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February 22, 2022

Nuclear Regulatory Commission, Region III  
Division of Nuclear Material  
2443 Warrenville Road, Suite 210  
Lisle, Illinois 60532-4352

**Re: Reply to a Notice of Violation**  
**License No. 13-26408-01, Docket No. 030-32764**

ATTN: Document Control Desk, Washington, DC 20555-0001  
Copy: Regional Administrator, Region III

This letter will document a response to the inspection findings during the routine inspection that took place on November 17<sup>th</sup> & 19<sup>th</sup>, 2021 under Earth Exploration License No. 13.26408-01. The findings of this inspection were presented during a scheduled Teams meeting on February 2<sup>nd</sup>, 2022 at 1500 by Jason Draper (NRC) to inform Terracon employees Josh Williams (Project Manager), Curtis Bradburn (RSO), Michael Moir (Group Manager) and Adam Maier (Corporate RSO). Presented below are the answers to the observations and Severity Level IV violations made by Mr. Draper from a letter dated February 15<sup>th</sup>, 2022. Terracon offers the following corrective actions to ensure compliance with applicable regulations and license conditions.

**Inspection Finding A (Severity Level IV Violation).** Condition 12 of Amendment No. 13 to NRC License No. 13-26408-01 states that the Radiation Safety Officer (RSO) for the license was a specifically named individual.

Contrary to the above, between January 8, 2021, and April 16, 2021, the licensee failed to have the named individual on the license serve as the RSO. Specifically, the employment of the RSO named on the license was terminated on January 7, 2021.

**Response:** Due to changes in staff and the termination of Glen Hodson changes were not made in the EEI RSO role for license No. 13.26408-01. EEI management takes full responsibility for not sending in an amendment to make a change to the RSO role.

Corrective Action(s)	Due Date	Responsibility
Adam Maier to receive termination notices for all Terracon employees. EEI management agrees and commits to notifying Corporate RSO Adam Maier who manages Terracon's radiation safety program and who is listed on License No. 15-27070-01.	Full Compliance	Adam Maier

Corrective Action(s)	Due Date	Responsibility
EEL management agrees and commits to notifying Corporate RSO Adam Maier of any changes immediately. Adam Maier manages Terracon's radiation safety program and is listed on License No. 15-27070-01 as the corporate RSO.	Full Compliance	Rick Olson
Corrective Action(s)	Due Date	Responsibility
Michael Moir (RSO) is qualified and trained in accordance to 10 CFR 30.33(a)(3) and Mr. Moir has been trained in Terracon Roles and Responsibilities (attached). Mr. Moir will be responsible for managing RSO duties at the office level and Corporate RSO Adam Maier will remain on License No. 15-27070-01 and manage office level RSOs.	Full Compliance	Adam Maier & Michael Moir

**Inspection Finding B (Severity Level IV Violation).** Condition 13.A of Amendment No. 15 to NRC License No. 13-26408-01 states, in part, that sealed sources shall be tested for leakage and/or contamination at intervals not to exceed the intervals specified in the certificate of registration issued by the U.S. Nuclear Regulatory Commission under 10 CFR 32.210 or by an Agreement State. Certificate of Registration NC-646-D-130-S specifies the leak test frequency for Troxler 3400 Series portable moisture density gauges as 12 months.

Contrary to the above, between September 1, 2021, and December 2, 2021, the licensee failed to test sealed sources for leakage and/or contamination at intervals not to exceed 12 months, as specified in the Certificate of Registration (NC-646-D-130-S). Specifically, the licensee previously leak-tested three Troxler Model 3440 portable gauges (SNs: 27261, 22603, and 18314), containing sealed sources of cesium-137 (nominal activity 8 millicuries) and americium 241:beryllium (nominal activity 40 millicuries) on September 1, 2020, October 6, 2020, and November 5, 2020, respectively. The licensee did not again test the sources for leakage and/or contamination until November 18, 2021, December 2, 2021, and December 1, 2021, respectively, intervals in excess of 12 months, and the sources were not otherwise exempted from testing.

**Response:** The lapse in RSO duties, failure to understand leak test requirements and failure to have a system in place for expired certifications resulted in the above gauges not being leak tested per the SSDR.

