DEPARTMENT OF HIGHWAYS

TED SCHWINDEN, GOVERNOR

2701 PROSPECT

STATE OF MONTANA

HELENA, MONTANA 59620

December 5, 1988

Charles L. Cain, Chief
Nuclear Materials Licensing Section
U.S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, TX 76011

In a letter dated June 30, 1987, the MDOH requested an amendment to Materials License 25-~~1148~~-01, citing five proposals.
(11498)

In a letter dated August 27, 1987, you granted requests a, b, c, and e, but requested more information on item d. This item pertains to authorization of Mr. Joseph P. Liuzza to qualify individuals to be radiation safety instructors.

Enclosed is the information you requested, namely: a) a training outline including number of hours devoted to each topic and b) the written final exam.

In light of this information and the information in the June 30 letter, we now wish to resubmit item d for your consideration.

We may wish to begin instructor training as early as February 1989 if we can be authorized to do so by then. We will also be renewing our Materials License about that time. Thus, we request either amendment #17 to our current license or temporary authorization to initiate the training until it becomes a condition of the renewed license, whichever you prefer.

If you would like to discuss this request, please call me at (406)444-6297.

FOR
ROBERT T. RASK, CHIEF
MATERIALS BUREAU

RTR:JPL:dh:5gg

Enclosures

12/13/88
Dec-3-III
Date Completed 12/13/88

462303

PROCEDURE FOR QUALIFYING RADIATION SAFETY INSTRUCTORS FOR THE FIVE MONTANA DEPARTMENT OF HIGHWAYS DISTRICTS

SCREENING

Two or three candidates will be recommended from each District by District management or personnel specialists. A finalist will be selected from the candidates by structured interview based upon these qualifications:

a) physical science background
b) experience in nuclear testing
c) interest, ability, and will to serve as radiation safety instructor
d) prior radiation safety training (at least 8 hours required)

EFFECTIVE PRESENTATION TRAINING

The finalist will be required to complete successfully the 2½-day effective presentation seminar offered by the Professional Development Center, Montana Department of Administration. The seminar agenda is attached.

RADIATION SAFETY TRAINING

The finalist will be required to complete successfully the Radiation Safety Instructor course outlined in the accompanying literature. This course shall be presented in three segments, each three days in duration. The average test score for the three segments shall be 70 percent with no individual segment score less than 60 percent. A finalist failing either of these conditions may take a 4 to 8 hour remedial course per segment and retest on any number of segments.

PRACTICAL TRAINING

The finalist will present the standard twelve-hour radiation safety course to a panel headed by Joe Liuzza or Bob Rask. This presentation will be carefully critiqued, deficiencies addressed, and any inadequate phases of the presentation will be reviewed.

NRC RECOGNITION

When all of the proceeding steps have been completed successfully, the test results and credentials of the finalist will be presented to the NRC for evaluation.

JL:by:1c

effective presentations

June 22, 23, and 24, 1988

agenda

Wednesday, June 22

1:00 - 2:00	Introduction	Freda Rodgers, Dept. of SRS
2:15 - 4:00	Getting Started analyzing audience identifying purpose setting objectives outlines & lesson plans	Cathy Kendall, Dept. of Justice
400 - 5:00	Preparation Time for Presentations	

Thursday, June 23

8:00 - 8:30	Review	Freda Rodgers, Dept. of SRS
8:30 - 10:30	Individual Presentations preparation videotaped delivery review and critique	network members and class participants
10:45 - noon	Platform Skills	John Moore, Dept. of Administration
1:00 - 1:30	Film: "Speaking Effectively to One or One Thousand"	
1:30 - 2:45	Varied Activities Used in Presentations	B.J. Combest, Dept. of Administration
3:00 - 4:00	Use and Abuse of Audio-visual Aids	Roy Symons, Dept. of Highways
4:00 - 5:00	Preparation Time for Presentations	

Friday, June 24

8:00 - 8:30	Review	Freda Rodgers, Dept. of SRS
8:30 - 11:30	Individual Presentations preparation videotaped delivery review and critique	network members and class participants
11:30 - 12:00	Evaluation and Wrap-Up	

QUALIFICATION OF RADIATION SAFETY INSTRUCTORS

CONTENTS OF COURSE

INTRODUCTION AND ORIENTATION

MATHEMATICS FOR RADIATION SAFETY INSTRUCTORS

- Algebra
- Statistics
- Special Functions

NUCLEAR THEORY

RADIATION THEORY

- Quantum Physics Concepts

MEASURING AND DETECTION

HEALTH AND SAFETY

ACCIDENTS AND INCIDENTS

REGULATIONS

- Nuclear Regulatory Commission
- Packaging
- DOT: Transport of RAM
- Storage and Handling

TECHNIQUES OF GAUGE OPERATION

- Compaction Gauge
- Asphalt Content Gauge

QUALIFICATION OF RADIATION SAFETY INSTRUCTORS

DETAIL OF COURSE CONTENTS

MATHEMATICS FOR RADIATION SAFETY INSTRUCTORS

	Time allotted (hours)
ALGEBRA REFRESHER	4
Negative numbers	
Roots and powers	
Inverse square law	
ELEMENTARY STATISTICS	5
Basic statistical terms and concepts	
Use of statistical calculators	
The Normal probability distribution (bell curve)	
The Poisson probability distribution (rare events)	
SPECIAL FUNCTIONS	1
The Logarithm	
The Exponential Function	

NUCLEAR THEORY

PROPERTIES OF NUCLEI	8
Nuclear size, nuclear mass, density, charge distribution	
Isotopes	
Nuclear stability, binding energy	
Radioactivity	
Nuclear models	
	18

Time allotted (hours)

RADIATION THEORY

INTRODUCTION	1
Discussion of units (dimensions)	
Definitions of terms	
QUANTUM PHYSICS	3
Wave-particle duality	
Point sources	
Non-localized sources	
Photon absorption	
Neutron moderation	
Compton scattering	
Pair production	
IONIZING VERSUS NON-IONIZING RADIATION	2
Photons: x-rays, gamma rays	
Betas	
Alphas	
Neutrons	
Other particles	
Wave type radiation	
	6

MEASURING AND DETECTION

	Time allotted (hours)
DETECTORS	2
GM counters	
Ionization counters	
Scintillation counters	
NaI and other solid state counters	
MEASUREMENT	3
Radiation statistics	
Leak testing and analysis	
Survey meters	
Practical exercise	
	5

HEALTH AND SAFETY

	Time allotted (hours)
INTRODUCTION	2
ALARA	
Filmbadge and TLD	
Nuclear Regulatory Commission	
Department of Health & Environmental Sciences	
PENETRATION POWER AND SHIELDING	2
Neutrons	
Gammas	
Alphas	
Betas	
SPECIAL TOPICS	5
Occupational exposure limits	
Health risks	
Biological effects of radiation	
Women and radiation	
Radiation Safety Officer	
Training requirements for gauge operators	
The NRC Materials License	
	9

ACCIDENT AND INCIDENT PROCEDURE

	Time allotted (hours)
RESPONSE	1
The tester's response	
The Radiation Safety Officer's response	
Communication with the RSO and the NRC	
INVESTIGATION	2
Procedure	
Requirements	
Documentation	
PRACTICAL EXERCISES	3
Review of Nashua West accident of Sept. 1, 1987	
Mock accident	
	6

NRC REGULATIONS

			Time allotted (hours)
CODE OF FEDERAL REGULATIONS			10
10CFR	19	Notices, Instruction & Reports to Workers	
	20	Standards for Protection Against Radiation	
	21	Reporting Non-Compliance	
	170 and 171	Fees for Licensing and Facilities	
49CFR	173	Transport of Radioactive Material Packaging and Labeling	
OTHER TOPICS			2
Forms and Documents			
Storage and Handling			
Disposal of Radioactive Material			—
			12

ADV TECHNIQUES OF GAUGE OPERATION

	Time allotted (hours)
COMPACTION GAUGE	7
Theory of operation	
Maintenance	
Calibration procedure	
Trench moisture measurement	
Gauge-core correlation	
Density and moisture offsets	
Quality assurance	
Radiological specifications	
Practical exercise (graded)	
AC GAUGE	5
Theory of operation	
Maintenance	
Calibration procedure	
Moisture adjustment	
Radiological specifications	
Practical exercise (graded)	
ORAL FINAL EXAM	1
WRITTEN FINAL EXAM	3
	16

Total Course Time is 72 Hours

MONTANA DEPARTMENT OF HIGHWAYS

Radiation Safety Instructor Qualification

Final Exam

This exam consists of five parts. You will complete the test in three sittings. The part or parts administered in each sitting will be determined by the instructor.

