30 - 20907

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)* 83124

X	a. NEW LICENSE
	b. AMENDMENT TO: LICENSE NUMBER
	c. RENEWAL OF: LICENSE NUMBER 11901

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.)*
U.S. Department of Interior, Geological Survey, Water Resources Division. Alaska District
TELEPHONE NUMBER: AREA CODE – NUMBER EXTENSION
FTS (907) 271-4138

3. NAME AND TITLE OF PERSON TO BE CONTACTED REGARDING THIS APPLICATION
Richard Snyder, Hydrologic Technician
TELEPHONE NUMBER: AREA CODE – NUMBER EXTENSION
FTS (907) 271-4153

4. APPLICANT'S MAILING ADDRESS *(Include Zip Code)*
(Address to which NRC correspondence, notices, bulletins, etc., should be sent.)
1209 Orca Street
Anchorage, Alaska 99501

5. STREET ADDRESS WHERE LICENSED MATERIAL WILL BE USED *(Include Zip Code)*
1209 Orca Street
Anchorage, Alaska 99501

(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.	Richard L. Snyder	Hydrologic Technician
b.		
c.		

7. RADIATION PROTECTION OFFICER
Richard L. Snyder

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.	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	any		5 mCi
(2)	Phosphorus 32	any		5 mCi
(3)				
(4)			DEC -2 AM 11:06	83.

	E DESCRIBE USE OF LICENSED MATERIAL
(1)	Primary production of aquatic systems.
(2)	Nutrient limitation studies of algae and aquatic plants.
(3)	
(4)	

16390

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	NA	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)	liquid scintillation spectrometer	Packard Tri carb	3255	2	beta	1-2 cpm
(2)	liquid scintillation	Beckman	LS-100	1	beta	1-2 cpm
(3)	hand held GM	Ludlum-12	Probe 44-7	1	beta	50-450,000 cpm
(4)						

11. CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10

☒ a. CALIBRATED BY SERVICE COMPANY

NAME, ADDRESS, AND FREQUENCY
Ludlum Measurements, Inc.
501 Oak street. Sweetwater, TX 79556
(915) 235-5494 Yearly

☐ 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	Siemens Gammasonics, Inc.	☒ MONTHLY
☐ (2) THERMOLUMINESCENCE DOSIMETER (TLD)		☐ 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 MANUFACTUBER, SO STATE.

^{14}C disposal by release into sanitary sewerage system as per NRC regulations part 20.303 and air (CO_2 gas) as per part 20.106

^{32}P by holding for decay then disposal into sanitary sewer and trash.

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)* NONE	b. CERTIFYING OFFICIAL *(Signature)* Raymond S. George
	c. NAME *(Type or print)* Raymond S. George
(1) LICENSE FEE CATEGORY:	d. TITLE Associate District Chief
(2) LICENSE FEE ENCLOSED: $	e. DATE November 30, 1983

10. (1) One of these instruments belongs to the State of Alaska, Department of Fish and Game, F.R.E.D. Division, Soldotna, AK. It is available to us for counting ^{14}C and ^{32}P samples. Their license number is 50-18324-01. The other instrument we could use belongs to the U.S. Geological Survey, Denver Central Laboratory, 5293 Ward Road., Arvada, CO. 80002.

(2) This instrument belongs to the U.S. Geological Survey, Denver Central Laboratory, 5293 Ward Road, Arvada, Colorado 80002. This instrument like the second instrument above is also available to us but it's great distance makes it less practical for routine use.

(3) This is a hand held instrument, owned and operated by the licensee.

11. (1) Calibration of the Alaska Department of Fish and Game instrument is by a series of 3 standards supplied by Packard Instrument Co.
These are used to check the instrument calibration for every run of samples or minimally once a year.

(2) The Ludlum Instrument will be calibrated and certificated once a year by the manufacturer.

13. Enclosed is a floor print of our first floor at 1209 Orca Street illustrating the location of fume hood, sinks, counters, and restricted access storage cabinet in our shop area. Also enclosed is a sketch of our mobile travel trailer that could be used in road accessable areas in Alaska. Most of the work with the radioactive material will be done in the trailer, however, the 1209 Orca Street facility will be used for disposal thru the Anchorage sewer system or vented as CO_2 gas thru the fume hood. Liquid and dry waste will be held in the trailer for proper disposal in Anchorage.

