11 February 2020

Ms. Janine Katanic
Senior Health Physicist
Division of Nuclear Materials Safety
Materials Inspection Branch
US Nuclear Regulatory Commission
Region IV
Janine.Katanic@nrc.gov

Re: 4 February 2020 Inspection of HGCMC – License No. 50-23276-01

Dear Ms. Katanic,

It was my pleasure to meet you last week and to accompany you and Eugene Laughlin (HGCMC RSO) while you conducted your inspection. During the inspection, it became clear to Gene and me that there were items that needed immediate addressing. This letter and attachments summarize the corrective actions taken to date and those to be completed shortly.

A portable gauge audit was completed using the checklist in Appendix E of the NUREG-1556 Volume 1, Rev. 2. To ensure that the audit is conducted, at least annually, the obligation was added to the Hecla Greens Creek Mining Company's (HGCMC) compliance register.

I was unable to verify if the prior RSO (Ted Morales) communicated with Klohn Crippen Berger (KCB) about the use of the Troxler portable gauge. KCB provided HGCMC with their training records for the three field QA/QC personnel on-site over 2015 and 2016. A Radiation Work Permit (RWP) program is being implemented to confirm that all gauge users are compliant with HGCMC policies and federal regulations. The RWP requires the signature of the RSO or the authorized user's supervisor, who minimally will meet the same standard of training as the authorized user.

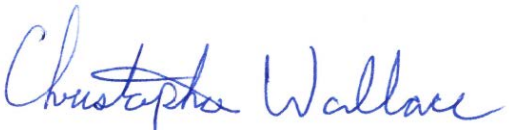
HGCMC's Standard Operating Procedure Use of Portable Nuclear Gauges, which include in the emergency and security procedures, were reviewed and updated (draft copy attached). A copy of the SOP will be maintained with each of the portable gauges.

Other items to be completed include labeling the Troxler case as to proper orientation while it is stored to decrease potential public exposure (ALARA), updating of the log sheet to include the

gauge used, and labeling the storage unit with a reminder that an RWP is required before using a gauge.

Should you require additional information, or have any other questions or concerns, I may be contacted via e-mail at cwallace@hecla-mining.com, or by phone at 907-790-8473.

Sincerely,



Christopher Wallace
Permitting and Environmental Compliance Coordinator
Hecla Greens Creek Mining Company

Attachments (4):

- 20190000 Portable Gauge Audit
- 20200206 Radiation Work Permit
- 20200206 HGCMC Compliance Register
- SOP Use of Portable Nuclear Gauges (draft)
- KCB Training Records

Portable Gauge Audit Checklist

Note: All areas indicated in audit notes may not be applicable to every license and may not need to be addressed during each audit. For example, licensees do not need to address areas that do not apply to their activities, and activities that have not occurred since the last audit need not be reviewed during the next audit.

Licensee's name Hecla Greens Creek Mine

License No. 50-23276-01

Date of Last Audit _____

Date of This Audit 2-4-2020

Audit Date Range 1 Jan 2019 – 31 Dec 2019

Auditor Signature	Eugene Laughlin Auditor Printed Name	2-4-2020 Date
Christopher Wallace Digitally signed by Christopher Wallace DN: cn=Christopher Wallace, o=Hecla Mining Company, ou=Greens Creek Mine, email=cwallace@hecla-mining.com, c=US Date: 2020.02.07 11:49:36 -09'00' Management Signature	Christopher Wallace Management Printed Name	7 February 2020 Date

1. AUDIT HISTORY

a. Were previous audits conducted periodically (at least annually)? (10 CFR 20.1101)

Audit tasks were being performed semi-annually, though not formally. Going forward, the Annual Audit is being added to the company standard and a form will be provided.

b. Were records of previous audits maintained? (10 CFR 20.2102)

Procedures are being implemented to ensure we are more consistent with this.

c. Were any deficiencies identified during the last two audits or 2 years, whichever is longer?

The RSO has not identified any issues during the last 2 years of semi-annual inspections.

d. Were corrective actions taken? (Look for repeated deficiencies)

Record keeping will be improved through use of this document, as well as additions to company SOP.

2. ORGANIZATION AND SCOPE OF PROGRAM

a. If the mailing address or places of use and/or storage changed, was the license amended? [License Condition (L/C)]

N/A , No change or amendments

N/A, No change in licensee status

c. If the licensee changed the radiation safety officer (RSO), was the license amended? (L/C)

There have been no changes.

d. Sealed Sources and Devices

1. Does the license authorize all of the NRC-regulated radionuclides contained in the gauges possessed? (L/C)

Yes.

2. Are the gauges as described in the Sealed Source and Device (SSD) registration certificate? (L/C)

Yes

3. Are copies of (or access to) SSD registration certificates available?

Yes.

4. Are manufacturer's manuals for operation and maintenance available? (10 CFR 32.210)
Yes.

5. Are the actual uses of gauges consistent with the authorized uses listed on the license? (L/C)

Yes.

6. Are the locations of use of the gauges compatible with the "Conditions of Normal Use" and "Limitations and/or Other Considerations of Use" on the SSD registration certificates? (L/C)

Yes.

e. Is the current inventory of material below the possession limits listed on the license? (L/C)

Currently source material matches the possession limit as listed on the license.

3. TRAINING AND INSTRUCTIONS TO WORKERS

a. Were all workers who are likely to exceed 1 mSv [100 mrem] in a year instructed per 10 CFR 19.12? Was refresher training provided, as needed? Were records maintained?

Yes. Past Dosimetry records indicate dosages to users are below 1 mSv

b. Is each gauge operator trained in accordance with license requirements? (L/C)

Yes. Duane Hevly provided on site instruction to the current gauge users.

c. Are training records maintained for each gauge operator?

Yes. Certificates of training completion, as well as 5000-23 task training forms.

d. Did interviews with operators reveal that they know the operating, emergency and security procedures?

Not to my satisfaction. These procedures will be better covered in the SOP and training will be renewed annually before use.

e. Did this audit[1] include observation of operators using the gauge in a field situation? Operating the gauge? Performing routine cleaning and lubrication? Transporting the gauge? Storing the gauge? Was the use of the gauge in accordance with regulations?

Gauges were in storage for the Winter, so not being used. Storage was secure.

f. Did the operator demonstrate safe handling and security during transportation, use, and storage?

Transportation was not observed however questioning revealed that improvement can be made to transportation procedures.

g. Was U.S. Department of Transportation (DOT) hazardous material (HAZMAT) training (required at least once every 3 years) provided as required? (49 CFR 172.700, 49 CFR 172.701, 49 CFR 172.702, 49 CFR 172.704)

Gauge user only moves the instrument on site, not on public areas. Should gauge need to be removed from property, employees involved with the shipping and handling maintain the appropriate DOT training.

