FORM AEC-874A
(12-57)

U. S. ATOMIC ENERGY COMMISSION
PRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 11-197-1

AMENDMENT NO. 3

University of Idaho
Agricultural Chemistry
Moscow, Idaho

Attention: Dr. J. V. Jordan

In accordance with application dated January 22, 1958, and letter from J. V. Jordan dated January 23, 1958, License No. 11-197-1 is amended as follows:

Item 6. Maximum amount of Sulfur 35 which licensee may possess at any one time is decreased from 500 millicuries to 100 millicuries.

Item 6. Maximum amount of Chlorine 36 which licensee may possess at any one time is decreased from 50 millicuries to 2 microcuries.

Items 6, 7, 8, and 9 are amended to add:

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
Calcium 45	Any	20 millicuries
Sodium 24	Any	5 millicuries

9. Authorized use

To study calcium and sodium ion movement in slick spot soils.

SUPERSEDED
By License Number

For the U. S. Atomic Energy Commission
Original Signed
James R. [illegible]

by [signature] for JRM 3-7-58
Division of Licensing and [illegible]
Washington 25, D. C.

Date March 6, 1958

EH/pws

A/3

Form AEC-374a
(2-56)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 11-197-1

AMENDMENT NO. 2

University of Idaho
Department of Agricultural Chemistry
Moscow, Idaho

Attn: Dr. J. V. Jordan

In accordance with application dated December 13, 1957, License No. 11-197-1 is amended as follows:

Item 9 (Authorized use of Phosphorus 32) is amended to add: Agricultural field studies.

Condition No. 12 is amended to read:

12. Licensed material to be used at University Home Experiment Station, Moscow, Idaho, and Branch Stations at Sandpoint, Idaho, and Deary, Idaho.

For the U. S. Atomic Energy Commission

Original Signed By
James R. Mason 1-27-58

by [redacted]

Chief, Isotopes Extension
Div. of Licensing & Regulation
Oak Ridge, Tennessee

Date January 20, 1958

BC 1115

Form AEC-374a
(2-56)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 11-197-1

AMENDMENT NO.1

University of Idaho
Department of Agricultural Chemistry
Moscow, Idaho

Attn: Dr. J.V. Jordan

In accordance with letter dated February 5, 1957, from Dr. J. V. Jordan, License No. 11-197-1 is hereby amended to change the possession limit for Phosphorus 32 to read 3 curies.

amendment # 2 1-20-58 JVJ 1-27-58
MLS.
Amendment # 3
3/8/58 JVJ
MLS.

NRB/cjk.

Date February 20, 1957

For the U. S. Atomic Energy Commission

by PCA/NB 2-20-57

Director, Isotopes Extensi
Division of Civilian Appli
Oak Ridge, Tennessee

Form AEC-?74
?,9-55)

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 30, Licensing of Byproduct Material, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose (s) and at the place (s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Name **University of Idaho** **Department of Agricultural Chemistry**	3. License number **11-197-1**
2. Address **Moscow, Idaho** **Attn: Dr. J. V. Jordan**	4. Expiration date **April 30, 1958**
	5. Reference No.

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
Phosphorus 32	**Any**	**50 millicuries**
Sulfur 35	**Any**	**500 millicuries**
Chlorine 36	**Any**	**50 millicuries**

9. Authorized use

To be used as tracers in soil and plant nutrient studies in replicated field experiments, in the laboratory and in greenhouses.

CONDITIONS

10. Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.; **and the material is to be used by, or under the supervision of, the individual named above.**

11. Except as hereinafter provided the licensee shall comply with provisions of the Atomic Energy Commission's proposed standards for protection against radiation as published in the Federal Register, July 16, 1955 (10-CFR-20), until such time as said proposed regulations or revisions thereof become effective regulations of the Commission. Notwithstanding, Section 20.2(f) of said standards, labeling shall not be required for laboratory containers such as beakers, flasks and test tubes, used transiently in laboratory procedures during presence of the user.

12. Licensed material to be used at University Farm Experiment Station, Moscow, Idaho and Branch Station, Sandpoint, Idaho.

Amend #3 reduce possession limit of P-32 to 5-35-100 mc Cl-36 - 2 mc
add Na-24 Ca-45

Amend #1 C.K. 4/19/57

For the U. S. Atomic Energy Commission

Date **April 3, 1956**

by ORIGINAL SIGNED BY LESTER R. ROGERS

For: Director, Isotopes Extension
Division of Civilian Application
Oak Ridge, Tennessee

IEB:HWS (11-197-1)

Oak Ridge, Tennessee
January 27, 1958

Dr. J. V. Jordan
Department of Agricultural Chemistry
University of Idaho
Moscow, Idaho

Subject: AMENDMENT TO LICENSE NO. 11-197-1

Dear Dr. Jordan:

Enclosed is Amendment No. 2 to Byproduct Material License No. 11-197-1 issued in accordance with your application dated December 13, 1957, and your letter dated January 13, 1958.

Thank you for the additional information concerning your program which was submitted in your letter of January 13.