Read each problem carefully. You should perform all computations on the pages provided. In most cases, brief, substantive answers are worth more than wordy ones. You must score a minimum of 60 percent at each sitting and your average for the entire exam must be at least 70 percent. The value of each problem will be indicated by the instructor.

Name _____

Date _____

Part or parts issued this period:

I II III IV V

Sitting Number ____

JL:lrk:4gg-1

462303

Part I: MATHEMATICS

1. Define:

event

sample

population

standard deviation

variance

mean

median

central limit theorem

normal probability distribution

poison probability distribution

the exponential function

scientific notation

2. The radiation dose rate 4 feet from a point source is 20 mrem per hour.

i) At what distance would the dose rate be

a) 400 mrem/hour

b) 1 mrem per hour

c) 10 rem/hour

ii) What is the dose rate 6 feet from the source?

3. Perform the following calculations WITHOUT using your calculator.

Data $X_1 = 3$ $X_4 = 0$

$X_2 = -4$ $X_5 = 6$

$X_3 = -9$

What is $\sum_{i=1}^{5} X_i$?

What is $\bar{X}$?

What is $\sum_{i=1}^{5} X_i^2$?

What is σ_{n-1} ?

JL:lrk:4gg-3

4. Normal Distribution

A large number of random density tests have been performed on a given lot of asphalt concrete. The average, $\bar{X}$, is 141.7 PCF and the standard deviation is 2.4 PCF. Use the next page, if necessary, for additional calculations.

a) What is the probability that a single random test will result in a density less than 138 pounds?

b) What is the probability that a single random test result will lie in the range 142 - 143 PCF?

c) If another series of tests were performed on the same lot, what range of densities would include 80% of the results. Express the answer as 141.7 + or - _____ PCF.

d) If a QA spec required all test results to be greater than 137 PCF, what percentage of tests taken on this mix would you expect to fail?

JL:lrk:4gg-4

462303

JL:lrk:4gg-5

5. Poisson Distribution

The average number of potholes along a certain stretch of highway is 3 per lane-mile. What is the probability that between two mileposts in a given lane a pavement rater encounters:

a) zero potholes

b) one pothole

6. Twenty one-minute density standard counts with a Troxler Model 3411 nuclear device produce the following results:

Mean = 2399

Standard deviation = 15.8

Does this gauge pass the density stability test? If not, what must be done?

7. Using your calculator, compute:

a) log 32

b) log(186/207)

c) $\sqrt{\log(1/32)}$

d) log 10000

e) $\ln 6^2$

f) ln(-22)

g) log 186 - log 207

h) 3log 2

i) exp(-2.782)

j) 1/exp(2.782)

k) exp(6.7-2.5)

l) 2ln 6

8. Using your calculator, determine the stability ratio for the following moisture standard count data from a Troxler Model 2401 gauge.

623

614

609

617

622

611

622

630

609

618

Stability ratio = _____

Does this gauge pass the test?

JL:lrk:4gg-8

Part II: RADIATION AND NUCLEAR THEORY

1. Define:

atomic number (Z)

mass number (A)

isotope

radioactivity

exponential decay law

half life

alpha particle

beta particle

gamma ray

Planck's constant

JL:lrk:4gg-9

462303

2. An approximate formula for the radius of a nucleus of mass number A is $R = (1.2 \times 10\text{-}15 \text{ meters}) \times \sqrt[3]{A}$. Use this formula to predict the radius in meters of a gold nucleus. Convert your answer to inches.

R = _____ meters

R = _____ inches

3. If the density of a nucleus is its mass divided by its volume ($= \frac{4}{3} \pi R^3$), compute the density of a gold nucleus. Express the result in grams per cc and pounds per cubic foot.

JL:lrk:4gg-10

4. What is the basic cause of instability in heavy nuclei?

5. The half life of a given element is 5,000 years. If it is known that only 1.0 gram of the element exists today, how much existed 100,000 years ago?

JL:lrk:4gg-11

6. If the density standard count for a Cesium 137 source was 2000 in 1970, what would you expect it to be in 1989?

7. Discuss the liquid drop and shell models of the nucleus.

JL:lrk:4gg-12

8. Define:

curie

rem

rad

roentgen

parent nucleus

alpha decay

pair production

activity

JL:lrk:4gg-13

9. List and discuss the sources of radiation.

10. What is the photoelectric effect? Draw a diagram.

JL:lrk:4gg-14

11. Discuss briefly the process of Compton scattering. Draw a diagram.

12. What is the difference between neutron moderation and neutron absorption? Name two neutron moderators and two neutron absorbers.

JL:lrk:4gg-15

13. State the Heisenberg uncertainty principle. What does it imply about making measurements on atomic systems?

14. What is the difference between x-rays and gamma rays? How is each type of radiation typically produced?

15. What is non-ionizing radiation? Give some examples.

PART III: RADIATION SAFETY

1. Define:

ALARA

Relative Biological Effectiveness

Gray

Sievert

Whole body radiation

Absorption coefficient

attenuation

restricted area

byproduct material

JL:lrk:4gg-17

2. What is the fundamental mechanism of radiation detection?

3. Explain the operation of a GM detector, including the ionization process and ion migration. Draw a schematic of the apparatus. For which types of radiation detection is the GM detector most efficient?

JL:lrk:4gg-18

462303

4. How can one distinguish roughly between alpha, beta, and gamma radiation?

5. What is a beta window?

6. How does the range of charged particles in a medium relate to:

   a) the density of the medium?

   b) the atomic number of the medium?

   c) the incident particle energy?

7. How is the "range" of gamma rays defined?

8. What whole body dose would likely cause, in a typical adult,

   a) death _____

   b) severe sickness _____

   c) blood abnormalities _____

9. Explain the purpose of a leak test. How is the result of the test reported?

10. Define linear energy transfer. Which particles typically have low l.e.t.? Which have high l.e.t.?

JL:lrk:4gg-20

11. What are the two categories of risk associated with exposure to radiation in low to moderate does?

12. Briefly, what is the primary mechanism by which radiation damages living tissue?

13. What is meant by:

    a) cumulative effect of radiation?

    b) threshold effect of radiation?

14. What type of cells are most influenced by radiation?

JL:lrk:4gg-21

15. Why are children and pregnant women more susceptible to health hazards associated with radiation than the population?

16. Explain how film badges should be worn, transported, and stored. Is a film badge likely to be a reliable indicator of a leaking sealed source? Why or why not?

17. What are the three primary means of reducing one's radiation exposure? Comment briefly on each.

JL:lrk:4gg-22

18. What is the function of the Nuclear Regulatory Commission?

19. What are the NRC quarterly occupational does limits for:

a) the whole body _____

b) extremities _____

c) skin of the whole body _____

JL:lrk:4gg-23

PART IV: ACCIDENTS AND INCIDENTS

1. A fire breaks out near your nuclear gauge storage area. Explain in detail what must be done.

2. You return from lunch and discover your nuclear device has been stolen from your pick-up.

   a) What should you do? Be specific.

   b) What could have been done to avert this problem?

JL:lrk:4gg-24

3. You are notified by a FPM that a nuclear compaction gauge has been run over on a paving project.

   a) What do you ask the FPM?

   b) What do you tell him?

   c) What do you do?

   d) Whom do you notify? When?

4. You receive a call from Helena informing you that a nuclear gauge has a leaking source. Explain in detail everything that must be done

   a) if the gauge has been in storage since the leak test.

   b) if the gauge was just placed on a project.

   c) if the gauge has been on several projects since the leak test with several operators involved.

JL:lrk:4gg-25

PART V: REGULATIONS

1. Define the A_1 and A_2 values for RAM packaging.

2. Complete the following table:

	A_1	A_2	Transport Group
Radium 226	C_1	C_1	
Cesium 137	C_1	C_1	
Americium 241	C_1	C_1	

3. Define:

Transport group

Transport index

UN number

Type A package

Type B package

Special Form

Normal Form

JL:lrk:4gg-26

4. Explain the difference between Radioactive White I, Radioactive Yellow II, and Radioactive Yellow III packaging. Be specific.