14. (b) The ^{14}C activity we will receive is sodium bicarbonate ($NaHCO_3$) solution with a ph of 9.5. It is packaged in sealed glass ampoules containing 1.1 ml of solution and an activity of 23 microcurries (uCi). This results in 20.91 microcurries per ml. The way our system is designed to operate the maximum ^{14}C we could use in one day is 6 ampoules or 138 uCi. Our building has about twenty-five people and using a figure of 20 gallons per person, per day, this comes to 500 gallons per day or 1,893,000 ml. Assuming the maximum of 138 uCi, per day, was used this would result in a daily discharge of 7.3×10^{-5} uCi/ml; well less than the limit of 2×10^{-2} uCi/ml from Appendix B table one, column two.

We propose to initially use the ^{14}C proceedure 36 times per year, although this could change, it would take a considerable change in program and experimental design to approach the 1 Ci/year limit of waste to the sewer.

There will be some ^{14}C waste as CO_2 gas that will be vented to outside air by an exhaust fan or a fume hood. For the samples, a 60 ml bottle receives 2.091 uCi of ^{14}C that results in a concentration of .03485 uCi per ml within the bottle. A five ml aliquot is then taken from each bottle and transferred to a vial, and assuming no ^{14}C uptake the maximum would be 0.17425 uCi per vial. For 60 vials this could have a maximum of 10.455 uCi ^{14}C that would be converted to CO_2 gas on any one day. In a year this would result in 376.38 uCi ^{14}C. Our fume hood exhausts air at the rate of 26 cubic meters per minute.

It would take us atleast 30 minutes to generate the 10.455 uCi/day ^{14}C as gas which would result in a concentration of 1×10^{-8} uCi/ml or much less than the 1×10^{-7} uCi/ml in air limit.

Some additional ^{14}C as CO_2 gas would be generated as part of our clean-up proceedures, however, this would be small and hard to quantify.

The liquid ^{32}P will be allowed to decay in sealed containers in the restricted area until it has decayed enough for proper sewer disposal. Any dry waste or contaminated material would be packaged and allowed to decay 200 days before disposed of in the municipal landfills.

15. Laboratory trailer and storage cabinet will be marked with appropriate "Caution Radioactive Materials" signs. Radioactive materials will be handled by trained personnel and after use be disposed of as listed in 14 (b).

Laboratory logs will be kept of quantities of radiation obtained, use and manner of disposal. Radiation decontaminants will be used to wipe down work areas followed by dilute acid and water wipes.

Protective aprons or lab coats and gloves will be worn and cleaned similar to the work areas after use or before disposal. All labware and ampoules that were in contact with radioactive isotopes will be rinsed in tap water followed by an acid rinse under the fume hood, followed by another tap water rinse, then trash disposal or further cleaning and reuse.

All waste containers being held for decay will be labeled with "Radioactive Material" labels that will have the date on them.

After work and cleanup proceedures the work areas will be monitored with a hand held Geiger counter. If contaminated areas are found they will be recleaned.

Monthly beta film badge service is to be used by all personnel working with radioactive materials. Monthly records will be kept.

New isotopes contained in glass ampoules within cans, and waste for decay will be stored in a locked cabinet in a corner of our shop area. The cabinet is marked with a "Caution, Radioactive Material" sign.

Experiments will take place in closed vessels in a water bath incubator or within an aquatic system.

The duties of the radiation protection officer shall be: (1) to make sure all appropriate records are kept and tabulated, (2) personnel are properly trained and using the proceedures as stated in this application and in the NRC Rules and Regulations; Part 20. (3) maintain control of access to restricted radioactive storage area, (4) report loss, theft or other incidents to NRC, (5) submit personnel monitoring reports to NRC if required.

16. FORMAL TRAINING IN RADIATION SAFETY: Richard L. Snyder

	Type of training	Where trained	Duration of training	When	Remarks
a.	Principles and Practices of Radiation Protection.	University of Wisconsin	4 years	1958-1962	B.S. Degree
b.	Radioactive measurement standardization and monitoring techniques and instruments.	University of Alaska	1 week	1968	Radiological monitor Instructor course.
c.	Mathematics and Calculations basic to the use and measurement of Radioactivity.	University of Alaska	3 months	1968	Math - Algebra
		University of Alaska	1 week	1968	Radiological monitor Instructor course.
d.	Biological effects of Radiation	University of Wisconsin	4 years	1958-1962	B.S. Degree
		University of Alaska	1 week	1968	Radiological monitor Instructor course