4. RADIATION SURVEY INSTRUMENTS

a. If the licensee possesses its own survey meter, does the survey meter meet NRC requirements? [10 CFR 20.1501(c)]

Yes. There are 3 available, with at least 2 meters on site, calibrated annually,

b. Are calibration records maintained, if applicable? [10 CFR 20.2103(a)]

Yes. Calibration documents, provided by Ludlum, are kept in the transportation box.

5. GAUGE INVENTORY

a. Is a record kept showing the receipt of each gauge? [10 CFR 30.51(a)(1)]

b. Are all gauges physically inventoried every 6 months or at other intervals approved by the NRC? (L/C)

Yes. Inventory is taken semi-annually.

c. Are records of inventory with appropriate information maintained? (L/C)

Yes. Information recorded on semi-annual check sheet for wipe test and survey.

6. PERSONNEL RADIATION PROTECTION

a. Are considerations for keeping doses as low as is reasonably achievable (ALARA) incorporated into the radiation protection program? [10 CFR 20.1101(b)]

Yes.

b. Were prospective evaluations performed showing that unmonitored individuals receive less than the limits in 10 CFR 20.1502(a)? Did these evaluations consider doses to minors [10 CFR 20.1502(a)(2)] and declared pregnant women [10 CFR 20.1502(a)(3)]?

All employees with opportunity to be in proximity of gauges have been badged, with none , including users, receiving dosages even approaching limits.

c. Did unmonitored individuals' activities change during the year in a way that could put them over the limits in 10 CFR 20.1502(a)? If yes, was a new evaluation performed?

There have been no changes to either tasks or travel that would increase exposure to radiation from licensed material.

d. If external dosimetry is required [i.e., when individuals are likely to receive greater than the limits in 10 CFR 20.1502(a)], is dosimetry provided to these individuals? If yes, address the following:

1. Is the dosimetry supplier approved by the National Voluntary Laboratory Accreditation Program? [10 CFR 20.1501(c)]
   Yes, Landauer
2. Are the dosimeters exchanged at the appropriate frequency?
   Badges are changed out quarterly
3. Are dosimetry reports reviewed and signed by the RSO when they are received?
   Reports are reviewed quarterly as results are released by vendor. The records are available electronically from Landauer and paper copies are kept on file.

e. Are records of exposures, surveys, monitoring, and evaluations maintained? (10 CFR 20.2102, 10 CFR 20.2103, 10 CFR 20.2106)
Yes, Conducted semi-annually along with leak tests, with results kept on file.

7. PUBLIC DOSE

a. Are gauges stored in a manner to keep doses to members of the public below 1 millisievert (mSv) (100 mrem) in a year? [10 CFR 20.1301(a)(1)]

Yes. Gauges are in a locked steel container, located away from any habitation.

b. Has a survey or evaluation been performed per 10 CFR 20.1501(a)? Have there been any additions or changes to the storage, security, or use of the surrounding areas that would necessitate a new survey or evaluation?

Yes, surveys are done semi-annually, though there has been no change to procedures.

c. Do unrestricted area radiation levels exceed 0.02 mSv (2 mrem) in any one hour? [10 CFR 20.1301(a)(2)]

No. The highest readings are consistently below 0.20 mrem/hr adjacent to storage.

d. Are gauges being stored in a manner that would prevent unauthorized use or removal? (10 CFR 20.1801)

Yes. Gauges are stored in a locked steel container, in a locked metal cabinet, inside a locked box. The storage area is also located in an area that cannot be accessed by nonemployees.

e. Are records of surveys maintained? (10 CFR 20.2103, 10 CFR 20.2107)

Yes

8. OPERATING, EMERGENCY, AND SECURITY PROCEDURES

a. Have operating, emergency, and security procedures been developed and updated to incorporate any new elements, practices, or requirements?

Yes, however, they will be updated again prior to gauge use this year.

b. Does each operator have current copies of the operating, emergency, and security procedures, including current emergency telephone numbers?

They have access to current copies. Some new procedures will be implemented this year and retraining will take place before gauges are put into service.

c. Did any emergencies occur?

No there have not been any incidents.

1. If so, were they handled properly? N/A

2. Were appropriate corrective actions taken? N/A

d. Were gauges properly controlled or secured during use or storage? (10 CFR 20.1801, 10 CFR 20.1802)

For the most part, however during discussions with the user it became apparent that procedures for transportation on site will need to be improved.

e. Are the gauges in storage being secured with two independent physical controls? [10 CFR 30.34(i)]

Yes. They are located in a locked metal cabinet inside a steel storage container.

9. LEAK TESTS

a. Were sealed source leak tests performed every 6 months or at other authorized intervals? (L/C)

Yes, bi-annually. In April and October of every year. Testing performed by Ram Services.

b. Were leak tests performed in accordance with license requirements? (L/C)

Yes.

c. Are records of leak test results retained with all of the required information included? (L/C)

Yes.

d. Were any sources found to be leaking, and if yes, was the NRC notified? (L/C)

No. There has not been any indication of leaks.

10. MAINTENANCE OF GAUGES

a. Are manufacturer's procedures followed for routine cleaning and lubrication of the gauge?

Yes.

b. Does the source rod remain attached to the gauge during cleaning? (L/C)

Yes. The source rod is not removed from the gauge.

c. Is nonroutine maintenance performed where the source or source rod is detached from the gauge? If yes, was it performed according to license requirements (e.g., extent of work, individuals performing the work, procedures, dosimetry, survey instrument, compliance with limits under 10 CFR 20.1301, "Dose limits for individual members of the public")?

N/A. This type of service has not been and would not be performed on site.

d. Are labels, signs, and postings identifying gauges containing radioactive material, radiation areas and warnings clean and legible? Yes.

11. TRANSPORTATION

a. Were U.S. Department of Transportation (DOT)-7A or other authorized packages used? [49 CFR 173.415, 49 CFR 173.416(b)] Yes. Manufactures case was used for transport on site.

b. Are Type A package, engineering drawings, and performance test records on file? [49 CFR 171.2 (a, b, e), 49 CFR 173.415(a)] Yes. Provided by Troxler.

c. Were packages properly labeled? (49 CFR 172.400, 49 CFR 172.403, 49 CFR 172.406, 49 CFR 172.407) Yes.

d. Were packages closed and sealed (e.g., locked) during transport? [49 CFR 173.475(f)]

Yes. Manufactures case was used and locked.

e. Were shipping papers prepared and used? [49 CFR 172.200(a)]

The gauges were never transported or used off site in public areas or roads.

f. Were packages secured against movement? (49 CFR 177.834)\

This is an area that we will need to address before gauge is used again. The need to secure the instrument in the vehicle, even though it is on private property will need to be emphasized.

12. NOTIFICATION AND REPORTS

a. Did any reportable incidents occur? Were the appropriate notifications made to the NRC Emergency Operations Center (301-816-5100)? Examples of incidents with notification requirements are as follows:

1. Lost or stolen radioactive material (10 CFR 20.2201)

2. Overexposures or high radiation levels (10 CFR 20.2202)

3. Gauge is disabled or fails to function as designed [10 CFR 30.50(b)(2)]

4. Generic equipment issues identified by the licensee (10 CFR 21.21)

N/A. There were no events.