Corrective Action(s)	Due Date	Responsibility
Leak test will be managed by Michael Moir and he commits to completing leak test prior to expiration date at intervals of 12 months as specified under SSDR. Expired leak tests SNs: 27261, 22603, and 18314 were completed using swipe test and sent off to the vendor for evaluation.	Full Compliance	Michael Moir

Corrective Action(s)	Due Date	Responsibility
EEL and RSO Michael Moir will comply with Terracon's annual and monthly RSO inspections that addresses leak test compliance using the OGP mobile application. All RSOs are trained on the application and complete a Radioactive materials inspection monthly and annually. Any deficiencies noted are corrected immediately to close out the audit and be available for NRC inspections. See attached monthly and annual inspection forms.	Full Compliance	Michael Moir
Corrective Action(s)	Due Date	Responsibility
Terracon will continue to utilize our internal inventory control center (TICCS) system in combination with Microsoft Outlook as an administrative tool to confirm completion of leak tests and calibrations. The system auto generates emails to RSOs 30 days prior to leak test expiration. Michael Moir will receive these alerts.	Full Compliance	Michael Moir

**Inspection Finding C (Severity Level IV Violation).** Title 10 CFR Part 71.5(a) requires that each licensee who transports licensed material outside the site of usage, as specified in the NRC license, or where transport is on public highways, or who delivers licensed material to a carrier for transport, comply with the applicable requirements of the DOT regulations in 49 CFR parts 107, 171 through 180, and 390 through 397, appropriate to the mode of transport.

Title 49 CFR 172.702 requires that each hazmat employer ensure that each hazmat employee is trained and tested, and that no hazmat employee performs any function subject to the requirements of 49 CFR Parts 171-177 unless trained, in accordance with Subpart H of 49 CFR Part 172. The terms Hazmat Employer and Hazmat Employee are defined in 49 CFR 171.8.

Title 49 CFR 172.704(c)(2) requires, in part, that a hazmat employee receive the training required by this subpart at least once every three years.

Contrary to the above, between February 5, 2019, and December 2, 2021, the licensee did not provide recurrent training at least once every three years to three hazmat employees that satisfied the requirements in Subpart H of 49 CFR Part 172, and the licensee otherwise meets the definition of a hazmat employer in 49 CFR 171.8. Specifically, the individuals had not received this training since last completing it on February 5, 2016, March 29, 2018, and April 9, 2018, respectively.

**Response:** EEL did not have a good system in place to track DOT HAZMAT training that is required every three years. Terracon's system is managed by Terracon University that will send users and RSOs of upcoming expired training. Also, to avoid 3-year DOT requirement, all authorized users will take the ATI 101 initial gauge user training yearly even though the DOT expires every 3 years. ATI 101 training covers operation, security, DOT and safety which is above and beyond what gauge users receive yearly. See attached ATI 101 course syllabus. Licensed material will be used by or under the direct supervision of the individuals listed on the attached document "*Authorized Nuclear Gauge Users*". Terracon agrees to require all

authorized users or individuals working in or frequenting restricted areas to pass initial online training by the American Technical Institute. All users completed the required training with hands on training to transport and use a nuclear gauge. Training of each authorized user will be maintained for at least three years after the last use of licensed material by the authorized user.

Corrective Action(s)	Due Date	Responsibility
Licensed gauges will be used by and under the direct supervision of the Local Radiation Safety Officer, Mr. Moir. Mr. Moir will also confirm that the required training is completed and all users are operating gauges safely. This includes continual training, site visits, coaching and hands on training in order to maintain gauge and DOT transport safety.	Full Compliance	Michael Moir
Corrective Action(s)	Due Date	Responsibility
Gauge users will be enrolled and pass ATI 101 training with hands on that meets the NRC and DOT requirements prior to using nuclear gauges.	Full Compliance	Michael Moir

Terracon remains committed to gauge safety. We have invested heavily in robust systems to train employees and to audit their performance in the field. We have created custom training programs and developed our own mobile app solutions to ensure that our employees have the tools they need to successfully and safely perform their work.

