uraniumone™
investing in our energy

May 13, 2010

Nuclear Materials Licensing Branch
U.S. Nuclear Regulatory Commission, Region IV
612 E. Lamar Boulevard, Suite 400
Arlington, TX 76011-4125
Attn: Lizette Roldan

**RE: Docket No 030-38260, Control No. 472609 Answers to request for additional information**

Dear Ms. Roldan:

Please find the attached responses to your request for additional information in regards to the Uranium One PFN tool License Application.

This information was e-mailed to your attention on May 13, 2010 to minimize any delays of the review process for the application.

If you should have any questions or need additional information, please call me at (307) 234-8235 ext. 330 or e-mail to the address below.

Sincerely,

**Scott Schlerman | Sr. SH & E Specialist**
**Uranium One Americas Inc.**
**907 N Poplar | Suite 260 | Casper, WY 82601| USA**
Office: 307. 234.8235 ext 330 | Cell: 307.840.1157
scott.schierman@uranium1.com
www.Uranium1.com

Docket No. 030-38260
Control No. 472609

**ANSWERS TO REQUEST FOR ADDITIONAL INFORMATION REGARDING NEW LICENSE APPLICATION**

1. **In your license application you request tritium (H-3) in a sealed source form. However when providing the manufacturer and model number there are inconsistencies in the application. For example, you request under item 6 the material from Thermo Electron Corporation Models: A-210, MP 320, B 320, A-325 and later in the "Operating, Safety and Emergency Procedure" in Section M you mention the manufacturer and model as Thermo-MF Physics Model A-3062. Please confirm the manufacturer and model number for the sealed source you are requesting.**

   We have confirmed that the correct manufacturer's model number is A-3062. A corrected table for Item 6 in the attachment to the application is shown in attachment A to this response. We have also amended the requested maximum possession limit to twelve (12) Curies.

2. **Provide a copy of a typical examination and the correct answers to the examination questions. Indicate the passing grade.**

   All training will be conducted by Radiation Consultants, Inc., an outside consultant, whose address is 2017 Westside Drive, Deer Park, Texas 77536. Radiation Consultants is a highly-regarded and well-known company that provides training for well-logging and tracer studies. Radiation Consultants is licensed for training purposes in Texas (L02179).The specific course titles are: "Radiation Safety Officer Training" and "Well Logging Supervisor Training." Radiation Consultants license and course outline are attached to this response as Attachment B.

   An alternate provider for training services is Almac LLC, 809 Balmoral Court, Friendswood, Texas 77546. Almac is licensed for training purposes in the State of Texas (L05721). Almac's license is attached to this response as Attachment C.

   Because Uranium One will not be doing in-house training, no examinations or grading sheets are available.

3. **Submit a description of your program for inspecting the job performance of each well logging supervisor or logging assistant at intervals not to exceed 12 months, as described in 10 CFR 39.13.**

   Uranium One will audit the logging program annually. The audit will include observation of the performance of each logging supervisor and logging assistant during an actual well logging operation at intervals not to exceed 12 months. If a

logging supervisor or logging assistant has not participated in a well logging operation for more than 12 months since the last inspection, the individual will be inspected the first time he or she engages in well logging operations.

4. **Please confirm you will obtain a written agreement prior to well logging with a sealed source that meets the requirements specified in 10 CFR 39.15.**

   Uranium One is the well owner and operator and will be the licensed logging operator performing well logging operations. Therefore, in accordance with 10 CFR §39.15(d), a written agreement between the licensee and the well owner or operator is not required because the licensee and the well owner or operator are part of the same corporate structure. Uranium One agrees to meet the requirements of 10 CFR §39.15(a)(1)-(5) as required by 10 CFR39.15(d).

5. **Please confirm visual inspections will be conducted prior to each use and records maintained in accordance with Section 8.10.9.1 of NUREG 1556, Vol. 14, to ensure that well logging equipment is in good working condition and is labeled as required.**

   Visual inspections will be conducted prior to each use and records will be maintained to ensure that well logging equipment is in good working condition and labeled as required in accordance with NUREG 1556, Volume 14, Section 8.10.9.1.