13. POSTING AND LABELING

a. Is NRC Form 3, “Notice to Employees,” posted? (10 CFR 19.11)

Yes, though it was not the current revision, that has been corrected now to the new one.

b. Are NRC regulations and license documents posted, or is a notice posted stating where these documents are located? (10 CFR 19.11, 10 CFR 21.6)
Notice is posted giving the RSO’s contact information.

Annual Radiation Safety Audit
For Portable Gauge Users

14. DECOMMISSIONING

a. Were any locations of use or separate buildings decommissioned since the last audit? Were appropriate notifications made or license amendments requested? (10 CFR 30.36)

Not in the last year but since the last Audit. Notifications and amendments were made.

b. Are records kept of information important to decommissioning? [10 CFR 30.35(g)]

Yes. The information of how and where the decommissioned gauges were taken is on file.

15. GENERIC COMMUNICATIONS AND NEWSLETTER

a. Are NRC Regulatory Issue Summaries, NRC Information Notices, and Office of Nuclear Material Safety and Safeguards quarterly newsletters received?

No. I have not received any notifications from NRC.

b. Is appropriate training and action taken in response to these? N/A.

16. EVALUATION OF OTHER FACTORS

a. Is senior licensee management appropriately involved with the radiation protection program and/or RSO oversight? Yes.

b. Does the RSO have sufficient time to perform his or her radiation safety duties? Yes.

c. Does the licensee have sufficient staff to support the radiation protection program? Yes.

17. DEFICIENCIES IDENTIFIED IN AUDIT AND CORRECTIVE ACTIONS

1)Annual Audits need to be better recorded. The current RSO is now informed of requirements and will see that this task is performed.

2)We will need to have an annual refresher of the SOP for Portable Gauge Use by the Users prior to using the gauges, to ensure that they are familiar with and following all procedures.

3) A Portable Gauge Use permit system will need to be implemented to ensure procedures are followed.

Hecla Greens Creek Mining Company

Radiation Work Permit

A radiation work permit (RWP) is necessary for all work associated with gauges covered under NRC License No. 50-23276-01.

Requestor:_____ Date: _____

Location: _____

User :_____Training current **Y / N** ; Dosimetry **Y / N**

User :_____Training current **Y / N** ; Dosimetry **Y / N**

User :_____Training current **Y / N** ; Dosimetry **Y / N**

Time Gauge Removed from Storage:_____ Returned:_____

Instrument & Model:_____Log Entry:_____

Condition of Gauge: _____

Shutter Function:_____

Gauge Cleaned or Lubed:_____

Remarks:_____

_____

_____

Dosimetry badges will be worn on chest through out exposure to Gauge.

Access to gauge requires current Training and Dosimetry.

_____/ /____

Requestor Signature Print Name Date

_____/ /____

RSO/Supervisor Signature Print Name Date.