Very truly yours,

James W. Hitch, Assistant Chief
Isotopes Extension
Division of Licensing and Regulation

Enclosures:
1. Amendment No. 2 to License No. 11-197-1
2. Application forms w/instructions

Sims:bc

OFFICE ▶	Isotopes	Isotopes				
SURNAME ▶	HWS	JVJ				
DATE ▶	1-27-58	1-27-58				

Form AEC-318 (Rev. 9-53)

U. S. GOVERNMENT PRINTING OFFICE 16—62761-3

8634
B-2

UNIVERSITY OF IDAHO
COLLEGE OF AGRICULTURE
AGRICULTURAL EXPERIMENT STATION
MOSCOW, IDAHO

DEPARTMENT OF AGRICULTURAL CHEMISTRY

January 23, 1958

Isotopes Extension
Division of Licensing and Regulation
U. S. Atomic Energy Commission
Oak Ridge, Tenn.

Gentlemen: Re: Extension of License 11-197-1-2
My letter of January 22, 1958

In my letter of January 22 requesting an extension of, and modifying License 11-197-1-2, I neglected to mention our S-35 possession limit. The 500 millicurie limit can well be scaled down to 100 mc.

The isotopes and possession limits we are requesting are as follows:

P-32	3 curies
S-35	100 millicuries
Cl-36.....	2 microcuries
C-14	0.5 millicuries
Na-24.....	5 millicuries
Ca-45.....	20 millicuries

This should have been included in my letter of January 22.

Very truly yours

J. V. Jordan
Associate Agricultural Chemist

JVJ/g
cc/Dr. Gurevitch
Radioisotopes Committee

UNIVERSITY OF IDAHO
COLLEGE OF AGRICULTURE
AGRICULTURAL EXPERIMENT STATION
MOSCOW, IDAHO

DEPARTMENT OF AGRICULTURAL CHEMISTRY

8653
app 1-20-58
11-197-1

January 22, 1958

Isotopes Extension
Division of Licensing and Regulation
U. S. Atomic Energy Commission
Oak Ridge, Tennessee

Gentlemen:

Re: (1) Your reference IEB:RWS(8362) and our letter of Jan. 13/58
(2) Extension of License 11-197-1-2
(3) Revision of Cl possession limit
(4) Addition of new isotopes

Items 1 and 2

Please refer to recent correspondence regarding extension of License 11-197-1-2 for P-32 possession. I replied to your reference IEB:RWS(8362) on January 13. This is mentioned to help orient our position as regards the license extension, a request now in your hands.

Item 3

Since we have only some 2 microcuries of Cl-36 on hand and probably will have no use for the 50 millicuries possession limit, this amount could be graded down at your discretion to 1 millicure.

Item 4

We would like to add the following isotopes and possession limits to the license:

Ca-45	20 mc
Na-24	5 mc

The application forms are attached.

Item 5

Please send a few sets of order forms AEC-391.

Many thanks for your consideration.

Very truly yours

J. V. Jordan
Associate Agricultural Chemist

JVJ/g
Enc.: 2 applications in duplicate
cc/Dr. Gurevitch, Radioisotopes Committee

8309

Form AEC-313 (9-55)

ATOMIC ENERGY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE

Form approved. Budget Bureau No. 38-R027.3

DUPLICATE

INSTRUCTIONS: Complete Items 1 through 19 if this is a new application. If renewal is requested, complete only Items 1 through 11 provided that with respect to the other items there has been no change in the information previously submitted. Mail two copies to: U. S. Atomic Energy Commission, P. O. Box E, Oak Ridge, Tennessee, Attention: Isotopes Extension, Division of Civilian Application. Upon approval of this application, the applicant will receive an AEC Byproduct Material License. General requirements for issuance of an AEC Byproduct Material License are contained in Title 10, Code of Federal Regulations, Part 30.

1. (a) NAME AND SHIPPING ADDRESS OF APPLICANT (*Institution, firm, hospital, person, etc.*)

University of Idaho
Moscow, Idaho

(b) ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED (*If different from shipping address*)

2. DEPARTMENT TO USE BYPRODUCT MATERIAL

Agricultural Chemistry

3. INDIVIDUAL USER (*Name and title of individual(s) who will use or directly supervise use of byproduct material*)

J. V. Jordan, Associate Agricultural Chemist

4. RADIOLOGICAL SAFETY OFFICER (*Name of person qualified in radiological safety, if other than individual user*)

5. PREVIOUS LICENSE OR AUTHORIZATION NUMBER (*If this is an application for renewal of a license for byproduct material obtained under a prior license or authorization for radioisotope procurement*)

11-197

BYPRODUCT MATERIAL OR IRRADIATION SERVICE DESIRED

6. BYPRODUCT MATERIAL (*Element and mass number*)	7. CHEMICAL AND/OR PHYSICAL FORM (*Or catalog number*)	8. MAXIMUM AMOUNT OF RADIOACTIVITY IN MILLICURIES THAT YOU WILL POSSESS AT ANY ONE TIME
Sodium-24	NaCl in HCl solution	5 mc.