Submitted by:

Donna Wichers
Senior Vice President, ISR Operations
05-13-10

# Attachment A

| Radioisotope | Chemical/Physical Form | Maximum Possession Limit | Proposed Use |
|---|---|---|---|
| Hydrogen-3 | Gas; titanium, scandium, and/or zirconium tritide neutron generator tube (Thermo Electron Corporation, Model A-3062) | Twelve (12) Curies total, not to exceed 3 Curies per tube | Prompt fission neutron logging for uranium, thorium and other fissionable materials in downhole accelerators |

Attachment B
Radiation Consultants
Texas License L-02179

Department of State Health Services

# RADIOACTIVE MATERIAL LICENSE

Pursuant to the Texas Radiation Control Act and Texas Department of State Health Services (Agency) regulations on radiation, 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 radioactive material listed below; and to use such radioactive material for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules, regulations and orders of the Agency now or hereafter in effect and to any conditions specified below.

| LICENSEE | | This license is issued in response to a letter |
|---|---|---|
| 1. Name | RADIATION CONSULTANTS INC<br>ATTN BRUCE E BRISTOW | Dated: February 3, 2009<br>Signed By: Bruce E. Bristow |
| 2. Address | P O BOX 787<br>DEER PARK TX 77536 | 3. License Number: L02179 / Amendment Number: 39 |
| | | PREVIOUS AMENDMENTS ARE VOID |
| | | 4. Expiration Date: April 30, 2011 |

RADIOACTIVE MATERIAL AUTHORIZED

| 5. Radioisotope | 6. Form of Material | 7. Maximum Activity | 8. Authorized Use |
|---|---|---|---|
| A. Cs-137 | A. Sealed source (IRL Series 2, 3M Model 4P6E, 4F6S, EZ Models 193, 225, NER-570 Series, NER-580 Series; QSA Model CDC.800 Series; J.L. Shepherd Model 6810) | A. 1 source not to exceed 330 millicuries | A. Survey instrument calibration using J.L. Shepherd & Associates Model 10 Portable Calibrator. |
| B. Any radioactive material | B. Leak test samples | B. As obtained to perform tests for leakage and/or contamination | B. To perform analyses of tests for leakage and/or contamination of sealed sources and devices containing sealed sources. |
| C. Cs-137 | C. Sealed source (GI Model VD-HP; 3M Models 4F6H, 4F6B or 4F6S) | C. 2 sources not to exceed 400 millicuries each | C. Possession only in **NATCO** Model B-2025 source holder. |
| D. Cs-137 | D. Sealed source (**TFS** Model 57157C) | D. 1 source not to exceed 500 millicuries | D. Possession only in **Thermo Fisher Scientific (TFS)** 5180A source holder. |

9. Radioactive material shall only be stored at, **and sources described in parts A and B of conditions 5, 6, 7 and 8 used at**:

| Site Number | Location |
|---|---|
| 000 | Deer Park - 2017 Westside Drive |

10. The authorized place of use is at temporary sites, in areas not under exclusive Federal jurisdiction, throughout Texas.

Department of State Health Services

# RADIOACTIVE MATERIAL LICENSE

| LICENSE NUMBER | AMENDMENT NUMBER |
|---|---|
| L02179 | 39 |

11. Each site shall maintain documents and records pertinent to the operations at that site. Copies of all documents and records required by this license shall be maintained for Agency review at Site 000.

12. Radioactive material shall not be stored or used at a permanent site unless that site is specifically authorized on this license. A site is considered permanent if radioactive material is stored and/or used at that location for more than 90 days in any twelve-month period.

13. The licensee shall comply with the provisions (as amended) of Title 25 Texas Administrative Code (TAC) §289.201, §289.202, §289.203, §289.204, §289.205, §289.251, §289.252 and §289.257.

14. The individual designated to perform the functions of Radiation Safety Officer (RSO) for activities covered by this license is Bruce Bristow.

15. Sealed sources containing radioactive material shall not be opened or removed from their respective source holders.

16. The interval of testing for leakage of the sources described in Part D of Conditions 5, 6, 7 and 8 shall not exceed three years.

17. The licensee is authorized to distribute their leak/wipe test kit Model RC-1 to customers and to subsequently analyze the leak/wipe sample.

18. The licensee shall maintain, for inspection by the Agency, appropriate records for verification of reported leak test results and instrument calibration.

19. The licensee is authorized to pick up, package and transport radioactive waste to an authorized waste disposal firm in accordance with procedures revised on October 2001. Radioactive waste is not authorized to be stored by the licensee or kept in the licensee's vehicle for longer than 12 hours.

20. In accordance with correspondence and procedures dated October 2001, the licensee is hereby authorized to perform commercial radiation survey instrument calibration. The calibrations shall be performed only by the RSO.

21. The licensee is authorized to conduct a radiation safety course for well loggers in accordance with provisions of 25 TAC §289.253. The individual authorized to perform the above training is Bruce Bristow.

