NRC FORM 374
(10-89)

U.S. NUCLEAR REGULATORY COMMISSION

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 39, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Flow Technology	3. License number 25-27563-01
2. 5935 Blaze Mountain Drive Belgrade, Montana 59714	4. Expiration date May 31, 2007
	5. Docket or Reference No 030-34456

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Cesium-137	A. Sealed sources registered either with NRC under 10 CFR 32.210 or with an Agreement State and incorporated in a compatible gauging device as specified in Item 9 of this license	A. See Condition 9.A.
B. Americium-241	B. Sealed sources registered either with NRC under 10 CFR 32.210 or with an Agreement State and incorporated in a compatible gauging device as specified in Item 9 of this license	B. See Condition 9.B.

9. Authorized use

A., B., and C. To be used, for measurement purposes, in compatible portable **Boart Longyear Company (formerly Campbell Pacific Nuclear Company), Humboldt Scientific, Inc., Seaman Nuclear Corporation and/or Troxler Electronic Laboratories, Inc.** gauging devices that have been registered either with NRC under 10 CFR 32.210 or with an Agreement State and have been distributed in accordance with an NRC or Agreement State specific license authorizing distribution to persons specifically authorized by an NRC or Agreement State license to receive, possess, and use the devices.

180282

9706190059 970516
PDR ADOCK 03034456
C PDR

ML40

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number 25-27563-01

Docket or Reference Number 030-34456

CONDITIONS

10. Licensed material may be used at the licensee's facilities located at 1215 Apple's Way, Belgrade, Montana, and may be used at temporary job sites of the licensee anywhere in the United States where the U.S. Nuclear Regulatory Commission maintains jurisdiction for regulating the use of licensed material.

11. A. Licensed material shall only be used by, or under the supervision and in the physical presence of, the Radiation Safety Officer or individuals who have successfully completed the manufacturer's training program for gauge users, have received copies of, and training in, the licensee's operating and emergency procedures, and have been designated by the Radiation Safety Officer.

B. The Radiation Safety Officer for this license is Patrick L. Redmond.

12. A. Sealed sources and detector cells shall be tested for leakage and/or contamination at intervals not to exceed 6 months or at such other intervals as specified by the certificate of registration referred to in 10 CFR 32.210 or by an Agreement State.

B. Notwithstanding Paragraph A of this Condition, sealed sources designed to emit alpha particles shall be tested for leakage and/or contamination at intervals not to exceed 3 months.

C. In the absence of a certificate from a transferor indicating that a leak test has been made within 6 months prior to the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.

D. Sealed sources need not be leak tested if:

(i) they contain only hydrogen-3; or

(ii) they contain only a radioactive gas; or

(iii) the half-life of the isotope is 30 days or less; or

(iv) they contain not more than 100 microcuries of beta and/or gamma emitting material or not more than 10 microcuries of alpha emitting material; or

Printed on recycled paper

12. (Continued)

(v) they are not designed to emit alpha particles, are in storage, and are not being used. However, when they are removed from storage for use or transferred to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source or detector cell shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.

E. The leak test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. If the test reveals the presence of 0.005 microcurie or more of removable contamination, a report shall be filed with the U.S. Nuclear Regulatory Commission in accordance with 10 CFR 30.50(b)(2), and the source shall be removed immediately from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. The report shall be filed within 5 days of the date the leak test result is known with the U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011, ATTN: Director, Division of Nuclear Materials Safety. The report shall specify the source involved, the test results, and corrective action taken.

F The licensee is authorized to collect leak test samples for analysis by Troxler Electronics or Boart Longyear (CPN). Alternatively, tests for leakage and/or contamination may be performed by persons specifically licensed by the Commission or an Agreement State to perform such services.

13. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from source holders by the licensee.

14. The licensee shall conduct a physical inventory every 6 months to account for all sources and/or devices received and possessed under the license.

15. Each portable gauge shall have a lock or outer locked container designed to prevent unauthorized or accidental removal of the sealed source from its shielded position. The gauge or its container must be locked when in transport, storage, or when not under the direct surveillance of an authorized user.

16. Except for maintaining labeling as required by 10 CFR Part 20 or 71, the licensee shall obtain authorization from NRC before making any changes in the sealed source, device, or source-device combination that would alter the description or specifications as indicated in the respective Certificates of Registration issued either by the Commission pursuant to 10 CFR 32.210 or by an Agreement State.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number 25-27563-01

Docket or Reference Number 030-34456

17. Any cleaning, maintenance, or repair of the gauges that requires removal of the source rod shall be performed only by the manufacturer or by other persons specifically licensed by the Commission or an Agreement State to perform such services.

18. The licensee is authorized to transport licensed material only in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."

19. The licensee shall not use sealed sources or probes containing sealed sources at depths exceeding 3 feet below the surface.

20. In addition to the possession limits in Item 8, the licensee shall further restrict the possession of licensed material to quantities below the minimum limit specified in 10 CFR 30.35(d) for establishing decommissioning financial assurance.

21. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

A. Application dated May 5, 1997
B. Facsimile of letter May 16, 1997

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date MAY 16 1997

By Billie Gruszynski

Billie Gruszynski (Ms.)
Nuclear Materials Licensing Branch
Region IV
Arlington, Texas 76011

Printed on recycled paper

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

May 16, 1997

Flow Technology
ATTN: Patrick L. Redmond
Radiation Safety Officer
5935 Blaze Mountain Drive
Belgrade, Montana 59714

SUBJECT: NEW LICENSE

Please find enclosed License No. 25-27563-01. You should review this license carefully and be sure that you understand all conditions. If you have any questions, you may contact the reviewer who signed your license at (817)860-8120
You should note that License Condition 20 has been included relative to the maximum amount of material you may possess under the license. This licensing action was necessary to preclude you from exceeding possession limits of materials requiring that decommissioning financial assurance be provided. Should you determine that you require possession of material in excess of 10 CFR 30.35(d) amounts, please notify us regarding an amendment to your license.

NRC expects licensees to conduct their programs with meticulous attention to detail and a high standard of compliance. Because of the serious consequences to employees and the public which can result from failure to comply with NRC requirements, you must conduct your program involving radioactive materials in accordance with the conditions of your NRC license, representations made in your license application, and NRC regulations. In particular, note that you must:

1. Operate in accordance with NRC regulations 10 CFR Part 19, "Notices, Instructions and Reports to Workers: Inspection and Investigations," 10 CFR Part 20, "Standards for Protection Against Radiation," and other applicable regulations.

2. Possess radioactive material only in the quantity and form indicated in your license.

3. Use radioactive material only for the purpose(s) indicated in your license.

4. Notify NRC in writing of any change in mailing address (no fee required if the location of radioactive material remains the same).

5. Request and obtain written NRC consent before transferring your license or any right thereunder, either voluntarily or involuntarily, directly or indirectly, through transfer of control of your license to any person or entity. A transfer of control of your license includes not only a total change of ownership, but also a change in the controlling interest in your company whether it is a corporation, partnership, or other entity. In addition, appropriate license amendments must be requested and obtained for any other planned changes in your facility or program that are contrary to your license or contrary to representations made in your license application, as well as supplemental correspondence thereto, which are incorporated into your license. A license fee may be charged for the amendments if you are not in a fee-exempt category.