9. IF IRRADIATION SERVICE IS DESIRED, STATE PERTINENT DETAILS SUCH AS: CHEMICAL COMPOSITION AND WEIGHT IN GRAMS OF TARGET MATERIAL, RADIOACTIVITY, IRRADIATION TIME IN DAYS, AND NEUTRON FLUX

STATEMENT OF USE

10. (a) DESCRIBE PURPOSE FOR WHICH BYPRODUCT MATERIAL WILL BE USED. (*If material is for "human use" complete Supplement A in lieu of this item. If material is to be used in or manufactured as a "sealed source" complete Supplement B in addition to this item.*)

Laboratory studies of "slick spot" soils. Study movement of sodium ion under conditions of a Donnan equilibrium.

(b) DESCRIBE PROCEDURES WHICH WILL BE OBSERVED TO MINIMIZE HAZARD FROM HANDLING, STORAGE, AND DISPOSAL OF THE BYPRODUCT MATERIAL

Experiments will use only few microcuries to be run in hood behind glass. Tracer will be highly diluted by soil during experiment. Stock sample to be stored in steel safe. Operator will use rubber gloves, face mask. Assistant will operate survey meter. Disposal of wastes in "official" Univ. burial ground. Use film badges and dosimeters.

CERTIFICATE

11. 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 do solemnly swear (or affirm) that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.

State of Idaho
County of Latah

Subscribed and sworn to before me this 22nd day of January 1958

H. E. SLADE, Notary Public
Latah County, Moscow, Idaho
My Commission Expires 9-20-61

Notary Public

University of Idaho
Applicant named in Item 1

By [signature]
Bursar
Title of Certifying Official

22 January 1958
Date

WARNING

18 U. S. C., Section 1001; Act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make a representation to any department or agency of the United States as to any matter within its jurisdicti

Burial Ground stat

16—51204-6

8909

(*Continued on reverse side*)

Form AEC-313 (9-55)

ATOMIC ENERGY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE

Form approved. Budget Bureau No. 38-R027.3.

INSTRUCTIONS: Complete Items 1 through 19 if this is a new application. If renewal is requested, complete only Items 1 through 11 provided that with respect to the other items there has been no change in the information previously submitted. Mail two copies to: U. S. Atomic Energy Commission, P. O. Box E, Oak Ridge, Tennessee, Attention: Isotopes Extension, Division of Civilian Application. Upon approval of this application, the applicant will receive an AEC Byproduct Material License. General requirements for issuance of an AEC Byproduct Material License are contained in Title 10, Code of Federal Regulations, Part 30.

1. (a) NAME AND SHIPPING ADDRESS OF APPLICANT (*Institution, firm, hospital, person, etc.*)	(b) ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED (*If different from shipping address*)
University of Idaho Moscow, Idaho	On dryland S. of Boise, Idaho.

2. DEPARTMENT TO USE BYPRODUCT MATERIAL
Agricultural Chemistry

3. INDIVIDUAL USER (*Name and title of individual(s) who will use or directly supervise use of byproduct material*)
J. V. Jordan, Associate Agricultural Chemist

4. RADIOLOGICAL SAFETY OFFICER (*Name of person qualified in radiological safety, if other than individual user*)

5. PREVIOUS LICENSE OR AUTHORIZATION NUMBER (*If this is an application for renewal of a license for byproduct material obtained under a prior license or authorization for radioisotope procurement*)
11-197

BYPRODUCT MATERIAL OR IRRADIATION SERVICE DESIRED

6. BYPRODUCT MATERIAL (*Element and mass number*)	7. CHEMICAL AND/OR PHYSICAL FORM (*Or catalog number*)	8. MAXIMUM AMOUNT OF RADIOACTIVITY IN MILLICURIES THAT YOU WILL POSSESS AT ANY ONE TIME
Calcium-45	$CaCl_2$ in HCl solution	20 mc.

9. IF IRRADIATION SERVICE IS DESIRED, STATE PERTINENT DETAILS SUCH AS: CHEMICAL COMPOSITION AND WEIGHT IN GRAMS OF TARGET MATERIAL, RADIOACTIVITY, IRRADIATION TIME IN DAYS, AND NEUTRON FLUX

STATEMENT OF USE

10. (a) DESCRIBE PURPOSE FOR WHICH BYPRODUCT MATERIAL WILL BE USED. (*If material is for "human use" complete Supplement A in lieu of this item. If material is to be used in or manufactured as a "sealed source" complete Supplement B in addition to this item.*)

Field studies on dryland - non-agricultural. To be used as tracer for calcium ionic movement studies in slick spot soils.

(b) DESCRIBE PROCEDURES WHICH WILL BE OBSERVED TO MINIMIZE HAZARD FROM HANDLING, STORAGE, AND DISPOSAL OF THE BYPRODUCT MATERIAL

Tracer will be used in isolated area on "Slick spots." Tracer to be placed at specific depths, absorbed as a liquid by absorbent cotton. Individual increments about 1 mc. Spots can be fenced and posted. No potable water sources in area. Rainfall about 9". Soil samples to be buried in "official" Univ. burial ground. Use film badges.

