



COLORADO

Department of Public
Health & Environment

Radioactive Materials License

Pursuant to the Colorado Radiation Control Act, Title 25, Article 11, Colorado Revised Statutes, and the State of Colorado Rules and Regulations Pertaining to Radiation Control (the Regulations), and in reliance on statements and representations heretofore made by the licensee designated below; a license is hereby issued authorizing such licensee to transfer, receive, possess and use the radioactive material(s) designated below; and to use such radioactive material(s) for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules, regulations, and orders now or hereafter in effect of the Colorado Department of Public Health and Environment and to any conditions specified below.

1. Licensee: Hazen Research, Inc.
2. Mailing address: 4601 Indiana Street, Golden, Colorado 80403
3. License number: CO 077-02, amendment number 59
4. Expiration date: September 30, 2026
5. Authorized storage/use location: 4601 Indiana Street, Golden, Colorado 80403
6. Designated Radiation Safety Officer: Virginia Premo
Designated Alternate Radiation Safety Officer: Marcello Cerniglia
7. Radiation Safety Officer contact number: (303) 279-4501 ext. 205
8. Fee category: 3.N, 3.Q
9. Reference number:

Conditions

10. Authorized radioactive material and uses:

- A. The licensee is authorized to possess and use not more than 370 MBq (10.0 mCi) of natural or depleted uranium in any form for evaluating batch chemistry on various ores, soils, or waste materials.
- B. The licensee is authorized to possess and use not more than 555 MBq (15.0 mCi) of natural thorium in any form for evaluating batch chemistry on various ores, soils, or waste materials.
- C. The licensee is authorized to possess and use not more than 74 MBq (2 mCi) of barium-133 in any form as reference materials for standardizing radiochemical analytical procedures, and as chemical yield indicators.

- D. The licensee is authorized to possess and use not more than 370 kBq (10 μ Ci) of any radionuclide of atomic number 1 through 96 in any form as reference materials for standardizing radiochemical analytical procedures, and as chemical yield indicators.
- E. The licensee is authorized to receive not more than 370 kBq (10 μ Ci) of any radionuclide of atomic number 1 through 96 in environmental samples for evaluating batch process chemistry.
- F. The licensee is authorized to receive not more than 37 MBq (1 mCi) of cesium-137 in aqueous form for evaluating batch process chemistry, standardizing radiochemical analytical procedures, and as chemical yield indicators.
- G. The licensee is authorized to possess not more than 1 sealed source, each source containing 370 MBq (10 mCi) of cesium-137 to be used in a Berthold Technologies model LB 300 LP series gauge for measuring fill levels and material densities.

11. Authorized radioactive material users:

- A. Radioactive material shall be used by, or under the direct supervision of Marcello Cerniglia, Erin Hamand, Kimberly Kusler, Allison Mathena, Virginia Premo, and Jeanalee Schlabaugh.
- B. The Radiation Safety Officer (RSO) shall maintain written records indicating the date and basis of approval of designated users.
- C. Only those persons who have successfully completed the Hazen in-house training as described in the license renewal application dated August 26, 2021 and are designated as users by the Radiation Safety Officer shall be permitted to perform licensed activities.

12. General requirements:

- A. The licensee shall comply with the provisions of the Regulations: Part 1, "General Provisions"; Part 3, "Licensing of Radioactive Material"; Part 4, "Standards for Protection Against Radiation"; Part 10, "Notices, Instructions and Reports to Workers; Inspections"; and Part 17, "Transportation of Radioactive Material".
- B. The licensee shall not transfer possession and/or control of radioactive materials or items contaminated with radioactive material except: by transfer of waste to an authorized recipient; by transfer to a specifically licensed recipient; or, as provided otherwise by specific condition of this license pursuant to the requirements of Section 3.22 of the Regulations.

- C. The licensee shall ensure that information listed in this license is correct and accurate. The licensee shall notify the department in writing within 10 days whenever the information contained in Items 1 through 7 above is no longer current or determined to be incorrect.
- D. The licensee may transport radioactive material or deliver radioactive material to a carrier for transport in accordance with the provisions of Part 17 of the Regulations and the requirements of U.S. Department of Transportation (49 CFR).
- E. The licensee shall not make any false statement, representation, or certification in any application, record, report, plan, or other document regarding radiation levels, tests performed or radiation safety conditions or practices.

