

NRC FORM 313 U.S. NUCLEAR REGULATORY COMMISSION <small>(03-2013) 10 CFR 30, 32, 33, 34, 35, 36, 39, and 40</small>	APPROVED BY OMB: NO. 3150-0120 EXPIRES: 05/31/2015 <small>Estimate burden per response to comply with this mandatory collection request: 4.3 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. Send comments regarding burden estimate to the Information Services Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocoll@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOF-10202, (3150-0120), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.</small>
<h2 style="margin: 0;">APPLICATION FOR MATERIALS LICENSE</h2>	

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. *AMENDMENTS/RENEWALS THAT INCREASE THE SCOPE OF THE EXISTING LICENSE TO A NEW OR HIGHER FEE CATEGORY WILL REQUIRE A FEE.

APPLICATION FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH: OFFICE OF FEDERAL & STATE MATERIALS AND ENVIRONMENTAL MANAGEMENT PROGRAMS DIVISION OF MATERIALS SAFETY AND STATE AGREEMENTS U.S. NUCLEAR REGULATORY COMMISSION WASHINGTON, DC 20555-0001 ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS: IF YOU ARE LOCATED IN: ALABAMA, CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, FLORIDA, GEORGIA, KENTUCKY, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, NORTH CAROLINA, PENNSYLVANIA, PUERTO RICO, RHODE ISLAND, SOUTH CAROLINA, TENNESSEE, VERMONT, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO: LICENSING ASSISTANCE TEAM DIVISION OF NUCLEAR MATERIALS SAFETY U.S. NUCLEAR REGULATORY COMMISSION, REGION I 2100 RENAISSANCE BOULEVARD, SUITE 100 KING OF PRUSSIA, PA 19406-2713	IF YOU ARE LOCATED IN: ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO: MATERIALS LICENSING BRANCH U.S. NUCLEAR REGULATORY COMMISSION, REGION III 2443 WARRENVILLE ROAD, SUITE 210 Lisle, IL 60532-4352 ALASKA, ARIZONA, ARKANSAS, CALIFORNIA, COLORADO, HAWAII, IDAHO, KANSAS, LOUISIANA, MISSISSIPPI, 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 BRANCH U.S. NUCLEAR REGULATORY COMMISSION, REGION IV 1600 E. LAMAR BOULEVARD ARLINGTON, TX 76011-4511
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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 <i>(Check appropriate item)</i> <input type="checkbox"/> A. NEW LICENSE <input type="checkbox"/> B. AMENDMENT TO LICENSE NUMBER <input checked="" type="checkbox"/> C. RENEWAL OF LICENSE NUMBER <u>07-17431-01 Amend. 18</u>	2. NAME AND MAILING ADDRESS OF APPLICANT <i>(Include ZIP code)</i> Duffield Associates, Inc. 5400 Limestone Road Wilmington, DE 19808				
3. ADDRESS WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED 5400 Limestone Road, Wilmington, DE 19808, 128 West Market Street, Georgetown, DE 19947, and temporary job sites anywhere in the United States where NRC maintains jurisdiction.	4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION Michael S. Johnson, Radiation Safety Officer <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">BUSINESS TELEPHONE NUMBER (302) 239-6634</td> <td style="width: 50%;">BUSINESS CELLULAR TELEPHONE NUMBER (302) 420-1567</td> </tr> <tr> <td colspan="2">BUSINESS EMAIL ADDRESS mjohnson@duffnet.com</td> </tr> </table>	BUSINESS TELEPHONE NUMBER (302) 239-6634	BUSINESS CELLULAR TELEPHONE NUMBER (302) 420-1567	BUSINESS EMAIL ADDRESS mjohnson@duffnet.com	
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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.
8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.	7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING EXPERIENCE.
10. RADIATION SAFETY PROGRAM.	9. FACILITIES AND EQUIPMENT.
11. WASTE MANAGEMENT.	12. LICENSE FEES <i>(Fees required only for new applications, with few exceptions*)</i> <i>(See 10 CFR 170 and Section 170.31)</i>

FEE CATEGORY	AMOUNT ENCLOSED \$ 0.00
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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 R. David Charles, P.E., Executive Vice President	SIGNATURE 	DATE 4/11/13
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FOR NRC USE ONLY					
TYPE OF FEE	FEE LOG	FEE CATEGORY	AMOUNT RECEIVED	CHECK NUMBER	COMMENTS
			\$		
APPROVED BY				DATE	