CERTIFICATE

11. 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 do solemnly swear (or affirm) that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.

State of Idaho
County of Latah
Subscribed and sworn to before me this 22nd day of January 1958

H. E. SLADE, Notary Public
Latah County, Moscow, Idaho
My Commission Expires 9-20-61

Notary Public

University of Idaho
Applicant named in Item 1

By
Bursar
Title of Certifying Official

22 January 1958
Date

WARNING

18 U. S. C., Section 1001; Act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make [illegible] representation to any department or agency of the United States as to any matter within its jurisd[iction].

Burial Ground

8909

(*Continued on reverse side*)

16—87264-5

11-197-1

IEB:RWS (8362)

Oak Ridge, Tennessee
January 9, 1958

Dr. J. V. Jordan
Department of Agricultural Chemistry
University of Idaho
Moscow, Idaho

Subject: APPLICATION FOR BYPRODUCT MATERIAL LICENSE

Dear Dr. Jordan:

Reference is made to your application dated December 13, 1957, for amendment to Byproduct Material License No. 11-197-1.

After making a preliminary review of your application, we wish to obtain the following information:

1. We would like to have a copy of the written radiological safety instructions given to the personnel working in this program.

2. What procedures do you follow to prevent entry of unauthorized persons to the areas containing Phosphorus 32 fertiliser?

3. What measures do you take to prevent the spread of contamination on shoes and clothing?

4. Have you checked the possibility of radioactivity in potable water supplies from soil dilution or run off?

5. What is the approximate concentration of Phosphorus 32 per square foot of soil for the projected work and what is the area of the plots to be used?

OFFICE ▶	Sims:bc/bj					
SURNAME ▶	Isotopes RWS	Isotopes				
DATE ▶	1-9-58	1-9-58				

Form AEC-318 (Rev. 9-53) U. S. GOVERNMENT PRINTING OFFICE 16—62761-3

6. What are the possibilities of air polution during and following the application of the fertilizer and what preventive measure do you take?

Since we did not receive a reply to our letter of February 20, 1957, these items are again being brought to your attention.

The present status of your license covers the projected use of Phosphorus 32 with a maximum possession limit of three curies for use at Moscow and Sandpoint in the laboratory and greenhouse. Also, your present possession limit of three curies would cover the amount requested in this application. Before we can review your application for extension of this program to include field use, we will need the above information and any additional material you may wish to include in support of the use of Phosphorus 32 in the program.

Very truly yours,

Cecil R. Buchanan, Assistant Chief
Isotopes Extension
Division of Licensing and Regulation

OFFICE ▶						
SURNAME ▶						
DATE ▶						

Form AEC-318 (Rev. 9-53) U. S. GOVERNMENT PRINTING OFFICE 16—62761-3

11-197-1

Form AEC-313 (9-55)

ATOMIC ENERGY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE

Form approved. Budget Bureau No. 38-R027.3.

DUPLICATE FOR PUBLICATION

INSTRUCTIONS: Complete Items 1 through 19 if this is a new application. If renewal is requested, complete only Items 1 through 11 provided that with respect to the other items there has been no change in the information previously submitted. Mail two copies to: U. S. Atomic Energy Commission, P. O. Box E, Oak Ridge, Tennessee, Attention: Isotopes Extension, Division of Civilian Applications. Upon approval of this application, the applicant will receive an AEC Byproduct Material License. General requirements for issuance of an AEC Byproduct Material License are contained in Title 10, Code of Federal Regulations, Part 30.

1. (a) NAME AND SHIPPING ADDRESS OF APPLICANT (*Institution, firm, hospital, person, etc.*)

Dr. J. V. Jordan
University of Idaho
Moscow, Idaho

(b) ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED (*If different from shipping address*)

Sandpoint, Idaho
Deary, Idaho

2. DEPARTMENT TO USE BYPRODUCT MATERIAL

Department of Agricultural Chemistry

3. INDIVIDUAL USER (*Name and title of individual(s) who will use or directly supervise use of byproduct material*)

Dr. J. V. Jordan

4. RADIOLOGICAL SAFETY OFFICER (*Name of person qualified in radiological safety, if other than individual user*)

5. PREVIOUS LICENSE OR AUTHORIZATION NUMBER (*If this is an application for renewal of a license for byproduct material obtained under a prior license or authorization for radioisotope procurement*)

11 - 197 - 1

BYPRODUCT MATERIAL OR IRRADIATION SERVICE DESIRED

6. BYPRODUCT MATERIAL (*Element and mass number*)	7. CHEMICAL AND/OR PHYSICAL FORM (*Or catalog number*)	8. MAXIMUM AMOUNT OF RADIOACTIVITY IN MILLICURIES THAT YOU WILL POSSESS AT ANY ONE TIME
Phosphorus 32	conc. superphosphate	650 millicuries

9. IF IRRADIATION SERVICE IS DESIRED, STATE PERTINENT DETAILS SUCH AS: CHEMICAL COMPOSITION AND WEIGHT IN GRAMS OF TARGET MATERIAL, RADIOACTIVITY, IRRADIATION TIME IN DAYS, AND NEUTRON FLUX

STATEMENT OF USE

10. (a) DESCRIBE PURPOSE FOR WHICH BYPRODUCT MATERIAL WILL BE USED. (*If material is for "human use" complete Supplement A in lieu of this item. If material is to be used in or manufactured as a "sealed source" complete Supplement B in addition to this item.*)

field experiments on sick and vigorous alfalfa. P-32 to be used as a tracer for nutrient uptake and moisture movement in the soil.

