

University of Wyoming
ATTN: John E. Dorges
Radiation Safety Officer
Radiation Safety Office
University Station, Box 3944
Laramie, Wyoming 82071

OCT 26 1984

Gentlemen:

We are in receipt of your letter dated August 29, 1984, referencing your forthcoming data for Kr-85 gasification applications. We will continue our review when the data and pertinent information is available for review.

Sincerely,

Original Signed By
Jack E. Whitten

Jack E. Whitten
Nuclear Materials Safety Section

NMSS
JEWhitten;df
10/25/84

C:NMSS
RJEverett
10/26/84

8510230307 841119
REG4 LIC30
49-09955-01 PDR

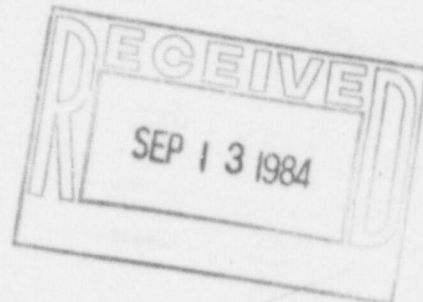


UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION IV
611 RYAN PLAZA DRIVE, SUITE 1000
ARLINGTON, TEXAS 76011

BETWEEN: William O. Miller, Chief
License Fee Management Branch
Office of Administration

R. J. Everett, Chief
Material Radiation Protection Section, TPB,
DV&TP, RIV



LICENSEE FEE TRANSMITTAL

A. REGION IV

1. APPLICATION ATTACHED

Applicant/Licensee:

Application Dated:

Control No.:

License No.:

Wyoming, the University of
August 20, 1984
60383
49-09955-10 (030-01176)

2. FEE ATTACHED

Amount:

Check No.:

Voided

3. COMMENTS

Signed

Date

Laura Hurley
August 29, 1984

B. LICENSEE FEE MANAGEMENT BRANCH

1. Fee Category and Amount:

2. Correct Fee Paid. Application may be processed for:

Amendment ✓

Renewal

License

FEE EXEMPT

fee paid under C. N.
60280 - this
part separated out
fee OK (g + asc)

Signed

Date

to Jackson
9/10/84



THE UNIVERSITY OF WYOMING

RADIOLOGICAL SAFETY CONTROL PROGRAM
BIOCHEMISTRY BUILDING

LARAMIE, WYOMING 82071

Statement

I have read the proposed amendment including the Western Research Institute under the UW NRC broad license and the letter requesting NRC approval by parts (Part 1 on site use of Kr-85; Part 2 on field use of Kr-85). I am in agreement with the amendment and letter.

A handwritten signature in cursive script, reading "Bruce Culver", written over a horizontal line.

8/14/84
date

Bruce Culver
Associate Professor, Pharmacy
Member of Radiation Safety Committee

60383



THE UNIVERSITY OF WYOMING

RADIOLOGICAL SAFETY CONTROL PROGRAM
BIOCHEMISTRY BUILDING

LARAMIE, WYOMING 82071

Statement

I have read the proposed amendment including the Western Research Institute under the UW NRC broad license and the letter requesting NRC approval by parts (Part 1 on site use of Kr-85; Part 2 on field use of Kr-85). I am in agreement with the amendment and letter.

Ray Kunselman

8-16-84
date

Ray Kunselman
Professor, Physics and Astronomy
Member of Radiation Safety Committee



THE UNIVERSITY OF WYOMING

RADIOLOGICAL SAFETY CONTROL PROGRAM
BIOCHEMISTRY BUILDING

LARAMIE, WYOMING 82071

Statement

I have read the proposed amendment including the Western Research Institute under the UW NRC broad license and the letter requesting NRC approval by parts (Part 1 on site use of Kr-85; Part 2 on field use of Kr-85). I am in agreement with the amendment and letter.

Daniel R. Caldwell

8-15-84

date

Dan Caldwell
Associate Professor, Microbiology
and Veterinary Medicine
Member of Radiation Safety Committee



THE UNIVERSITY OF WYOMING

RADIOLOGICAL SAFETY CONTROL PROGRAM
BIOCHEMISTRY BUILDING

LARAMIE, WYOMING 82071

Statement

I have read the proposed amendment including the Western Research Institute under the UW NRC broad license and the letter requesting NRC approval by parts (Part 1 on site use of Kr-85; Part 2 on field use of Kr-85). I am in agreement with the amendment and letter.