5. Radioactive Materials -

For use in Troxler Electronic Laboratories, Inc. Model Nos. 3400 Series and 3411-B portable gauging devices for measuring the physical properties of materials:

- Cesium 137, Special Form, Sealed Sources (AEA Technology/QSA, Inc. Model No. CDCW556, Isotope Laboratories Model No. HEG-137, or Troxler Drawing No. A-102112), not to exceed 10 millicuries per source and 220 millicuries total; and
- Americium 241:Beryllium, Special Form, Sealed Sources (AEA Technology/QSA, Inc. Model No. AMNV.997, Isotope Laboratories Model No. 3021, 3027 or Am1.NO2, or Troxler Drawing No. A-102451, C-106580), not to exceed 50 millicuries per source and 1,100 millicuries total.

For use in Troxler Electronic Laboratories, Inc. Model Nos. 4640 and 4640B portable gauging devices for measuring the physical properties of materials:

- Cesium 137, Special Form, Sealed Sources (AEA Technology/QSA, Inc. Model No. CDCW556, Isotope Laboratories Model No. HEG-137, or Troxler Drawing No. A-102112), not to exceed 10 millicuries per source and 40 millicuries total.

The distributor of the radioactive sources shall provide a certification document for each source. Radiation quantity is below the threshold for which financial assurance for decommissioning is required.

6. Radioactive sources are for use only in portable nuclear moisture-density gauges or in portable nuclear density gauges to measure the physical properties of materials.

7. Michael S. Johnson, Radiation Safety Officer (RSO)

Training experience provided by the portable gauge manufacturer: Troxler Gauge Operators Training Course (November 24, 1987) and Troxler Radiation Officer Training Courses (July 24, 1994 and February 28, 2001).

8. Before using licensed materials, authorized users shall successfully complete one of the training courses described in Criteria in the section titled, "Training For Individuals Working In Or Frequenting Restricted Areas" in NUREG-1556, Vol. 1, Revision 1, "Consolidated Guidance About Materials Licenses: Program-Specific Guidance About Portable Gauge Licenses," dated September 2001.

9. No response required.

10. See attached copy of Duffield Associates' Radiation Safety Program for details.

11. Radioactive source disposal shall be disposed of in accordance with NRC requirements by transfer to a licensee specifically authorized to possess the nuclear material.

Attachments: Duffield Associates, Inc. Radiation Safety Program, Revised March 25, 2013

DUFFIELD ASSOCIATES, INC.
RADIATION SAFETY PROGRAM

Revised March 25, 2013
By Michael S. Johnson, Radiation Safety Officer

PURPOSE

The purpose of this section is for Duffield Associates, Inc. (Duffield Associates) to clearly specify the employee training required and the procedures to be followed when using portable nuclear moisture-density gauges.

SCOPE

This radiation safety program covers the training requirements for first-time gauge users, procedures to be followed when storing, transporting, using and providing maintenance for gauges, radiation dose monitoring, USDOT refresher training, record retention and duties of the Duffield Associates' Radiation Safety Officer (RSO).

ADMINISTRATIVE AND GENERAL INFORMATION

The radiation safety program described herein is based upon the following government publications and regulations:

- 10 CFR Part 2, "Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders" (NRC)
- 10 CFR Part 19, "Notices, Instructions and Reports to Workers: Inspection and Investigations" (NRC)
- 10 CFR Part 20, "Standards for Protection Against Radiation" (NRC)
- 10 CFR Part 21, "Reporting of Defects and Noncompliance" (NRC)
- 10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material" (NRC)
- 10 CFR Part 71, "Packaging and Transportation of Radioactive Material" (NRC)
- 10 CFR Part 150, "Exemptions and Continued Regulatory Authority in Agreement States and in Offshore Waters under Section 274"
- NRC NUREG – 1556, Vol. 1, "Consolidated Guidance About Materials Licenses, Program- Specific Guidance About Portable Gauge Licenses, Final Report" (NRC)
- 49 CFR Parts 170 through 189, "Transportation Regulations" (DOT)