6. Maintain in a single document decommissioning records that have been certified for completeness and accuracy listing all the following items applicable to the license:

   - Onsite areas designated or formerly designated as restricted areas as defined in 10 CFR 20.3(a)(14) or 20.1003.

   - Onsite areas, other than restricted areas, where radioactive materials in quantities greater than amounts listed in Appendix C to 10 CFR 20.1001-20.2401 have been used, possessed, or stored.

   - Onsite areas, other than restricted areas, where spills or other unusual occurrences involving the spread of contamination in and around the facility, equipment, or site have occurred that required reporting pursuant to 10 CFR 30.50(b)(1) or (b)(4), including areas where subsequent cleanup procedures have removed the contamination.

   - Specific locations and radionuclide contents of previous and current burial areas within the site, excluding radioactive material with half-lives of 10 days or less, depleted uranium used only for shielding or as penetrators in unused munitions, or sealed sources authorized for use at temporary job sites.

   - Location and description of all contaminated equipment involved in licensed operations that is to remain onsite after license termination.

7. Submit a complete renewal application with proper fee, or termination request at least 30 days before the expiration date on your license. You will receive a reminder notice approximately 90 days before the expiration date. Possession of radioactive material after your license expires is a violation of NRC regulations.

8. Request termination of your license if you plan to permanently discontinue activities involving radioactive material.

You will be periodically inspected by NRC. Failure to conduct your program in accordance with NRC regulations, license conditions, and representations made in your license application and supplemental correspondence with NRC will result in enforcement action against you. This could include issuance of a notice of violation; imposition of a civil penalty; or an order suspending, modifying, or revoking your license as specified in the "General Statement of Policy and Procedure for NRC Enforcement Actions" (Enforcement Policy), 60 FR 34381, June 30, 1995.

Thank you for your cooperation.

Sincerely,

Billie Gruszynski

Billie Gruszynski (Ms.)
Nuclear Material Licensing Branch

Docket: 030-34456
License: 25-27563-01
Control: 466396

Enclosures: As stated

DOCUMENT NAME: P:\FLOWTECH.CVR

To receive copy of document, indicate in box: "C" = Copy without enclosures "E" = Copy with enclosures "N" = No copy

RIV:NMLB	N						
BGruszynski BG							
5/16/97							

OFFICIAL RECORD COPY

m/s #16

T4

FLOW TECHNOLOGY
QUALITY SOIL TESTING

May 16, 1997

Ms. Billie Gruszynski
Nuclear Materiasl Licensing Branch
611 Ryan Plaza Drive
Suite 400
Arlington, TX 76011-8064

RECEIVED
MAY 16 1997
REGION IV

RE: Response to Comments Concerning Application for a Material License
Docket: 030-34456
Control: 466396

Dear Ms. Gruszynski:

Thank you for your prompt review of my application for a Materials License to operate and store portable soil moisture/density gauges. The following responses to your comments are presented below.

Item 3:

It is my intent to use the portable moisture-density gauges at temporary job sites within the jurisdiction of the NRC. Your office will be contacted prior to using these gauges in any state other than Montana. If using the gauges in any state which is not under the jurisdiction of the NRC the appropriate officials with the state in question will be contacted to obtain reciprocity or to satisfy the requirements of the specific state. need not

Item 6:

No source will be used at a depth greater than 3 feet. The maximum depth anticipated for use will be 18-inches.

Item concerning Items 8.1 and 8.2 of Draft Regulatory Guide DG-0008

The Radiatin Safety Plan has been modified to reflect wording that training records for employees will be maintained for a period of three years after the emplyee terminates employment. Refresher classes will be required annually and will include "dry runs", updates and refresher discussions on DOT requirements or rule changes, changes to the licensing agreement or new NRC regulations, and deficiencies identified in the annual audits. Records of all refresher training classes will be maintained and will include the date of the training, identity of the insturctor, list of attndees, and a summary of the topics covered. These records will be kept for at least three years.

Item 9:

The location where the gauge is to be stored is an existing room which can be locked. However the cabinet below the existing counter will consist of a welded metal cubicle with a locking front door that will be built when a License is granted. The purpose of the welded steel cabinet is to prevent the possibility of theft if the building should be broken into. The room is used intermittently for laboratory testing but is not a permanent work station. All required signage will be posted on the door to the room. While at work sites the gauge will be chained and locked into the back of my vehicle while not in use. The gauge will be covered to prevent its being an attractive nuisance. At night the gauge will be locked in the hotel room in its protective case to prevent theft from the auto.

Office : 5935 Blaze Mountain Drive • Belgrade, Montana 59714 • (406) 388-4062
Lab: 1215 Apple's Way • Belgrade, Montana 59714 • (406) 388-0105

466396

Item 10.2 of the Draft Regulatory Guide DG-0008

I have arranged to use the survey meter of a local engineering firm (Pioneer Technical Services, Inc.) with whom I work frequently. This gauge will be available for my use in case of an accident at a jobsite. This meter is a Technical Associates Contamination Meter Model TBM-3S. This meter is capable of reading 0.01 mRem/Hr to 100 mRem/Hr.

Item 10.8 of the Draft Regulatory Guide DG-0008

Audits will be performed annually by the RSO and will include the following information and documentation procedures.

Results of Audits and all comments associated with said audits will be maintained in a three ring binder for use by all authorized users and the RSO.

Records of audits or other reviews of program content will be mainatined for a minimum of three years.

The audit will ensure that the licensee is abiding by NRC and DOT regulations and the conditions and terms of the license.

The audit will ensure that the radiation protection program is achieving occupational doses and that the gauges are leak tested as previously specified to assure that the public is exposed to doses that are ALARA. Employee records will include records of film badge exposure.

The audit will assure that all records are in order, that leak tests are up-to-date, that all materials and records are inventoried, and will assure that all users have been appoved by the RSO and have taken the required training.

All deficiencies uncovered by the annual audit will be promptly remedied. All audits will be conducted in accordance with Appendix I of Draft Regulatory Guide DG-0008.

Please feel free to contact me at your earliest convenience if there are other concerns with the application. Again, I appreciate your continued interest and timely review of this application.

Sincerely,

Patrick L. Redmond

Patrick L. Redmond, P.E.

RECEIVED
MAY 16 1997
REGION IV

(466396)

LEGAL IDENTITY QUESTIONNAIRE

The type of information re uested by this form will be helpful to Region IV in performing its regulatory responsibilities and should be sought during initial licensing and subsequent routine inspection contacts with licensees. However, licensee provision of this information is not a requirement. If the licensee cannot supply all of the indicated information, obtain as much as possible, especially for smaller businesses. Information should be obtained informally by telephone or personal contact. This form shall be completed by Region IV personnel only. It should not be sent to an applicant or licensee nor should the information requests be part of any standard correspondence format. Place the completed copy of this form in the docket file.