The actions of this inspection obviously are a disappointment to us. Like all of our employees, we are trained appropriately and given all the tools needed to be successful to manage the RSO program.

With regard to this inspection, we appreciate the time and effort of the NRC. Terracon is also committed in the below corrective actions.

Corrective Action(s)	Due Date	Responsibility
Communicate the incident, root causes and corrective actions to all RSOs during a scheduled RSO call.	03.22.2022	Adam Maier
Communicate the incident, root causes and corrective actions to all Indianapolis office staff via monthly safety meeting.	03.22.2022	Rick Olson & Michael Moir
Send an email to operations of the inspection findings and corrective actions found during the NRC visit.	Full Compliance	Adam Maier



We would like to thank you for your time and your courtesy during the visit. Terracon takes its radiation safety program, State, NRC and DOT regulatory requirements very seriously. The Terracon Corporate Radiation Safety Officer approves the responses to the Notice of Violations. If you have any additional questions or requests, please contact me at your earliest opportunity.

Sincerely,  
**TERRACON CONSULTANTS, INC.**

**Richard D. Olson, P.E.**  
**Principal**

**Terracon Consultants, Inc.**

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*Formerly Earth Exploration, Inc.*

License No. 15-27070-01

**Adam Maier, CSP**

Eastern Operating Group Corporate Safety Professional | Corp Health and Safety



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## American Technical Institute's Portable Nuclear Moisture/Density Gauge Training Course Outline

1. Introduction
  - a. Course Topics
  - b. Hands On Training
  - c. Quiz Completion Requirements
2. Radiation Basics
  - a. Introduction
  - b. Basic Chemistry
  - c. Elements
  - d. Atoms
  - e. Protons, Neutrons & Electrons
  - f. Isotopes & Ionization
  - g. Radioactivity
  - h. Types of Radiation
  - i. Source Locations
  - j. Half-Life
  - k. Radiation Units
  - l. Quality Factors
  - m. Radiation Measurement
  - n. Classes of Radiation Exposure
  - o. Effects of Radiation Exposure
  - p. Occupational Exposure
  - q. Methods to Minimize Exposure
3. Safety
  - a. Introduction
  - b. Personnel Monitoring
  - c. Storage and Security
  - d. Transportation
  - e. Two Independent Physical Controls
  - f. Storage Examples
  - g. Required Information for Transport/Shipping
  - h. Shipping Log
  - i. Labeling
  - j. Becquerel
  - k. Placarding of Vehicles
  - l. Shipping
  - m. Under Transport
  - n. Transporting by Air
  - o. Incidents
4. Record Keeping
  - a. Radioactive Materials License
  - b. Training Certificates
  - c. Refresher Training
  - d. HAZMAT Training
  - e. Regulations
  - f. Leak Test & Dosimetry Reports
  - g. Inventory
  - h. Certificate of Competent Authority

- i. Type A Package Testing
  - j. Emergency Response Sheet
  - k. Notice to Employees Poster
  - l. Bill of Lading
  - m. Posting Notices
- 5. NRC and Agreement State Regulations
  - a. Agreement/Non-Agreement States
  - b. Federally-Controlled Sites in Agreement States
  - c. Licensing and Inspection
  - d. Reciprocity
  - e. Contact Information
  - f. Completeness and Accuracy of Information
  - g. Safety and Security Issues
  - h. Employee Protection
  - i. Protected Activities
  - j. Filing a Complaint
  - k. Violation Actions
  - l. Nondiscriminatory Actions
  - m. Agreements and Protected Activity
  - n. Deliberate Misconduct
  - o. Deliberate Misconduct (continued)
- 6. Nuclear Gauge Incidents
- 7. Homeland Security
  - a. History
  - b. Gauge Thefts
  - c. Gauge Thefts (continued)
  - d. Minimizing Theft
  - e. Security Threats
  - f. Security Steps to Take
  - g. Summary
- 8. Training
  - a. Criteria for Required Training
  - b. Application Submittal
  - c. Criteria for Acceptable Training Courses
  - d. Required Course Content
  - e. Course Examination
  - f. Course Instructor Qualifications
  - g. Hands-On Training
- 9. Portable Nuclear Moisture/Density Gauge Usage
  - a. Standardizing the Gauge
  - b. Standardization Procedures
  - c. Materials Testing
  - d. Gauge Cleaning