(b) DESCRIBE PROCEDURES WHICH WILL BE OBSERVED TO MINIMIZE HAZARD FROM HANDLING, STORAGE, AND DISPOSAL OF THE BYPRODUCT MATERIAL

No storage ; material will be applied to soil in replicated field experiments as soon as received : conc. super. to be applied by 2-foot long galvanized applicator by technician wearing rubber gloves and face mask. First plant samples to be collected after about 4 half lives. Activity in these samples relatively low due to tremendous soil dilution.

CERTIFICATE

11. 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 do solemnly swear (or affirm) that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.

State of Idaho
County of Latah
Subscribed and sworn to before me this 13th day of December 1957

H. E. SLADE, Notary Public
Latah County, Moscow, Idaho
My Commission Expires 9-20-61

Notary Public

University of Idaho
Applicant named in Item 1

By J. W. Watts
Deputy Bursar
Title of Certifying Official

13 December 1957
Date

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 sta[illegible] representation to any department or agency of the United States as to any matter within its jurisdiction.

8362

(*Continued on reverse side*)

11-197-1

IN REPLY REFER TO:
IEB:CZK(LIC:11-197-1)

Oak Ridge, Tennessee
February 20, 1957

University of Idaho
Department of Agricultural Chemistry
Moscow, Idaho

Attention: Dr. J. V. Jordan

Subject: AMENDMENT NO.1 TO LICENSE NO.11-197-1

Dear Dr. Jordan:

Enclosed is the subject Amendment by means of which we have increased the possession limit for Phosphorus 32 from 50 millicuries to 3 curies.

The increase in possession limit obviously means that you will be using considerably greater amounts of P-32 tagged fertilizer for various studies in the field. Health hazards will increase proportionally. Thus, we should like to recommend that the following radiological protection procedures be observed:

1. The field in which radioactivity is used should be fenced and posted with radiation caution signs.

2. Protective apparel should be worn including a filter type face mask.

3. Field plots should be restricted from entry by unauthorized personnel.

4. Personnel monitoring equipment should be worn and exposure records should be maintained.

5. Possible discharge of radioactivity to potable water supplies should be taken into account. Estimates should be made of the concentrations possible in the run-off waters, residual activity that might be retained on the soil and the probable concentrations in plants. Provisions should be made to prevent consumption of the contaminated plant material.

6. Appropriate equipment should be used to minimize atmospheric contamination.

OFFICE ▶						
SURNAME ▶						
DATE ▶						

Form AEC-318 (Rev. 9-53) U. S. GOVERNMENT PRINTING OFFICE 16—62761-3

7. The plant material grown in soil fertilized with radioactive phosphorus should not be allowed to become any type of consumer product.

In addition to the above, we are assuming that you will follow health safety procedures as presented in your application on the basis of which License No. 11-197-1 was issued.

For your information and guidance we are enclosing a copy of "Standards for Protection Against Radiation", 10-CFR-20, which were published in the Federal Register on January 29, 1957.

We would appreciate your cooperation in the above matters and your confirmation that the recommendations will be carefully considered.

Very truly yours,

Cecil R. Buchanan,Assistant Chief
Byproduct Licensing Branch
Isotopes Extension
Division of Civilian Application

Enclosures:
1. Amendment No.1 to Lic.No.11-197-1
2. Industrial applications w/insts.(1 set)
3. Part 20
4. Part 30

Kwast/msb

OFFICE ▶	Isotopes					
SURNAME ▶	K. 2-20-57					
DATE ▶						

Form AEC-318 (Rev. 9-53) U. S. GOVERNMENT PRINTING OFFICE 16—62761-3

UNIVERSITY OF IDAHO
COLLEGE OF AGRICULTURE
AGRICULTURAL EXPERIMENT STATION
MOSCOW, IDAHO

DEPARTMENT OF AGRICULTURAL CHEMISTRY

DUPLICATED FOR DIV. OF INSP. 981

February 5, 1957

Dr. Lester R. Rogers
Director, Isotopes Extension
Division of Civilian Application
Oak Ridge, Tennessee

Dear Sir:

This has reference to License No. 11-197-1 issued to the Department of Agricultural Chemistry, University of Idaho. In this license the maximum amount of P-32 which the licensee may possess at any one time is 50 millicuries.

During the coming spring we expect to be receiving 2 to 3 curies of P-32 from the U. S. Department of Agriculture for field application in plant uptake and P source studies. This P-32 will be received incorporated in the fertilizer product, weighed out in glass sealers ready for individual plot application. My question is, should our license be revised to permit us to possess, say, 3 curies P-32 activity at any one time? We have handled 1-2 curies P-32 annually in field experiments during 1949-1954.

