ANACONDA Minerals Company
P.O. Box 689
Butte, Montana 59703
Telephone 406-723-4311

585-5011 FTS

April 30, 1984

U.S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 1000
Arlington, TX 76011

Attention Mr. Jack Whitten

Dear Mr. Whitten:

As per our recent conversations, I would like to amend our license to include the following:

A. Qualify myself as an instructor for conducting a Radiation Safety Training class. This would serve a two-fold purpose:

a. Promote a general awareness of our Radiation Safety Program.

b. Serve as a training course for license applicants in the future.

Please note the following attachments:

1. Qualifications
2. Outline of Training Program
3. Duration of Training
4. Method of Determining Competency
5. Possible Training Aids

The time interval shown in the course outline covers three days of training. This would be the minimum. With added training aids and good class participation, we may find a five-day course more satisfactory.

I anticipate two levels of training:

a. General Knowledge - for management, supervisors, or hourly persons.

b. Detailed Course - for persons directly involved with our radiation program (electronic technicians and safety engineers). This would require more training in the field and experience to qualify for licensing.

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25-09138-01
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Since this is a new program for our company, I would welcome suggestions and constructive criticism on your part to make this a rewarding effort.

B. I would also like to amend our present license to allow, under my supervision, those non-routine functions such as installation, relocation, and removal from service.

Our use of nuclear devices is limited to sealed source units with locking shutter devices used to measure pipeline density or level, and seldom require any changes. It would be much more flexible to make minor changes without hiring an outside firm.

At present, unused gauges remain installed rather than in storage and new applications are often avoided due to cost and time considerations.

Please see the following attachment:

Attachment VI

6. Installation Procedure
7. Relocation Procedure
8. Removal from Service Procedure

Sincerely,

Ivan L. Markland

Ivan L. Markland

enclosure

CERTIFICATION:

I certify that the attached application contains information which is true and correct to the best of my knowledge and belief.

James R. Tindorf

Manager - Health, Safety and Environment
Montana Operations

ATTACHMENT I

QUALIFICATIONS

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Attachment #1

BOX 9267, AUSTIN, TEXAS 78766-9990 USA. (512) 836-0801. TELEX 77-6413

TEXAS NUCLEAR
A SUBSIDIARY OF RAMSEY ENGINEERING

LETTER OF CERTIFICATION

This is to certify that

Ivan Markland
Anaconda Minerals

has attended and successfully completed a course of instruction, conducted under the auspices of Texas Nuclear Corporation and described in the attached Course Agenda. The course covers fundamentals of radiation, units of dose and quality of radiation fields, hazards of radiation exposure, detection devices, regulatory controls, industrial devices and specific training on installation and leak testing of Texas Nuclear density, level and weigh gauges.

The said course of instruction, together with prior experience, is structured to qualify persons who complete it to understand and safely perform various operations involving nuclear devices including the installation, relocation and leak testing of such equipment. The operations are to be done in accordance with the rules and regulations of the United States Nuclear Regulatory Commission and/or "Agreement States", and are in all respects subject to such rules and regulations.

This letter cannot be used in lieu of a specific license from or other sanction by an appropriate regulatory agency.

TEXAS NUCLEAR CORPORATION

W. Hendrick

W. G. Hendrick
Health Physicist

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Certificate Of Training

This is to certify that

IVAN L. MARKLAND

Has Successfully Completed a Radiation Safety Training Course presented by Texas Nuclear Corporation.

TEXAS NUCLEAR
A SUBSIDIARY OF RAMSEY ENGINEERING

Issued 12th Day Of March 1984

L. D. Hendrick
Health Physicist

Tom Brudevold
President

RECORD OF PERFORMANCE

Ivan Markland

Quiz I	Quiz II	Exam	Final Grade
96	98	92	93

Class Average - 89

ATTACHMENT I

16. FORMAL TRAINING IN RADIATION SAFETY

Training and Experience of Ivan Markland

Mr. Markland is Maintenance Superintendent of the Butte Concentrator, Anaconda Minerals Company, Butte, Montana. He also has served as Radiation Protection Officer for Butte Operations since 1965.

He is trained and experienced in the following practices:

A. Principles and practices of radiation protection.

B. Radioactivity measurement standardization and monitoring techniques and instruments.

C. Mathematics and calculations basic to the use and measurement of radioactivity.

D. Biological effect of radiation.

Mr. Markland attended a two-week course presented by the U.S. Air Force in 1954 while stationed at Patrick Air Force, Cape Canaveral, Florida;

A one-week course at the University of Montana 1971, presented by the U.S. Department of Health Education and Welfare. Guest speakers were:

1. Dr. Vincent P. Collins
   CMEF, Radiology Department
   Baylor University School of Medicine
   Houston, Texas

2. Hamilton Johnson LTC USAF
   Staff Bioenvironmental Engineer
   Headquarters 15th AF SAC
   March ARB, California

A three-day refresher course presented by Texas Nuclear, 1979.