13. Occupational dose monitoring:

- A. The licensee shall monitor the occupational doses for each of its employees (including contracted labor) who is likely to receive an occupational dose exceeding 10% of any applicable limit specified in Part 4 of the Regulations. Personal breathing zone air sampling and bioassay results shall be used in the determination of an employee's dose from intakes of radioactive materials whenever monitoring is required under Section 4.18.2 of the Regulations.

14. Specific radiation safety requirements:

- A. The licensee shall conduct surveys to determine concentrations of airborne radioactive materials during each crushing, blending, drying, and pulverizing operation. Results of surveys shall be maintained on file by the licensee for inspection by the department.
- B. The licensee shall conduct surveys to determine levels of surface contamination within the radioactive materials usage areas. Surveys shall be conducted at monthly intervals for ongoing projects and at the conclusion of activities that are likely to produce contamination, whichever is more frequent. Surveys shall be performed daily when 100 μ Ci or more of unsealed cesium-137 is used. Results of surveys shall be maintained on file by the licensee for inspection by the department.
- C. Each sealed source that is authorized in Items 10.A through 10.F of this license shall be tested for leakage in accordance with the requirements of Section 4.16 of the Regulations at intervals not to exceed six months.
- D. Each sealed source that is authorized in Item 10.G of this license shall be tested for leakage in accordance with the requirements of Section 4.16 of the Regulations at intervals not to exceed three years.

- E. The licensee shall conduct tests for the proper operation of the on-off mechanism (shutter) and indicator, if any, at intervals not to exceed six months or as specified in the applicable Sealed Source and Device Safety Evaluation Registration Certificate.
- F. The licensee shall perform installation, relocation, maintenance, and surveys for the radioactive material authorized in Item 10.G in accordance with procedures dated August 26, 2021.
- G. The licensee shall calibrate all radiation monitoring and sampling equipment after repair and at least annually. A check source shall be used to assure that radiation detection instruments are operating properly before each day's use.

15. Special license requirements:

- A. The licensee shall maintain in effect a financial warranty acceptable to the department in the amount of \$310,378.00 in 2022 dollars in accordance with the requirements of Section 3.9.5 of the Regulations.
- B. The licensee shall provide in writing to the department, no later than June 30th of each year, and annual report demonstrating proof of the value of existing financial warranties and any proposed changes to the financial assurance warranties.
- C. The licensee shall limit worker time with aerosolized radioactive materials to less than 200 hours per year when working with a half-face respirator and 1000 hours per year when working with a full-face respirator to ensure doses remain below limits requiring bioassays in accordance with Part 4 of the Regulations. Bioassays shall be performed if the number of hours stated above are exceeded and any resulting dose included in the occupational dose for the year.
- D. Each employee who works with aerosolized radioactive material shall log hours to demonstrate compliance with license condition 15.C. The log shall record the name of the individual, date, hours exposed, and type of respiratory protection used. Records shall be kept for five years for review by the department.
- E. A physical inventory of each sealed source possessed by the license shall be conducted at intervals not to exceed six months or an alternate frequency specifically approved by the department. The licensee shall retain each inventory record for at least five years. The inventory records shall contain the date of the inventory, the model number of each sealed source, the serial number if one has been assigned, the identity of each source radionuclide and its estimated activity, the location of each sealed source, and the name of the individual who performed the inventory.

16. Licensee commitments and reference documents:

The State of Colorado Rules and Regulations Pertaining to Radiation Control shall govern unless the licensee's statements, representations, and procedures contained in the application and correspondence are more restrictive than the Regulations. Except as specifically provided otherwise by this license, the licensee shall possess and use radioactive material described in Item 10 of this license in accordance with the statements, representations, and procedures contained in:

- A. the applications and attachments dated August 26, 2021; and
- B. the license correspondence and attachments dated December 1, 2021; January 12, 2022; February 4, 2022; March 11, 2022; March 14, 2022; May 9, 2022; June 13, 2022; October 12, 2023; October 30, 2023; and November 28, 2023.

For the Colorado Department of Public Health and Environment

Date: 12/07/2023 By: _____