	2	10 - 20907		
NRC Form 313 I U.S. NUCLEAR REGULATORY ((12-81) 10 CFR 30	COMMISSION 1.	APPLICATION FOR: heck and/or complete as appropriate)		
APPLICATION FOR BYPRODUCT MATERI INDUSTRIAL	AL LICENSE X	a. NEW LICENSE		
See attached instructions for details. Completed applications are filed in duplicate with the Division of F Office of Nuclear Material Safety, and Safeguards, U.S. Nuclear Reg Vashington, DC 20555 or applications may be filed in person at the 1717 H Street, NW, Washington, D. C. or 7915 Eastern Avenue, Sil	uel Cycle and Material Safety, ulatory Commission, e Commission's office at ver Spring, Maryland.	b. AMENDMENT TO: LICENSE NUMBER c. RENEWAL OF: LICENSE NUMBER		
APPLICANT'S NAME (Institution, firm, person, etc.) U.S. Department of Interior, Geological Survey, Water Resources Division. Alaska District	3. NAME AND TITLE OF PERSON TO BE CONTACTED REGARDING THIS APPLICATION Richard Snyder, Hydrologic Technician			
TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION FTS (907) 271-4138	TELEPHONE NUMBER: ARE FTS (907) 271-4153	A CODE - NUMBER EXTENSION		
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) INDIVIDUAL(S) WHO WILL USE OR DIRECTLY SUPER (See Items 16 and 17 for required training and experience of each in	, USE ADDITIONAL PROPERL VISE THE USE OF LICENSED dividual named below)	Y KEYED PAGES.) MATERIAL		
FULL NAME	TITLE			
Richard L. Snyder	Attach a resume of person's train	ing and experience as outlined in Items		
Richard L. Snyder	16 and 17 and describe ins respond	numities ander Herri 13.		
8. LICENSE	ED MATERIAL			
L ELEMENT CHEMICAL I AND AND/OR N MASS NUMBER PHYSICAL FORM E	NAME OF MANUFACTURER AND MODEL NUMBER (If Sealed Source)	MAXIMUM NUMBER OF MILLICURIES AND/OR SEALED SOURCES AND MAXIMUM ACTI- VITY PER SOURCE WHICH WILL BE POSSESSED AT ANY ONE TIME		
NO. A B	c	D		
(1) Carbon 14 any		5 mCi		
(2) Phosphorus 32 any		5 mCi		
(3)				
(4)	90: 11A S- 0:	30 88.		
DESCRIBE USE OF	E LICENSED MATERIAL			
(1) Primary production of aquatic systems	i.			
(2) Nutrient limitation studies of algae	and aquatic plants.			
(3)	8508050276 850606 16390			
(4)	50-11901-02	PDR		

C

-

.

			9. STORAGE OF	SEALED SOURC	ES	
LINEN	CONTAINER AND/OR DEVICE IN WHICH EACH SEALED SOURCE WILL BE STORED OR USED. A.		NAME OF MANUFACTURER B.		MODEL NUMBER	
(1)	NA	NA		NA		NA
(2)						
(3)						
(4)						
	1	10 8/			ENITO	
-	ТҮРЕ	MANUFACTURER'S	MODEL	NUMBER	BADIATION	SENSITIVITY
D-ZWO	OF INSTRUMENT	NAME	NUMBER	AVAILABLE	DETECTED (alpha, beta, gamma, neutron)	RANGE (milliroentgens/hour or counts/minute)
	A	В	C	D	E	F
(1)	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. CALIBR	ATION OF INSTR	UMENTS LISTE	D IN ITEM 10	
	(915) 235-5494 (Check and/or complete	Yearly 12. PE	RSONNEL MONI	TORING DEVICE	S	EXCHANGE FREQUENC
	Â		10	B		С
L(1) FILM BADGE Siemens Gammasonics, Inc.		nc.	MONTILY			
1(2	DOSIMETER (TLD)	MOLUMINESCENCE METER (TLD)			QUARTERLY	
3 (3	OTHER (Specify):	·			OTHER (Specify):	
-						
	13. FACILITIES A	ND EQUIPMENT (C	heck were appropr	iate and attach an	notated sketch(es) a	nd description(s).
	LABORATORY FACI STORAGE FACILITI	LITIES, PLANT FACIL ES, CONTAINERS, SPE	ITIES, FUME HOOD CIAL SHIELDING (/	DS (Include filtration lixed and/or tempora	n, if any), ETC. wy), ETC.	
] d.	RESPIRATORY PROT	TECTIVE EQUIPMENT,	ETC.			
			14. WASTE	DISPOSAL		
NA.	AME OF COMMERCIAL	WASTE DISPOSAL SE	RVICE EMPLOYED			
IF ВЕ 14 32	COMMERCIAL WASTE USED FOR DISPOSIN E APPLICATION IS FO C disposal by part 20.303 P by holding f	DISPOSAL SERVICE I G OF RADIOACTIVE V DR SEALED SOURCES release into s and air (CO ₂ g for decay then	SNOTEMPLOYED, VASTES AND ESTIM AND DEVICES AND anitary sewen as) as per pa disposal into	SUBMIT A DETAIL ATES OF THE TYP THEY WILL BE RI cage system art 20.106 o sanitary se	ED DESCRIPTION OF TE AND AMOUNT OF TURNED IO THE M as per NRC reg ewer and trash	F METHODS WHICH WILL ACTIVITY INVOLVED. IF ANTECTORBER, SO STAT
IC F	FORM 3131(12-81)					