5. Explain in detail all the packaging, labeling, signing, and documentation requirements for transporting a Troxler compaction gauge (10 mCi Cs137 and 50 mCi Am241).

JL:lrk:4gg-27

6. Employees who work with radioactive material must be kept informed and educated in many practical and safety matters. List at least 3 regulations or ideas that you would emphasize in your radiation safety course on the topic of:

a) storage of RAM

b) transport of RAM

c) use of film badges

JL:lrk:4gg-28

d) use of nuclear gauges

e) accidents involving RAM

f) personal safety

JL:lrk:dgg-29

462303

DEPARTMENT OF HIGHWAYS

TED SCHWINDEN, GOVERNOR

STATE OF MONTANA

2701 PROSPECT

HELENA, MONTANA 59620

May 19, 1988

Mr. Jack Whitten
Senior Licensing Reviewer
U.S. Nuclear Regulatory Commission
611 Ryan Plaza Dr., Suite 1000
Arlington, TX 76011

REQUEST FOR AMENDMENT
MATERIALS LICENSE #25-11498-01

The Montana Department of Highways requests authority to possess and use in accordance with the subject Materials License, the following special form radioactive material:

L. AM 241:BE	Sealed Source (Troxler Drawing #8-100608)	Not to exceed 110 mCi. per source

This material is for use in the Troxler Model 3241-C series asphalt content gauge or any subsequent Troxler asphalt content gauge with the same radiological specifications.

Robert T. Rask

ROBERT T. RASK, CHIEF
MATERIALS BUREAU

RTR:JL:lrk:3xx

cc: Joe Liuzza

DEPARTMENT OF HIGHWAYS

TED SCHWINDEN, GOVERNOR

2701 PROSPECT

STATE OF MONTANA

HELENA, MONTANA 59620

March 10, 1988

Jack Whitten
Senior Licensing Reviewer
U.S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, TX 76011

REQUEST FOR AMENDMENT LICENSE #25-11498-01

The Montana Department of Highways requests authorization to possess, store, transport, and use as we deem appropriate the following by-product material in Campbell Pacific Nuclear Corporation nuclear gauges:

I.	Cs 137	Sealed Source - CPN 131	Not to exceed 10 m Ci.
J.	Am241: Be	Sealed Source - CPN 131	Not to exceed 50 m Ci.
K.	Am241: Be	Sealed Source - CPN 131	Not to exceed 100 m Ci.

Sources I and J are to be used in CPN Density-Moisture gauges MC-3 or any subsequent MC series gauge within the stated radiological specifications. Source K is to be used in Asphalt Content gauge AC-2 or any subsequent AC-series gauge within the stated radiological specifications.

All activity involving these materials will be conducted in accordance with the provisions of the subject license with no exception.

Joe Liuzza

JOE LIUZZA, MATERIAL LAB SPECIALIST
NUCLEAR SECTION

JL:kw:4x

cc: R. Rask
S. Barnes
J. Liuzza

461886

DEPARTMENT OF HIGHWAYS

TED SCHWINDEN, GOVERNOR

STATE OF MONTANA

2701 PROSPECT

HELENA, MONTANA 59620

February 4, 1988

Mr. Jack Whitten
Senior Licensing Reviewer
U.S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, TX 76011

REQUEST FOR AMENDMENT #15 - MATERIALS LICENSE #25-11498-01

The Montana Department of Highways requests that the NRC authorize Mr. Boyd Bomar to act as a Radiation Safety Instructor within the Department. Specifically, we request:

a) That Mr. Bomar be authorized to present a course of instruction in radiation safety and gauge operation to individuals who are to operate nuclear moisture/density gauges or asphalt content gauges. This course is to be at least 8 hours long.

b) That the NRC recognize Mr. Bomar's signature on any certificate or document issued by the Montana Department of Highways attesting to an individual's knowledge of radiation safety and gauge operating procedures.

c) That the document so signed by Mr. Bomar will qualify the individual to use the licensed materials in the gauges in the manner prescribed in our Materials License.

Mr. Bomar has over 18 years of experience in nuclear testing in the construction industry, six of which are in a supervisory capacity. He has an excellent safety record, and his training (see attachment) and experience are extensive. In addition to the training listed, Mr. Joe Liuzza has presented information to Mr. Bomar on atomic and nuclear phenomena, biological effects of radiation, radiation statistics, and NRC regulations.

In light of his knowledge, experience and conscientiousness, I endorse Mr. Bomar as a radiation safety instructor.

R. Scott Baines for R.T.R.
ROBERT T. RASK
RADIOLOGICAL SAFETY OFFICER

RTR:JPL:kw:1dd
Attachment

Copy sent to DCS

BOYD E. BOMAR

Schools Attended - Dates and Total Hours

	Jan - May 1968	Basic Road Construction Basic Engineering Course	Night School
	Jan - Mar 1969	Surveying and Geometry Advanced Engineering Course	Night School
**	March 17-19, 1973	Troxler Nuclear School - Denver	24.0 hours **
**	May 30, 1975	Campbell Pacific Nuclear Radiation Safety and Nuclear Gauges	8.0 hours **
	March 3-7, 1980	Montana State University Construction Inspection Materials	40.0 hours
	Apr 15-17, 1980	Utilization of Asphalt Emulsions in Highway Construction & Maintenance	24.0 hours
	May 21-22, 1981	Communications Skills for Supervisors	16.0 hours
**	Feb 8-11, 1982	Montana State University Nuclear Densometer Operators Course	32.0 hours **
**	Feb 23-26, 1982	Statistical Quality Control in Highway Construction	24.0 hours **
**	Jan 25-26, 1983	Alan Jackson - M.S.U. Nuclear Radiation Safety & Gauge Operation	8.0 hours **
**	May 1, 1986	Hazardous Materials	2.0 hours **
	Sept 25, 1986	Advanced Driving	8.0 hours
**	Apr 23, 1987	Bender and Associates Soil Compaction Seminar	8.0 hours
	May 20-21, 1987	Asphalt Conference - Bozeman, Montana	12.0 hours
**	Dec 11, 1987	School on Ludlum gauge for Leak Test Evaluation - Larry Lloyd	6.0 hours **
			112.0 applicable hours

Related Experience

June 1969 - Sept 1975	Advisor for Nuclear Measurements Section
May 1978 - Oct 1981	Lab Inspector for Nuclear Measurements Section
Oct 1981 - Present	Supervisor of Nuclear Measurements Section

** Indicates training applicable to radiation safety and radiation theory

JPL:by:kw:3G

DEPARTMENT OF HIGHWAYS

TED SCHWINDEN, GOVERNOR

2701 PROSPECT

STATE OF MONTANA

HELENA, MONTANA 59620

January 18, 1988

Mr. Jack Whitten
Senior Licensing Reviewer
U.S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, TX 76011

Request for Amendment No. 14: License #25-11498-0
Leak-Test Analysis

The Materials Bureau of the Montana Department of Highways requests authorization to analyze leak-test disks for nuclear moisture/density gauges and asphalt content gauges.

Please review the attached application. If you need any additional information, call me.

Robert T. Rask

ROBERT T. RASK
RADIOLOGICAL SAFETY OFFICER
MATERIALS BUREAU

RTR:JL:lrk:lb

FEE EXEMPT
170.11(a)(4)

Copy sent to DCS

461812

January 18, 1988

AMENDMENT #14 REQUEST
U.S. NUCLEAR REGULATORY COMMISSION
MATERIALS LICENSE #25-11498-01

LOCATION OF USE - All leak-test analyses will be performed in Room 141, the Nuclear Measurements Lab, at the address indicated on the subject license, Amendment No. 13.

PERSON TO BE CONTACTED - Robert T. Rask or Joseph P. Liuzza

RADIOACTIVE MATERIAL - Calibration sources G and H listed on the subject license, Amendment No. 13, in items 6, 7 and 8

PURPOSE FOR WHICH LICENSED MATERIAL WILL BE USED - Leak-testing 10 mCi Cesium 137 sources and 50 mCi Americium 241 sources in portable moisture density gauges and 300 mCi Americium 241 sources in asphalt content gauges or any of the sources A, B, C, D, E or F listed on the subject license, Amendment No. 13, in items 6, 7 and 8.