HECLA GREENS CREEK - PERMIT OBLIGATIONS REGISTRY

PERMIT ACTIVITIES											PERMIT INFORMATION											
ACTIVITY Identification.	ACTIVITY TYPE	ACTIVITY DETAILS	TASK FREQUENCY	DUE DATE(s)	RESPONSIBLE DEPARTMENT	Responsible Position	SUPPORTING DEPARTMENT	Supporting Position	STATED RELATED REQUIREMENTS	NOTES	PERMIT Identification.	TITLE OF PERMIT	AGENCY PERMIT NUMBER	PERMIT SECTION(S)	CATEGORY	AGENCY	PERMIT TYPE	RANKING	LOCATION / SCOPE OF AUTHORIZATION	EFFECTIVE DATE	EXPIRATION DATE	REAPPLY DATES OR REQUIREMENTS	NOTES
21-1	Roles/Responsibilities	Cover letter details the responsibilities of the Radiation Safety Officer (RSO). RSO for this license is provided to Eugene Laughlin only. RSO must have completed one of the training courses in NUREG-1556 RSO responsibilities include: -overall management of the radiation safety program -identifying radiation safety problems -initiating or recommending corrective actions -ensuring compliance with the license -day to day management of the program	As required	n/a	Mill Operations	RSO	Governmental Affairs and Public Relations	Permitting and Environmental Compliance Coordinator	NRC's Safety Culture Policy Statement www.nrc.gov/about-nrc/regulatory/enforcement/safety-culture.html.	n/a	21	Nuclear Materials License - Amendment	License No. 50-23276-01 Amendment No. 17 Docket No. 030-20447	Covering letter 12 11	License	U.S. NRC	Other	High	Authorizes Hecla Greens Creek Mining Company to receive, acquire, possess and transfer by-product, source, and special nuclear material designated in the license; to use such materials for the purpose(s) and at the place(s) designated in the license; to deliver or transfer such material to persons authorized to receive it.	November 10, 2014	January 31, 2024	Submit a complete renewal application or termination request at least 30 days before the expiration date.	
21-2	Operational	Licensed by-product, source, and/or special nuclear material: A. Cesium-137 B. Americuium-241:Be C. Americium-241:Be A, B and C may be used and/or stored only at the Environmental Storage Trailer #4 at the Hawk Inlet facility.	Continuous compliance required	n/a	Mill Operations	RSO	Governmental Affairs and Public Relations	Permitting and Environmental Compliance Coordinator	n/a	Section 7 provides the approved chemical and/or physical form of the sources. Section 8 provides the maximum amount of possession at any one time. Section 9 provides details on authorized uses of gauging devices.	21	Nuclear Materials License - Amendment	License No. 50-23276-01 Amendment No. 17 Docket No. 030-20447	6 10	License	U.S. NRC	Other	High	Authorizes Hecla Greens Creek Mining Company to receive, acquire, possess and transfer by-product, source, and special nuclear material designated in the license; to use such materials for the purpose(s) and at the place(s) designated in the license; to deliver or transfer such material to persons authorized to receive it.	November 10, 2014	January 31, 2024	Submit a complete renewal application or termination request at least 30 days before the expiration date.	
21-3	Staff/Contractor Awareness and Training	Licensed materials may be used directly by or under the physical supervision of, individuals who have received the training described in the July 19, 2013 application and letter of January 9, 2014.	As Required	n/a	Mill Operations	RSO	Governmental Affairs and Public Relations	Permitting and Environmental Compliance Coordinator	Training described in the July 19, 2013 application and letter of January 9, 2014	n/a	21	Nuclear Materials License - Amendment	License No. 50-23276-01 Amendment No. 17 Docket No. 030-20447	11	License	U.S NRC	Other	High	Authorizes Hecla Greens Creek Mining Company to receive, acquire, possess and transfer by-product, source, and special nuclear material designated in the license; to use such materials for the purpose(s) and at the place(s) designated in the license; to deliver or transfer such material to persons authorized to receive it.	November 10, 2014	January 31, 2024	Submit a complete renewal application or termination request at least 30 days before the expiration date.	
21-4	Maintenance	Requirements, including methods and qualifications, for testing of leakage and/or contamination from sealed sources are outlined in Section 13. - testing must be at intervals specified in the certificate of registration issued by the US NRC. -in absence of a certificate, the sealed source or detector cell must be tested prior to use. -records of leak tests must be keep in units of microcuries and shall be maintained for 3 years.	Frequency of testing as per certificate of registration. At least every 10 years for sealed sources in storage.	As determined by the licensee.	Mill Operations	RSO	Governmental Affairs and Public Relations	Permitting and Environmental Compliance Coordinator	10 CFR 32.10	n/a	21	Nuclear Materials License - Amendment	License No. 50-23276-01 Amendment No. 17 Docket No. 030-20447	13	License	U.S. NRC	Other	High	Authorizes Hecla Greens Creek Mining Company to receive, acquire, possess and transfer by-product, source, and special nuclear material designated in the license; to use such materials for the purpose(s) and at the place(s) designated in the license; to deliver or transfer such material to persons authorized to receive it.	November 10, 2014	January 31, 2024	Submit a complete renewal application or termination request at least 30 days before the expiration date.	
21-5	Maintenance Inspection	All sources and/or devices covered under this license must be accounted for through a physical inventory. Records must be maintained for 5 years from the date	Every 6 months		Mill Operations	RSO	Governmental Affairs and Public Relations	Permitting and Environmental Compliance Coordinator	n/a	Inventory records must detail: -date of the inventory -radionuclides -quantities -manufacturer's name and model numbers	21	Nuclear Materials License - Amendment	License No. 50-23276-01 Amendment No. 17 Docket No. 030-20447	15	License	U.S. NRC	Other	High	Authorizes Hecla Greens Creek Mining Company to receive, acquire, possess and transfer by-product, source, and special nuclear material designated in the license; to use such materials for the purpose(s) and at the place(s) designated in the license; to deliver or transfer such material to persons authorized to receive it.	November 10, 2014	January 31, 2024	Submit a complete renewal application or termination request at least 30 days before the expiration date.	
21-6	Operation	Each portable gauge shall have a lock or out locked container. The gauge or its container must be locked when in transport, storage or removed from direct surveillance of an authorized user.	As required	n/a	Mill Operations	RSO	Governmental Affairs and Public Relations	Permitting and Environmental Compliance Coordinator	n/a	n/a	21	Nuclear Materials License - Amendment	License No. 50-23276-01 Amendment No. 17 Docket No. 030-20447	17	License	U.S. NRC	Other	High	Authorizes Hecla Greens Creek Mining Company to receive, acquire, possess and transfer by-product, source, and special nuclear material designated in the license; to use such materials for the purpose(s) and at the place(s) designated in the license; to deliver or transfer such material to persons authorized to receive it.	November 10, 2014	January 31, 2024	Submit a complete renewal application or termination request at least 30 days before the expiration date.	
21-7	Maintenance	Cleaning, maintenance or repair of gauges that require removal of the source or source rod from the gauge shall be performed by the manufacturer or other person specifically licensed by the NRC. In general, sealed sources or source rods shall not be opened or sources removed from the rod except as authorized.	As required	n/a	Mill Operations	RSO	Governmental Affairs and Public Relations	Permitting and Environmental Compliance Coordinator	n/a	n/a	21	Nuclear Materials License - Amendment	License No. 50-23276-01 Amendment No. 17 Docket No. 030-20447	18 14	License	U.S. NRC	Other	High	Authorizes Hecla Greens Creek Mining Company to receive, acquire, possess and transfer by-product, source, and special nuclear material designated in the license; to use such materials for the purpose(s) and at the place(s) designated in the license; to deliver or transfer such material to persons authorized to receive it.	November 10, 2014	January 31, 2024	Submit a complete renewal application or termination request at least 30 days before the expiration date.	
21-8	Audit	Licensees must review the content and implementation of their radiation protection programs at least annually to ensure the following: -Programs comply with NRC and U.S. DOT regulations (as applicable) with the terms of the license. -Occupational doses and doses to members of the public are ALARA.	Annual		Mill Operations	RSO	Governmental Affairs and Public Relations	Permitting and Environmental Compliance Coordinator	n/a	Reference NUREG-1556 Volume 1, Rev 2 Appendix E for an example of a portable gauge audit checklist.	21	Nuclear Materials License - Amendment	License No. 50-23276-01 Amendment No. 17 Docket No. 030-20447		License	U.S. NRC	Other	High	Authorizes Hecla Greens Creek Mining Company to receive, acquire, possess and transfer by-product, source, and special nuclear material designated in the license; to use such materials for the purpose(s) and at the place(s) designated in the license; to deliver or transfer such material to persons authorized to receive it.	November 10, 2014	January 31, 2024	Submit a complete renewal application or termination request at least 30 days before the expiration date.	

Standard Operating Procedure
Use of Portable Nuclear Gauges

PURPOSE:

To define and address elements unique to the safe transport and use of Portable Nuclear Gauges at Hecla Greens Creek Mining Company (HGCMC). Regularly performed tasks and those posing specific hazards are evaluated and communicated to all employees so that the proper Health, Safety, and Environmental (HSE) precautions can be taken.

Standard Operating Procedures exist to ensure that all HSE issues have been addressed and guidelines established for the involved task.

SCOPE:

This procedure applies to HGCMC located on Admiralty Island, Alaska, and to the use, transport, and storage of gauges containing radioactive source material.

RESPONSIBILITY:

The Manager of Health and Safety and/or his/her designee is responsible for implementation and periodic review of this procedure.

The Radiation Safety Officer (RSO) and/or Superintendent of Surface Operations are responsible for ensuring compliance with this procedure.

Each employee is responsible for compliance with this procedure, and identification of all possible job hazards and HSE concerns associated with the use and possession of instruments containing radioactive source material.

HEALTH AND SAFETY:

All employees, contractors, vendors, and visitors are required to perform tasks safely, following safe practices identified through Safety Standards or officially approved Standard Operating Procedures.

The use of instruments that emit ionizing radiation is a task with some risk. To mitigate the risk, it is critical that the operator abides by all operational guidelines as laid out in this SOP.

Standard Operating Procedure
Use of Portable Nuclear Gauges

PROCESS:

Approximately half of the Tailings generated from the processing of ore through Greens Creek's Mill is deposited in a dry stack placement area. This finely ground rock must be compacted to allow placement of subsequent layers as well as to limit water saturation that would erode the Tailings pile.

One way of ensuring optimal compaction is by use of gauges, which can test and determine the density and moisture content of the compacted material, without disturbing the placement.

Nuclear gauges, that emit ionizing radiation, are industry standard for performing these tests.

A rod or probe containing the nuclear source material, Ce-137 or AmBe 241, is inserted into a small hole drilled into the ground. The source material emits radiation, which passes through the compacted tailings and is read by a detector in the base of the instrument. The denser the ground that the radiation passes through, the lower the counts of detections. This number is then used to calculate compaction.