- Troxler Electronic Laboratories, Inc. "Troxler Transportation Guide," latest revision
- Troxler Electronic Laboratories, Inc. "Troxler Nuclear Gauge Safety Training Program," latest revision
- Troxler Electronic Laboratories, Inc. "Troxler Radiation Safety Officer Training Manual," Edition 5.1, March 2003
- "Delaware Radiation Control Regulations," amended January 12, 1996 (State of Delaware)
- "1985 Regulations for Control of Ionizing Radiation," and subsequent amendments (State of Maryland)
- Title 25 of Pennsylvania Code Chapter 230, "Packaging and Transportation of Radioactive Material," and Article V, "Radiological Health," latest revision
- State of New Jersey Department of Environmental Protection Radiation Protection and Release Prevention Regulation (7:28, Subchapters 1 to 64, latest revision)

Duffield Associates' program is also based upon the terms of our Nuclear Regulatory Commission Radioactive Materials License; our Commonwealth of Pennsylvania Department of Environmental Protection / Bureau of Radiation Protection Radioactive Materials License; our State of Maryland Department of the Environment / Radiological Health Program Radioactive Materials License; our State of New Jersey Department of Environmental Protection Radiation Protection Radioactive Materials License, and our State of Delaware Office of Radiation Control Registration. Nuclear gauges possessed by Duffield Associates, Inc. contain two special form-sealed radioactive sources which are double encapsulated in stainless steel: (a) a gamma radiation source used to obtain wet density measurements (cesium-137 with maximum source activity of approximately 7.3 to 8.0 millicuries or 0.3 GBq) and (b) a neutron radiation source used to obtain moisture measurements (americium-241: beryllium with maximum source activity of approximately 40 millicuries or 1.48 GBq). Information provided by the gauge manufacturer indicates that (a) while no radiation hazard is imposed on the operator when following the normal recommended procedures of use, a potential hazard does exist if improperly used and (b) a Hazards Communication Standard Material Safety Data Sheet (MSDS) is not required for nuclear gauges since they are not considered to be an article that releases or otherwise results in exposure to a hazardous chemical under normal use (reference: CFR 29, Part 1910.1200).

EMPLOYEE TRAINING

First time gauge users are required to successfully complete the one-day radiation safety training course for the transporters and operators of nuclear gauge testing equipment provided by a recognized instructor approved by the RSO or an on-line course approved by the American

Portable Nuclear Gauge Association. The course shall include instruction on the following topics:

- Principles and Practices of Radiation Protection;
- Leak Testing Procedures;
- Mathematics and Calculations Basic to the Use and Measurement of Radioactivity;
- Biological Effects of Radiation;
- Radioactivity Measurement Standardization and Monitoring Techniques and Instruments;
- Accident and Incident Procedures;
- Procedures for Nuclear Gauge Storage and Transportation; and
- General Safety Precautions

The “Radiation Safety” course also provides both the general and specific hazardous materials transportation training (Parts 1 to 3 training) required by US DOT 49CFR172, Subpart H as applied to nuclear gauges (i.e., recognition, labeling, preparation for transport, transportation, regulatory compliance, emergency response, personal protection and accident avoidance).

The sponsors of the course have indicated that this one-day course satisfies both NRC and Agreement State requirements for gauge operator and radiation safety certification.

Gauge users also are required to complete a computer-based security awareness training module (Part 4 training) provided by US DOT within 90 days after the start of their nuclear gauge-related employment, as noted in US DOT 49CFR 172.704.

First-time gauge users and new employees who have previous nuclear gauge use experience with previous employers are required to successfully complete an in-house training program which includes instruction on the following topics:

- Gauge Utilization Log (Sign in/Out) and Transport Procedures
- Gauge Operation and Control
- Emergency Procedures

In addition, first-time gauge users shall receive field “hands on” training with a previously trained and experienced gauge user who will evaluate the trainee’s knowledge and “hands-on” competence. Field training information shall be provided to the RSO.

As required by Maryland Department of the Environment (MDE), Duffield Associates’ RSO shall provide annual Parts 2 & 3 refresher training for potential gauge users (also required once

every three years by USDOT). Topics will include personal dose badge monitoring procedures, radiation safety and gauge transport, security, operating, and emergency procedures. In addition, a review shall be provided on methods to keep gauge radiation exposure "as low as reasonably achievable" (ALARA). This course shall be presented in the form of group meeting(s) and/or written text. Upon completion of the Hazmat refresher course, all gauge users must pass a minimum 20 question test based on the material presented. As a follow up, the RSO shall discuss (in person or by e-mail) and document any wrong answers of the each test with gauge users on an individual basis.