RESPONSIBLE INDIVIDUALS - ROBERT T. RASK is the RSO, JOSEPH P. LIUZZA or BOYD BOMAR will perform the analyses of leak tests or directly supervise the procedures.

The formal training for Robert T. Rask appears on the application for license dated December 19, 1977; that for Joseph P. Liuzza appears in the letter dated June 30, 1987. Mr. Bomar's formal training appears on the attached outline (ATTACHMENT 1). Mr. Liuzza and Mr. Bomar received 6 hours of hands-on instruction in leak-test analysis from Mr. Larry Lloyd on December 11, 1987.

Topics covered were those listed on paragraph 3 of the letter dated July 9, 1987.

These responsible individuals will consult with Larry Lloyd and his staff periodically to keep current with leak-testing developments.

TRAINING FOR ANCILLARY PERSONNEL - Any individual assisting us in leak testing or leak-test analysis will be trained until proficient (minimum of 2 hours) by Joe Liuzza or Boyd Bomar. Topics will include radiation safety and ALARA philosophy, radiation detection instruments, a complete study of the step-by-step procedures for leak testing or leak-test analysis (ATTACHMENT 2), and accident and emergency procedures. Training files will be maintained.

FACILITIES AND EQUIPMENT - Testing will be performed at the location specified under the heading "LOCATION OF USE".

RADIATION SAFETY PROGRAM

1. PERSONNEL MONITORING - All individuals involved in any radiation activity will wear a film badge.

2. RADIATION DETECTION INSTRUMENTS - Aside from the GM survey meter described in the letter of October 11, 1983, we possess the following:

   One (1) portable end-window GM detector system with constant geometry sample holder (ATTACHMENT 3). The device detects beta and gamma radiation to a sensitivity on the order of 10^{-3} microCurie.

This device will be used to analyze the leak-test paper discs. Sources used to calibrate this device are described in ATTACHMENT 4. Calibration procedures are outlined in ATTACHMENT 5.

3. EMERGENCY PROCEDURE - If a wipe for a particular gauge is contaminated, the district to which the gauge is assigned will be notified immediately. The gauge will be restricted from any further use and will not be moved or handled unless absolutely necessary. Either Joe Liuzza or Boyd Bomar will travel to the location of the gauge, check the radiation profile of the gauge, inspect the source rod and weld, and take a second wipe. Larry Lloyd of the Montana Department of Health and Environmental Science will be contacted for further assistance.

4. RECORDS - The record of the leak-test results will be kept on the attached document (ATTACHMENT 6). A quality assurance log will be maintained. Recorded in this log will be operating voltage for the day, daily background counts and standard deviation based on 50 minutes of counting, counts for the alpha source, and counts for the beta source. After each ten (10) wipes, 5-minute counts for background, alpha source, and beta source will be taken and these results recorded. This information will be kept on file at least three years after the counts are taken.

JPL:by:kw:2T

BOYD E. BOMAR

Schools Attended - Dates and Total Hours

	Jan - May 1968	Basic Road Construction Basic Engineering Course	Night School
	Jan - Mar 1969	Surveying and Geometry Advanced Engineering Course	Night School
**	March 17-19, 1973	Troxler Nuclear School - Denver	24.0 hours **
**	May 30, 1975	Campbell Pacific Nuclear Radiation Safety and Nuclear Gauges	8.0 hours **
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**	Feb 8-11, 1982	Montana State University Nuclear Densometer Operators Course	32.0 hours **
**	Feb 23-26, 1982	Statistical Quality Control in Highway Construction	24.0 hours **
**	Jan 25-26, 1983	Alan Jackson - M.S.U. Nuclear Radiation Safety & Gauge Operation	8.0 hours **
**	May 1, 1986	Hazardous Materials	2.0 hours **
	Sept 25, 1986	Advanced Driving	8.0 hours
**	Apr 23, 1987	Bender and Associates Soil Compaction Seminar	8.0 hours
	May 20-21, 1987	Asphalt Conference - Bozeman, Montana	12.0 hours
**	Dec 11, 1987	School on Ludlum gauge for Leak Test Evaluation - Larry Lloyd	6.0 hours **
			112.0 applicable hours

Related Experience

June 1969 - Sept 1975	Advisor for Nuclear Measurements Section
May 1978 - Oct 1981	Lab Inspector for Nuclear Measurements Section
Oct 1981 - Present	Supervisor of Nuclear Measurements Section

** Indicates training applicable to radiation safety and radiation theory

JPL:by:kw:3G

ATTACHMENT #1

MODEL 1000

SCALER

FEATURES: panel meter for HV reading; operates scintillation, or G-M detectors; preset electronic timer;
POWER: 115 volts, 50-60 Hz single phase at less than 100 mA
INPUT SENSITIVITY: 50 mV
HIGH VOLTAGE: Adjustable from 400 - 2500 volts
INPUT CONNECTION: A single series "C" connector with ballast resistor for 1-wire scintillation, or G-M detectors
TIMER: Thumb switch operation from 0-99 minutes with multiples of X0.1, X1, X10, or an EXT position for manual timing.
LINEARITY: Typically ± 2% of full scale
SIZE: 12.7(5")W by 21.6(8.5")H by 24.1(9.5")L
WEIGHT: 3.0(6.5 pounds)

MODEL 2000

SCALER

FEATURES: Battery/line power; built in battery charger; panel meter for HV reading, and battery check; operates proportional, scintillation, or G-M detectors; preset electronic timer;
POWER: 115 volts, 50-60 Hz single phase at less than 100 mA, or 4 "D" cell batteries (rechargeable batteries available upon request)
INPUT SENSITIVITY: Voltage sensitive, adjustable from 2 mV to 100 mV
HIGH VOLTAGE: Adjustable from 100 - 2500 volts (will support 100 megohm scintillation loads to 1500 volts)
TIMER: thumb switch operation from 0-99 minutes with multiples of X0.1, X1, X10, or an EXT position for manual timing
LINEARITY: Typically ± 2% of full scale
SIZE: 13.3(5.25")W by 21.6(8.5")H by 23.5(9.25")L
WEIGHT: 3.9(8.5 pounds), including batteries

MODEL 2200; 2200-1

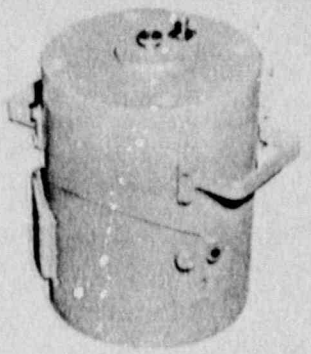
SCALER RATEMETER
SINGLE CHANNEL ANALYZER

FEATURES: Battery/line power; built in battery charger; operates scintillation, proportional, or G-M detectors; preset electronic timer; single channel analyzer capability for Gamma spectrum; adjustable threshold, window, and HV; readout dimmer control; panel meter for count, HV, and battery check
POWER: 115 volts, 50-60 Hz single phase at less than 100 mA, or 4 each "D" cell batteries (rechargeable batteries available upon request)
INPUT SENSITIVITY: Voltage sensitive, adjustable from 3mV to 100mV where 1.00 on threshold dial equals 10 mV; Discriminator allows threshold sensitivity to be lowered to 2.0 mV at 1.00 on the threshold dial.
HIGH VOLTAGE: Adjustable from 200 - 2500 volts (will support 100 megohm scintillation loads to 1500 volts)
TIMER: Thumb switch operation from 0-99 minutes with multiples of X0.1, X1, X10, or an EXT position for manual timing
RESPONSE: FAST(3 seconds)
SLOW(12 seconds) for 67% of full scale
LINEARITY: Typically ± 2% of full scale
RATEMETER: Four decade count ratemeter from 0-500 CPM with multipliers of X1, X10, X100, X1K
SIZE: 12.7(5")W by 21.6(8.5")H by 21.6(8.5")L
WEIGHT: 4.8(10.6 pounds), including batteries
NOTE: The Model 2200-1 utilizes the same electronics as the Model 2200 except that it is stabilized with, either a light emitting diode(LED), or an Am-241 pulser.

Telex #466832 UD / 915-235-5494 / or write P.O. Box 810 / 501 Oak / Sweetwater, Texas 79556, U.S.A.