# Answered Observation - Annual RSO Inspection rv1.1

<b>Organization:</b>	Indianapolis	<b>Date:</b>	12/10/2021
<b>Location:</b>	Indianapolis	<b>Observer:</b>	Michael Moir
<b>Observed:</b>	Employee	<b>Work Shift:</b>	
<b>Observed Details:</b>	Curtis Bradburn	<b>Product / Part:</b>	
<b>Observation Title:</b>	Annual RSO Inspection rv1.1		

## Annual RSO Inspection rv1.1: License and Administration

**Q: 01** Local RSO Name

**Answer** Curtis Bradburn

**Comment:** All gauges accounted for and signed out appropriately. All leak tests current. Recent NRC inspection yielded few discrepancies.

**Q: 02** Does the Local RSO meet all required training for the State or NRC? Is training up to date?

**Answer** Yes

**Q: 03** Enter the State and applicable license number.

**Answer** Indiana - 15-27070-01

**Comment:** EEI License number. We will be changing to Terracon in 2022

**Q: 04** Is the license accurate and up to date? List license expiration date in Comments (MM/DD/YYYY)

**Answer** Yes

**Comment:** July 30th, 2022

**Q: 05** Are gauges being stored at any locations NOT listed on the license?

**Answer** No

**Comment:** All gauges are returned daily or have temporary storage on site

## Training and Authorized Users

**Q: 06** Has each authorized user attended an approved training course and demonstrated competency prior to using licensed devices?



**Answer** Yes

**Comment:** ATI training course via TU

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## Gauge Inventory

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**Q: 07** Do gauge users understand requirements for safe handling and security during transportation, use and storage, including the requirement for dual security and constant surveillance?

**Answer** Yes

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**Q: 08** Is an inventory of all gauges performed at least every six months and available for inspection?

**Answer** Yes

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**Q: 09** Are sign-out/sign-in procedures posted and are records maintained which display the date of use, gauge user and gauge number? Confirm the procedures are being followed.

**Answer** Yes

**Comment:** Sign out sheets are kept in RSO's office for a period of 5 years.

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**Q: 010** Are gauges being stored in a manner that would prevent unauthorized use or removal?

**Answer** Yes

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**Q: 011** Are records maintained demonstrating receipt of each gauge in possession (i.e., from manufacturer, transfer from another Terracon office, etc.)?

**Answer** Yes

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**Q: 012** Does the office have XRF device(s) with nuclear source?

**Answer** Yes

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**Q: 013** Are inoperable gauges tagged out of service and noted on inventory as out of service?

**Answer** Yes

**Comment:** Decommissioned gauge sent to Instrotek for disposal

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## Personal Radiation Protection

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**Q: 014** Are efforts taken to maintain radiation exposures as low as reasonably achievable (ALARA)? Is the radiation storage area located minimum 15 feet from any occupied areas?

**Answer** Yes

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**Q: 015** If personnel monitoring is required by the State, have all gauge users been individually assigned a monitoring badge that is exchanged at the appropriate frequency and immediately forwarded to the dosimetry supplier with the control badge for analysis?

**Answer** Yes

**Comment:** Quarterly

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**Q: 016** Does the Local RSO review monitoring reports when received? Did any monitored personnel receive more than 10% of the permissible radiation dosage (5 rem) in the past 12 months?

**Answer** Yes

**Comment:** No overages detected

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**Q: 017** Are the reports provided to the gauge users?

**Answer** Yes

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**Q: 018** Enter the date of the last survey meter calibration (MM/DD/YYYY).

**Answer** 02/18/2018

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## Public Radiation Exposure

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**Q: 019** Does each gauge user understand and carry an up to date copy of emergency procedures listing emergency contact personnel and telephone numbers?

**Answer** Yes

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**Q: 020** Does each gauge case contain a copy of the most up to date regulatory license?

**Answer** Yes

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**Q: 021** Conduct a survey meter spot check. Confirm there were no gauges found to be leaking. Note radiation levels in unrestricted areas on each side of gauge storage area.