Current Full Legal Name of Licensee: Flow Technology

Previous Legal Name: None

License No. _____

Licensee Contact and Title: Patrick L. Redmond
Telephone: 406-388-4862

Form of business:

- ___ Individual Person
- ✓ Sole Proprietorship Patrick L. Redmond
  List Owner's Name, Home Address, and Telephone No. below
- ___ Partnership
  List Partners' Names, Home Addresses, and Tele Nos. below
- ___ Corporation
  Attach List of Names and Home Addresses for the following:
  - Corporate Officers
  - Any Principal Stock Holder
  - Members of Board of Directors
- ___ Other (Provide detailed information below)

Billie Grusynski
NRC Staff Member

5/15/97
Date

****

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

May 15, 1997

Flow Technology
ATTN: Patrick L. Redmond, P.E.
Geotechnical Engineer
5935 Blaze Mountain Drive
Belgrade, Montana 59714

SUBJECT: NEW LICENSE APPLICATION DEFICIENCIES

We have reviewed your application dated May 5, 1997, requesting a byproduct materials license for the use of portable gauging devices. Before further action can be taken, we will need the following additional information.

1. Item 3 of your application did not state that you wish to include temporary job sites; however, you have addressed transportation.

   Provide assurance that you do wish to work at temporary job sites within NRC jurisdiction.

   Reference: Item 3 of DG-0008

2. Item 6 of your application did not specify whether or not you would measure to depths exceeding 3 feet.

   Should you plan to exceed depths of 3 feet, your operating and emergency procedures should address the possibility of sources becoming lodged in the hole. If you will not exceed depths of 3 feet, please so state.

   Reference: Item 6 of DG-0008

3. Your Radiation Safety Plan stated only that you would maintain records on personnel monitoring.

   Provide assurance that you will maintain training records as noted in Items 8.1 (until 3 years after individual terminates employment); and 8.2 refresher training for 3 years. There are a number of other records which must also be maintained as noted in the guide and in NRC regulations.

   Reference: Items 8.1 and 8.2 of DG-0008

4. Item 9 of your application leads me to believe that your building is under construction. It is not clear whether there is a cabinet under the bench where you plan to store the gauge. You have also indicated that the "back room can be locked when not occupied..." Is this the room where the gauge is to be stored?

If the building is under construction, please so state. Provide commitment that the room will be locked at all times when the gauge is stored and the room is unoccupied; or commit to there being a separate locked cabinet in which the gauge is stored.

Reference: Item 9 of DG-0008

5. Your application did not address radiation detection instruments.

Provide either a commitment to have an appropriate calibrated survey meter at each jobsite listing the type and range of the instrument, frequency of calibration, and describe how you will ensure that the instrument is working properly; or you may explain how you will have access to an appropriate survey meter following an incident at the jobsite. Please read the reference material carefully for the information you need to provide.

Reference: Item 10.2 of DG-0008

6. Your Radiation Safety Plan refers to the RSO ensuring that the results of audits are documented and provided to management. However, the audit information concerning the name and qualifications of the auditor, the scope and extent of the audits, frequency of the audits, and management's commitments were not addressed. I understand that at this time, the RSO and management are one and the same; however, this may not always be the case.

Provide the information requested concerning the annual audit.

Reference: Item 10.8 of DG-0008

In order to continue review of your application **(letter)**, we request that you submit your response within 30 calendar days from the date of this letter. Please reply in duplicate and

refer to the control number specified below. If you have questions or require clarification on any of the information requested above, we encourage you to contact us at (817)860-8120.

Sincerely,

Billie Gruszynski

Billie Gruszynski (Ms.)
Nuclear Materials Licensing Branch

Docket: 030-34456
Control: 466396

To receive a copy of this document, indicate in the box "C" - Copy without attachment/enclosure "E" - Copy with attachment/enclosure "N" - No Copy

OFFICE	RIV:AO:NMLB	N						
NAME	BGruszynski BG							
DATE	5/15/97							

FAX TRANSMITTAL

RECEIVED
MAY - 8 1997

TO:	Ms. BILLIE GRUSZYNSKI
COMPANY:	NRC LICENSING BRANCH
FAX NUMBER:	817-860-8263
FROM:	PATRICK REDMOND @ FLOWTECHNOLOGY
DATE:	5/8/97
PAGES INCLUDING COVER SHEET:	2

COMMENTS

TRAINING CERTIFICATE FOR MOISTURE/DENSITY GAUGE WHICH WAS LEFT OUT OF THE APPLICATION PACKET

466396

TROXLER ELECTRONIC LABORATORIES, INC.

HEREBY CERTIFIES THAT

Patrick L. Redmond

of

Vector Engineering, Inc.

HAS SUCCESSFULLY COMPLETED THE TROXLER ELECTRONIC LABORATORIES, INC. TRAINING COURSE FOR THE USE OF NUCLEAR TESTING EQUIPMENT.

SUBJECTS INCLUDED IN THIS COURSE WERE AS FOLLOWS:

Radiological Safety

1. *Principles and practices of radiation protection.*
2. *Leak testing procedures.*
3. *Mathematics and calculations basic to the use and measurement of radioactivity.*
4. *Biological effects of radiation.*
5. *Radioactivity measurement standardization and monitoring techniques and instruments.*
6. *Accident and incident procedures.*
7. *Procedures for nuclear gauge storage and transportation.*
8. *General safety precautions.*

Gauge Operation

1. *Instrument theory*
2. *Operating procedures*
3. *Maintenance*
4. *Field application*
5. *Gauge calibration*

Ben E. Edwards
INSTRUCTOR

6/12/87
DATE

W. F. Troxler
PRESIDENT

№ 18240

RECEIVED
MAY - 8 1997
REGION IV

MAY-01-97 12:44 PM FLOM TECHNOLOGY 406 388 4062

4663982

TAX ID # 460224598

Lic No 40-18000-01

Docket No 03013735

DIVISION OF ACCOUNTING AND FINANCE
REQUEST FOR REFUND TO EMPLOYEE/VENDOR

THE EMPLOYEE/VENDOR IDENTIFIED BELOW HAS OVERPAID THE NUCLEAR REGULATORY COMMISSION FOR GOODS AND/OR SERVICES PROVIDED AND IS DUE A REFUND

EMPLOYEE/VENDOR/PAYEE CODE: _____

NAME: St. Luke's Midland Regional Medical Center

ADDRESS: Attn: Dale J. Stein

ADDRESS: 305 South State Street, P.O. Box 4450

CITY: Aberdeen STATE: SD ZIP: 57402-4450

TRANS CODE: PX

TRANS TYPE: ____	FUND: ____	JOB CODE: ____	AMOUNT: $60.00
TRANS TYPE: IR	FUND: R1435	JOB CODE: INTR	AMOUNT:
TRANS TYPE: IR	FUND: R1099	JOB CODE: ADCH	AMOUNT:
TRANS TYPE: IR	FUND: R1099	JOB CODE: FINE	AMOUNT:

TOTAL REFUND AMOUNT: $60.00

COMMENTS: Overpmt Amd fee Lic 40-18000-01 CK # 086868

(limit comments to 40 characters, including spaces)