17. EXPERIENCE:

When	Where	Isotope	Amount	Project
TRACER				
1961-62	University of Wisconsin - soils dept. Madison, Wisconsin.	^{32}P	Unknown	Seasonal Uptake Rates of P by Pinus Resinosa-Red Pine seedlings.
1963-67	Dept. of Interior Geological Survey Water Resources Div. Denver, Colorado.	^{137}Cs	1.0 mCi	ion exchange and sorption/desorption studies on heavy metal oxides and clay minerals. AEC License - #5-1399-8
		^{57}Co	0.5 mCi	
		^{85}Sr	1.0 mCi	
		^{60}Co	1.0 mCi	
		^{51}Cr	0.5 mCi	
		^{95}Nb	0.5 mCi	
		^{54}Mn	0.1 mCi	
		^{65}Zn	0.5 mCi	
		^{32}P	2.0 mCi	
		^{198}Au	1.0 mCi	
		$^{110m+10}Ag$	1.0 mCi	
SEALED SOURCES				
1968-83	Department of Interior - Geological Survey Water Resources Div. Anchorage, Alaska	^{60}Co	25 mCi	Well logging NRC liscense - #50-11901-01
		$^{241}Am/Be$	3 Ci	

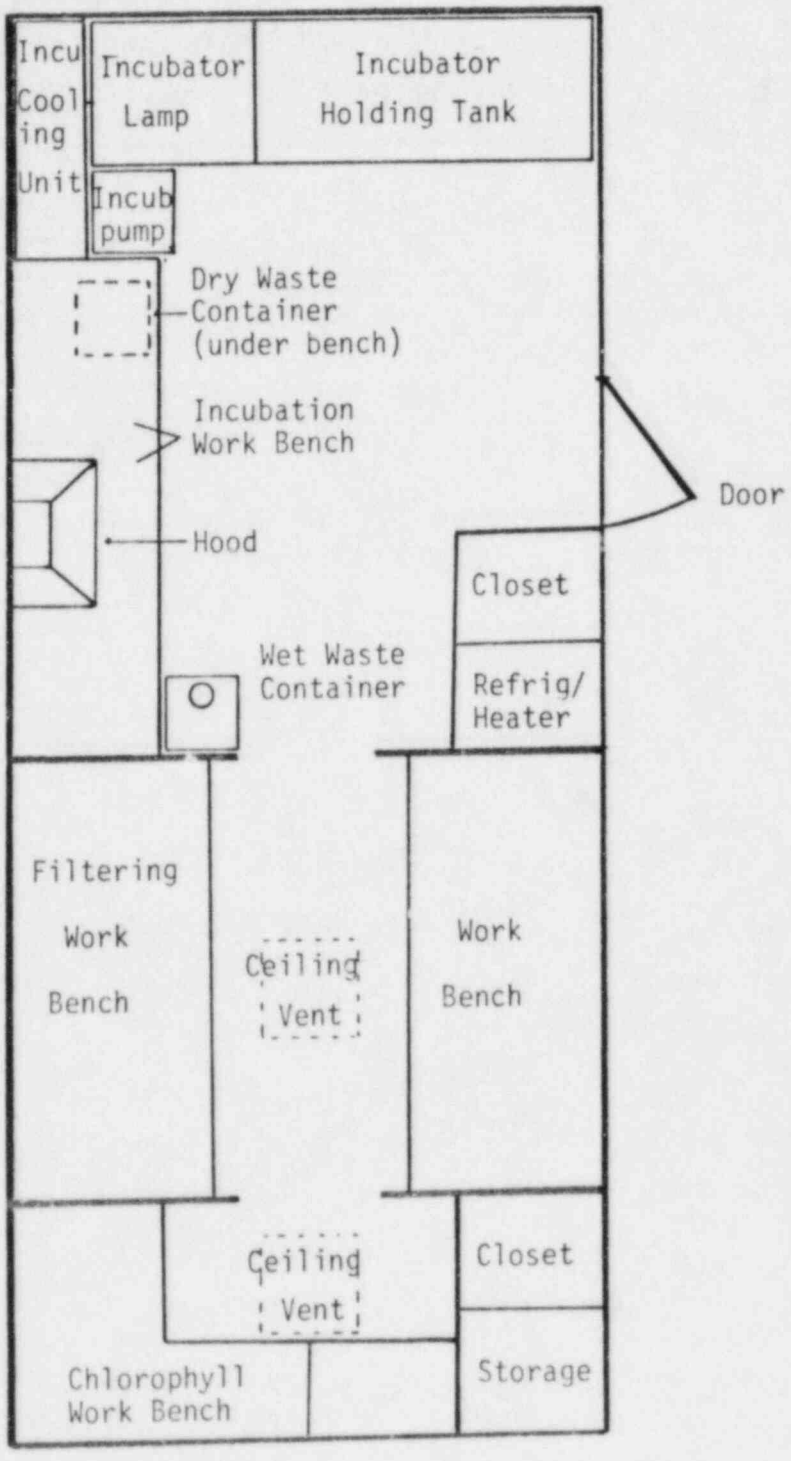
9-213-C
(March 1949)
Sketch Form

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....