**Answer** Gauge 6: 30mrem/hr while charging. All other gauges in use.

**Comment:** Exterior of storage room ranges from 0.09 to 0.12 mrem/hr

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### Leak Tests

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**Q: 022** Was each gauge leak tested every 12 months or at the frequency required by license conditions?

**Answer** Yes

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**Q: 023** Are records of leak test results maintained for each gauge and copies carried with the user in the vehicle cab?

**Answer** Yes

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### Transportation

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**Q: 024** Do all gauge cases have legible "Yellow II" transport labels on opposing sides of the case (2 labels)? A Type A label within 6 inches of each 'Yellow II' label. Manufacturer's label?

**Answer** Yes

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**Q: 025** Is the Transport Index section of all "Yellow II" labels legible and appropriately completed?

**Answer** Yes

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**Q: 026** Are DOT shipping papers completed and carried in the cab of each transport vehicle (within arm's reach of driver)? Are all documents up to date and include emergency phone number, special form certificate and Terracon emergency procedures.

**Answer** Yes

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**Q: 027** Are gauge cases secured to prevent movement and double locked in truck beds during

transportation?

**Answer** Yes

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**Q: 028** Are spare labels and paperwork available in the storage area so users can frequently replace damaged labels or lost paperwork?

**Answer** Yes

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## Postings and Labeling

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**Q: 029** Does the nuclear gauge storage area bear a “Caution: Radioactive Material” warning sign?

**Answer** Yes

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**Q: 030** Is a copy of the NRC or appropriate state “Notice to Workers” poster posted?

**Answer** Yes

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**Q: 031** Does the storage area posting indicate where a copy of the radioactive materials license and regulations can be found?

**Answer** Yes

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**Q: 032** Is a written, up-to-date list of authorized gauge users maintained, posted and available for inspection?

**Answer** Yes

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**Q: 033** Is the radiation storage area diagram up-to-date and available for inspection?

**Answer** Yes

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**Is follow up required:** N

**Is Follow Up Completed:**

**Potential Risk Severity:** Follow Up this Week

**Observation Outcome:** Acceptable

**Observation Narrative:** All items in accordance with EEI license agreement. Terracon license will take effect in 2022. Report

of findings from recent NRC inspection is not yet available.

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## CERTIFICATE OF COMPLETION

### ATI Portable Nuclear Moisture Density Gauge Training 101 Certification

Presented to

**Lewis  
King**

01-DEC-2021

Course offered by



The course subject matter covers radiation basics, gauge safety, NRC regulations, gauge usage and USDOT 49 CFR 172. Course meets the NRC requirements and is accepted by the Radiological Department of NV.

  
Signature of Licensee's RSO  
(Verification of closed book test & hands on training)

  
John K. Pratsman, Chief People Officer



# CERTIFICATE OF COMPLETION

## ATI Portable Nuclear Moisture Density Gauge Training 101 Certification

Presented to


**Leonard  
Perez**

02-DEC-2021

Course offered by



The course subject matter covers radiation basics, gauge safety, NRC regulations, gauge usage and USDOT 49 CFR 172. Course meets the NRC requirements and is accepted by the Radiological Department of NV

  
Signature of Licensee's RSO  
(Verification of closed book test & hands on training)

  
John K. Pratsman, Chief People Officer

# Terracon

## CERTIFICATE OF COMPLETION

### ATI Portable Nuclear Moisture Density Gauge Training 101 Certification

Presented to

**William  
Eyster**

30-NOV-2021

Course offered by

**ATI**  
American Technical Institute, LLC

The course subject matter covers radiation basics, gauge safety, NRC regulations, gauge usage and USDOT 49 CFR 172. Course meets the NRC requirements and is accepted by the Radiological Department of NV

Signature of Licensor's RSO

(Verification of closed book test & hands on training)

*John K. Pratsman*

John K. Pratsman, Chief People Officer





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Michael Moir  
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Fax: 317-273-2250

## LEAK TEST CERTIFICATE

InstroTek License #092-1073-1


This certifies that leak test analysis was conducted on the sample with the following information. The results shown below accurately represent the level of removable contamination.