The ionizing radiation, that makes these compaction tests possible, presents a risk to employees, and the public, if not properly handled. Due to the health dangers of radiation, the US government has a department, the Nuclear Regulatory Commission (NRC), that regulates the use and handling of radioactive materials.

A license must be obtained from the NRC to possess a radioactive isotope, and the directions contained in that license must be followed. These requirements include directions on storing, transport, use, and training of personnel. It also requires a Radiation Safety Officer (RSO) to oversee and ensure safe operation of the radiation protection program, performing surveys and audits to ensure compliance with the license and regulations, making sure that radiation exposures are As Low As Reasonably Achievable (A.L.A.R.A.).

There may be different conditions encountered while handling and transporting instruments containing nuclear sources. The Gauge

Standard Operating Procedure
Use of Portable Nuclear Gauges

Operators must familiarize themselves with each job, yet the circumstances may change.

Remember **SAFETY FIRST!** Perform a "Take 5" Risk Assessment before all jobs. If you have any questions, ASK.

1) TRAINING

a) Authorized Users:

- Anyone using Portable Nuclear Gauges on Hecla Greens Creek property must have documentation of training as a Nuclear Gauge User.
- Initial training will be a portable gauge manufacturer's course for users and hands-on training in the use of portable gauges.

Training should consist of –

- 2 hours of radiation safety and regulatory requirements, emphasizing safe use of the gauge; radiation versus contamination; internal versus external exposure; concepts of A.L.A.R.A.; supervision of gauges; location of the sealed source within the portable gauges; inventory; recordkeeping; incidents; licensing and inspection by the regulatory agency; need for complete and accurate information; employee protection; and deliberate misconduct.
- 2 hours of practical training to include portable gauge theory, operating procedures, emergency procedures, security, maintenance, and transportation procedures; and field training emphasizing radiation safety, controlling and maintaining surveillance over the portable gauge, performing routine cleaning and lubrication, packaging and transporting the gauge, storing the gauge, and following emergency and security procedures.

- Annual Refresher training will be performed each year by the RSO, covering Greens Creek Mine nuclear safety procedures.

b) Awareness:

- Anyone that may encounter a Portable Nuclear Gauge, working in the vicinity of but not using a gauge, during the performance of their duties at Greens Creek, must have Awareness Training.
- Awareness training can be the same as the annual refresher for Gauge users.
- Awareness training is refreshed annually.

2) RADIATION DOSE

a) Dose Monitoring:

- Any Authorized User performing tasks or duties that will put them in the proximity of a gauge or nuclear source, must wear a personal dosimeter, that is assigned to them.

    - Greens Creek employees, that are Authorized Users, will each have badges assigned to them, that are changed out quarterly.
    - Contractors, using their company instruments, will be monitored under their dosimetry program, as directed by their license.
    - Contractors working with or in the proximity of Greens Creek's instruments will be assigned a Greens Creek visitors badge that will be worn in conjunction with the badge or device from their dosimetry program.
        - Visitor badges will only be assigned to one person and will be stored at Greens Creek, alongside the quarterly control badge. They will be changed out quarterly with Greens Creek's devices.
        - The name of the contractor and the company they work for will be recorded, along with the dates and times they were monitored.

- Employees working with nuclear gauges found not to be wearing dosimetry will be subject to disciplinary action.

- Awareness trained personnel and all other employees will not be badged. Since only Authorized Users will be allowed in proximity, that is within 15' of the instruments while in use.

b) Exposure Limits:

- All Greens Creek employees are considered members of the public, as far as the radiation dose is concerned.
- Employees are not to receive more than 100 mrem of occupational radiation a year, and no more than 2 mrem in any one hour.
- If personal monitoring indicates that an employee has attained or is approaching these dosages, their exposure to nuclear gauges and materials will be restricted.

Exposures will always be kept A.L.A.R.A..

3) STORAGE

a) Location:

- Portable Gauges will be stored in the steel container, located on the upper truck pad at Hawk Inlet, which is designated for the storage of radioactive sources.
- Whenever the instrument is not actively being used, it will be secured in the Radiation container.

b) Security:

- It is specifically required to use a minimum of two independent physical controls to secure the gauge.
- Portable gauges are kept in their locked transportation cases, that are stored inside a locked cabinet, inside of a locked steel container.
- The keys that secure the gauges will be kept in the control of the Surface Superintendent and/or the RSO.
  The keys will be released to a Greens Creek Authorized User only after a Radiation Work Permit has been acquired.

- At all times the gauge must either be:

  • under the control and constant surveillance of a gauge user;

OR

• secured with a minimum of two independent physical controls that form tangible barriers to secure gauges from unauthorized removal. This requirement must be met at all times when in storage and including temporary job sites.

4) TRANSPORTATION

- Always ensure the shutter is closed before moving a gauge.
- Portable Gauges will be kept in the locked manufacturer's transportation case while in transit from storage to the worksite.
- The locked transportation case with a gauge will be confined against movement in the bed of a pick-up, during transport, by brackets, straps, or a box that is firmly attached to the bed of the truck.
- The gauge will be secured from theft or tampering by 2 locked chains positioned to prevent the opening of the case lid or the removal of the case. Optionally, the case can be secured inside a locked bed box with a single chain and lock.

5) EMERGENCY PROCEDURES

a) Lost or Stolen Gauge:

- Immediately notify the Radiation Safety Officer (RSO). The emergency contact information is on the lines below.

  The RSO is Eugene Laughlin

  Contact is 523-6492 or Mill Shifter for contact info

  The regulatory agency is the Nuclear Regulatory Commission (NRC) Immediately notify the NRC Operations Center at 301-816-5100.

b) Damaged Gauge: Including stuck shutter or fugitive source.

- Locate the gauge and/or sources. Do not touch or move the gauge.

- Immediately tape off an area in a 20' radius around the nuclear gauge and/or sources.
- Do not leave the area unattended. Keep all unauthorized personnel away from the nuclear gauge or source.
- If a vehicle is involved, it must be stopped until the extent of contamination, if any, can be established.
- From a distance, the gauge user should perform a visual inspection of the nuclear gauge to determine if the source housing or shielding has been damaged.
- Use a survey meter to measure the dose rate, starting at a distance and moving closer, to ascertain activity levels and confirm source presence. Do not exceed 2 mrem of exposure.
- Contact the company RSO. Provide the RSO with the following:

  - The date, time, and location of the accident.
  - The gauge model and serial number.
  - The nature of the accident.
  - The location and condition of the gauge and/or source.
  - The dose rate at 1 m (3 ft.) from the gauge. If possible.

- If you are unable to reach the RSO, maintain isolation, and contact Safety.
- Follow the instructions of the RSO. The RSO may need to report the incident to the regulatory agency. The RSO may also be required to notify the USDOT of accidents during transport off-site.