PREPARED BY: Rita Messer DATE: 5/7/97

AUTHORIZED BY: [signature] DATE: 5/7/97

ORIGINAL INV. NO: _____ DATE PAID: _____ AMOUNT: _____

REFUND ENTERED INTO COLLECT BY: _____

REFUND DETERMINED BY: _____ DATE: _____

PLEASE ATTACH APPROPRIATE SUPPORTING DOCUMENTATION

MC
AA905 AMD
May 2 ~~IT~~
CK # 086868
dated 5/1/97
in the amount of $500
466395

BETWEEN:

License Fee Management Branch, ARM
and
Regional Licensing Sections

(FOR LFMS USE)
INFORMATION FROM LTS

Program Code: 03121
Status Code: 3
Fee Category: _____
Exp. Date: 0
Fee Comments: _____
Decom Fin Assur Reqd: _____

1997 MAY -7 PM 2:16

LICENSE FEE TRANSMITTAL

A. REGION IV

1. APPLICATION ATTACHED
Applicant/Licensee: FLOW TECHNOLOGY
Received Date: 970506
Docket No: 3034456
Control No.: 466396
License No.:
Action Type: New Licensee

2. FEE ATTACHED
Amount: $550.00
Check No.: 510

3. COMMENTS

Signed Billie Gruszynski
Date 5/6/97

RECEIVED
MAY 16 1997
REGION IV

B. LICENSE FEE MANAGEMENT BRANCH (Check when milestone 03 is entered ✓)

1. Fee Category and Amount: 3P $550

2. Correct Fee Paid. Application may be processed for:
Amendment ✓
Renewal
License

3. OTHER

Signed Rita Messier
Date 5/7/97

Log May 2 IV
Remitter
Check No. 510
Amount $550
Fee Category 3P
Type of Fee Appl
Date Check Rec'd
Date Completed 5/7/97
By: Lou

FLOW TECHNOLOGY
QUALITY SOIL TESTING

May 5, 1997

RECEIVED
MAY - 6 1997
REGION IV

Ms. Billie Gruszynski
Nuclear Materials Licensing Branch
611 Ryan Plaza Drive
Suite 400
Arlington, TX 76011-8064

RE: Application for Material License

Dear Ms. Gruszynski:

Please find enclosed two copies of NRC Form 313 as well as a check in the amount of $550.00 to cover the application fee. Due to a recent requirement to provide testing on a time sensitive project anything you can do to accelerate the application process would be greatly appreciated. By the same token, if there is anything that I can do or if additional information is required, to expedite the process please feel free to let me know. I can be reached at (406) 388-4062 or (406) 388-0105.

Thank you for your timely attention to this matter.

Sincerely,

Patrick L. Redmond

Patrick L. Redmond, P.E.
Geotechnical Engineer

Office : 5935 Blaze Mountain Drive • Belgrade, Montana 59714 • (406) 388-4062
Lab: 1215 Apple's Way • Belgrade, Montana 59714 • (406) 388-0105

4 6 6 3 9 8

NRC FORM 313 (10-94)
10 CFR 30, 32, 33, 34, 35, 36, 39 and 40

U. S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR MATERIAL LICENSE

APPROVED BY OMB: NO. 3150-0120
EXPIRES 6-30-96

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 9 HOURS. SUBMITTAL OF THE APPLICATION IS NECESSARY TO DETERMINE THAT THE APPLICANT IS QUALIFIED AND THAT ADEQUATE PROCEDURES EXIST TO PROTECT THE PUBLIC HEALTH AND SAFETY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0120), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW.

APPLICATION FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:

DIVISION OF INDUSTRIAL AND MEDICAL NUCLEAR SAFETY
OFFICE OF NUCLEAR MATERIALS SAFETY AND SAFEGUARDS
U.S. NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20555-0001

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS:

IF YOU ARE LOCATED IN:

CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, PENNSYLVANIA, RHODE ISLAND, OR VERMONT, SEND APPLICATIONS TO:

LICENSING ASSISTANT SECTION
NUCLEAR MATERIALS SAFETY BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406-1415

ALABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA, PUERTO RICO, SOUTH CAROLINA, TENNESSEE, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO:

NUCLEAR MATERIALS LICENSING SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION II
101 MARIETTA STREET, NW, SUITE 2900
ATLANTA, GA 30323-0199

IF YOU ARE LOCATED IN:

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO:

MATERIALS LICENSING SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION III
801 WARRENVILLE RD
LISLE, IL 60532-4351

ALASKA, ARIZONA, ARKANSAS, CALIFORNIA, COLORADO, HAWAII, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEVADA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, OREGON, PACIFIC TRUST TERRITORIES, SOUTH DAKOTA, TEXAS, UTAH, WASHINGTON, OR WYOMING, SEND APPLICATIONS TO:

NUCLEAR MATERIALS LICENSING SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TX 76011-8064

PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S. NUCLEAR REGULATORY COMMISSION JURISDICTIONS.

1. THIS IS AN APPLICATION FOR *(Check appropriate item)*

- [X] A. NEW LICENSE
- [ ] B. AMENDMENT TO LICENSE NUMBER _____
- [ ] C. RENEWAL OF LICENSE NUMBER _____

2. NAME AND MAILING ADDRESS OF APPLICANT *(Include Zip code)*

Flow Technology
5935 Blaze Mountain Drive
Belgrade, MT 59714

3. ADDRESS(ES) WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED

1215 Apples Way
Belgrade, MT 59714

(ALSO FLOW TECHNOLOGY)

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

Patrick L. Redmond
406-388-4062

TELEPHONE NUMBER

SUBMIT ITEMS 5 THROUGH 11 ON 8-1/2 X 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.

5. RADIOACTIVE MATERIAL
a. Element and mass number, b. chemical and/or physical form, and c. maximum amount which will be possessed at any one time.

6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED.

7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING EXPERIENCE.

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.

9. FACILITIES AND EQUIPMENT.

10. RADIATION SAFETY PROGRAM.

11. WASTE MANAGEMENT.

12. LICENSEE FEES *(See 10 CFR 170 and Section 170.31)*

FEE CATEGORY | AMOUNT ENCLOSED $

13. CERTIFICATION. *(Must be completed by applicant)* THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT.

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35, 36, 39 AND 40, AND THAT ALL INFORMATION CONTAINED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF.