Very truly yours

J. V. Jordan
Associate Agr. Chemist

JVJ/g

88470

RADIOISOTOPE SHIPPING DOCUMENT

K RIDGE NATIONAL LABORATORY

OPERATED FOR U. S. ATOMIC ENERGY COMMISSION
BY CARBIDE AND CARBON CHEMICALS COMPANY
A DIVISION OF
UNION CARBIDE AND CARBON CORPORATION
OAK RIDGE, TENNESSEE

RADIOISOTOPE ORDER NO. 1008-55

RAIL EXPRESS 8-9-56

CUSTOMER'S ORDER NO.	RADIOISOTOPE ORDER NO.	APPROVAL NO.	SCHEDULED DATE
10475-G	1008-55	11-197-1	8-9-56

SHIP TO

UNIVERSITY OF IDAHO
AGRICULTURAL CHEMISTRY DEPARTMENT
MOSCOW, IDAHO

ATTN: J. V. JORDAN

BILL TO (IF DIFFERENT FROM SHIP TO)

UNIVERSITY OF IDAHO
AGRICULTURAL CHEMISTRY DEPT.
MOSCOW, IDAHO

ROUTE AND SHIPPING INSTRUCTIONS

RAIL EXPRESS

CONTAINER NO. NR

BILLING INSTRUCTIONS

DESCRIPTION OF MATERIAL ORDERED | **SPECIFIC ACTIVITY REQUESTED** | **DATE SHIPPED** 8-9-56 | **BOX WEIGHT** 1#

ORDERED	SHIPPED	DESCRIPTION	UNIT PRICE	EXTENSIONS	HANDLING CHARGE	CONTAINER CHARGE	TOTAL VALUATION
10 MCS	10 Mcs.	S 35 (P-1)	2.00	20.00	10.00		30.00

CHEMICAL FORM	BATCH NO.	CONCENTRATION	VOLUME	SPECIFIC ACTIVITY
~~SO_4 in Weak HCl~~	81	~~21.70 ± 20%~~ mc/ml	.5 ml	CF mc/g

ANALYSIS

Assayed at 8:00 A. M. 8-9-56

PPT at pH 7 _____

I 133 _____ %

xxx SO_4 < 0.01 mg/ml

Heavy Metals _____ p.p.m.

Total Solids < 1 mg/ml

Non Volatile Materials < 1 mg/ml

Alpha _____ c/min/mt

Radiochemical Purity _____ %

Acidity 0.095 N Acid

CUSTOMER CODE	3010	SALE CODE	1 1
CUSTOMER TYPE	7	MATERIAL TYPE	3661-61-360

APPROVED FOR SHIPMENT

SHIPPED BY _____
RADIOISOTOPE SHIPPING DEPARTMENT

SIGNED _____
RADIOISOTOPE SALES DEPARTMENT

4

86225

OAK RIDGE NATIONAL LABORATORY

OPERATED FOR U. S. ATOMIC ENERGY COMMISSION
BY CARBIDE AND CARBON CHEMICALS COMPANY
A DIVISION OF
UNION CARBIDE AND CARBON CORPORATION
OAK RIDGE, TENNESSEE

RADIOISOTOPE ORDER NO. 1007-221

RAIL EXPRESS 8-2-56

CUSTOMER'S ORDER NO.	RADIOISOTOPE ORDER NO.	APPROVAL NO.	SCHEDULED DATE
6949	1007-221	11-197-1	8-2-56

SHIP TO

UNIVERSITY OF IDAHO
AGRICULTURE CHEMISTRY DEPT.
MOSCOW, IDAHO

ATTN: J. V. JORDAN

BILL TO (IF DIFFERENT FROM SHIP TO)

AGRICULTURE CHEMISTRY DEPT.
UNIVERSITY OF IDAHO
MOSCOW, IDAHO

ROUTE AND SHIPPING INSTRUCTIONS

RAIL EXPRESS

CONTAINER NO. NR

BILLING INSTRUCTIONS

DESCRIPTION OF MATERIAL ORDERED — SPECIFIC ACTIVITY REQUESTED

DATE SHIPPED 8-2-56

BOX WEIGHT 1#

ORDERED	SHIPPED	DESCRIPTION	UNIT PRICE	EXTENSIONS	HANDLING CHARGE	CONTAINER CHARGE	TOTAL VALUATION
5 UCS	.005 mcs	CL 36 (P)	1.00 UC	5.00	10.00		15.00

CHEMICAL FORM	BATCH NO.	CONCENTRATION	VOLUME	SPECIFIC ACTIVITY
HCl Solution	42	0.035 ± 10% mc/ml	.2 ml	.586 mc/g

ANALYSIS

Assayed at 8:00 A. M. 8-2-56

PT at pH 7

133 59.7 ~~mc/ml~~ %
~~xxx~~ Cl

Heavy Metals p.p.m.