Hazards, Safety Rules, and Procedures

1. Always ensure the shutter is functioning correctly before using or transporting a gauge.
2. Ionizing Radiation, such as used in Portable Gauges, can be harmful to your health.
3. Keep exposure A.L.A.R.A.. Limit the amount of time spent near the gauge, step away whenever possible.
4. If there is a problem, your first action is to take 3 giant steps away from the gauge. Distance will reduce your exposure.
5. If you don't have a dosimetry badge, don't go near the gauge.
6. Never leave the gauge unattended, lock it up.
7. In case of exposure, be sure to record who was exposed, the distance from the source and how long they were exposed.

Standard Operating Procedure
Use of Portable Nuclear Gauges

REVISION HISTORY:

CM#	Description of Change	Prepared By	Date
	Initial Release	Eugene Laughlin	

KCB Training Records

Stuart Hunt
& Associates Ltd.

ONLINE TRAINING

CERTIFICATE OF COMPLETION

Fabien Rasselet

has successfully completed

Radiation Safety & TDG - Portable Gauge Users

on May 08, 2013 via the 'AVANTI E-training System'.

Expires on May 08, 2016

Student E-mail: frasselet@klohn.com

Avanti
e-training system

Stuart Hunt & Associates Ltd

ONLINE TRAINING CENTRE

ONLINE TRAINING

CERTIFICATE OF COMPLETION

Mr. Fabien Rasselet

HAS SUCCESSFULLY COMPLETED

Radiation Safety & TDG - Portable Gauge Users

On Sep 28, 2016 via the AVANTI E-training System

Expires on: Sep 28, 2019

Mark: 100%
Minimum Required: 100%

Student E-mail: frasselet@klohn.com

Avanti e-training system

Certificate of Training for

Use of Portable Nuclear Gauge &
KCB Radiation Safety Program

Fabien Rasselet
c/o 500 - 2955 Virtual Way,
Vancouver, British Columbia, V5M 4X6
has completed the SafeTrain training course. This training is in accordance with the requirements of the Transportation of Dangerous Goods Act and Regulation, and the Nuclear Safety and Control Act and Regulations

KLOHN CRIPPEN BERGER LTD.

Training Received
A Classification, nature and characteristics
B Packaging requirements
C Safety marking requirements
D Documentation requirements
E Special precautions requirements
F Reporting requirements
G Emergency action requirements
H Proper equipment use
I Safety equipment use

Radiation Safety Officer's Signature	Sep 28, 2016 Date of Issue	Employee's Signature	Sep 28, 2017 Date of Expiry

Certificate of Training

Employee: Fabien Rasselet

has completed the training described on the reverse, in accordance with the requirements of the Transportation of Dangerous Goods Regulations.

Employer: Klohn Crippen Berger Ltd.

Employer's Address: 500-2955 Virtual Way

Vancouver, BC V5M 4X6

Issue date: September 28, 2016

Expires on: Sep 28, 2019

Stuart Hunt & Associates Ltd.

www.stuarthunt.com
800-661-4591

All aspects of handling and transporting **Class 7** materials by road for the packages indicated with an "x":

Package Type

- Excepted packages
- Industrial packages
- **X** - Type A packages
- Type B packages
- Type C packages
- Type H packages

Employee Signature

Employer Signature (RSO)

To Complete the TDG Wallet Certificate:

1. Print the card on a heavier bond paper or cardstock (recommended).
2. Legibly print the employers name in the space provided.
3. Legibly print the employer's place of business in the address space provided. Place of business could be a local office, a regional office or a head office.
4. The employee and the employer (RSO or other authorized person) must sign the card in the respective location.
5. Scan or photocopy the signed document for your records. Inspectors will ask to see a signed copy of the card on file.
6. Cut along the solid outer border to remove the card.
7. Fold the card in half along the dotted line.
8. It is recommended that the card be laminated to increase its durability.

Klohn Crippen Berger

RADIATION SAFETY TRAINING CHECKLIST

Before training with the Radiation Safety Officer

Hands-On Training Requirements		Time	Initials
1.	a. Complete Stuart Hunt TDG Class 7 online training course	4 hours	
	b. Read KCB's Radiation Safety Program Manual on Infodesk	30 minutes	
	c. Complete KCB's Radiation Safety video and complete the quiz on Infodesk	30 minutes	
	d. Read Troxler's nuclear gauge operation manual and quick reference card on Infodesk	30 minutes	
	e. Review KCB's Job Hazard Analysis (#208) on use of Nuclear Gauge on Infodesk	15 minutes	

Hands-on training with the Radiation Safety Officer

Section I: KCB Radiation Safety Program Training		Time	Initials
2.	a. License and organizational structure b. Responsibilities c. Radiation exposure limits d. Radiation survey meter e. Dosimeter Usage f. Emergency procedures	20 minutes	
Section II: Nuclear Gauge Storage			
3.	a. Security requirements b. Signage requirements c. Radiation level requirements d. Documents to be posted e. Short term (< 90 days) and long term (>90 days) storage	20 minutes	
Section III: Transportation			
4.	a. Packing and labelling b. Internal and external shipping c. Shipping documents d. Road restrictions	20 minutes	
Section IV: Use of Portable Gauge			
5.	Before use: a. Checking gauge / container condition and labels b. Checking shutter and slide block	15 minutes	
	Using portable nuclear gauge: a. Turning on/off, battery charging and self-checking b. Standard count and requirements c. Adjusting settings d. Handling on site e. Preparing test location(s) f. Conducting tests	40 minutes	
	Maintenance and calibration: a. Cleaning b. Collecting leak test samples c. Lubrication d. Changing battery	20 minutes	

Expected training time: 8 hours total

Confirm that all training requirements listed above are complete by signing below

Operators Name:	FABIEN RASSELET	Signature:		Date: (yyyy-mm-dd) 2016-09-28
RSO Name:	Bin Yuan	Signature:		Date: (yyyy-mm-dd) 2016-09-28

Stuart Hunt & Associates Ltd

ONLINE TRAINING CENTRE

ONLINE TRAINING

CERTIFICATE OF COMPLETION

Jim Casey

HAS SUCCESSFULLY COMPLETED

Radiation Safety & TDG - Portable Gauge Users

On Aug 9, 2016 via the AVANTI E-training System

Expires on: Aug 9, 2019

Mark: 100%
Minimum Required: 100%

Student E-mail: JCasey@klohn.com

Avanti e-training system

Certificate of Training for

Use of Portable Nuclear Gauge &
KCB Radiation Safety Program

Jim Casey
c/o 500 - 2955 Virtual Way,
Vancouver, British Columbia, V5M 4X6
has completed the SafeTrain training course. This training is in accordance with the requirements of the Transportation of Dangerous Goods Act and Regulation, and the Nuclear Safety and Control Act and Regulations

KLOHN CRIPPEN BERGER LTD.