WARNING: 18 U.S.C. SECTION 1001 ACT OF JUNE 25, 1948 62 STAT. 749 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

CERTIFYING OFFICER -- TYPED/PRINTED NAME AND TITLE	SIGNATURE	DATE
Patrick L. Redmond, P.E., Geotechnical Engineer	Patrick L. Redmond	5/5/97

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	AMOUNT RECEIVED $	CHECK NUMBER	COMMENTS
APPROVED BY				DATE	

PRINTED ON RECYCLED PAPER

Item 5:

For CPN MC series moisture/density gauges:

Model	Element	Source	Maximum Amount
(1) CPN Model MC-2	Cesium 137	CPN Model 131	No single source to exceed 10 millicuries
	Americium 241/Be	Sealed Source	No single source to exceed 50 millicuries
(1) CPN Model MC-3	Cesium 137	CPN Model 131	No single source to exceed 10 millicuries
	Americium 241/Be	Sealed Source	No single source to exceed 50 millicuries
(1) CPN Model MC-3	Cesium 137	CPN Model 131	No single source to exceed 10 millicuries
	Americium 241/Be	Sealed Source	No single source to exceed 50 millicuries

For Troxler Electronic Laboratories Electronic Laboratories series moisture/density gauges

Model	Element	Source	Maximum Amount
(1) Troxler Electronic Laboratories Model 3400 Series	Cesium 137	CPN Model 131	No single source to exceed 10 millicuries
	Americium 241/Be	Sealed Source	No single source to exceed 50 millicuries

Item 6:

The sealed radioactive sources will be contained within either Campbell Pacific Nuclear (CPN) MC series or Troxler Electronic Laboratories model 3400 series moisture-density gauges and will be used to measure soil and asphalt density and moisture content for control of soils on earthwork construction projects. Gauges will be based out of the Belgrade location on 1215 Apple's Way.

Item 7:

Patrick L. Redmond will be the designated radiation safety officer for Flow Technology and his training certificate is attached. Mr. Redmond has acted as the radiation safety officer previously when employed by ESA Consultants of Bozeman, Montana and Fort Collins, Colorado. He has also worked extensively with moisture/density gauges while employed by J.M. Lambe and Associates of Anchorage, Alaska; Vector Engineering of Nevada City, California; and Welsh Engineering of Sparks, Nevada. Mr. Redmonds resume is enclosed. Mr. Redmond is currently the only employee, and the owner, of Flow Technology.

Item 8:

Before an individual will be permitted to use a gauge, the user will have successfully completed a safety course as set forth in the criteria in Part 1 of Appendix D of Policy and Guidance Directive PG 2-07. All users will receive copies of, and be trained in accordance with the Radiation Safety Plan concerning our operating and emergency procedures. A copy of the Radioactive Materials License and the Radiation Safety Plan will accompany the gauge at all times. All users will be designated as an authorized user by the RSO. Flow Technology will retain certificates of course completion from authorized training classes for inspection. Flow Technology shall retain for inspection, Certificates of Completion from a manufacturer's authorized training class in our permanent records.

Item 9:

The location of the proposed permanent facility is 1215 Apple's Way located west of Belgrade as shown on the enclosed site plan. A detail showing the storage location in the laboratory portion of our firm is shown on the enclosed storage location drawing. The gauge(s) will be chained and locked into the storage case when not in use. No permanent work space (i.e. desk) is located within 10 feet of the gauge storage

site. The back room can be locked when not occupied and signage will be placed on the doorway to the room. There are no windows in this room.

Item 10:

All personnel entering restricted areas, as well as users of the gauge, will be required to wear a film badge. The exchange frequency of film badges will be one month. Flow Technology has two potential suppliers of film badges:

LAUNDAUER, INC.
2 Science Road
Glenwood, IL 60425-1586
(708) 755-7000

SEIMANS DOSIMETRY SERVICE
2501 Barrington Road
Hoffman Estates, IL 60195
(800) 666-4552

Leak Testing: The leak testing equipment Flow Technology will use for the Campbell Pacific Nuclear gauges will be the CPN Leak Test Kit, Part No. LTK 1 or equivalent. The leak testing equipment Flow Technology will use for the Troxler Electronic Laboratories gauge will be a manufacturer approved leak test kit. This leak test kits will be returned to either Campbell Pacific or Troxler Electronic Laboratories as appropriate to determine if the source is leaking. Leak test samples will performed at six-month intervals and only the RSO will take the leak test samples. The gauges will be returned yearly to the respective manufacturer for calibration and leak testing if it has not been leak tested at the time it was sent in.

No Maintenance will be performed on any equipment that involves removing the source or placing it in an unshielded position.

Flow Technology will maintain its current copies of applicable DOT regulations and will develop and implement procedures for complying with all applicable DOT regulations.

Also see attached Radiation Safety Plan.

See attached Review of Radiation Safety Program.

Item 11:

The gauge(s) will only returned to the manufacturer or transferred to an authorized licensee only.

RADIATION SAFETY PLAN

GENERAL

This Radiation Safety Plan covers the procedures for the safe and proper use and possession of radioactive material as contained in portable moisture/density gauges used to measure soil and other materials. When handled in accordance with this plan, the radioactive materials present no hazard to the licensee's employees, customers, or the general public.

RADIATION SAFETY OFFICER

All use and possession is under the direction and supervision of the Radiation Safety Officer (RSO). The RSO is a single point of accountability and responsibility between the Regulatory Agency and the Licensee. The RSO is responsible for all aspects of the Radiation Safety Plan, including the following specific duties:

* To ensure that all terms and conditions of the license are being complied with and that the information contained is up to date and accurate.

* To ensure that the equipment is leak tested at the required 6 month intervals.

* To ensure that the equipment is only used by operators authorized by the RSO, and that they use the equipment in accordance with all relevant regulations. This will include wearing of a suitable personnel monitoring device.

* To maintain records as required by the license and the regulations.

* To ensure that all equipment is properly secured against unauthorized removal at all times.

* To serve as a point of contact and give assistance in case of an emergency such as equipment damage in the field, theft, or fire and to notify the proper authorities in case of an emergency.

* To ensure that all operators have read and understand this Radiation Safety Plan.

* To arrange appropriate training for all operators.

* To post all required signs and notices at gauge storage location.

  Post document RH-2364, Notice to Employees
  Label storage cabinet with "Caution, Radioactive Material" and international symbol.
  Post notice of where a copy of the organization's license, safety plan, and copy of regulations are located.

* To ensure that licensed materials possessed by the license is limited to the kinds and quantities of by product materials listed on the license.

* To ensure individuals using gauges: are properly trained; have received refresher training at least annually from the Radiation Safety Officer to include participation in a "dry run" of emergency procedures and review of operating and emergency procedures, Department of Transportation (DOT) requirements, all changes in regulatory requirements; and that users are designed by the RSO.

* To ensure that personnel monitoring devices are used as required and reports of personnel exposure are reviewed in a timely manner.

* To ensure proper authorities are notified in case of an accident, damage to gauge, fire or theft.

* To ensure that (a) the license is abiding by NRC and DOT regulations and the terms and conditions of the license (e.g. periodic leak tests, inventories, use limited to trained, approved users), and (b) the licensee maintains required records with all required information (e.g. records of personnel exposure; receipt, transfer, and disposal of licensed material; gauge users training) sufficient to comply with NRC requirements.

* To ensure that the results of audits, identification of deficiencies, and recommendations for change are documented (and maintained for at least three years), provided to management for review, and prompt action is taken to correct deficiencies, properly secured against unauthorized removal at all times when gauges are not in use.

* To ensure that corrective actions are communicated to all personnel who use licensed material (regardless of their location or the license under which they normally work).