A handwritten signature in cursive script, appearing to read "Norm Rhodine", written over a horizontal line.

8/17/84
date

Norm Rhodine
Professor, Electrical Engineering
Member of Radiation Safety Committee



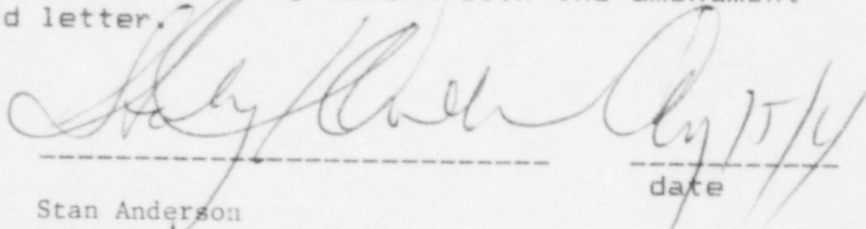
THE UNIVERSITY OF WYOMING

RADIOLOGICAL SAFETY CONTROL PROGRAM
BIOCHEMISTRY BUILDING

LARAMIE, WYOMING 82071

Statement

I have read the proposed amendment including the Western Research Institute under the UW NRC broad license and the letter requesting NRC approval by parts (Part 1 on site use of Kr-85; Part 2 on field use of Kr-85). I am in agreement with the amendment and letter.



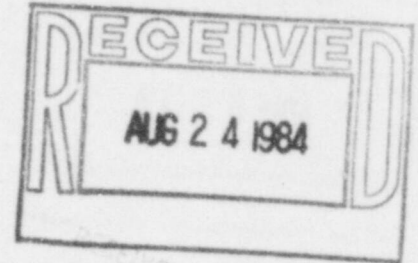
date

Stan Anderson
Professor, WYO coop unit
Chairman, Radiation Safety Committee

60383



THE UNIVERSITY OF WYOMING
RADIOLOGICAL SAFETY CONTROL PROGRAM
BIOCHEMISTRY BUILDING
LARAMIE, WYOMING 82071



U.S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
611 Ryan Plaza Drive, Suite 1000
Arlington, Texas 76012

August 20, 1984

Attention: Mr. Jack Whitton

30-1176

Re: Control No 60280

Dear Mr. Whitton,

This letter is in response to our telephone call of August 14, 1984 concerning the Western Research Institute (WRI) amendment to the UW NRC broad license #49-09955-10.

I hereby request that the amendment be considered in two parts (1 and 2), and that approval for Part 1 be approved as soon as possible because WRI needs to use the Kr-85 in the near future. The parts are as follows:

Part 1. Approval of the amendment as submitted except those parts referring to gassification tests in the field.

Part 2. With respect to gassification tests in the field a report of test procedures will be forwarded to your office within 90 days showing:

- RECEIVED BY LF
- Date *9/4/84*
Leg. *Aug 6 IV*
By *Jacques*
Orig. To
Action Compl. *9/10/84*
- a) For generic applications
 - i) Example calculations for potential public exposure.
 - ii) Activity limits which may be injected in a given time frame.
 - iii) Instrumentation requirements.
 - iv) Security of area from the general public.
 - v) Placarding
 - vi) Training requirements of participants.
 - vii) Records to be kept.
 - viii) Out of state projects will be arranged under reciprocity agreements and/or special arrangements with the appropriate regulatory authorities.
 - b) For non-generic applications, ie- those where air concentrations at the site boundary or where injected activity limits will be exceeded.
 - i) Each such application will be reviewed and approved by the Radiation Safety Committee.
 - ii) The application will be reviewed and approved by the State of Wyoming Radiological Health Service.

FEE EXEMPT

(3K) fee paid under C. N.
60280 - OK S + ASC

~~30-1176~~

201 filed
11/21/84
60383

iii) Applications which are not unanimously approved by the Radiation Safety Committee and the state Radiological Health Service will be submitted to the NRC via the amendment process.