Training Received
A Classification, nature and characteristics
B Packaging requirements
C Safety marking requirements
D Documentation requirements
E Special precautions requirements
F Reporting requirements
G Emergency action requirements
H Proper equipment use
I Safety equipment use

Radiation Safety Officer's Signature

Aug 8, 2016
Date of Issue

Employee's Signature

Aug 8, 2017
Date of Expiry

Certificate of Training

Employee: Jim Casey
has completed the training described on the reverse, in accordance with the requirements of the Transportation of Dangerous Goods Regulations.

Employer: Klohn Crippen Berger Ltd.

Employer's Address: 500 - 2955 Virtual Way
Vancouver, BC V5M 4X6

Issue date: August 9, 2016
Expires on: Aug 9, 2019

Stuart Hunt & Associates Ltd.
www.stuarthunt.com
800-661-4591

All aspects of handling and transporting **Class 7** materials by road for the packages indicated with an "x":

Package Type

- Excepted packages
- Industrial packages
X - Type A packages
- Type B packages
- Type C packages
- Type H packages

Employee Signature

Employer Signature (RSO)

To Complete the TDG Wallet Certificate:

1. Print the card on a heavier bond paper or cardstock (recommended).
2. Legibly print the employers name in the space provided.
3. Legibly print the employer's place of business in the address space provided. Place of business could be a local office, a regional office or a head office.
4. The employee and the employer (RSO or other authorized person) must sign the card in the respective location.
5. Scan or photocopy the signed document for your records. Inspectors will ask to see a signed copy of the card on file.
6. Cut along the solid outer border to remove the card.
7. Fold the card in half along the dotted line.
8. It is recommended that the card be laminated to increase its durability.

Klohn Crippen Berger

RADIATION SAFETY TRAINING CHECKLIST

Before training with the Radiation Safety Officer

Hands-On Training Requirements		Time	Initials
1.	a. Complete Stuart Hunt TDG Class 7 online training course	4 hours	
	b. Read KCB's Radiation Safety Program Manual on Infodesk	30 minutes	
	c. Complete KCB's Radiation Safety video and complete the quiz on Infodesk	30 minutes	
	d. Read Troxler's nuclear gauge operation manual and quick reference card on Infodesk	30 minutes	
	e. Review KCB's Job Hazard Analysis (#208) on use of Nuclear Gauge on Infodesk	15 minutes	

Hands-on training with the Radiation Safety Officer

Section I: KCB Radiation Safety Program Training		Time	Initials
2.	a. License and organizational structure b. Responsibilities c. Radiation exposure limits d. Radiation survey meter e. Dosimeter Usage f. Emergency procedures	20 minutes	
Section II: Nuclear Gauge Storage			
3.	a. Security requirements b. Signage requirements c. Radiation level requirements d. Documents to be posted e. Short term (< 90 days) and long term (>90 days) storage	20 minutes	
Section III: Transportation			
4.	a. Packing and labelling b. Internal and external shipping c. Shipping documents d. Road restrictions	20 minutes	
Section IV: Use of Portable Gauge			
5.	Before use: a. Checking gauge / container condition and labels b. Checking shutter and slide block	15 minutes	
	Using portable nuclear gauge: a. Turning on/off, battery charging and self-checking b. Standard count and requirements c. Adjusting settings d. Handling on site e. Preparing test location(s) f. Conducting tests	40 minutes	
	Maintenance and calibration: a. Cleaning b. Collecting leak test samples c. Lubrication d. Changing battery	20 minutes	

Expected training time: 8 hours total

Confirm that all training requirements listed above are complete by signing below

Operators Name: JIM CASEY	**Signature:**	**Date:** 2016-08-08 *yyyy-mm-dd*
RSO Name: Ben Kwan	**Signature:**	**Date:** 2016-08-08 *yyyy-mm-dd*

Stuart Hunt
& Associates Ltd.

ONLINE TRAINING

CERTIFICATE OF COMPLETION

Jim Casey

has successfully completed

Radiation Safety & TDG - Portable Gauge Users

on Jul 07, 2013 via the 'AVANTI E-training System'.

Expires on Jul 07, 2016

Student E-mail: JCasey@klohn.com

Avanti
e-training system

Stuart Hunt & Associates Ltd

ONLINE TRAINING CENTRE

ONLINE TRAINING

CERTIFICATE OF COMPLETION

Mr. Maxwell Cronk

HAS SUCCESSFULLY COMPLETED

Radiation Safety & TDG - Portable Gauge Users

On Aug 16, 2016 via the AVANTI E-training System

Expires on: Aug 16, 2019

Mark: 100%
Minimum Required: 100%

Student E-mail: MCronk@klohn.com

Avanti e-training system

Certificate of Training

Employee: Maxwell Cronk

has completed the training described on the reverse, in accordance with the requirements of the Transportation of Dangerous Goods Regulations.

Employer: Klohn Crippen Berger

Employer's Address: 500-2955 Virtual Way
Vancouver, BC, V5M 4X6

Issue date: August 16, 2016

Expires on: Aug 16, 2019

Stuart Hunt & Associates Ltd

www.stuarthunt.com
800-661-4591

All aspects of handling and transporting **Class 7** materials by road for the packages indicated with an "x":

Package Type

- Excepted packages
- Industrial packages
- **X** - Type A packages
- Type B packages
- Type C packages
- Type H packages

Employee Signature

Employer Signature RSO

To Complete the TDG Wallet Certificate:

1. Print the card on a heavier bond paper or cardstock (recommended).
2. Legibly print the employers name in the space provided.
3. Legibly print the employer's place of business in the address space provided. Place of business could be a local office, a regional office or a head office.
4. The employee and the employer (RSO or other authorized person) must sign the card in the respective location.
5. Scan or photocopy the signed document for your records. Inspectors will ask to see a signed copy of the card on file.
6. Cut along the solid outer border to remove the card.
7. Fold the card in half along the dotted line.
8. It is recommended that the card be laminated to increase its durability.

Certificate of Training for

Use of Portable Nuclear Gauge &
KCB Radiation Safety Program

Maxwell Cronk

c/o 500 - 2955 Virtual Way,
Vancouver, British Columbia, V5M 4X6
has completed the SafeTrain training course. This training is in accordance with the requirements of the Transportation of Dangerous Goods Act and Regulation, and the Nuclear Safety and Control Act and Regulations

KLOHN CRIPPEN BERGER LTD.