Total Solids ~ 1 mg/ml

Non Volatile Materials ~ 1 mg/ml

Alpha c/min/mt

Radiochemical Purity %

~~Acidity~~ ~~1.04 N Acid~~

CUSTOMER CODE	SALE CODE
3010	1 1
CUSTOMER TYPE 7	MATERIAL TYPE 3661-61-288

SHIPPED BY _____
RADIOISOTOPE SHIPPING DEPARTMENT

APPROVED FOR SHIPMENT

SIGNED _____
RADIOISOTOPE SALES DEPARTMENT

11-197-1

Form AEC-313 (9-55)

ATOMIC ENERGY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE

Form approved. Budget Bureau No. 38-R027.3.

INSTRUCTIONS: Complete Items 1 through 19 if this is a new application. If renewal is requested, complete only Items 1 through 11 provided that with respect to the other items there has been no change in the information previously submitted. Mail two copies to: U. S. Atomic Energy Commission, P. O. Box E, Oak Ridge, Tennessee, Attention: Isotopes Extension, Division of Civilian Application. Upon approval of this application, the applicant will receive an AEC Byproduct Material License. General requirements for issuance of an AEC Byproduct Material License are contained in Title 10, Code of Federal Regulations, Part 30.

FOR DIV. OF INSP.

1. (a) NAME AND SHIPPING ADDRESS OF APPLICANT (*Institution, firm, hospital, person, etc.*)	(b) ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED (*If different from shipping address*)
University of Idaho, Moscow, Idaho	Univ. Home Expt. Sta. Moscow Branch sta. Sandpoint (see attached explanation)

2. DEPARTMENT TO USE BYPRODUCT MATERIAL

Agricultural Chemistry

3. INDIVIDUAL USER (*Name and title of individual(s) who will use or directly supervise use of byproduct material*)

J.V.Jordan, Assoc. Prof. and Assoc. Agric. Chemist

4. RADIOLOGICAL SAFETY OFFICER (*Name of person qualified in radiological safety, if other than individual user*)

-

5. PREVIOUS LICENSE OR AUTHORIZATION NUMBER (*If this is an application for renewal of a license for byproduct material obtained under a prior license or authorization for radioisotope procurement*)

not applicable

BYPRODUCT MATERIAL OR IRRADIATION SERVICE DESIRED

6. BYPRODUCT MATERIAL (*Element and mass number*)	7. CHEMICAL AND/OR PHYSICAL FORM (*Or catalog number*)	8. MAXIMUM AMOUNT OF RADIOACTIVITY IN MILLICURIES THAT YOU WILL POSSESS AT ANY ONE TIME
P32	P-32-P-1, P-32-P-2	50
S35	S-35-P-1, S-35-P-2	500 (see attached explanation)
Cl36	Cl-36-P	50

9. IF IRRADIATION SERVICE IS DESIRED, STATE PERTINENT DETAILS SUCH AS: CHEMICAL COMPOSITION AND WEIGHT IN GRAMS OF TARGET MATERIAL, RADIOACTIVITY, IRRADIATION TIME IN DAYS, AND NEUTRON FLUX

-

STATEMENT OF USE

10. (a) DESCRIBE PURPOSE FOR WHICH BYPRODUCT MATERIAL WILL BE USED. (*If material is for "human use" complete Supplement A in lieu of this item. If material is to be used in or manufactured as a "sealed source" complete Supplement B in addition to this item.*)

To be used as tracers in plant nutrient studies in replicated field experiments, also in laboratory and greenhouse

(b) DESCRIBE PROCEDURES WHICH WILL BE OBSERVED TO MINIMIZE HAZARD FROM HANDLING, STORAGE, AND DISPOSAL OF THE BYPRODUCT MATERIAL

Shipment monitored, opened, diluted to volume if a liquid, in hood (P32 behind plastic shield. Aliquots of diluted material removed as wanted for any 1 expt. Surgical gloves and plastic face mask used. Storage in steel cupboard. Liquid disposal in waste jars, later poured into drum in sunken concrete pit. Solids similar treatment. Latter drums when full are buried in accord with local Isotopes Comm. regulations.

CERTIFICATE

11. 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 do solemnly swear (or affirm) that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.

State of Idaho
County of Latah
Subscribed and sworn to before me this 27th day of March 1956

University of Idaho
Applicant named in Item 1

By W. H. Pierce
Head Physical Sciences
Title of Certifying Official

H. E. SLADE, Notary Public, Latah County, Moscow, Idaho
My Commission Expires Dec 20-57

March 27 1956
Date

Notary Public

WARNING

18 U. S. C., Section 1001; Act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make representation to any department or agency of the United States as to any matter within its jurisdi

Burial Ground

(Continued on reverse side)

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APPLICATION FOR BYPRODUCT MATERIAL LICENSE

INSTRUCTIONS: Complete Items 12 through 19 if this is a new application. This information may be omitted from subsequent applications provided there is no change in the information previously submitted, and reference is made in Item 5 to the application on which this information appears.