22. In accordance with 25 TAC §289.255(u)(12)(B), the licensee is authorized to retrieve disconnected sources or sources that cannot be returned by normal means to a fully shielded position or properly secured. Source retrieval activities shall be performed under the direct supervision and in the physical presence of the RSO.

Department of State Health Services

# RADIOACTIVE MATERIAL LICENSE

| LICENSE NUMBER | AMENDMENT NUMBER |
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23. The licensee is authorized to perform the service of fixed gauge installation and to supervise such activities in accordance with procedures dated October 2001.

24. **The licensee is authorized to conduct a radiation safety course for industrial radiographers in accordance with provisions of 25 TAC §289.255. The individual authorized to perform the above training is Bruce Bristow.**

25. Except as specifically provided otherwise by this license, the licensee shall possess and use the radioactive material authorized by this license in accordance with statements, representations and procedures contained in the following:

    application dated March 28, 1997,
    Radiation Procedures Rev. #1 dated October 2001,
    letter dated October 4, 2001 and
    facsimile received May 9, 2002.

    Title 25 TAC §289 shall prevail over statements contained in the above documents unless such statements are more restrictive than the regulations.

RRF:rrf

FOR THE DEPARTMENT OF STATE HEALTH SERVICES

Date February 19, 2009

Ray Fleming, Chief
Industrial Licensing Program

# RADIATION CONSULTANTS, INC.

RADIOLOGICAL SAFETY / HEALTH PHYSICS SERVICES

*(Texas License No. L02179)*

Post Office Box 787
Deer Park, Texas 77536
281.476.0658
Office: 281.476.0072
radcons@yahoo.com

Toll Free : 800.899.4112

Fax:

e-mail:

www.radcons.com


## 24 Hour Course Outline for Well-Logging Radiation Safety

### Day 1

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### I. Structure of Matter

A. The atom
   1. Early Greek theories
   2. Eventual problems with the theories

B. Structure of the atom
   1. The nucleus
      (a) Proton - characteristics
      (b) Neutron - characteristics
   2. Electrons
      (a) Electron shells
      (b) Electrical stability

C. Atomic number

D. Mass number

E. Isotopes
   1. Definition
   2. Radioactive -vs- Stable
   3. Examples
   4. Usefulness

### II. Characteristics of Radiation and Radioactivity

A. Discussion of types
   1. Alpha and Beta
   2. Gamma and X-Ray
   3. Neutrons

B. Electron Volt
   1. Definition
   2. Electromagnetic spectrum

C. Mechanisms of decay

D. Induced radioactivity

E. Units of activity

1. Curie
2. Becquerel
3. Half-life

F. Interaction of radiation with Matter
1. Ionization
2. Effects of Ionization

G. Penetrating powers of nuclear radiation
1. Range of various types in air
2. Range of various types in tissue

## III. Radiation Units

A. The Roentgen

B. The Rad
1. Definition and discussion
2. Conversion to SI system

C. Dose Equivalent
1. Quality Factor (OF)
2. Rem (Sievert)

D. Submultiples

E. Dose rates

F. Flux

G. Relationship of units
1. Difference in units
2. Exposure, absorbed dose, dose equivalent

## IV. Control of Radiation Exposure (Dose)

A. Time

B. Distance
1. Definition of inverse square law
2. Problem solving session
3. Neutron calculations and problems

C. Shielding

D. Radiation Safety Calculations Session

## Day 2

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## V. Radiation Detection and Measurement

A. Ionization of a gas
1. Ion chambers
2. Geiger-Mueller (GM) detectors
3. Direct reading pocket dosimeters

B. Photographic effect
1. Film badge design and use
2. Use of control badge

C. Solid state detectors

1. Scintillation detectors
2. TLDs and OSLs

D. Calibration
1. Procedure
2. State and federal requirements

E. Survey techniques
1. How to read survey meters
2. Survey procedures
3. Recognizing problem areas
4. Recording of surveys

F. Maintenance of equipment

## VI. Biological Effects and Significance of Dose

A. General biological data
1. Cell biology
2. Interaction of radiation with cells
3. Prompt effects
4. Delayed effects
5. Genetic effects
6. Teratogenic effects