As required by Maryland Department of the Environment (MDE) once every two years (also required once every three years by US DOT), Duffield Associates' RSO shall also provide a US DOT Part 1 refresher course to all gauge users regarding hazardous materials transportation regulations. The course consists of a review of general hazardous materials transportation regulations. All gauge users will be required to watch an 18 minute DOT video titled, "Awareness for Initial Response to Hazardous Materials Incidents," or to review comparable written or on-line review materials, (identification, classification, packaging and transportation of hazardous materials, safety and emergency response procedures). Upon completion of the Hazmat refresher course, all gauge users must pass a (minimum) 15 question test based on the material presented. As a follow up, the RSO shall discuss (in person or by e-mail) and document any wrong answers of the each test with gauge users on an individual basis.

Upon the completion of the USDOT 4-part initial or refresher training period, the RSO shall provide a signed training summary listing employees that are currently eligible to transport and utilize nuclear gauges.

Also, as required by NUREG-1556, Vol. 1, the RSO (and/or designated assistant) shall perform unannounced "spot-checks" at our facility and in the field to review gauge users' conformance with applicable transportation and security regulations and in-house procedures. These reviews shall be documented in the RSO's log.

STANDARD OPERATING PROCEDURES SPECIFIC TO GAUGE USERS

Standard operating procedure items shall be included in the previously noted gauge user training and refresher programs.

Personal Occupational Radiation Dose Monitoring

All gauge users shall be provided with a personal radiation dose monitoring badge which is to be worn only when transporting, using or maintaining nuclear gauges or during other instances of potential occupational exposure (i.e., working in the vicinity of non-destructive structural steel x-

ray testing, etc.). The maximum annual upper body radiation exposure to a trained employee authorized by the RSO is 5,000 millirems.

If requested by a staff member, Duffield Associates shall provide, at no cost to the employee, an additional dose monitoring badge to any gauge user whom expects to receive significant non-occupational exposure outside of the workplace (i.e., from radiation therapy, numerous medical x-rays, etc.).

Duffield Associates currently utilizes TLD dosimeter badges which shall be collected approximately every three months, as recommended by their provider (currently Mirion Technologies) and returned to the provider for processing. Upon receipt of each new dosimeter report from the supplier, the RSO shall review the results by comparing old and new data, sign the dosimeter report, and forward copies to applicable regional offices. Each gauge user shall be informed by the RSO if any new personal exposure is noted and, if warranted, retrained in methods to keep radiation exposure ALARA. The most recent dose badge report shall be posted on a bulletin board along with a copy of the most recent NRC or Agreement State "Notice to Employees" information sheet and facility inspection report at each nuclear gauge storage facility (main and regional offices).

Female gauge users shall be provided with a copy of Duffield Associates, Inc.' prenatal policy regarding protection against ionizing radiation. Upon review of the policy, the female gauge user shall provide written documentation to the RSO that she has read and understands the policy. A copy of this policy is contained as part of Duffield Associates' Employee Handbook, maintained electronically on the company's intranet.

When not in use, employee radiation dose badges shall be stored in a designated container or area located at sufficient distance from stored gauges so the badges receive only background radiation. A radiation dose monitor badge shall be placed in the employee badge storage container to serve as a "control" badge to document any "non-occupational" exposure. Gauge users shall be instructed to wear their dosimeter on or near their torso when using the gauge under normal circumstances.

Public Dose

The maximum annual radiation exposure a member of the general public (anyone not currently authorized for gauge use by the RSO) is 100 millirems.

A separate monitor badge shall be placed to the extent practical in the vicinity of the closest typical work station(s) to the gauge storage closet to document conformance with public and occupational dose limits as specified by the NRC and Agreement State regulations. A radiation survey meter and/or a radiation dosimeter shall be utilized by the RSO (with follow-up reviews by the RSO or designated assistant) to assist in the documentation of the general public's typical radiation exposure at work stations in the vicinity of each of the designated nuclear gauge storage locations.