ATTACHMENT #3

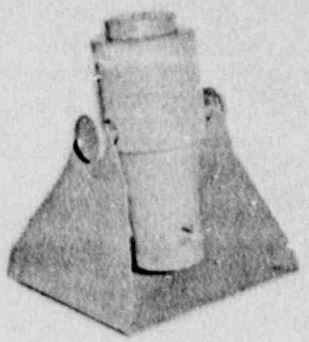
SPECIAL DETECTORS



MODEL 180-8; 180-9

SAMPLE HOLDER

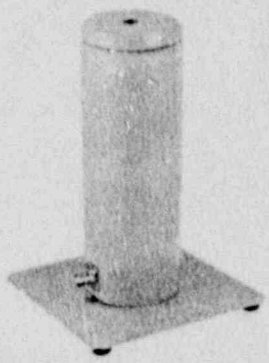
INDICATED USE: Low background swipe counter
DETECTOR: Model 44-7, (other detectors available upon request)
SIZE: 33.0 (13")H by 24.1 (9.5") diameter, overall width with handles is 31.8 (12.5")
CONSTRUCTION: Lead shielding (1.75" thick), removable cap and hinged door
WEIGHT: 113.6 (250 pounds)
NOTE: 180-9 has an extra 14.6(5.75") in height for scintillation detectors



MODEL 203

SHIELDED WELL SCINTILLATOR

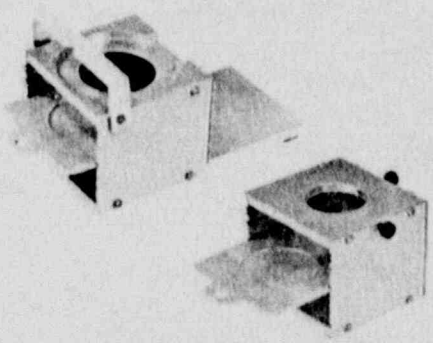
INDICATED USE: Gamma assay
DETECTOR: Integral line 5.1 (2") thick by 4.4 (1.75") diameter NaI (Tl)
WELL SIZE: 3.9 (1.55") deep by 1.7 (0.66") diameter
WINDOW: 0.025 (0.010") aluminum
EFFICIENCY: 70% of 4pi for I-125
SIZE: Base — 34.3 (13.5") by 30.5 (12")
Height — with lid 41.9 (16.5")
CONSTRUCTION: 3.8 (1.5") lead wall, removable cap
WEIGHT: 56.8 (125 pounds)



MODEL 243

SHIELDED WELL SCINTILLATOR

INDICATED USE: Gamma assay
DETECTOR: Integral line 5.1 (2") thick by 4.4 (1.75") diameter NaI (Tl)
WELL SIZE: 3.9 (1.55") deep by 1.7 (0.66") diameter
WINDOW: 0.025 (0.010") aluminum
EFFICIENCY: 70% of 4pi I-125
SIZE: Base — 20.3 (8") by 20.3 (8")
Shield — 27.9 (11")H by 8.9 (3.5") diameter
CONSTRUCTION: 1.3 (0.5") lead surrounding detector with 1.3 (0.5") lead cap
WEIGHT: 13.6 (30 pounds)



Model 180-2, Model 180-4

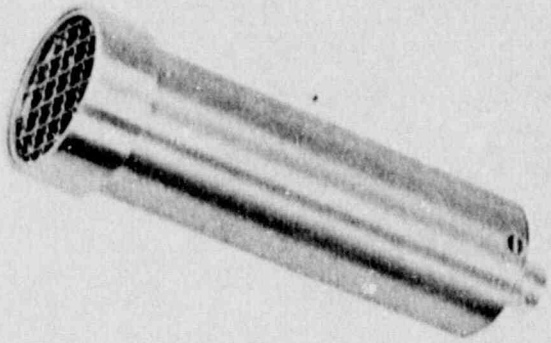
Sample Holder for 44-9, Sample Holder for 44-7

INDICATED USE: Repeatable geometry counting of wipes, filter paper or slides
SAMPLE DRAWER: Slides out for rapid manual sample changing, 47mm diameter depression for sample spacing
SPACING: Slide slots at ⅛", ¼", ½", 1", 2", detector spacing is adjustable
SIZE: 6.68 (2⅝")H by 8.26 (3¼")W by 7.62 (3")D
WEIGHT: 180-2, 2.2 (1 pound)
180-4, 1.94 (14 oz.)
CONSTRUCTION: Anodized Aluminum

LUDLUM MEASUREMENTS, INC.
Telex #466832 UD / 915-235-5494 / or write P.O. Box 810 / 501 Oak / Sweetwater, Texas 79556, U.S.A.

BETA-GAMMA DETECTORS

Also See Models: 3-98; 14C; 5; 6; 15; 19; 77; 316-2; 9; 17

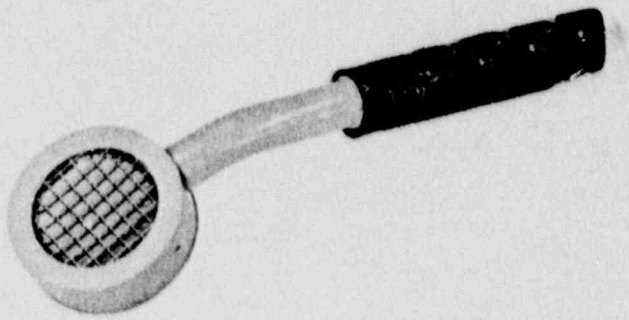


MODEL 44-7

β-WINDOW

MICA END WINDOW G-M DETECTOR

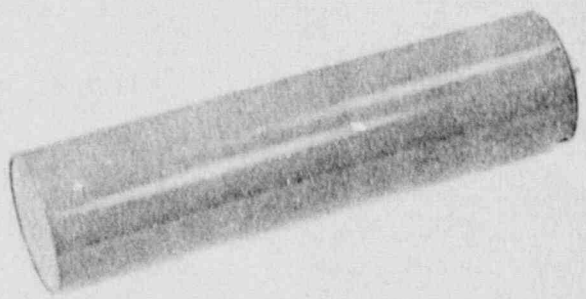
INDICATED USE: Alpha, Beta-Gamma survey
WINDOW: 1.7 ± 0.3 mg/cm² mica
PROTECTIVE SCREEN: 74% open (can be removed)
WINDOW AREA: Active area approximately 6.4 cm²
EFFICIENCY: 10% for C-14, 45% for Sr-90, Alpha 30%, Gamma 1700 CPM/mR/hr for Cs-137
MOUNTING: Aluminum holder
SIZE: 12.7 (5")L by 3.8 (1.5") diameter
WEIGHT: 0.5 (1 pound)
FINISH: Anodized



MODEL 44-9

PANCAKE G-M DETECTOR

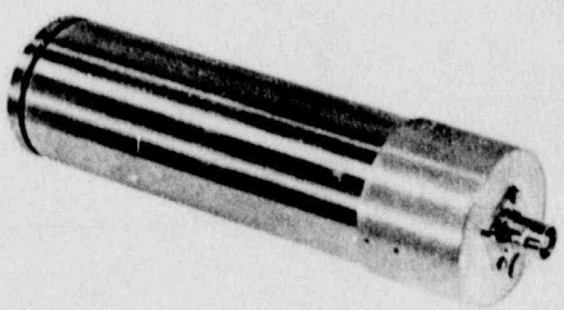
INDICATED USE: Frisker for Alpha, Beta-Gamma
WINDOW: 1.7 ± 0.3 mg/cm² mica
PROTECTIVE SCREEN: 74% open
WINDOW DIAMETER: 4.4 (1.75") diameter
WINDOW AREA: Active area approximately 15.5 cm²
EFFICIENCY: 10% for C-14, 60% for Sr-90, Alpha 30%, Gamma 1900 CPM/mR/hr for Cs-137
MOUNTING: Aluminum holder, handle and window protector
SIZE: 21.0 (8.25")L by 7.0 (2.75") diameter; handle is 2.54 (1") in diameter
WEIGHT: 0.5 (1 pound)



MODEL 44-10

GAMMA SCINTILLATOR

INDICATED USE: Low level Gamma detection
DETECTOR: 5.1 (2") thick by 5.1 (2") diameter NaI (Tl)
TUBE: 5 (2") diameter photomultiplier
EFFICIENCY: Approximately 900,000 CPM/mR/hr for Cs-137 Gamma
SIZE: 27.9 (11")L by 6.7 (2.625") diameter
WEIGHT: 1.1 (2.5 pounds)



MODEL 44-11

INTEGRAL LINE SCINTILLATOR

INDICATED USE: Gamma assay
DETECTOR: 5.1 (2") thick by 5.1 (2") diameter NAI (TI) integral line
PHOTOMULTIPLIER TUBE: 5.1 (2") diameter
EFFICIENCY: Approximately 900,000 CPM/mR/hr for Cs-137 Gamma
DYNODE STRING: MODEL 112 dynode string (series "C" connector furnished unless otherwise requested)
SIZE: 26.7 (10.5")L by 6.4 (2.5") diameter
WEIGHT: 1.4 (3 pounds)
FINISH: Anodized

LUDLUM MEASUREMENTS INC

Telex #466832 UD / 915-235-5494 / or write P.O. Box 810 / 501 Oak / Sweetwater, Texas 79556, U.S.A.