Training Received
A Classification, nature and characteristics
B Packaging requirements
C Safety marking requirements
D Documentation requirements
E Special precautions requirements
F Reporting requirements
G Emergency action requirements
H Proper equipment use
I Safety equipment use

Radiation Safety Officer's Signature	Aug 16, 2016 Date of Issue	Employee's Signature	Aug 16, 2017 Date of Expiry

Klohn Crippen Berger

RADIATION SAFETY TRAINING CHECKLIST

Before training with the Radiation Safety Officer

Hands-On Training Requirements		Time	Initials
1.	a. Complete Stuart Hunt TDG Class 7 online training course	4 hours	MC
	b. Read KCB's Radiation Safety Program Manual on Infodesk	30 minutes	MC
	c. Complete KCB's Radiation Safety video and complete the quiz on Infodesk	30 minutes	MC
	d. Read Troxler's nuclear gauge operation manual and quick reference card on Infodesk	30 minutes	MC
	e. Review KCB's Job Hazard Analysis (#208) on use of Nuclear Gauge on Infodesk	15 minutes	MC

Hands-on training with the Radiation Safety Officer

Section I: KCB Radiation Safety Program Training		Time	Initials
2.	a. License and organizational structure b. Responsibilities c. Radiation exposure limits d. Radiation survey meter e. Dosimeter Usage f. Emergency procedures	20 minutes	MC
Section II: Nuclear Gauge Storage			
3.	a. Security requirements b. Signage requirements c. Radiation level requirements d. Documents to be posted e. Short term (< 90 days) and long term (>90 days) storage	20 minutes	MC
Section III: Transportation			
4.	a. Packing and labelling b. Internal and external shipping c. Shipping documents d. Road restrictions	20 minutes	MC
Section IV: Use of Portable Gauge			
5.	Before use: a. Checking gauge / container condition and labels b. Checking shutter and slide block	15 minutes	MC
	Using portable nuclear gauge: a. Turning on/off, battery charging and self-checking b. Standard count and requirements c. Adjusting settings d. Handling on site e. Preparing test location(s) f. Conducting tests	40 minutes	MC
	Maintenance and calibration: a. Cleaning b. Collecting leak test samples c. Lubrication d. Changing battery	20 minutes	MC

Expected training time: 8 hours total

Confirm that all training requirements listed above are complete by signing below

Operators Name:	Max Gronk	**Signature:**		**Date:** yyyy-mm-dd	2016-08-16
RSO Name:	Bin Yuan	**Signature:**		**Date:** yyyy-mm-dd	2016-08-16

Stuart Hunt & Associates Ltd

ONLINE TRAINING CENTRE

ONLINE TRAINING

CERTIFICATE OF COMPLETION

Mr. Maxwell Cronk

HAS SUCCESSFULLY COMPLETED

Radiation Safety & TDG - Portable Gauge Users

On Aug 16, 2016 via the AVANTI E-training System

Expires on: Aug 16, 2019

Mark: 100%
Minimum Required: 100%

Student E-mail: MCronk@klohn.com

Avanti e-training system

Stuart Hunt
& Associates Ltd

ONLINE TRAINING
CERTIFICATE OF COMPLETION

Maxwell Cronk

has successfully completed

Radiation Safety & TDG - Portable Gauge Users

on Sep 25, 2013 via the 'AVANTI E-training System'.

Expires on Sep 25, 2016

Student E-mail: MCronk@klohn.com

Avanti
e training system

Klohn Crippen Berger

RADIATION SAFETY TRAINING CHECKLIST

Before training with the Radiation Safety Officer

Hands-On Training Requirements		Time	Initials
1.	a. Complete Stuart Hunt TDG Class 7 online training course	4 hours	MC
	b. Read KCB's Radiation Safety Program Manual on Infodesk	30 minutes	MC
	c. Complete KCB's Radiation Safety video and complete the quiz on Infodesk	30 minutes	MC
	d. Read Troxler's nuclear gauge operation manual and quick reference card on Infodesk	30 minutes	MC
	e. Review KCB's Job Hazard Analysis (#208) on use of Nuclear Gauge on Infodesk	15 minutes	MC

Hands-on training with the Radiation Safety Officer

Section I: KCB Radiation Safety Program Training		Time	Initials
2.	a. License and organizational structure b. Responsibilities c. Radiation exposure limits d. Radiation survey meter e. Dosimeter Usage f. Emergency procedures	20 minutes	MC
Section II: Nuclear Gauge Storage			
3.	a. Security requirements b. Signage requirements c. Radiation level requirements d. Documents to be posted e. Short term (< 90 days) and long term (>90 days) storage	20 minutes	MC
Section III: Transportation			
4.	a. Packing and labelling b. Internal and external shipping c. Shipping documents d. Road restrictions	20 minutes	MC
Section IV: Use of Portable Gauge			
5.	Before use: a. Checking gauge / container condition and labels b. Checking shutter and slide block	15 minutes	MC
	Using portable nuclear gauge: a. Turning on/off, battery charging and self-checking b. Standard count and requirements c. Adjusting settings d. Handling on site e. Preparing test location(s) f. Conducting tests	40 minutes	MC
	Maintenance and calibration: a. Cleaning b. Collecting leak test samples c. Lubrication d. Changing battery	20 minutes	MC

Expected training time: 8 hours total

Confirm that all training requirements listed above are complete by signing below

Operators Name: Max Cronk	**Signature:**	**Date:** 2015-10-08 yyyy-mm-dd
RSO Name: Bin Yuan	**Signature:**	**Date:** 2015-10-08 yyyy-mm-dd

TDG Wallet Certificate

Employee: Maxwell Cronk

has completed the training described on the reverse, in accordance with the requirements of the Transportation of Dangerous Goods Regulations.

Employer: Klohn Crippen Berger

Employer's Address: 500-2955 Virtual Way

Vancouver, BC V5M 4X6

Issue date: Sep 25, 2013

Expires on: Sep 25, 2016

Stuart Hunt & Associates Ltd

www.stuarthunt.com
800-661-4591

All aspects of handling and transporting **Class 7** materials by road for the packages indicated with an "x":

Package Type

- Excepted packages
- Industrial packages
X - Type A packages
- Type B packages
- Type C packages
- Type H packages

Employee Signature

Employer Signature (RSO)

To Complete the TDG Wallet Certificate:

1. Print the card on a heavier bond paper or cardstock (recommended).
2. Legibly print the employers name in the space provided.
3. Legibly print the employer's place of business in the address space provided. Place of business could be a local office, a regional office or a head office.
4. The employee and the employer (RSO or other authorized person) must sign the card in the respective location.
5. Scan or photocopy the signed document for your records. Inspectors will ask to see a signed copy of the card on file.
6. Cut along the solid outer border to remove the card.
7. Fold the card in half along the dotted line.
8. It is recommended that the card be laminated to increase its durability.

Certificate of Training for

Use of Portable Nuclear Gauge &

KCB Radiation Safety Program

Maxwell Cronk

c/o 500 - 2955 Virtual Way,

Vancouver, British Columbia, V5M 4X6

has completed the SafeTrain training course. This training is in accordance with the requirements of the Transportation of Dangerous Goods Act and Regulation, and the Nuclear Safety and Control Act and Regulations

KLOHN CRIPPEN BERGER LTD.

Radiation Safety Officer's Signature

Oct 8, 2015
Date of Issue

Training Received

A Classification, nature and characteristics
B Packaging requirements
C Safety marking requirements
D Documentation requirements
E Special precautions requirements
F Reporting requirements
G Emergency action requirements
H Proper equipment use
I Safety equipment use

Employee's Signature

Oct 8, 2016
Date of Expiry