Anchorage Subdistrict Office

LIMNOLOGY FIELD LABORATORY/TRAILER SETUP:



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Sheet No. 1 of 1 Sheets. Prepared by T. Rowe Date 11/22/83 Checked by ..... Date .....

U. S. GOVERNMENT PRINTING OFFICE 16—25896-3

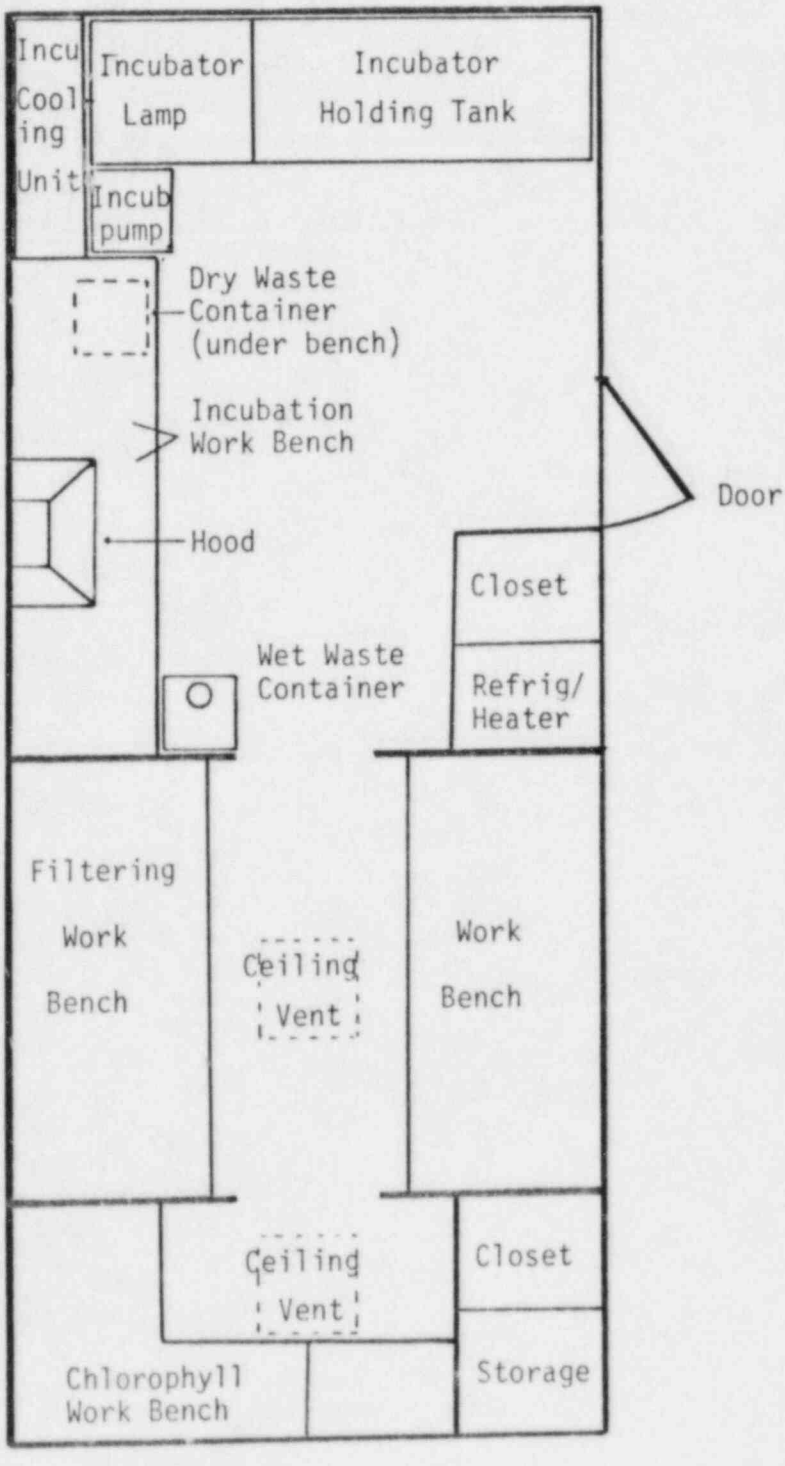
9-212-C
(March 1949)
Sketch Form

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....

Anchorage Subdistrict Office

LIMNOLOGY FIELD LABORATORY/TRAILER SETUP:



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