OPERATION

1. Operate at the operating voltage established for beta counting. Run a 5 minute background count. Divide the results by 5 to obtain counts per minute. Record as C_b.

2. Run a 5 minute count of the Cs^{137} standard. Divide this result by 5 and record a C_b.

3. Run a 5 minute count of the wipe sample. Divide this result by 5 and record as C_g. If a result above background is obtained, the activity can be calculated as follows:

$$A = \frac{(C_g - C_b)\ (A_s)}{(C_s)\ (2.22 \times 10^6)} = \mu Ci$$

where:

A = Activity in μCi.
C_g = Gross count of sample in cpm.
C_b = Background count in cpm.
C_s = Gross count of calibration standard.
A_s = Activity of calibration standard in dpm.

4. If the operating voltage for alpha and beta are the same, insert a piece of paper between the wipe and the detector. If there is a difference, then the activity is alpha and the A_s and C_s of the Am^{241} source should be used to determine the activity with the difference. Those counts remaining above backgrwound will be beta and activity should be calculated using the A_s and C_s of the Cs^{137} source.

ATTACHMENT #2

THE SOURCE
Radiation standards and check sources
2889 Industrial Rd. Santa Fe, NM 87501
(505) 473-9538

Certificate of Calibration

(Alpha Sources)

The 241 Americium alpha source was measured in a hemispherical 2π windowless proportional counter using P-10 as counting gas. The alpha emissions from the surface of the source were measured at its plateau voltage to determine its 2π cpm rate. Corrections were applied for background, coincidence loss and backscatter factors when applicable. Source is referenced to NBS standard.

10,300 2pi	cpm
19,900	dpm
0.009	microcurie
09-22-87	date of measurement
Michael A. Ortiz	analyst
87AM3100295 S-Am-31	source number

The uncertainty of the measurement at the 99% confidence interval is 5%.

ATTACHMENT #4

THE SOURCE
Radiation standards and check sources
2889 Industrial RD. Santa Fe, NM 87501
(505)473-9538

Certificate of Calibration

(Gamma Sources)

The 137 Cesium gamma ray emmission rate was compared with a similar standard which was calibrated by National Bureau of Standards. The comparison was completed using a Germanium Intrinsic gamma detector and a multichannel pulse height analyzer.

The gamma activity of the standard on 09-22-87 was 0.605 uCi.

The uncertainty of the measurement and the activity of the source is 10 % which is the sum of the uncertainty of the NBS standard and the random error of counting at the 99% confidence interval.

87CS3100293 S-Cs-31

Calibrated by Michael A. Ortiz Date 09-22-87

Michael A. Ortiz

ADDITIONAL INFORMATION FOR SOURCE # 293

0.605 mCi Cs-137 - MEASURED EFFICIENCIES.

LUDLUM MODEL 44-7 G-M DETECTOR

	SOURCE IN CONTACT WITH DETECTOR SCREEN	SOURCE 1/16" AWAY FROM OUTER LIP OF DETECTOR
BETA-GAMMA	4.5%	3.7%
GAMMA ONLY	0.2%	0.1%

Paul Seitz

SET-UP PROCEDURE LUDLUM 2200 FOR G.M. DETECTOR

1. Select Line Operation
   (Connected to line power of 115 volts, 50-60 Hz)

2. Set the Window to the "Off" position, since the amplitude of the output pulse from a G.M. detector does not vary with energy.

3. Set the Threshold on 6.00. The input sensitivity if approximately 60 mV. At settings less than this, double-pulsing may occur. Some G.M. detectors may require higher settings of 7.00 or 8.00.

4. Set the timer to count 1 minute intervals.

5. With the Am^{241} calibration source in place, press the count button and then slowly increase the instrument high voltage until counting is initiated.

6. Reduce the high voltage until the counting stops. Set the high voltage at the nearest 50 volt interval below where counting is initiated.

7. Record the high voltage. Count for 1 minute and record the count.

8. Increase the instrument high voltage by 50 volts. Repeat step #7.

9. Continue increasing the high voltage in 50 volt intervals and repeat step #7 at each interval until either the maximum allowable detector voltage is reached or until the count rate approaches a constant discharge.

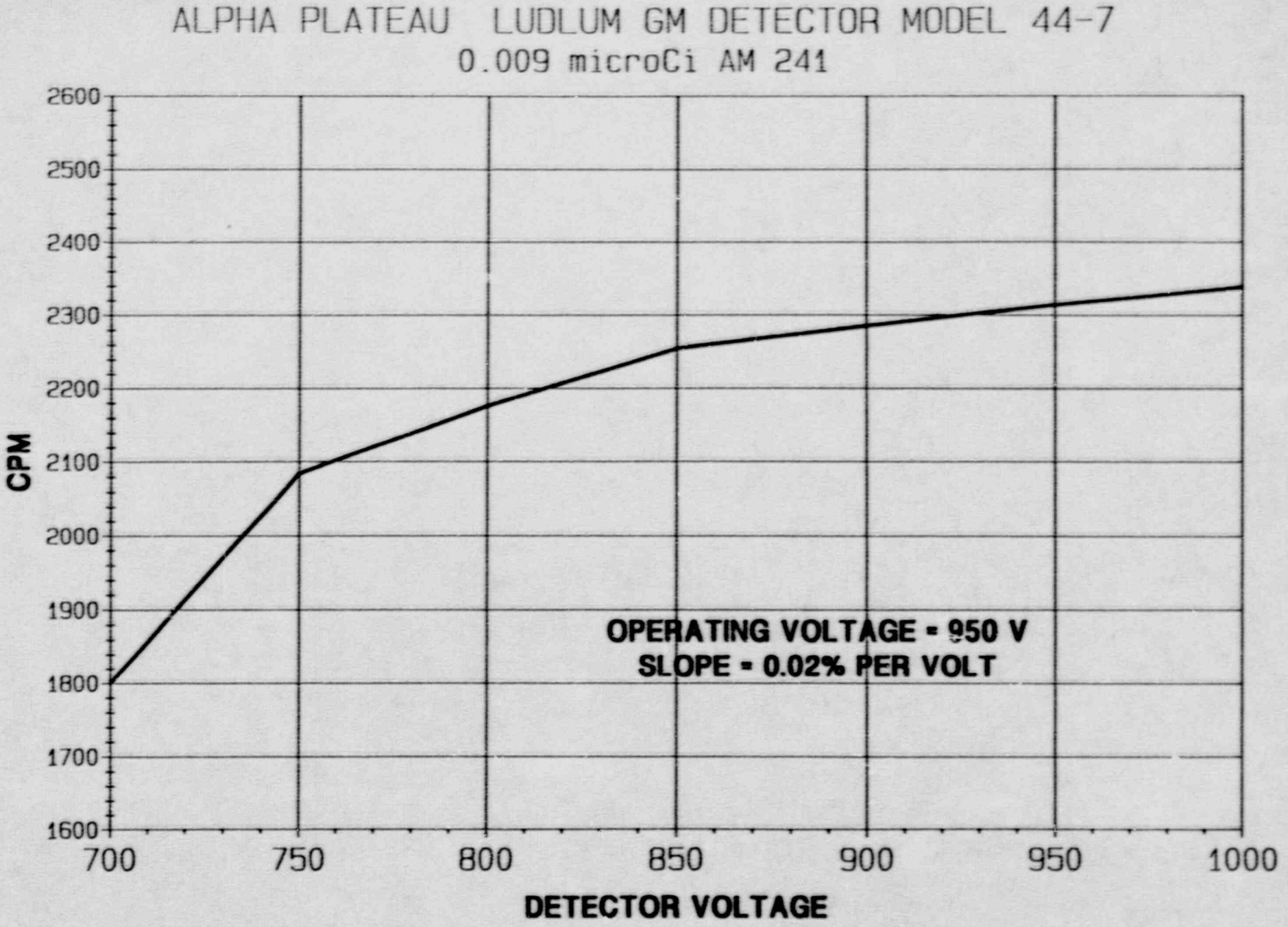
10. Plot the high voltage vs. count rate curve on graph paper with the high voltage values on the X-axis and the count rate on the Y-axis.