* To ensure that all incidents, accidents, and personnel exposure to radiation in excess of ALARA or Part 20 limits are investigated and reported to NRC and other authorities, as appropriate, within required time limits.

* To ensure that licensed material is transported in accordance with all applicable DOT requirements.

* To ensure that licensed material is disposed of or transferred properly.

* To ensure all users have up to date copies of NRC's regulations, reviews new or amended NRC regulations, and revise licenses procedures, as needed, to comply with NRC regulations.

* To ensure that the license is amended whenever there are changes in licensed activities, responsible individuals or information or commitments provided to NRC in the licensing process.

The RSO has complete independent authority to stop any operations that the RSO believes to be unsafe. The RSO will be given sufficient time to fulfill all the radiation safety duties and responsibilities listed above. The RSO, with the help of management, will perform a comprehensive review of Federal Regulations regarding radioactive material, to insure the RSO has up to date regulations and reviews new or amended regulations in order to make appropriate changes in licensee procedures to comply with the regulations. The regulations that will be reviewed are the following:

Title 10, Energy, Code of Federal Regulations (10CFR) Part 0-199, Nuclear Regulatory Commission; and

Title 49, Transportation , Code of Federal Regulations (49 CFR) Parts 100-177, Research and Special Programs Administration, DOT.

The RSO will submit a formal report on this review process twice per year.

OPERATION

* The operator will exercise suitable control over the gauge at all times. At no time is it to be left unattended or in the possession of an unauthorized person.

* When not being used for field measurements, the gauge will be locked and returned to its storage/transportation case.

* When testing is complete, the gauge will be returned to its permanent place of storage as soon as possible.

* When using the equipment the operator will wear the personnel monitoring device assigned. When the operator is not using the equipment, the monitoring device will be kept in a radiation free, low heat area.

* At all times operators will observe ALARA principles to minimize any dose received: As low as any dose achievable.

* While the equipment is in the operator's possession, the operator will have:

  Copy of the License;
  Copy of this Radiation Safety Plan with Emergency Procedures and Telephone Call Down List;
  Copy of Letter/Card of Authorization from RSO;
  Copy of Gauge Operating Manual; and
  Copy of Current Leak Test Certificate.

TRANSPORTATION

* During transportation, the equipment shall be fully secured in the transporting vehicle and located away from personnel. When transported in a closed vehicle (car or van), the case will locked and the vehicle will be locked when the operator is not with the vehicle. When transported in an open bed vehicle (pick up truck) the case will be locked and the case securely fastened and locked to the truck bed when the operator is not with vehicle.

* The equipment will only be transported in an approved DOT shipping container with all the required labels and markings.

* During transportation, the operator will have Shipping Papers on the seat adjacent to the driver or in a holder which is mounted to the inside of the driver's side of the vehicle describing the radioactive material with the proper nomenclature. A sample Shipping Paper is attached.

* When an open bed vehicle is parked overnight at a hotel or motel, the operator shall cover the case in the secured transport position or lock the case in the cage of the vehicle.

* When shipping by common carrier, the package shall be in compliance with 49 CFR 170-179.

MAINTENANCE

* Periodic maintenance will include cleaning of the gauge. The operator will have received proper instruction on how to clean the gauge and will wear his assigned monitoring device.

* No maintenance will performed in which the radioactive source is removed from the gauge. The gauge will be returned to the manufacturer or an approved service center for this type of service.

* A leak test will be performed once every 6 months (or at the interval specified in the license) using an approved leak test kit and in accordance with the gauge manufacturer's instructions. The RSO leak test the gauge and will wear his assigned monitoring device.

* The shipping case will be periodically checked for integrity, and to verify that all labels are present and readable.

RECORDS

Records will consist of:

Personal Monitoring;

Leak Testing: The leak testing equipment Flow Technology will use for the Campbell Pacific Nuclear gauges will be the CPN Leak Test Kit, Part No. LTK 1 or equivalent. The leak testing equipment Flow Technology will use for the Troxler Electronic Laboratories gauge will be a manufacturer approved leak test kit. This leak test kits will be returned to either Campbell Pacific or Troxler Electronic Laboratories as appropriate to determine if the source is leaking. Leak test samples will performed at six-month intervals and only the RSO will take the leak test samples. The gauges will be returned yearly to the respective manufacturer for calibration and leak testing if it has not been leak tested at the time it was sent in.

No Maintenance will be performed on any equipment that involves removing the source or placing it in an unshielded position.

Training; and Gauge Inventory.

A check out log will be attached to storage cabinet. Information on log will include serial number of gauge, operator checking out gauge, date checked out, destination, estimated return date, and actual date of return.

TRAINING

All operators will complete a manufacturer's Operator's Training Course. Operators will be given special training as required for their individual work assignments.

PHYSICAL DAMAGE

* If any moving equipment is involved, stop its movement, until the extent of contamination, if any, can be established.

* Cordon off the area around the incident. An area with a radius of fifteen (15) feet will be sufficient.

* Visually inspect the gauge to determine the extent of the damage to the sources(s), source housing(s), and shielding.

* At the earliest possible time, when the situation is under control, contact the RSO. Describe the conditions and follow the instructions of the RSO. The RSO will immediately notify the appropriate regulatory agency.

Radiation Safety Officer - Patrick Redmond	406-388-4062 (Home) 406-388-0105 (Laboratory) 406-580-7959 (Mobile)
Belgrade Police Department	406-388-4262 or 388-1480 after 5:00 PM

Gallatin County Emergency Services	406-582-3121 or 406-582-2100 Emergency
Montana Department of Health	406-444-5622

THEFT OR LOSS

Immediately notify the RSO. The RSO will immediately notify the appropriate regulatory agency and the police.

Belgrade Police Department 406-388-4262 or 388-1480 after 5:00 PM

FIRE

* Call the Fire Department.

  Belgrade Fire Department 406-388-4480

* Take action appropriate with a fire to protect personnel.

* Notify the RSO.

* Stand by to advise the fire fighters as to the nature, locations, and potential hazards of the radioactive materials. Supply them with an information packet consisting of the facility layout and a data sheet of the equipment including a photograph. Be sure to include any other important information (e.g., explosives, guard dogs, etc.).

  Melting points:

	Far. Degrees	Cent. Degrees
Stainless Steel	2550	1400
Carbide	2000	1090
Aluminum	1005	540
Lead	620	327
Polyethylene	257	125

Temperatures in an industrial fire will normally range from 500 degrees F. At floor level to a high at the ceiling of 1400 to 1800 degree F. The polyethylene and lead would melt in most fires, the aluminum only in a sever fire. The stainless steel capsule would not reach its melting point.