I am enclosing a set of forms signed by members of the Radiation Safety Committee giving approval of this request.

WRI presently does not have any contracts for field use of Kr-85 and do not expect any for at least a few months. WRI would like to have the field use option approved in order to facilitate negotiations when the opportunity arises. Members of WRI have had considerable experience using Kr-85 as a tracer in the field when the research group was under the auspices of the DOE.

Sincerely,

John E. Doerges
John E. (Jack) Doerges
Health Physicist

JED/kmh

cc Judy Newton, State of Wyoming Radiological Health
Services
Fred Turner (WRI)

60383



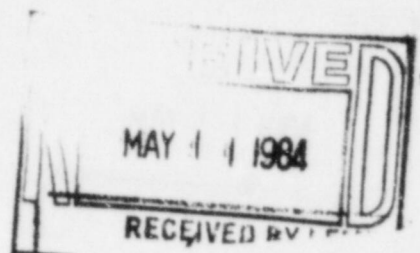
RADIATION SAFETY OFFICE
UNIVERSITY STATION, BOX 3944
307-766-3277

THE UNIVERSITY OF WYOMING

RADIOLOGICAL SAFETY CONTROL PROGRAM
BIOCHEMISTRY BUILDING

LARAMIE, WYOMING 82071

May 9, 1984



U.S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
611 Ryan Plaza Drive Suite 1000
Arlington, Texas 76012

*LFMB:
Change to 3K, EX, 3K
when issued*

Attention: Mr. R. J. Everett

Re: Amendment to NRC by-products materials license
Continuation of DOE exempt statue for the West
Institute on projects carried on under DOE contracts.

Dear Mr. Everett,

I would like to request an amendment to the University of Wyoming's
broad license #49-09955-10 as follows:

The use and possession of by-products materials by the Western
Research Institute, an affiliate of the University of Wyoming Research
Corporation, is hereby included under the University of Wyoming NRC
broad license number 49-09955-10.

A copy of the agreement between the University of Wyoming and the
Western Research Institute regarding this amendment is attached. The
agreement will be executed when approval of the amendment is received.

The Western Research Institute (WRI) is the former Department of
Energy's (DOE) "Laramie Energy Technical Center" (LETC) which is being
transferred to the University of Wyoming Research Corporation. DOE
funding (except for specific contracts) will be phased out over a
period of three years. The present use of radioactivity by WRI is
restricted to projects and/or contracts with DOE. The radionuclides
which will be transferred to University of Wyoming jurisdiction are as
follows:

Radionuclide	Activity	Form
Am-241	3 Ci	Sealed Am-Be Sou
Ra-226	20 μ Ci	Sealed Source
Cs-137	125 mCi	Sealed Source
Fe-55	50 mCi	Sealed Source
Kr-85	1.7-1.8 Ci	unsealed
Ni-65	15 mCi	Sealed Source

Applicant	22489
Check No.	403
Amount/Fee Category	Amendment
Type of Fee	Exempt
Date Check Rec'd.	6/12/84
Prepared By	SP-001
FILE EXEMPT	

The krypton-85 is used as a tracer of gas flow in coal, oil shale, and
tar sands gassification in surface retorts at the test facility and in
underground gassification tests in the field. The krypton is
introduced into the injection air stream and each exhaust stream is
sampled continuously and monitored by passing the sample stream
through a "krypton" detector. Injections of krypton are limited so
that the amount of krypton injected divided by the volume of air
injected for the duration of the experiment is below the maximum
permissible concentration for the restricted area.

~~841-1111~~

60383
10280

A sample calculation would be a maximum of 1 mCi of Kr-85 injected into the input feed of 20 ft³/min. (minimum flowrate) in the 10 ton retort for a minimum burn time of two days.³

$$\text{Total volume of gas} = 20 \frac{\text{ft}^3}{\text{min}} \times 28317 \frac{\text{cm}^3}{\text{ft}^3} \times 60 \frac{\text{min}}{\text{hr}} \times 48 \text{ hr}$$

$$= 1.6311 \times 10^9 \text{ cm}^3$$

$$1 \text{ mCi} = 1000 \mu\text{Ci}$$
$$1000 \mu\text{Ci} / 1.6311 \times 10^9 \text{ cm}^3 = 6.131 \times 10^{-7} \mu\text{Ci/cm}^3$$

which is less than $1 \times 10^{-5} \mu\text{Ci/cm}^3$ by a factor of 16.
This is a "worst case" calculation.