Make: Troxler, Inc.  
Model: 3440  
Serial Number: 18314

Date Swabbed: 12/1/2021  
Analysis Date: 12/6/2021

Source Type	Serial Number	Reading (uCi)
AmBe-241	47-13765	0.000003
Cs-137	50-7815	0.000165

Note: 0.005 MicroCuries (185 Bq) or greater is considered a leaking source. The source(s) tested above may remain in use.

Reviewed by:   
Customer Signature: \_\_\_\_\_

Print Date: 12/6/2021  
Date: \_\_\_\_\_

CPN gauges are 50 mCi Am241:Be and 10 mCi Cs-137. Humboldt gauges are 40 mCi Am241:Be and 10 mCi Cs-137. InstroTek Gauge is 40 mCi Am241:Be and 10 mCi Cs-137. Troxler gauges all, except 4640, are 40 mCi Am241:Be and 8 mCi Cs-137. Troxler 4640 is 8 mCi Cs-137. Refer to the manual for other products.



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## LEAK TEST CERTIFICATE

InstroTek License #092-1073-1


This certifies that leak test analysis was conducted on the sample with the following information. The results shown below accurately represent the level of removable contamination.

Make: Troxler, Inc.  
Model: 3440  
Serial Number: 22603

Date Swabbed: 12/2/2021  
Analysis Date: 12/13/2021

Source Type	Serial Number	Reading (uCi)
AmBe-241	47-18446	0.000003
Cs-137	75-4359	0.000218

Note: 0.005 MicroCuries (185 Bq) or greater is considered a leaking source. The source(s) tested above may remain in use.

Reviewed by:   
Customer Signature: \_\_\_\_\_

Print Date: 12/13/2021  
Date: \_\_\_\_\_

CPN gauges are 50 mCi Am241:Be and 10 mCi Cs-137. Humboldt gauges are 40 mCi Am241:Be and 10 mCi Cs-137. InstroTek Gauge is 40 mCi Am241:Be and 10 mCi Cs-137. Troxler gauges all, except 4640, are 40 mCi Am241:Be and 8 mCi Cs-137. Troxler 4640 is 8 mCi Cs-137. Refer to the manual for other products.



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## LEAK TEST CERTIFICATE


InstroTek License #092-1073-1

This certifies that leak test analysis was conducted on the sample with the following information. The results shown below accurately represent the level of removable contamination.

Make: Troxler, Inc.  
Model: 3440  
Serial Number: 27261  
Date Swabbed: 11/18/2021

Source Type	Serial Number	Reading (uCi)
AmBe-241	47-23887	0
Cs-137	750-1023	0.000144

Note: 0.005 MicroCuries (185 Bq) or greater is considered a leaking source. The source(s) tested above may remain in use.

Reviewed by:   
Customer Signature: \_\_\_\_\_

Print Date: 11/29/2021  
Date: \_\_\_\_\_

CPN gauges are 50 mCi Am241:Be and 10 mCi Cs-137. Humboldt gauges are 40 mCi Am241:Be and 10 mCi Cs-137. InstroTek Gauge is 40 mCi Am241:Be and 10 mCi Cs-137. Troxler gauges all, except 4640, are 40 mCi Am241:Be and 8 mCi Cs-137. Troxler 4640 is 8 mCi Cs-137. Refer to the manual for other products.

# Answered Observation - Monthly RSO Inspection

<b>Organization:</b>	Indianapolis	<b>Date:</b>	1/20/2022
<b>Location:</b>	Indianapolis	<b>Observer:</b>	Michael Moir
<b>Observed:</b>	Equipment	<b>Work Shift:</b>	
<b>Observed Details:</b>	39113	<b>Product / Part:</b>	
<b>Observation Title:</b>	Monthly RSO Inspection		

## Monthly RSO Inspection: License and Administration

**Q: 01** Local RSO Name

**Answer** Curtis Bradburn

**Q: 02** Enter the State and applicable license number.

**Answer** Indiana

**Comment:** Switched to Terracon in January, 2022

**Q: 03** List the current license expiration date

**Answer** 1/3/2022 12:00:00 AM

**Comment:** Current License date not available

**Q: 04** List the date of the last Annual RSO inspection.

**Answer** 12/10/2021 12:00:00 AM

**Q: 05** Is the current license up to date for office address, correct RSO, authorized users, gauge types and quantities?