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)	b. CERTIFYING OFFICIAL IS mature		
NONE	Raymond S. George		
(1) LICENSE FEE CATEGORY	d. TITLE Associate District Chief		
(2) LICENSE FEE ENCLOSED: \$	e. DATE November 30, 1983		
NRC FORM 313 I (12-81)	GPO 886-426		

- 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 14C and 32P 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 CO₂ gas thru the fume hood. Liquid and dry waste will be held in the trailer for proper disposal in Anchorage.

The ¹⁴C activity we will receive is sodium bicarbonate (NaHCO₃) 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 ¹⁴C 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 x 10⁻⁵ uCi/ml; well less than the limit of 2 x 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 ¹⁴C 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 ¹⁴C 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 ¹⁴C uptake the maximum would be 0.17425 uCi per vial. For 60 vials this could have a maximum of 10.455 uCi ¹⁴C that would be converted to CO_2 gas on any one day. In a year this would result in 376.38 uCi ¹⁴C. 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 ¹⁴C 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 ¹⁴C as CO_2 gas would be generated as part of our cleanup proceedures, however, this would be small and hard to quantify. The liquid ³²P 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.

14. (b)





16390

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
а.	Principles and Practices of Radiation Protection.	University of Wisconsin	4 years	1958-1962	B.S. Degree
ь.	Radioactive measurement standardization and monitoring techniques and instruments.	University of Alaska	l week	1968	Radiological monitor Instructor course.
c	Mathematics and Calculations	University of	3 months	1968	Math - Algebra
	basic to the use and measurement of Radioactivity.	Alaska University of Alaska	l week	1968	Radiological monitor Instructor course.
đ.	Biological effects of Radiation	University	4 years	1958-1962	B.S. Degree
		Wisconsin University of Alaska	1 week	1968	Radiological monito Instructor course

17. EXPERIENCE:

When	Where	Isotope	Amount	Project
TRACER				영상 지수가 감독하는 것이다.
1961-62	University of Wisconsin - soils dept. Madison, Wisconsin.	32p	Unknown	Seasonal Uptake Rates of P by Pinus Resinosa- Red Pine seedlings.
1963–67	Dept. of Interior Geological Survey Water Resources Div. Denver, Colorado. 110m	137cs 57co 85sr 60co 51cr 95Nb 54Mn 65Zn 32p 198Au +10 Ag	1.0 mCi 0.5 mCi 1.0 mCi 1.0 mCi 0.5 mCi 0.5 mCi 0.1 mCi 2.0 mCi 1.0 mCi 1.0 mCi	ion exchange and sorption/desorption studies on heavy metal oxides and clay min- erals. AEC License - #5-1399-8

SEALED SOURCES

1968-83	Department of	60 _{Co}	25 mCi	Well logging
	Interior - Geological Survey Water Resources Div.	241 _{Am/Be}	3 Ci	#50-11901-01
	Anchorage, Alaska			



TATES DEPARTMENT OF THE INTER GEOLOGICAL SURVEY UNITE WATER RESOURCES DIVISION

Anchorage Subdistrict Office





U. S. GOVERNMENT PRINTING OFFICE 16-25896-8

File



UNITED FATES DEPARTMENT OF THE INTER GEOLOGICAL SURVEY WATER RESOURCES DIVISION

File

Anchorage Subdistrict Office



Sheet No. 1 of 1 Sheets. Prepared by T. Rowe Date Date Checked by Date Date Date

DOCUMENT/ PAGE PULLED

AN	0.	8508050276
		,

NO. OF PAGES	<u> </u>	
REASON		
PAGE ILLEGIBLE		
HARD COPY FILED AT.	PDR	CF
	OTHER _	
BETTER COPY REQUEST	ED ON	
HARD COPY FILED AT:	PDR	CF
	OTHER_	RegionI
FILMED ON APERTURE	CARD NO	8508050276-0