Gauge Storage and Control

When not in use, nuclear gauges shall be stored at one of our licensed facilities in a dedicated, locked closet or container affixed to the concrete floor or a structural member of the building. NRC and Agreement State regulations require a minimum of two independent locking systems to be utilized at all times (even when the building is occupied). The storage room, closet or container shall be labeled with a "Caution/Radioactive Materials" placard and shall be located away from both public and continuously occupied work areas. Gauges may also be stored at temporary job sites after obtaining permission from the RSO if NRC or Agreement State security regulations and the above criteria are followed and a site specific monitor badge is placed at the nearest work station (if applicable). In all cases, the handle of each gauge's source rod shall be padlocked during storage.

Gauge Transportation

Authorized gauge transporters shall follow applicable DOT (COMAR 26.12.01.01 Section T) requirements. Each gauge removed from the storage closet shall be recorded on the daily utilization log with time in and out, job site/project name and employees initials. Initializing the gauge sign out box indicates that the employee has possession of his or her radiation dosimeter and, as required by DOT, has possession of the gauge Bill of Lading and has visually inspected the integrity and labeling of the transport case, and will seal and secure the transport case by using two independent locking systems (typically padlocks and adjustable chains or cables). In addition, prior to transporting the gauge by motor vehicle, the gauge source rod handle shall be padlocked to prevent unauthorized or accidental removal of the sealed source from its shielded position, the transport case shall be secured, blocked or braced to prevent excessive movement in case of accident, and the driver shall provide a pre-trip cursory review of the vehicle (i.e., check tires, lights, engine not stalling, etc.) to determine its "road worthiness." Also, to keep radiation exposure to the driver ALARA, the case shall be positioned as far away as practical from the driver's seat. The Bill of Lading shall be kept in a conspicuous position in the cab of the vehicle to provide information to emergency response personnel in case of accident. The above noted regulations and in-house procedures shall also be conformed with when transporting a gauge on project site roadways that are accessible to the general public.

Field Use and Control of the Gauge

Our NRC and Agreement States Materials Licenses stipulate that the gauge user is responsible for control of the gauge and that the gauge or transport box shall be locked utilizing two independent locking systems when in transport or when not under direct surveillance of an authorized user. The RSO shall include as a part of initial and refresher training discussions on various situations that could occur on job sites that could distract the gauge user from maintaining control of the gauge.

Gauge users shall request unauthorized personnel to stay away from the immediate vicinity of the gauge to minimize potential radiation exposure to the general public.

Gauge users shall keep occupational radiation exposure ALARA by (a) minimizing personal exposure to the source rod by centering the gauge on the prepared test surface to permit lowering of the source rod into the hole with the gauge housing resting directly on the ground surface to provide additional shielding, (b) minimizing their time spent in the immediate vicinity of the gauge, (c) increasing their distance from the gauge to the extent practical and (d) moving the source rod to the shielded position immediately upon completion of a test. An example of (b) and (c) above is standing 10 feet away from the gauge during 1 to 4 minute "counting" period during density testing and calibration.

Gauge users shall be instructed not to "force" or "hammer" the source rod into the ground if obstructions are encountered since this misuse, if often repeated, could lead to stress and potential damage or failure of the source rod.

Gauge Maintenance and Leak Testing

Personal monitoring dosimeters shall be worn at all times when performing maintenance on or when leak testing nuclear gauges. To keep radiation exposure ALARA when performing routine maintenance or leak testing, personnel shall (a) minimize time required to have source rod exposed, (b) position the gauge to keep the gauge housing between their body and the exposed source rod and (c) not directly touch the source rod or internal neutron source. Our license does not allow our personnel to open or remove gauge sealed sources; these activities can only be performed by the manufacturer.

Our license allows us to collect leak test samples for analysis by licensed laboratories and stipulates that each gauge shall be leak tested, at a minimum, on an approximate six (6)-month basis. Leak testing is performed by RSO or designated assistant. In addition, the RSO and/or designated assistants shall conduct a bi-annual physical inventory of all sealed sources (may be performed concurrent with leak testing activities).

Emergency Response Procedures

All nuclear density gauges used by Duffield Associates, Inc. contain special form-sealed radioactive sources which are doubly encapsulated in stainless steel. The radioactive materials employed are Cesium-137 and Americium-241: Beryllium.

These gauges are tested by the manufacturer to evaluate the integrity of the source containment under adverse conditions. This testing has indicated that when transported in appropriate transport cases, severe impact should have no effect on the source containment or exposure levels associated with the gauges. The transport cases also provide optimum protection during

shipment and are labeled by the manufacturer to comply with U.S. Department of Transportation regulations.