TRAINING AND EXPERIENCE WITH RADIOACTIVITY OF INDIVIDUAL USER NAMED IN ITEM 3

12. TYPE OF TRAINING

	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COURSE (Circle answer)
1. Principles and practices of radiological health safety	ORINS Colo. A. and M.	4 wks 2 wks	Yes No	Yes No
2. Radioactivity measurement standardization and monitoring techniques and instruments	"	"	Yes No	Yes No
3. Mathematics and calculations basic to the use and measurement of radioactivity	"	"	Yes No	Yes No
4. Biological effects of radiation	"	"	Yes No	Yes No
5. Actual use of radioisotopes in the types and quantities for which application is being made, or equivalent experience	"	"	Yes No	Yes No

13. ISOTOPE HANDLING EXPERIENCE

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
P32 S35 Ca45 C136	1.2 curies P32 at 1 time, others less than 100 mc.	field experiments lab. analyses greenhouse expt.	8 yrs	soil and plant studies using tagged fertz.

14. If Radiological Safety Officer named in Item 4 is different from individual user named in Item 3, use supplementary sheet to provide equivalent information on "Training and Experience With Radioactivity of Radiological Safety Officer." Supplementary sheet is attached (Circle answer) Yes (No)

PHYSICAL FACILITIES, EQUIPMENT, AND RADIATION INSTRUMENTATION

15. RADIATION DETECTION INSTRUMENTS (Use separate sheet 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)
see attached sheet					

16. FILM BADGES, DOSIMETERS, AND OTHER PERSONNEL MONITORING DEVICES INCLUDING BIO-ASSAY PROCEDURES

Biweekly film badge service - 1 badge per worker
12 dosimeters and Victoreen minometer - 2 dosimeters per worker when needed

17. METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED ABOVE (For film badges specify method of calibration and processing, or name applicable standard)

At least monthly, more frequent even daily when instruments in constant use - our work quite seasonal. Film badges serviced by Radiation Detection Co., Palo Alto, Calif. Read and service own dosimeters.

18. (a) DESCRIBE BRIEFLY REMOTE HANDLING EQUIPMENT, STORAGE CONTAINERS, SHIELDING, AND LABORATORY FACILITIES (Working areas, fume hoods, etc.)

see attached sheet

(b) SKETCHES OF SUCH FACILITIES ARE ATTACHED (Circle answer) Yes No

19. DESCRIBE BRIEFLY RADIATION SURVEYING PROCEDURES AND METHODS OF DISPOSING OF RADIOACTIVE WASTES

see attached sheet

U. S. GOVERNMENT PRINTING OFFICE 16—57264-5

11-197-1

1.

DUPLICATED

Attachment to Form AEC 313

J.V.Jordan
Agricultural Chemistry Dept.
University of Idaho
Moscow, Idaho

15. Radiation Detection Instruments

Type of instrument	No. avail.	Radiation detected	Sensitivity range	Window thick.	Use
Survey meters or monitors					personnel and equipment monitors
El-Tronics SM3 side window detector	1	B,γ	0-400 mr/hr	30 mg/cm²	
N.I.C.C. Model 2611 end window detector	1	B,γ	400 mr/hr 60000 cpm	1.4	
N.I.C.C. Model 1615 line operated, end window probe, rate meter and mr/hr	1	B,γ	20000 cpm	1.4	
Scalers					quant. measurement
Tracerlab 64	1	B,γ			
SC-13	1	B,γ,α			
R.C.L. Nucleometer Mark 9	1	B,γ,α			
N.I.C.C. Model 172	1	B,γ,α			
Shields and counters					
Tracerlab GM tubes TGC-2	4			less than 2 mgm/cm²	
R6L GM liquid counters and etc.	-				
Lead shields Model AL14A	3				
N.I.C.C. flow counter D46A	1				
R.C.L. preflush flow counter Mark 12	1				

18. Remote handling tongs and pipettor. Steel safe for storage of stock, also steel cabinets and drawers. Lead bricks for shielding, also plastic shield; Oak Ridge designed fume hood and ordinary lab fume hood, all controls remote. Central isotopes laboratory building for university personnel. Latter building has storage room, sample room, chem. lab., counting room and office.

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Attachment to AEC 313

J.V.Jordan
Agricultural Chemistry Dept.
University of Idaho
Moscow, Idaho

19. In laboratory, personnel, shipments and work area, and equipment monitored with line operated, end window survey meter. In field, El-Tronics portable survey meter used. Face and hands washed after principle operations - dust is a factor to be considered in field and greenhouse use especially. Solid and liquid wastes disposed of as indicated in Item 10b. Plant samples buried in designated burial ground on University station, or when P32 used, the material is left on the ground until the following spring, then burned. By this time, the P32 is so low that it cannot be detected when when extracted in the form of Mg ammonium phosphate hexahydrate.

Explanations

1b and
8. Field experiments with various S fertilizers now underway at 2 locations - Moscow and Sandpoint. The fertilzers are tagged in the Moscow lab then transported to Sandpoint and applied to the soil. Since each treatment is replicated several times in these experiments relatively large amounts of activity are required. Also in this case, residual effects of S fertilizers are being studied over 3-4 years so that higher than usual amounts of activity are added in order to have sufficient activity to measure after 3 to 4 years.

Additional safety measures

All university personnel before working with radioisotopes first undergo a physical examination, blood count and eye check.

Burial Ground Burned