DISPOSAL/DECOMMISSIONING

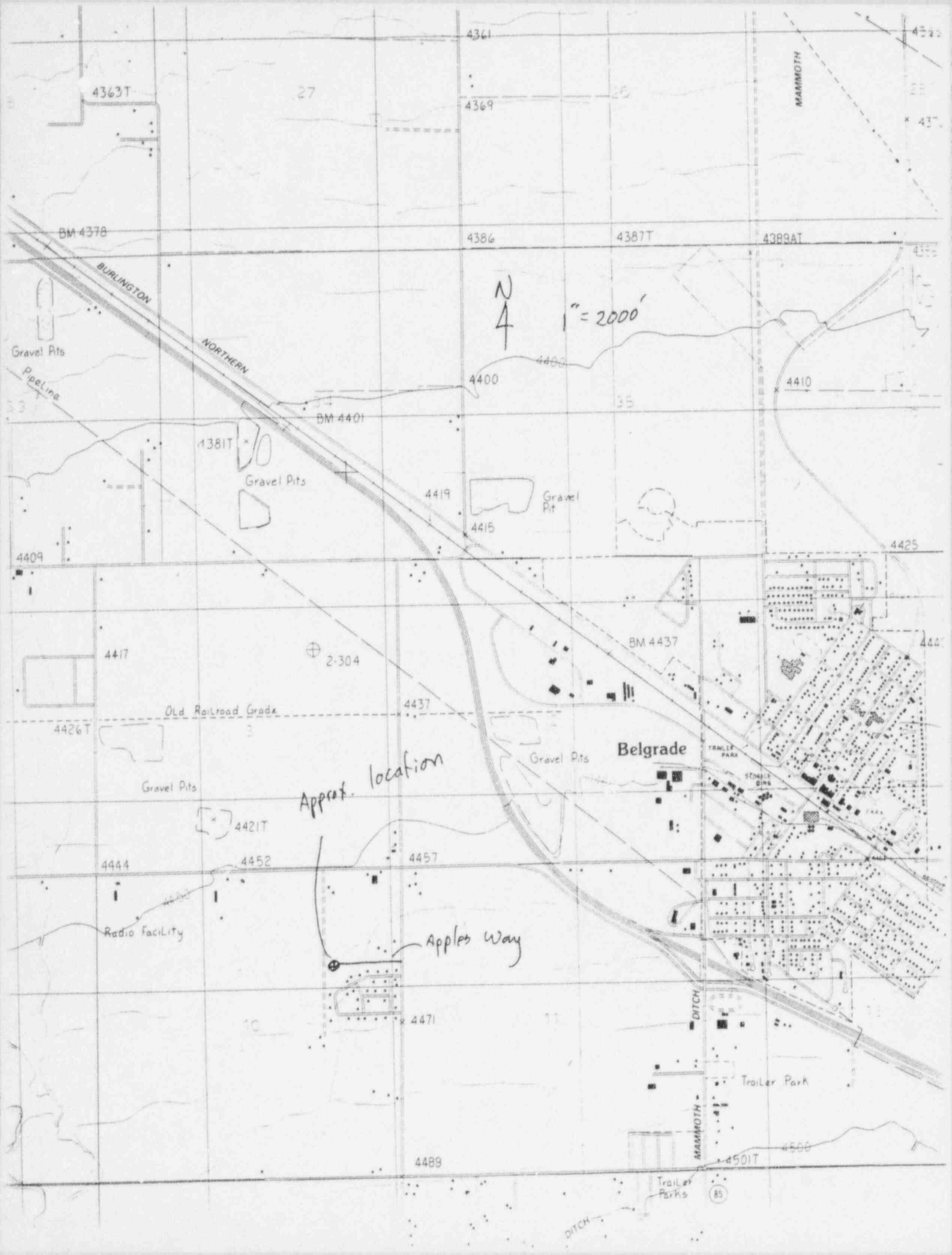
* Disposal will only be performed by transferring to a properly licensed organization.

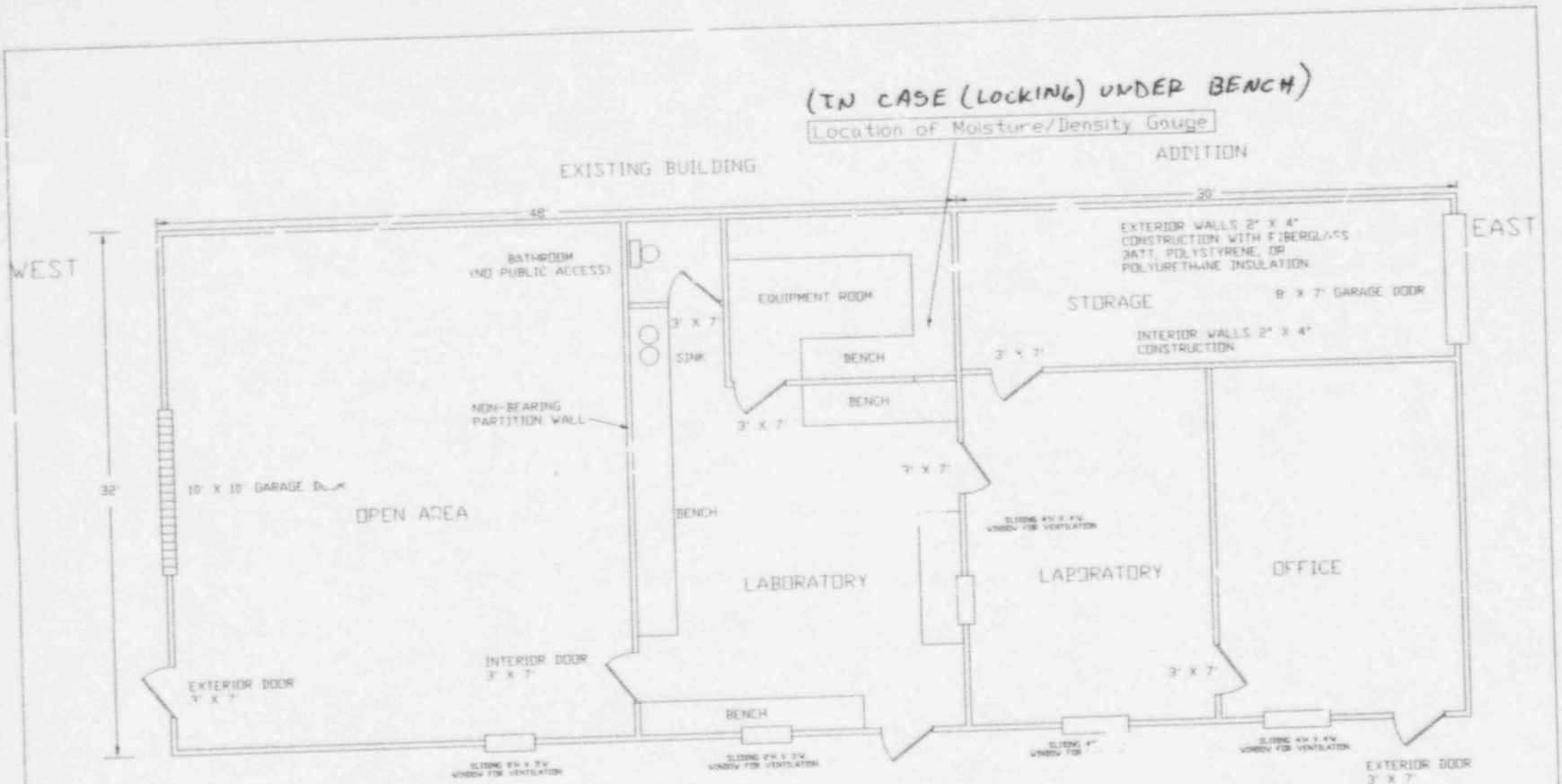
* The regulatory agency will be notified 30 or more days in advance of any relocation of the storage area. Formal decommissioning will not be required, provided leak test are current.