B. External radiation hazard
1. Radiation injuries
2. Radiation Sickness

C. Internal radiation hazards
(ingestion and inhalation pathways)

D. Personal dose control and monitoring

E. ALARA and risk perception

## VII. Well-Logging Equipment

A. Sources, radiation levels and shielding
1. Gamma-ray
2. Neutron
3. Storage, use and disposal

B. Remote handling tools

C. Vehicle transport containers

D. Use of equipment

E. Maintenance of equipment

F. Equipment labeling
1. Sources, handling tools, logging tools
2. Transport containers

G. Leak testing of sources

## VIII. Federal and State Regulations

A. 25 TAC §289.201 – General Provisions

B. 25 TAC §289.202 (10 CFR 20) - Standards for Protection Against Radiation

C. 25 TAC §289.203 (10 CFR 19) - Notices, Instructions and Reports to Workers; Inspections
D. 25 TAC §289.253 (10 CFR 34) - Radiation Safety Requirements For Well-Logging Service Operations and Tracer Studies
E. 25 TAC §289.252 (10 CFR 30) – Licensing of Radioactive Material

**Day 3**

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## IX. Transportation Requirements

A. Requirements of Title 49 CFR
   1. For transport
   2. For shipment by common carrier

## X. Operating and Emergency Procedures

A. Records
   1. Records required at temporary job-sites
   2. Records maintained by Logging Supervisors
B. Surveys
   1. Vehicle
   2. Area and well-head surveys
C. Locking and securing sources of radiation
D. Restricting areas
E. Inspection of equipment
F. Receipt and opening procedures
G. Utilization logs
H. Transportation
   1. Placarding of vehicles
   2. Transport containers
   3. Transport Documents
I. Emergency procedures
   1. Sources lost down-hole
   2. Contamination incidents (prevention and decontamination methods)
   3. Vehicle accidents
   4. Overexposure of personnel

## XI. Case Histories of Radiation Incidents

**Final Course Exam (Minimum Passing Grade is 80%)**

Attachment C
Almac LLC
Texas License L-05721

Department of State Health Services

# RADIOACTIVE MATERIAL LICENSE

Pursuant to the Texas Radiation Control Act and Texas Department of State Health Services (Agency) regulations on radiation, 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 radioactive material listed below; and to use such radioactive material for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules, regulations and orders of the Agency now or hereafter in effect and to any conditions specified below.

| LICENSEE | | This license is issued in response to letters | |
|---|---|---|---|
| 1. Name | ALMAC LLC<br>ATTN ALAN MCARTHUR | Received: January 29, 2010 | |
| 2. Address | 809 BALMORAL CT<br>FRIENDSWOOD TEXAS 77546 | Signed by: Alan McArthur, President | |
| | | 3. License Number<br>L05721 | Amendment Number<br>07 |
| | | PREVIOUS AMENDMENTS ARE VOID | |
| | | 4. Expiration Date<br>October 31, 2013 | |

| RADIOACTIVE MATERIAL AUTHORIZED | | | |
|---|---|---|---|
| 5. Radioisotope | 6. Form of Material | 7. Maximum Activity | 8. Authorized Use |
| A. Naturally occurring radioactive material (NORM) as defined at 25 TAC[+] Section (§) 289.259 | A. Solid, sludge or Liquid | A. As needed for each job. | A. Decontamination of pipe, land, buildings, equipment and materials. |

[+]Title 25 of the Texas Administrative Code

9. Radioactive material shall be used only at temporary sites, in areas not under exclusive Federal jurisdiction, throughout Texas.

10. The licensee shall maintain documents and records required by this license for Agency review at:

| Site Number | Location |
|---|---|
| 001 | Friendswood – 809 Balmoral Ct. |

11. The licensee shall comply with the provisions (as amended) of Title 25 Texas Administrative Code (TAC) Section (§) 289.201, §289.202, §289.203, §289.204, §289.205, §289.251, §289.252, §289.257, and §289.259.

12. The individual designated to perform the functions of Radiation Safety Officer (RSO) for activities covered by this license is Alan McArthur.

13. Radioactive material shall only be used by, or under the direct supervision of Alan McArthur and/or Frank J. Starkey.

Department of State Health Services

# RADIOACTIVE MATERIAL LICENSE

| LICENSE NUMBER | AMENDMENT NUMBER |
|---|---|
| L05721 | 07 |

14. Radioactive material shall only be used by individuals under the direct supervision of and in the physical presence of the RSO or FPRSO, only after each worker has successfully completed a training course determined by the Agency as appropriate. Documentation verifying the successful completion of the training for each worker shall be maintained by the licensee for inspection by the Agency.

15. A. The licensee shall provide written notification to the Agency at least five (5) days prior to commencing NORM decontamination activities. If, for a specific case, the five working day period would impose an undue hardship on the licensee, the licensee may, upon application to the agency, obtain permission to proceed sooner. The notification shall specify the following:

    (1) type of operation,
    (2) the mode of decontamination (if more than one mode is authorized on the license),
    (3) address and physical location of the decontamination activity,
    (4) dates when the activity will be conducted, and
    (5) the name of the person in charge of the operation at the site.