If proper user handling procedures are followed, the sealed radioactive sources employed in nuclear density gauges do not pose an immediate health hazard. However, prolonged direct contact with the sources should be minimized to reduce any potential radiation exposure. There is no risk of spontaneous explosion of fire associated with nuclear density gauges. The source capsule should be able to withstand extreme temperatures approaching the melting point of the stainless steel capsule (1,370° C). Manufacture information indicates gauges involved in fires have not lost their shielding integrity or source containment.

IN THE EVENT THAT A NUCLEAR GAUGE IS LOST OR STOLEN:

The gauge operator will immediately contact Duffield Associates' RSO (or designated alternate; see below for details). Duffield Associates, Inc. will then contact local law enforcement officials and the Nuclear Regulatory Commission or Agreement State regulator in general accordance with applicable license requirements. If the RSO (or designated alternate) cannot be reached, the gauge operator shall contact local law enforcement to help expedite recovery efforts.

IN THE EVENT THAT A NUCLEAR DENSITY GAUGE IS INVOLVED IN AN ACCIDENT, FIRE, OR EXPLOSION DURING TRANSPORT AND/OR FIELD USE, THE FOLLOWING STEPS MUST BE TAKEN:

1. The gauge operator shall initiate contact with police or other appropriate emergency response personnel in case of fire, explosion, serious injury or a vehicular accident on a public roadway on an as-needed basis prior to beginning Step 2. Do not contact NRC or Agreement State regulators at this time. Do not contact emergency personnel at this time in the event of an accident on a construction site (non-public site) that does not involve injury.
2. The gauge operator shall secure an area of approximately 15 feet in radius surrounding the gauge and parts, if any, to prevent entry by unauthorized persons. This area must be maintained until the condition of the gauge is evaluated.
3. The gauge operator shall visually review the condition of the gauge to determine the extent of damage to the source housing or shielding. If the gauge appears undamaged and if applicable, the source rod shall be returned to the shielded position. (Source rod is pulled up into the gauge housing by pulling the handle on top of the gauge into the uppermost position and then secured with a padlock).

4. Contact Duffield Associates, Inc. authorized Radiation Safety Officer (RSO) (or designated alternate if the RSO is not available) as soon as the above steps are completed. Following contact of Duffield Associates, Inc., user shall be restricted to the area outside the 15-foot radius surrounding the gauge and parts.
5. Duffield Associates authorized RSO will then contact the appropriate Nuclear Regulatory Commission Office and/or Agreement State emergency response personnel if applicable.
6. An emergency response kit containing an emergency response procedures handbook, a radiation survey meter, caution tape and personal protective equipment shall be maintained by the Duffield Associates RSO and designated assistants at each of our permanent gauge storage facilities. A radiation survey meter (calibrated on an approximate annual basis) will also be available within reasonable vicinity of our permanent gauge storage facilities and temporary jobsites. In the case of an accident, following notification of Duffield Associates, Inc., the RSO (or alternate if RSO is not immediately available) shall bring the emergency response kit and radiation survey meter to the accident area and follow the emergency response procedures to monitor for radiation detection to assess contamination by the gauge or damaged parts. If contamination is detected on the equipment, any involved vehicles must also be evaluated. All personnel (including gauge operator) shall be restricted to an area outside the area of radiation detection. Monitoring shall continue until emergency response personnel authorized by the Nuclear Regulatory Commission or local State agency arrive or the site.

IN THE EVENT THAT A NUCLEAR GAUGE BECOMES COVERED WITH SOIL IN A COLLAPSED EXCAVATION, THE FOLLOWING STEPS MUST BE TAKEN:

1. The gauge operator shall immediately inform the excavation contractor that, due to the potential for gauge damage and radioactive material loss, mechanical construction equipment cannot be utilized to recover the gauge.
2. Contact RSO as soon as practical.
3. If the approximate depth and location of gauge is known, the contractor may proceed with appropriate safe soil sloping and/or benching procedures along the edges of the excavation.
4. After the excavation is made safe by soil sloping and/or benching procedures, the gauge may be located by hand probing and/or hand excavation procedures (similar to procedures utilized to expose existing underground natural gas utility lines).

Duffield Associates personnel and emergency agency contact information is contained in the Bill of Lading as an attachment to the emergency response procedures text.