A refresher course is planned for 1984.

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17. EXPERIENCE

Ivan Markland

Strontium 90	500 millicurie Sealed Source	18 yrs	Density Gauge
Cobalt 60	100 millicurie 50 millicurie Sealed Sources	18 yrs	level indications
Cesium 137	100 millicurie Sealed Sources	5 yrs	Conveyor Scales
Cesium 137	20 millicurie 10 millicurie	18 yrs	Density gauges
Cesium 137	2 curie Sealed Sources	6 yrs	Level Indication
Cesium 137	3 curie Sealed Sources	11 yrs	Level Indication
Cesium 137	1 curie Sealed Sources	12 yrs	Level Indication
Cesium 137	50 millicurie Sealed Source	18 yrs	Density Gauge
Cesium 137	200 millicurie Sealed Source	4 yrs	Density Gauge

ATTACHMENT II

COURSE OUTLINE

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ATTACHMENT II

Radiation Safety Training Course

First Day's Session

8:00 a.m. to 9:00 a.m.

1. Introduction
    a. Purpose of Course
    b. Contents

9:00 a.m. to 11:30 a.m.

2. Principles and Practices of Radiation Protection
    a. The Atomic Structure
    b. Isotopes
    c. Forces of the Atom
    d. Radioactivity
    e. Types of Radiation
    f. Radiation Emission
    g. Radioactive Decay
    h. Particle or Proton Energy Levels
    i. Penetrating Abilities of Radiation

12:30 p.m. to 4:00 p.m.

3. Radioactivity Measurement Standardization
    a. Terms and Definitions
        1. Dose
        2. Roentgen
        3. Rad
        4. Rem
        5. Quality Factor
        6. Curie
4. Instruments and Monitoring
    a. Instruments
        1. Ion Chamber
        2. Proportional Detector
        3. Geiger-Mueller
        4. Scintellation Detectors

b. Monitoring-Personnel Disimetry

1. Film Badges
2. Pocket Dosimeters
3. Whole Body Counters
4. TLD's (Thermoluminecent Dosimeters)

Second Day's Session

8:00 a.m. to 11:30 a.m.

1. Mathematics and Calculations Basic to the Use and Measurement of Radioactivity
   a. Absorbed Dose
   b. Radiation Field Intensity
   c. Protection from External Radiation
      1. Time
      2. Distance
      3. Shielding
2. Biological Effects of Radiation
   a. Short-Term Exposure Effects
   b. Radiation Damage
      1. Somatic
      2. Hereditary
   c. Radiation Injury
      1. Acute Radiation Syndrome (CNS)
      2. Gastrointestinal (GI)
      3. Bone Marrow
   d. Biological Effects at Various Dose Rates

12:30 p.m. to 4:30 p.m.

   e. Permissible Dose Rates
   f. Radiation from Natural Sources

3. NRC Regulations and Licensing
   a. Agreement States
   b. NRC
   c. Licenses
      1. General
      2. Specific
   d. Scheduled Wipe Tests and Surveys

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e. Restricted Areas and Posting

f. Personnel Monitoring

g. Record Keeping Requirements

h. Accidents or Unusual Occurences

1. Immediate Notification

2. 24-Hour Notification

4. Waste Disposal and Shipping Regulations

a. Waste Disposal

b. Shipping Regulations

1. CFR Regulations

Third Day's Session

8:00 a.m. to 10:00 a.m. - Field Trip to Concentrator

1. Use of Portable Survey Meters

2. Wipe Tests

10:00 a.m. to 11:30 a.m.

1. Review - Questions and Answers

12:30 p.m - Test

ATTACHMENT III

COURSE TIME DURATION

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ATTACHMENT III

Course Time Duration

1. General Knowledge - Minimum three-day course with added time depending upon training aids used and time required in the field to satisfactorily cover on-hand training.

2. More Detailed Course for Licensing - Minimum five-day course with additional in-field training. Extensive training would be given one individual to provide for a backup Radiation Safety Officer.

Time shown on the course outline is a minimum schedule until some experience is gained in this course.

We would anticipate using this course as a scheduled refresher for future licensed personnel.