    B. This information shall be addressed to the following:

    Department of State Health Services
    Inspection Unit – MC 1986
    ATTN: Manager, Radiation Branch
    PO Box 149347
    Austin, Texas 78714-9347 or
    by facsimile to: (512) 834-6654.

16. **A. The licensee shall provide the following information in writing to the Agency within 30 days of the end of each calendar quarter following completion of NORM decontamination work for a customer when contaminated material is left in the possession of the customer:**

    **(1) customer name,**
    **(2) customer mailing address,**
    **(3) customer telephone number,**
    **(4) quantity of contaminated material generated as a result of the decontamination process,**
    **(5) disposition of contaminated material,**
    **(6) method (e.g., drums) of storage of contaminated material,**
    **(7) site where material is stored (provide map if street address is not available)**
    **(8) location at site where material is stored, and**
    **(9) storage conditions (e.g., metal shed, pallets on open ground, etc.).**

Department of State Health Services

# RADIOACTIVE MATERIAL LICENSE

| LICENSE NUMBER | AMENDMENT NUMBER |
|---|---|
| L05721 | 07 |

16. B. This information shall be addressed to the following:

Department of State Health Services
Radiation Safety Licensing Branch – MC 2835
ATTN: Manager, Radioactive Materials Group
PO Box 149347
Austin, Texas 78714-9347

17. Copies of the following documents and records shall also be maintained for Agency review at each temporary job site:

(1) current amendment of License;
(2) procedures referenced in License;
(3) sections of 25 TAC Chapter 289 referenced in License;
(4) records of the latest survey instrument calibration for the instruments in use at the site;
(5) records of radiation surveys made for any release of equipment from the site;
(6) records of analytical results made for the release of any material from the site; and
(7) records of surveys and or analyses made to demonstrate compliance with the dose limits or occupational workers or members of the public.

18. **The licensee is authorized to conduct a commercial radiation safety course for well loggers in accordance with provisions of 25 TAC §289.253. The individuals authorized to perform the above training are Thomas Cardwell and Alan McArthur.**

19. Except as specifically provided otherwise by this license, the licensee shall possess and use the radioactive material authorized by this license in accordance with statements, representations, and procedures contained in the following:

Application dated February 4, 2004;
Letters dated December 18, 2006;
**Letters received January 29, 2010; and**
Radiation Protection Plan and Standard Operating Procedures Received October 19, 2004.

Title 25 TAC Chapter 289 shall prevail over statements contained in the above documents unless such statements are more restrictive than the regulations.

JMK:jmk

FOR THE DEPARTMENT OF STATE HEALTH SERVICES

Date February 10, 2010

Ray Fleming, Program Coordinator
Industrial Licensing Program

# ALMAC Radiation Safety Course
# Well Logging Operations
# 24 Hours

| Topic | No. of Hours |
|---|---|
| **Day 1** | |
| Structure of the Atom | 1 hr |
| Atomic Number and Atomic Mass | 1 hr |
| Isotopes and Nuclides | 1 hr |
| Radioactive Decay and Emissions | 1 hr |
| Units of Radiation Activity (Bq and Ci) | 1 hr |
| Units of Radiation Dose (rem and Sievert) | 1 hr |
| Radioactive Sources, their emissions, and Dose Constants | 1 hr |
| Biological Effects of Radiation, Protection Standards | 1 hr |
| **Day 2** | |
| Controlling Radiation Dose (Time, Distance, & Shielding) | 1 hr |
| Methods used to prevent Contamination and To control the spread of contamination | 1 hr |
| Pathways for Internal Contamination | |
| Types of Radiation detection and Measurement Instruments (including Calibration) | 1 hr |
| Limitations of Various Surveying Instruments | 1 hr |
| Surveying and Documentation | 1 hr |
| Personnel Monitoring Equipment (various types, Pros and Cons of each) | 1 hr |
| Well logging Sources and Handling Equipment | 1 hr |
| Maintenance and Inspection of Equipment | 1 hr |
| **Day 3** | |
| Storage, Transport, and Control of Equipment and Sources of Radiation | 1 hr |
| Security and Increased Controls | 1 hr |
| Regulatory Requirements | 1 hr |
| Written Operating, Safety, and Emergency Procedures | 1 hr |
| Records maintenance and Retention Requirements | 1 hr |
| Incident Case Histories in Logging Services | 1 hr |
| Review of Course | 1 hr |
| Final Exam (Minimum Passing Grade is 80%) | 1 hr |