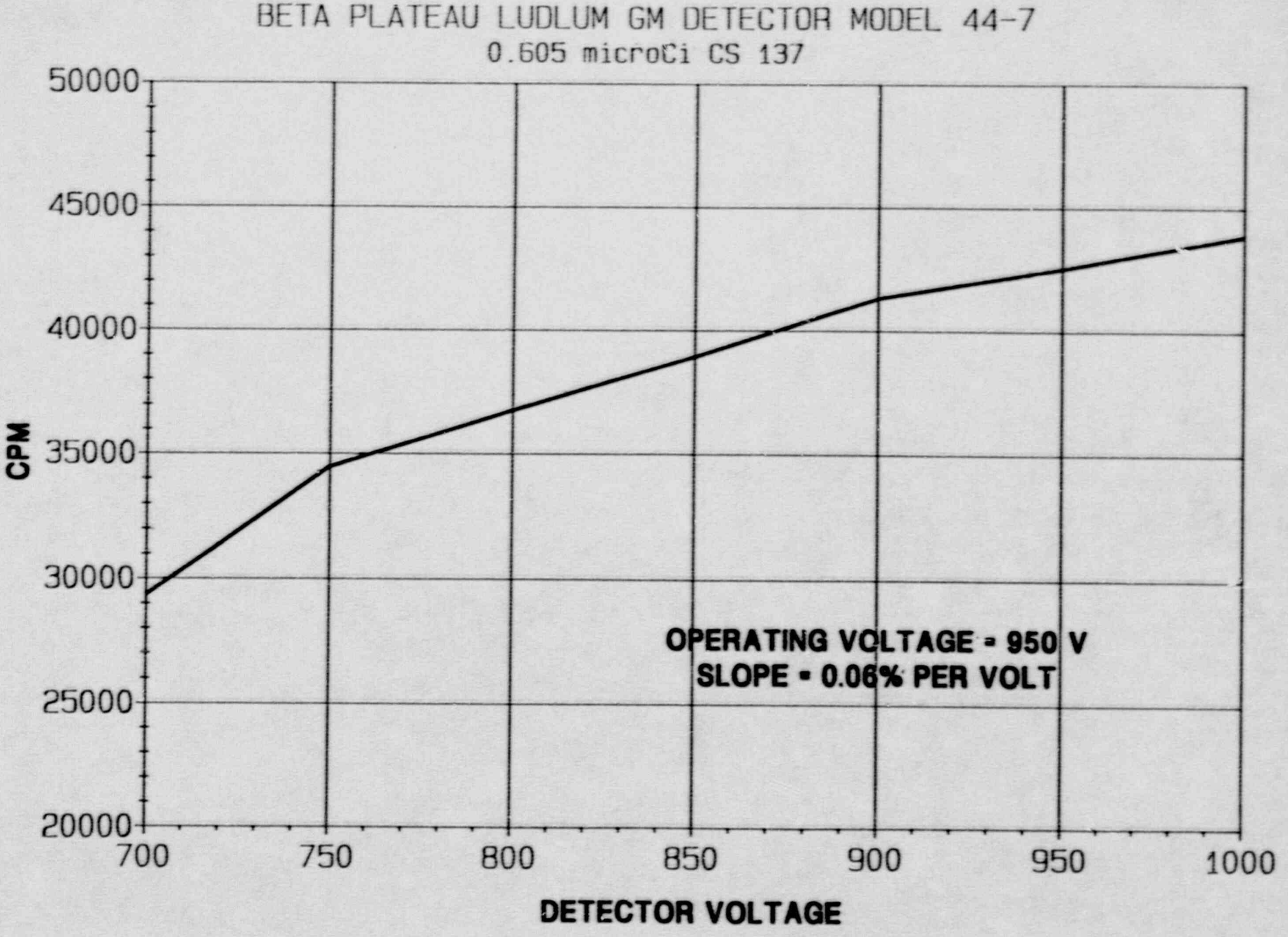
11. Set the instrument at a high voltage which provides a stable count rate. This voltage will be approximately 100 volts above the knee of the plateau. Record the high voltage. This will be the operating voltage for the alpha calibration.

12. Remove the calibration source from the area and do three 5 minute background counts. Divide these results by 5 to obtain counts per minute. Record the average background.

13. Repeat steps 4 through 12, using the Cs^{137} calibration source to establish the operating voltage for beta counting.

ATTACHMENT #5


ALPHA PLATEAU LUDLUM GM DETECTOR MODEL 44-7
0.009 microCi AM 241
2600
2500
2400
2300
2200
2100
2000
1900
1800
1700
1600
CPM
700
750
800
850
900
950
1000
DETECTOR VOLTAGE
OPERATING VOLTAGE = 950 V
SLOPE = 0.02% PER VOLT
ALPHAJ


BETA PLATEAU LUDLUM GM DETECTOR MODEL 44-7
0.605 microCi CS 137
50000
45000
40000
35000
30000
25000
20000
CPM
700
750
800
850
900
950
1000
DETECTOR VOLTAGE
OPERATING VOLTAGE = 950 V
SLOPE = 0.06% PER VOLT
BETAJ

ATTACHMENT #6

MONTANA DEPARTMENT OF HIGHWAYS

RADIOACTIVE MATERIAL LEAK-TEST RESULTS*

DEVICE	SERIAL NO.	SOURCE TYPE	SOURCE SERIAL NO.	ALPHA ** ACTIVITY	BETA ** ACTIVITY	DATE OF WIPE	NEXT WIPE DUE

* Alcohol saturated filter paper used for leak-test. Wipes are performed as follows:
MOISTURE/DENSITY GAUGE - Bottom of source rod and stainless steel weld are wiped.
ASPHALT CONTENT GAUGE - The radiation symbol label is wiped.
COUNTING INSTRUMENT: LUDLUM END WINDOW GM DETECTOR, MODEL 44-7, WITH CONSTANT GEOMETRY SAMPLE HOLDER. LUDLUM MODEL 2200 RATEMETER/SCALER

COUNT PERFORMED BY _____ DATE _____

** "-" represents less than 0.005 microCi of activity

JPL:by:kw:5F

DEPARTMENT OF HIGHWAYS

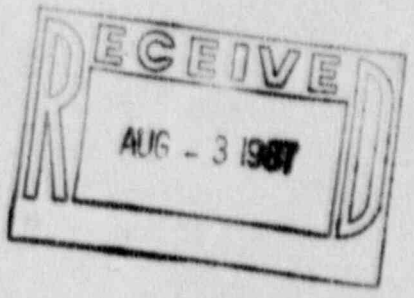
TED SCHWINDEN, GOVERNOR

2701 PROSPECT

STATE OF MONTANA

HELENA, MONTANA 59620

July 31, 1987



Mr. Jack Whitten
Senior Reviewer for Licensing
U.S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, TX 76011

ADDENDUM TO LETTER
DATED JULY 9, 1987

NRC LICENSE #25-11498-01

This addendum is intended to clarify the request in the letter of July 9, 1987 as was discussed by Ms. Joy Marshall, Mr. Jack Whitten, and Mr. Joe Liuzza in the telephone conversation of July 30, 1987.