ATTACHMENT IV

METHOD OF DETERMINING COMPETENCY

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AMMENDMENT IV

Final Test

TRUE OR FALSE

1. Electrons are normally found in the nucleus. T___ F___

2. The sum of neutrons and protons is the atomic weight. T___ F___

3. The roentgen (R) is a unit used to measure gamma or x-ray radiation only. T___ F___

4. Beta particles are more easily stopped than alpha particles because of their smaller mass and charge. T___ F___

5. The hands and feet can tolerate a larger radiation dose than the flood-forming organs. T___ F___

6. The quantity of an isotope that will make up 1 curie depends on the half-life of the isotope. T___ F___

7. Specific ionization refers to the number of ion pairs formed per unit path length. T___ F___

8. All atoms have unstable nuclei. T___ F___

9. Alpha-particle radiation causes little external damage but can be a serious internal hazard. T___ F___

10. It is possible for a G-M tube to become non-responsive in a high radiation area. T___ F___

11. Match the following:

1. Curie	A. Quality Factor
2. QF	B. Radiation Measurement Unit
3. Compton Effect	C. Gamma In, Electron Out - Reduced energy gamma photon
4. Atom	D. 3.7×10^{10} disintergrations/sec
5. Rad	E. Fundamental building block of chemical elements

MULTIPLE CHOICE

12. A G-M survey meter will not detect:

Beta radiation ____

Gamma radiation ____

Alpha radiation ____

13. One of the 103 known chemical substances that cannot be divided into simpler substances by chemical means is:

    Electron ____

    Element ____

    Ion ____

14. Which of the following radiations are the most penetrating?

    Beta ____

    Gamma ____

    Alpha ____

15. Which is the least penetrating?

    Beta ____

    Gamma ____

    Alpha ____

16. Assume the following:

Radiation Type	QF
Fast Neutron	10
Thermal Neutron	3
Gamma	1

    Calculate the following:

    a. The effect of a thermal-neutron dose of 50 mrads.

    b. Combined effect of 200 mr of gamma radiation and 5 mrads of fast neutron radiation.

17. Given the following:

    Radiation level three feet from a 1 curie source.

    Co^{60} - 1.59 r/hr
    Cs^{137} - .43 r/hr

    $$R_2 = R_1 \frac{(d1)^2}{(d2)}$$

    a. What would the level be at 6'(ft) from a 1 curie Co^{60} source _____ at 1 foot _____

    b. What would the level be at 9' (ft) from a 1 curie Cs^{137} source _____

18. Draw the radiation symbol showing colors.

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19. If ½" of lead is the half value layer of shielding for a specific gamma source, with a surface reading of 1000 mr/hr, how many layers will be required to reduce the level below 30 mr/hr?

20. When can individual exposure records be disposed of?

21. A high radiation area is one which an individual could receive a dose in excess of ____mr in one hour to a major portion of the body.

22. A satisfactory leakage test must not exceed _____ microcuries.

23. If a source unit is lost or stolen, notification must be made _____.

24. The two types of licenses issued by the NRC are _____ and _____.

25. Name two types of individual monitoring devices (exposure) _____ _____ and _____.

TEST ANSWERS AND GRADE POINTS

True or False

1.	F	6.	T	
2.	T	7.	T	
3.	T	8.	F	2 x 10 = 20 points
4.	F	9.	T	
5.	T	10.	T	

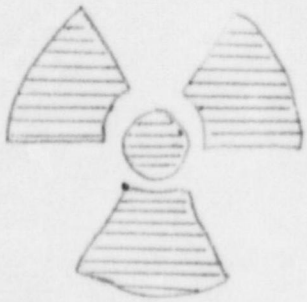
11. Match

    1. D
    2. A
    3. C — 2 x 5 = 10 points
    4. E
    5. B

12. Alpha Radiation
13. Element — 3 x 4 = 12 points
14. Gamma
15. Alpha

16. a. 398 mr/hr — 2 x 5 = 10 points
    b. 14.3 r/hr

17. a. 5 mr/hr — 1 x 8 = 8 points

18. 

Background yellow

Cross-hatched area - magenta or purple

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19. Six layers.

20. When so advised by an NRC inspector.

21. 100 mr.

22. .005 microcuries.

23. Immediately.

24. Specific and general.

25. Film badges, dosimeters or TLD's.

8 x 5 = 40 points

TOTAL =100 points

Passing - 75 points or higher.