**Answer** Yes

**Q: 06** Are gauges being stored in locations NOT listed on the license?

**Answer** Yes

**Q: 07** Have gauges been stored at a temporary location for more than 90 days?

**Answer**    Yes

**Comment:**    Dunn’s Bridge Solar Farm - Wheatfield, Indiana  
Gauge SN: 77740, 77759

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**Training and Instructions to Authorized Gauge Users**

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**Q: 08**        Has each authorized user have appropriate training e.g., gauge user, refresher and DOT Hazmat training?

**Answer**    Yes

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**Gauge Inventory**

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**Q: 09**        Are gauges being stored in a manner that would prevent unauthorized use or removal, including dual locks and a secure storage area?

**Answer**    Yes

**Q: 010**       Complete a gauge inventory.

**Answer**    Yes

**Q: 011**       Are sign-out/sign-in procedures posted and are usage records up to date?

**Answer**    Yes

**Q: 012**       Are inoperable gauges tagged out of service?

**Answer**    Yes

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**Personnel and Public Radiation Protection**

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**Q: 013**       Are efforts taken to maintain radiation exposures as low as reasonably achievable (ALARA)?

**Answer**    Yes

**Comment:**    Lead shielding was installed on walls as on 11/2021

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**Q: 014** If applicable, are dosimeter badges inventoried daily and being stored in the designated badge storage area outside of the gauge storage room?

**Answer** No

**Comment:** Badges are kept by individuals and returned for reading quarterly

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**Q: 015** Are gauges stored in a manner to prevent exposure < 100 millirems per year to members of the public?

**Answer** Yes

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### **Operating and Emergency Procedures**

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**Q: 016** Does each gauge operator understand and carry a copy of emergency procedures?

**Answer** Yes

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**Q: 017** Has the RSO instructed each gauge user to maintain continuous surveillance of gauges in his/her possession?

**Answer** Yes

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**Q: 018** Is the office survey meter available for use?

**Answer** Yes

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**Q: 019** What is the survey meter calibration date?

**Answer** 2/28/2021 12:00:00 AM

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### **Leak Tests**

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**Q: 020** Are records of leak test results maintained for each gauge and copies carried with the user in the vehicle cab?

**Answer** Yes

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**Q: 021**      Conduct a survey meter spot check. Confirm there were no gauges found to be leaking?

**Answer**    Yes

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**Posting/Labeling/Records**

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**Q: 022**      Does the nuclear gauge storage area have required NRC or State warning signs and postings?

**Answer**    Yes

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**Q: 023**      Is a written, up-to-date list of authorized gauge users maintained, posted and available for inspection?

**Answer**    Yes

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**Q: 024**      Do all gauge cases bear legible and appropriate labeling (two Yellow II, Type A, Cargo Aircraft Only and manufacturer's label?)

**Answer**    Yes

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**Is follow up required:**      N

**Is Follow Up Completed:**

**Potential Risk Severity:**    Follow Up this Week

**Observation Outcome:**     Acceptable

**Observation Narrative:**

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The Radiation Safety Officer (RSO) is designated by the office manager and is responsible for oversight of Terracon's Radiation Protection Program. The RSO is responsible for radiation safety in conjunction with the use, handling, and storage of radioactive materials. It is the duty of the RSO to ensure all licensed activities are carried out in compliance with the requirements of the license and the applicable rules and regulations.