RADIATION SAFETY PLAN

This radiation safety plan will be implemented at all times. A copy of these procedures shall be maintained in the licensee radioactive materials license file, and another copy in the shipping case of the nuclear gauge at all times.

Signed Patrick L. Reed Date 5/5/97


4361
4363T
27
4369
MAMMOTH
BM 4378
4386
4387T
4389AT
BURLINGTON
NORTHERN
N
1" = 2000'
Gravel Pits
PipeLine
4400
4410
BM 4401
4381T
Gravel Pits
4419
Gravel Pit
4415
4409
4425
4417
2-304
BM 4437
OLd Railroad Grade
4437
4426T
Belgrade
Gravel Pits
Gravel Pits
Appx. location
4421T
4444
4452
4457
Radio Facility
Apples Way
4471
DITCH
Trailer Park
MAMMOTH
4501T
4489
Trailer Parks
85
DITCH



REDMOND BUILDING
PLAN VIEW

1-INCH = 10 FEET

Patrick Redmond, P.E.

B.S. Geology	Montana State University
B.S. Civil Engineering	Montana State University
M.S. Geotechnical Engineering	Colorado State University

Registered Professional Engineer:
Iowa, Montana, New Jersey, Ohio, Oregon, Pennsylvania, South Dakota, Maryland

Professional Affiliations:

American Society of Civil Engineers
American Society for Testing and Materials
OSHA Hazardous Waste Site Operations (40-Hour)
OSHA Health and Safety Supervisor Course, Hazardous Waste Site Operations
Radiation Safety and Use of Nuclear Gauges

Project Experience

J.M. Lambe and Associates, Inc.; Soldotna, Alaska

- Field geotechnical engineer on an estimated 30 local and remote site geotechnical investigations and construction projects throughout coastal and interior Alaska.
- Directed exploratory drilling, provided quality assurance testing for soils, concrete, and asphalt in both laboratory and field settings, construction quality assurance.
- Preparation of geotechnical reports, laboratory testing including triaxial and long-term creep testing of permafrost in climate controlled environments.
- Managed a branch office which provided laboratory testing and QA for 2.2 miles of four-lane highway construction through the center of Homer, Alaska. Performed for Alaska DOT and required soil, asphalt, and concrete testing and construction supervision.
- Provided quality assurance testing for foundation retrofits for native housing in several villages throughout Alaska.
- Provided exploration and made foundation recommendations for new wind turbine electrical generators in the Pribilof Islands of the Bering Sea.

Water, Waste, and Land, Inc.; Fort Collins, Colorado

- Geotechnical laboratory testing (index testing, triaxial strength testing, freeze/thaw durability testing, and wetting/drying durability testing) of Oil Shale retorts for the Colony Oil Shale Project at Rifle, Colorado.
- Provided geotechnical testing and characterization of uranium mill tailing cover soils and borehole samples for a number of projects. Provided slope stability analyses and miscellaneous design computations for various uranium mill tailing closures.

Vector Engineering, Inc.; Grass Valley, California

- Engineering analysis and bid preparation for heap leach gold mining operations in central Nevada. Engineering designs included seepage analysis, stability analysis, hydrologic analyses, stormwater routing analyses, preparation of plans and specifications, and quality assurance testing.

- Performed field investigations, drilling, and site characterization for a large tailings dam for Barrick's Goldstrike Mine.

Welsh Engineering, Inc.; Sparks, Nevada

- Assisted with design and provided site quality assurance of heap leach facility in Black Hills. Included slope stability analyses, laboratory testing of liner materials, determination of geosynthetic/soil friction angles in direct shear apparatus using modified shear box, miscellaneous index testing, and quality assurance testing for installation of 2 million square feet of double and single lined waste facilities in an environmentally sensitive area.

ESA Consultants, Inc.; Fort Collins, Colorado and Bozeman, Montana

- Geotechnical analyses and plan and specification preparation as part of team that produced nine sets of phased construction documents for major dam reconstruction and superfund reclamation projects. Analyses included seepage and embankment stability for existing and retrofitted dams, site investigations, QA testing and construction supervision. Project won Grand Award from the American Consulting Engineers Council.

- Assisted with preparation of the feasibility study and remedy selection report for the Old Works/East Anaconda Development Area of the Smelter Hill NPL site in Anaconda Montana. Tasks included engineering analyses, bid document and technical specification preparation, preparation of construction drawings and construction quality assurance.

- Assisted with analyses and site geotechnical investigations and characterization for North Crow dam in southeastern Wyoming and Porter Draw Dam in southwestern Montana.

Inter-Fluve, Inc.; Bozeman, Montana

- Geotechnical, hydraulic, cost estimation, and sediment pond sizing, and engineering analysis for relocation of 3000 feet stream in a placer mine reclamation in Whites Guich. Included preparation of plans and specifications and construction QA.

- Engineer in responsible charge of construction of a multimillion dollar project in New Jersey that received the 1995 Grand Award from the International Erosion Control Association. Included landfill closure, and 2900 feet of streambank restoration and protection. This site has experienced floods of approximately the 20, 100, and 500 year return intervals in the year following construction without sustaining any detrimental effects.

- Engineer in responsible charge for reconstruction of 7000 feet of stream in southwest Montana. Included hydrologic and hydraulic designs as well and preparation of plans and specifications.

- Designed bank stabilization remedy for 1100 feet of failing river bank in Ohio with 35 foot high embankment with structures and a popular fishing area at the top of the embankment. Required extensive geotechnical analysis and slope reconstruction with internal reinforcement to withstand rapid drawdown and river stage changes of up to 30 feet for the design flood.

- Engineering analyses and plan and specification preparation for new riverbank stabilization and park construction on the Allegheny River in downtown Pittsburgh, Pennsylvania.

- Design, analysis, cost estimation, and plan preparation for restoration and stabilization of 4000 feet of stream though a golf course in Indiana.

- Design, analysis, cost estimation, and plan and specification preparation for 3500 feet of stream relocation and floodplain rebuilding on a major highway relocation for the South Dakota DOT.

- Feasibility study for stabilization of five large landslides in the Siskiyou National Forest, Oregon.

- Design, analysis, cost estimation, and plan and specification preparation for approximately 6000 feet of Rock Creek in the Lolo National Forest, Montana.

- Design, analysis, cost estimation, and plan and specification preparation, and construction supervision for 500 feet of severely degraded stream on the Iowa State University campus, Iowa.

- Design, analysis, cost estimation, and plan and specification preparation for 600 feet of degraded stream on hazardous waste cleanup site in New Jersey.

- Design, analysis, cost estimation, and plan and specification preparation for a 57 acre wetland mitigation project for the Tongue River Dam expansion in southeastern Montana.