have to be monitored. AR - 20.205(b)(11)

(d) Transportation of the byproduct materials to the laboratory will be by State of Alaska vehicle.

(e) Packages will be opened only within the designated use area and contents inspected for leaks.

(f) Opening of sealed containers containing byproduct material will take place within the designated use area. Any broken ampouls or glass vessels will be recorded as such; and contaminated surfaces either cleaned or disposed of per Items 5 and 8 above.

(g) Maintain current records of any transfer of radioactive materials either into or out of the laboratory.

APPENDIX I

AREA SURVEY PROCEDURES

1. All elution, preparation, and injection areas will be surveyed daily with an appropriately low-range survey meter and decontaminated if necessary.*

2. Laboratory areas where only small quantities of radioactive material are used (less than 200 μCi) will be surveyed monthly.

3. Waste storage areas and all other laboratory areas will be surveyed weekly.

4. The weekly and monthly surveys will consist of:

   a. A measurement of radiation levels with a survey meter sufficiently sensitive to detect 0.1 mR/hr.

   b. A series of wipe tests to measure contamination levels. The method for performing wipe tests will be sufficiently sensitive to detect 200 dpm per 100 cm^2 for the contaminant involved. Wipes of elution and preparation areas or other "high background" areas will be removed to a low background area for measurement.

5. A permanent record will be kept of all survey results, including negative results. The record will include:

   a. Location, date, and identification of equipment used, including the serial number and pertinent counting efficiencies.

   b. Name of person conducting the survey.

   c. Drawing of area surveyed, identifying relevant features such as active storage areas, active waste areas, etc.

   d. Measured exposure rates, keyed to location on the drawing (point out rates that require corrective action).

   e. Detected contamination levels, keyed to locations on drawing.

   f. Corrective action taken in the case of contamination or excessive exposure rates, reduced contamination levels or exposure rates after corrective action, and any appropriate comments.

6. Area will be cleaned if the contamination level exceeds 200 dpm/100 cm^2

*For daily surveys where no abnormal exposures are found, only the date, the identification of the person performing the survey, and the survey results will be recorded.

The undersigned have read the procedures for handling radioisotope byproducts and understand all emergency procedures.

Signature	Date
Signature	Date
Signature	Date
Signature	Date
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Signature	Date
Signature	Date

Formal Training in Radioisotope Safety Item #16: David L. Barto

1) Date: Fall Semester 1974

Institution: State University College at Fredonia, New york
Department of Biology

Course: Biology #440, Undergraduate Research - Limnology

Instructor: Dr. Thomas A. Storch

Course Summary: The course was a directed research project dealing with laboratory and in-situ field techniques of using carbon-14 to measure phytoplankton carbon fixation rates. The project specifically monitored the uptake of inorganic carbon-14 by phytoplankton, its conversion to soluble dissolved organic carbon-14 and its utilization by aquatic bacteria.

Research Project Title: Utilization of algal dissolved organic carbon by bacteria in the aquatic environment. Grade: A

This project resulted in the following presentation:

Heterotrophic Utilization of Soluble Algal Carbon, 38th Annual Meeting, American Society of Limnology and Oceanography, Juneau 22-25, 1975

This course provided instruction and the practical application of the procedures in a, b, and c of Item #16.

2) Date: Summer Semester 1975

Institution: State University College at Fredonia, New York
Department of Biology

Course: Biology #690, Graduate Research - Limnology

Instructor: Dr. Thomas A. Storch

Course Summary: The course was a directed research project dealing with laboratory and in-situ field techniques of using carbon-14 to measure phytoplankton carbon fixation rates. The project was designed to measure the response of phytoplankton growth to additions of various nuturients at varying concentrations.

Research Project Title: The Effect of varying nuturient concentrations on phytoplankton productivity in Chantaugua Lake. Grade: B

This course provided instruction and the practical application of the procedures in a, b, and c of Item #16.

Work Related Experience Item #17: David L. Barto

1) Date: May 1975 - May 1976, 1 year

Employer: Lake Eire Environmental Study, State University
College at Fredonia, New York

Job Title: Graduate Student

Experience Summary: Involved with a series of experiments to monitor phytoplankton carbon fixation rates using inorganic carbon-14. Experience with laboratory and in-situ techniques of light/dark bottle experiments and iron enrichment experiments to monitor phytoplankton photosynthetic rates.

2) Date: December 1977 to October 1979, 1 year, 11 months

Employer: USDI, Fish and Wildlife Service,
Great Lakes Fishery Laboratory,
1451 Green Road,
Ann Arbor, Michigan 48105

Job Title: Physical Science Technician

Experience Summary: Performed organo-chlorine analysis of fish tissue using a Varian model 2700 gas chromatograph. This chromatograph used a radioisotope nickel-63 electron capture detector. This employment provided instruction and the practical application of the procedures in a, b, and c of Item #16.

3) Date: April 1980 to July 1981, 1 year, 3 months

Employer: USDA, Forest Service
Chatham Area, Tongass National Forest
P.O. Box 1980
Sitka, Alaska 99835

Job Title: Fishery Biologist

Experience Summary: Involved with the measurement of phytoplankton carbon fixation rates using inorganic carbon-14. This work was accomplished cooperatively with the Alaska Department of Fish and Game as part of the lake enrichment program in northern Southeast Alaska.

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)* State Agency - Fee exempt	b. CERTIFYING OFFICIAL *(Signature)* David J. Bart
	c. NAME *(Type or print)* DAVID L. BARTO
(1) LICENSE FEE CATEGORY: NEW	d. TITLE Fishery Biologist
(2) LICENSE FEE ENCLOSED: $ NONE	e. DATE March 13, 1985 70159

NRC FORM 313 I (12-81) GPO 886-426

NOTE TO: License Fee Management Branch, ADM

FROM: Region 5

SUBJECT: VOIDED APPLICATION

Control Number 70169

Applicant State of Alaska

Date Voided 9/10/85

Reason for Void

no response received to
threat to abandon letter

Signature AR

Attachment:
Application

ok
LPMB

ML 50