The Materials Bureau of the Montana Department of Highways requests authorization to possess the two calibration sources described in the letter of July 9, 1987. With this authorization in hand we will purchase the sources. The remainder of the July 9th letter describes our intentions but contains no further amendment requests. A chronological outline of the action we will take after we purchase the sources is as follows: obtain training in the proper use of the equipment, design a testing method in accordance with NRC regulation, file an appropriate application for amendment to license #25-11498-01 requesting authorization to perform our own wipe test assays, commence wipe test assaying after authorization is granted.

I hope this discussion clarifies our position. I would appreciate prompt action on our request.

Robert T. Rask

ROBERT T. RASK, CHIEF
MATERIALS BUREAU

RTR:JPL:cm:4/CC

cc: R. T. Rask
Steve Herzog
Boyd Bomar
Joe Liuzza

Copy sent to DCS

DEPARTMENT OF HIGHWAYS

TED SCHWINDEN, GOVERNOR

2701 PROSPECT

STATE OF MONTANA

HELENA, MONTANA 59620

July 9, 1987

Mr. Jerry Everett, Chief
Material Radiation Protection Section
U.S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, TX 76011

REQUEST FOR PERMISSION TO POSSESS SEALED SOURCES

NRC LICENSE #25-11498-01

The Materials Bureau of the Montana Department of Highways is in the process of acquiring wipe-test assay equipment from Ludlum Instruments. Until last month, the assays had been performed by Mr. Larry Lloyd, Chief of the Occupational Health Bureau, Montana Department of Health and Environmental Sciences. Beginning in July and continuing until we are equipped and certified to perform our own assays, the Troxler Electronic Laboratories shall perform the assays for us.

Our equipment will be calibrated by two sealed sources manufactured by TMA/Eberline - one of CS 137, Model #CS7B Special, and one of AM 241, Model #DNS5 Special. Neither of these sources shall exceed 5 micro Curies in total activity. Each shall be in disc form, electroplated, and approximately 1 inch in diameter. The Materials Bureau hereby requests written authorization to possess these sources so that we may allow TMA/Eberline to ship them to us. These sources shall be handled and stored according to the provisions of license #25-11498-01.

When the equipment and sources have arrived, Mr. Larry Lloyd will present an 8-hour course on wipe-test assay to Mr. Joseph Liuzza and Mr. Boyd Bomar. Topics covered will be set-up, calibration, operation, activity calculations,

Copy sent to DCS

and quality assurance. We will also discuss record keeping and reporting procedures. Immediately thereafter an application for amendment to our NRC license will be filed in which we will request authorization to perform our own wipe-test assays. Included in the application will be a description of the equipment, calibration sources, and all pertinent specifications, a step-by-step procedure for performing the assays, sample calculations for converting our data to microcuries of activity, and the names and qualifications of those who will perform the assays. Those named to perform the tests shall be experienced in making quantitative measurements and documentation to that effect will be provided.

Robert T. Rask

ROBERT T. RASK, CHIEF
MATERIALS BUREAU

RTR:JPL:lrk:1:vv

cc: R. T. Rask
S. L. Herzog
J. P. Liuzza

DEPARTMENT OF HIGHWAYS

TED SCHWINDEN, GOVERNOR

2701 PROSPECT

STATE OF MONTANA

HELENA, MONTANA 59620

RECEIVED
JUL - 7 1987

June 30, 1987

RECEIVED

'87 JUL -9 A8:33

U.S.N.R.C.
LIC FEE MGMT BRANCH

Mr. Jerry Everett, Chief
Material Radiation Protection Section
U.S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, TX 76011

REQUEST FOR AMENDMENT TO NRC LICENSE

The Materials Bureau of the Montana Department of Highways operates and maintains nuclear moisture/density and asphalt content gauges under the provisions of NRC license #25-11498-01.

Please review the attached record of education and training of Mr. Joseph P. Liuzza and rule on the following amendment requests:

a. That Mr. Liuzza be certified to instruct field personnel of the Montana Department of Highways in the principles of radiation safety and theory and in the use of nuclear moisture/density and asphalt content gauges.

b. That Mr. Liuzza may issue certificates to field personnel who have successfully completed his course of instruction, thereby authorizing them to use nuclear moisture/density and asphalt content gauges.

c. That Mr. Liuzza be allowed to perform wipe-tests on the sources listed on license #25-11498-01.

d. That Mr. Liuzza be authorized to provide any or all of the 80 hours of instruction the NRC requires of an individual who is seeking certification as a radiation safety instructor.

FEE EXEMPT

Date 7/5/87
Log Jul-3-IV
By
7/8/87

120. n(a)(5) - State Copy sent to DCS

461576

e. That Mr. Liuzza be authorized to perform maintenance or repair of portable devices as described in item 15 of Amendment No. 12. He will follow the procedures stipulated in the letter of June 26, 1978, page 3, paragraphs 1 and 7, and the letter of August 17, 1978.

As the Radiation Safety Officer, I have thoroughly discussed radiation safety and nuclear gauge repair with Mr. Liuzza. Note that he has recently completed an 8-hour radiation safety & training course by a licensed instructor. He is also working side by side with an employee (Mr. Boyd Bomar) who has over 15 years experience in the radiation safety, maintenance and repair of these gauges. I am confident that with his education and background he meets the qualifications to perform the tasks as listed above.

In addition, we request that the name of Mr. Richard L. Vimpany, who is no longer an employee of the Montana Department of Highways, be disregarded in the reading of the documents listed in item 18 of Amendment No. 12.

I would appreciate action as soon as possible.

Robert T. Rask

ROBERT T. RASK, CHIEF
MATERIALS BUREAU

RTR:JPL:lrk:1:pp:

cc: R. T. Rask
S. L. Herzog
J. P. Liuzza

461576

JOSEPH P. LIUZZA

RECORD OF RADIATION TRAINING AND EXPERIENCE

TRAINING

DATE	COURSE OF STUDY	TOPICS COVERED	# APPLICABLE CONTACT HOURS
July 1977	Schlumberger Radiation Safety New Orleans, Louisiana Instructor: RSO	Radiation theory, safety, handling and transportation, emergency procedures. Use of radioactive materials in oil well logging.	8
June 1987	Montana State University RTAP Bozeman, Montana Instructor: Mr. Alan Jackson	Radiation theory, safety, handling and transportation, emergency procedures. Use of radioactive gauges in construction.	8

FORMAL EDUCATION, UNDERGRADUATE, UNIVERSITY OF NEW ORLEANS

September 1970	Modern Physics with Lab	Compton scattering, photoelectric effect, quantum concepts.	15
January 1971	Electrical Measurements	Oscilloscope, power supplies instrumentation.	6
June 1971	Quantum Mechanics	Scattering, electromagnetic waves and particles, cross section, absorption and emission.	15
September 1971	Atomic Physics	Spectra, periodic system, radioactivity, relativity, atomic models, x-rays.	15
January 1972	Nuclear Physics	Nuclear properties, nucleon scattering, radiation detection, radiation statistics, gamma transitions, alpha and beta decay.	30

12-SI-7/7

FORMAL EDUCATION, GRADUATE, UNIVERSITY OF NEW ORLEANS

January 1974	Quantum Theory	Advanced treatment of previously mentioned topics.	15
June 1974	ADV Quantum Theory	Advanced treatment of previously mentioned topics.	15
September 1974	Nuclear and Particle Physics	Spectroscopy, accelerators, resonance, leptons, baryons, meson theory.	15

FORMAL EDUCATION, GRADUATE, MONTANA STATE UNIVERSITY

September 1975	Relativity	High Energy Particles	5
September 1975	ADV Quantum Theory	Advanced Topics	15
January 1976	Atomic and Molecture Structure	Advanced Topics	15
January 1977	Statistical Mechanics	Statistical Treatment of particles	5
			182

RELATED EXPERIENCE

Physics Graduate Teaching Associate, University of New Orleans, 1973 - 1975 and at Montana State University, 1975 - 1977. Instructed students in principles of quantum theory, atomic and nuclear theory, operation of electronic instruments.

Field Engineer, Schlumberger Offshore Services, New Orleans, 1977 - 1979. Operated nuclear density and porosity tools, detectors, and associated electronics for oil well logging operations.

Physics Instructor, Carroll College, Helena, Montana, 1984-1986. Instructed students in electromagnetic theory, electrical engineering and electronics.

Master of Science degrees in Physics and Applied Mathematics.

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