### RSO Responsibilities

- Attend and participate in bi-monthly RSO meetings facilitated by the Corporate Radiation Safety Officer (CRSO).
- Answer questions or concerns from authorized users of density gauges.
- Understand all documents, policies, and procedures of the Terracon Radiation Protection Program.
- Store and maintain specific office radiation safety documents.
- Verify postings are current and located at the storage location so all employees have access.
- Understand how to use and maintain the Equipment Inventory Calibration System (TICCS).
- Interpret and follow all license requirements. Understand how to calculate maximum isotope quantity.
- Ensure all users read and understand emergency, operating and radiation safety procedures.
- Ensure radioactive materials are used only by individuals who are authorized by the license.
- Certify employees who use portable moisture or density gauges and XRF devices by completing hands-on training, including, but not limited to, the following:
  - Train authorized users on gauge use and safety in correlation to Terracon's Our Rules to Live By. Explain the hazards of exposing the source rod during operation.
  - Discuss the importance of pre-task planning prior to and during gauge use.
  - Explain the hazards of using gauges on active construction sites, around mobile equipment, and in trenches or excavations.
  - Discuss Terracart use and purpose in respect to transporting density testing equipment around the site.
  - Explain the hazards of hammering or removing pins. Discuss correct hand position and glove selection.
  - Demonstrate the use of the YM3000 pin puller.
  - Demonstrate how to secure a gauge using two independent controls, block and brace, and explain the meaning of maintaining constant surveillance and control.
  - Train authorized users on how to complete bill of lading.
  - Explain the gauge paperwork binder, including the distance it must be within for the driver, along with documents required to be in the gauge box.



- Explain emergency procedures and the chain of command.
  - Sign off on the gauge user training certificate.
- Manage authorized user training certificates and recertifications. This includes initial gauge training, manufacturer training, gauge refreshers, and three-year DOT HAZMAT training.
- Must be readily available to accompany a state or federal radiation official during an inspection.
- Manage possession, use, storage, securement, and maintenance of sources and gauges in consistency with the limitations in the license, the sealed source and device registration certificate(s), and the manufacturer's recommendations and instructions.
- Verify gauges being stored on temporary job sites meet storage requirements. Note: Gauges can't be stored on temporary job sites longer than three months unless the location is added to the license.
  - Complete inspections on temporary job sites.
- Ensure gauges are transported in accordance with all applicable NRC and US Department of Transportation requirements.
- Maintain license, amendments, and renewal requests in a timely manner.
- Review license to determine capacity prior to gauge purchases or transfers.
- Ensure sealed sources are leak tested according to SSDR certificate(s) or state requirements, and the manufacturer's recommendations or instructions.
- Complete and document an inventory of all gauges, XRFs and survey meters at least every six months.
- Maintain records of equipment and gauges. Inventory must be maintained for a minimum of three years.
- Verify sealed source calibration at a 12-month interval or specified by state or SSDR.
- Calibration of the survey meter will be performed on an annual basis using a licensed calibration facility. Calibration Frequency will be at Intervals Not to Exceed: 12 months
- Notify proper authorities in case of accident, damage to, or malfunction of gauges, fire, loss, or theft.
- In the event of an emergency, be available and respond to a site with a survey meter.
- Monitor unusual occurrences involving the gauge (e.g. malfunctions, accidents, damage, theft, etc.) to ensure they are investigated, cause(s) are determined, appropriate corrective action(s) are identified, and corrections taken.
- Ensure licensed material is disposed of properly.
- If applicable, ensure personal monitoring devices are used and exchanged at the proper intervals.
- If applicable, review dosimetry reports for all monitored personnel to determine if unnecessary exposures are being received.

- Investigate within 30 days the cause of any dose considered to be excessive. If warranted, the RSO will take corrective actions to prevent a reoccurrence.
- Coordinate with CRSO if a user has declared pregnancy.
- Emphasize the As Low As Reasonably Allowable (ALARA) philosophy to users, instruct on current procedures, and provide guidance on relevant changes to reduce exposures.
- Maintain documentation to demonstrate by measurement or calculation that the total effective dose equivalent to the individual member of the public likely to receive the highest dose from the licensed operation does not exceed the annual limit by means of the annual storage location radiation survey.
- Complete the annual RSO inspection using Terracon's OGP SOS mobile application. Review findings with the office manager and ensure all noted corrective actions are corrected in a timely manner.
- Complete the monthly RSO inspection using Terracon's OGP SOS mobile application. Review findings with the office manager and all noted corrective actions are corrected in a timely manner.
- Coach gauge users who violate core rules or practices, safe right procedures, or demonstrate improper gauge use.

In the event of an RSO resignation or termination, the office or department manager must immediately notify the CRSO. Additionally, the office must find a qualified individual to serve as the acting RSO and submit completed certifications and delegation of authority to the CRSO.