ATTACHMENT V

POSSIBLE TRAINING AIDS

60277

ANACONDA Minerals Company
P.O. Box 689
Butte, Montana 59703
Telephone 406-723-4311

April 24, 1984

Mr. L. L. Lloyd
Dept. of Health and
Environment Sciences
State of Montana
Cogswell Building
Helena, Montana 59620

Dear Sir:

The following videotapes would be a valuable training aid for our Radiation Safety Course as discussed.

1. No. 7070 Wycoff-Sem-S.I. Units for Ionizing Radiation
2. No. 7021A Barnett-Biological Effects of Ionizing Radiation I
3. No. 7021B Barnett-Biological Effects of Ionizing Radiation II
4. No. 7021C Barnett-Biological Effects of Ionizing Radiation III
5. No. 7021D Barnett-Biological Effects of Ionizing Radiation IV
6. No. 7084 Movie - M-67 Practice of Radiological Safety
7. No. 7013 Movie - M-45 Man & Radiation
8. No. 7085 Movie - M-37 Interaction of Radiation with Matter
9. Movie - M-96 Radiological Safety-Understanding the Atom

If any or all of these films are available, I would appreciate the use of them for this training.

Thank you.

Sincerely,

IVAN L. MARKLAND
Radiation Safety Officer
Anaconda Minerals

ILM/ces

DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

OCCUPATIONAL HEALTH BUREAU

TED SCHWINDEN, GOVERNOR

COGSWELL BUILDING

STATE OF MONTANA

(406) 444-3671

HELENA, MONTANA 59620

April 25, 1984

Bobby L. Dillard (HFR-89)
DHHS, PHS, FDA
Room 500, U.S. Customhouse
721 19th Street
Denver, Colorado 80202

Dear Bob:

The Anaconda Minerals Company is planning a radiation safety training class for employees working with licensed materials. Ivan Markland, the Anaconda Company Radiation Safety Officer, has asked if I can have the following videotapes available for their use between July 1 and August 1:

1. No. 7070 Wycoff-Sem-S.I. Units for Ionizing Radiation
2. No. 7021A Barnett-Biological Effects of Ionizing Radiation I
3. No. 7021B Barnett-Biological Effects of Ionizing Radiation II
4. No. 7021C Barnett-Biological Effects of Ionizing Radiation III
5. No. 7021D Barnett-Biological Effects of Ionizing Radiation IV
6. No. 7084 Movie - M-67 Practice of Radiological Safety
7. No. 7013 Movie - M-45 Man & Radiation
8. No. 7085 Movie - M-37 Interaction of Radiation with Matter
9. Movie - M-96 Radiological Safety Understanding the Atom

I will appreciate your help in obtaining these videotapes for the time period requested. Thank you.

Sincerely,

Larry L. Lloyd

Larry L. Lloyd
Chief

LLL:kh

cc: Ivan Markland

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ATTACHMENT VI

INSTALLATION PROCEDURE

ATTACHMENT VI

Installation Procedure

6a. New Units

Normally, as Radiation Safety Officer, I am aware of any plans to purchase nuclear gauges prior to contacting the manufacturer in regard to license requirements, etc.

Communications begin with specifications, pricing, delivery dates, and license requirements.

When these requirements have been met by both the buyer and supplier, I would be notified of shipment and receive the following:

1. Receipt of transfer - for files
2. Original source wipe - for files
3. Keys to shutter mechanism

I would be notified upon arrival and supervise the unloading in a secured but non-occupied area of our warehouse.

Wearing a personal monitor and using a functional survey meter, I would then make an initial survey to confirm radiation levels as per shipping labels. If a significant difference is noted, the area would be secured and the manufacturer notified (+50%).

If readings are normal, a complete inspection would be made by removing the crate and checking for any physical damage and radiation levels. Shutter checked for closed, locked position, etc. If all appears normal, a wipe test would be made and sent to be analyzed.

I would upon receipt of the wipe test results then supervise the installation. Once installed, a record would be made as to the radiation levels in that position and determine if additional shielding or posting is required. All files would then be updated as per NRC requirements. (Does not exceed 5 mr/hr @ 12" from source container.)

6b. Installation of Units from Storage

The same precautions would be taken as installation of a new unit.

1. Survey of the unit will be taken. Check shutter is closed and in locked position.
2. Upon receipt of wipe test results (.005 microcurie or less), I would personally supervise the movement and installation.

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4. Once in position, a new survey would be taken for our records and posting requirements.

5. All records will be updated.

7&8c. Removal from Service or Relocation

I personally would supervise the closing and locking of the shutter and survey the unit. I would then supervise the movement or storage of the unit.

7&8d. At no time would any work on a source holder be attempted. Any problems in this area would be referred to the manufacturer.