Krypton injections into larger retorts or in underground tests are calculated on a proportionate volume flow basis.

The krypton detectors have a minimum detection level of about $5 \times 10^{-7} \mu\text{Ci/cm}^3$ for 1 minute counts. Experiments performed near Debeque, Colorado where 2 Ci of Kr-85 were injected into the input air stream yielded maximum values of $1.7 \times 10^{-6} \mu\text{Ci/cm}^3$ and $2.0 \times 10^{-6} \mu\text{Ci/cm}^3$ at distances of 400 ft. and 200 ft. from the discharge point respectively. The detectors were placed at ground level directly under the path of the emission plume. The plume was near the surface of the ground. Count rates on a given detector sampling the plume showed no instance above minimum detectable for more than two consecutive minutes.

Krypton has not been detectable from background at site boundaries in the "breathing" zone.

All projects carried out under DOE contracts by WRI will comply with DOE regulations. A letter to that effect will be forwarded to you under separate cover from WRI.

Non DOE contracts involving the use of radioactive materials will be processed through the Radiation Safety Committee and the Radiation Safety Office on matters regarding NRC or UW regulations and Radiation Safety.

Sincerely,

John E. Doerges

John E. Doerges
Health Physicist

JD/mhm
enclosure

60323
60280

AGPEEMENT

This Agreement, made this _____ day of _____, 1984, by and between the Western Research Institute of the University of Wyoming Research Corporation, hereafter referred to as "WRI," and the University of Wyoming, hereafter referred to as "University,"

WITNESSETH:

WHEREAS, the University currently holds a Nuclear Regulatory Commission radioactive by-products materials license number 49-09955-10; and

WHEREAS, application has been made to include WRI's radioactive materials activities within the terms and conditions of said license.

NOW, THEREFORE, for and in consideration of the mutual covenants and conditions contained herein, the parties hereto agree as follows:

WRI agrees to require all of its employees who use radioactive materials for whatever purpose to comply with University Regulations regarding the use of radioactive materials and to adhere to the terms and conditions of the Nuclear Regulatory Commission by-products materials license.

WRI agrees that all employees using radioactive materials will be required to complete the University's Radiation Safety Office form "Application to Use Radionuclides," which form must be submitted to the University Radiation Safety Committee prior to any such use.

WRI agrees that all employees using radioactive materials will be required to perform regular laboratory surveys for unsealed sources, as prescribed by the University Radiation Safety Manual, and will be required to keep records of the same.

WRI agrees to appoint to the University Radiation Safety Committee a WRI employee qualified to review research proposals involving ionizing radiation.

The University agrees to perform radiation safety surveys of WRI laboratories which use radioactive materials or which produce ionizing radiation.

The University agrees to provide to WRI film badges and other dosimetry services and records.

The University agrees to perform leak tests of sealed sources as may, from time to time, be required by WRI.

6 0383
60280

It is mutually understood and agreed that the University Radiation Safety Officer shall have the authority to temporarily or permanently terminate any activities involving ionizing radiation which constitute a safety hazard or which otherwise violate University or Nuclear Regulatory Commission regulations. Any such action of the Radiation Safety Officer will be reported and promptly reviewed by the University Radiation Safety Committee, the decision of which will be final.

In consideration for the services described herein, WRI agrees to pay to University \$4,000 annually. On or before January 1, 1987, the parties may renegotiate the consideration for these services for the succeeding three-year period.

Failure of either party to insist on the strict performance of the terms, agreements, and conditions contained herein shall not constitute or be construed as a waiver or relinquishment of said party's right thereafter to enforce any such term, agreement, or condition, but the same shall continue in full force and effect.

SUBSCRIBED AND SWORN to the day and year first written above.

James E. Todd
Vice President for Finance

Wesley E. Barnes
Chief Executive Officer -
University of Wyoming
Research Corporation

60383
60280