Radiation Safety Officer Responsibilities

The company Radiation Safety Officer (RSO) shall assume the duties and responsibilities that include the following:

- To verify that the terms and conditions of the license are being met and that the information contained in the license is up-to-date.
- To verify that the gauges' sources have been leak tested approximately every six (6) months and that the leak test is performed in the manner prescribed by the equipment manufacturer.
- To verify possession of a radiation survey meter, calibrated on an approximate yearly basis, for use in the event of an emergency.
- To verify that the equipment is used only by individuals that have been authorized by the Radiation Safety Officer after completing both the initial license-required gauge operators radiation safety and DOT hazmat training course, in-house training, and subsequent USDOT refresher courses.
- To provide initial and refresher in-house training to gauge users on all topics covered by this Radiation Safety Program document.
- To verify that gauge users understand the radiation safety operating and emergency procedures.
- To verify that all personnel wear personal dose monitoring equipment when utilizing the gauges.
- To maintain the records as required by the license and the regulations. These records shall include radiation exposure records, leak test records and training certificates for all users and other required documents.
- To verify that the equipment is properly secured against unauthorized removal at times when it is not in use.
- To serve as a point of contact and give assistance in case of emergency such as equipment damaged in the field or theft and to notify the proper authorities in case of emergency.
- To verify that methods of storage, transportation, operation and maintenance of gauges is performed in such a manner as to keep exposure to radiation as low as reasonably achievable (ALARA).
- To document pertinent activities in an RSO's log.

RECORD RETENTION

The RSO shall maintain on file a copy of the following records and documents:

- NRC, DOT and State regulations
- NRC Materials License and State correspondence
- Gauge leak test results
- Personal dose monitoring badge reports
- Troxler and DOT training manuals and certificates
- In-house refresher training course outline and test results
- Sealed source and transport case certificates
- Individual gauge purchase, maintenance, calibration and, if applicable, disposal records
- Radiation survey meter calibration records
- Gauge sign in/out sheets, and change of jurisdiction documentation when gauges are relocated to and from NRC and Agreement State jurisdiction locations.
- RSO log documenting pertinent activities and unannounced “spot check” review results.
- In-house memoranda issued regarding regulatory changes, safe use, and other applicable topics

These documents shall be filed at a dedicated location and will be made accessible to all gauge users upon request.

PROGRAM EVALUATION AND MODIFICATIONS

The RSO shall review our Radiation Safety Program on an annual basis to evaluate the program's conformance with our NRC Materials License, State of Delaware Registration, Agreement State Licenses; and NRC, DOT, and Agreement State regulations. Revised regulations shall be reviewed at the time of their receipt. If any aspect of the Program is found to be in non-conformance based on this review or as a result of regulatory changes, the necessary Program changes shall be made. Modifications will be made in writing in the form of a dated memorandum to all gauge users. Retraining shall be provided to all gauge users if warranted by these changes.

PROGRAM ENFORCEMENT

As previously noted, the RSO shall provide on-site “spot-check” reviews of activities performed by our gauge users both at our facility and in the field. Results of these reviews are noted in the RSO log. Any observed violations of Program regulations and procedures will be discussed immediately with the employee and followed up by the RSO with future “spot checks” to the extent practical. Disciplinary actions, in accordance with Duffield Associates, Inc.’s Corporate Health and Safety Disciplinary Policy (Section 10.1.0) will be administered to employees found to be willingly negligent or not complying with the provisions of this policy.

Should the willful noncompliance or negligence to the provisions of this policy by an employee result in injury or increased risk to himself or another individual, disciplinary action more severe than the normal sequence of procedures may be administered. In addition, the RSO has the authority to stop use of a portable gauge should unsafe conditions occur.

This is to acknowledge the receipt of your letter application dated

4/11/13, and to inform you that the initial processing which includes an administrative review has been performed.

☒ Renewal (07-17431-01) There were no administrative omissions. Your application was assigned to a technical reviewer. Please note that the technical review may identify additional omissions or require additional information.

☐ Please provide to this office within 30 days of your receipt of this card

A copy of your action has been forwarded to our License Fee & Accounts Receivable Branch, who will contact you separately if there is a fee issue involved.

Your action has been assigned **Mail Control Number** 580485.

When calling to inquire about this action, please refer to this control number.

You may call us on (610) 337-5398, or 337-5260.