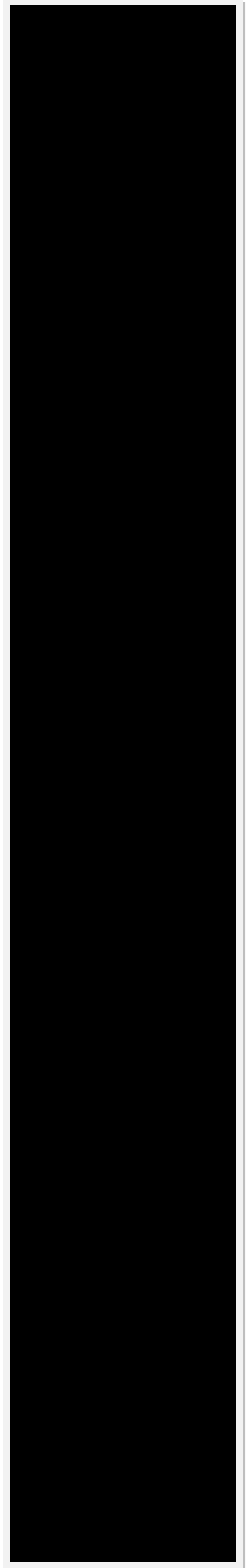


Consolidated Guidance About Water Treatment Licenses

Final Report



State of New Jersey
New Jersey Department of Environmental Protection
Air, Energy & Materials Sustainability
Division of Air Quality & Radiation Protection
Bureau of Environmental Radiation



1	PURPOSE OF REPORT.....	2
2	APPLICABLE REGULATIONS.....	3
3	CONTENTS OF A SPECIFIC LICENSE APPLICATION.....	4
3.1	Item 1: Name and Mailing Address of Applicant.....	4
3.2	Item 2: License Action Type.....	5
3.3	Item 3: Address(es) Where Licensed Material Will Be Possessed.....	5
3.4	Item 4: Person to Be Contacted About This Application.....	5
3.5	Item 5: Radioactive Material.....	6
3.6	Item 6: Proposed Use.....	7
3.7	Item 7: Radiation Safety Officer Name, Training, Experience, Telephone #, and Email.....	7
3.8	Item 8: Training Program for Individuals Working In or Frequenting Restricted Areas.....	9
3.9	Item 9: Facilities and Equipment.....	9
3.10	Item 10: Radiation Safety Program.....	10
3.10.1	Audit Program.....	10
3.10.2	Radiation Monitoring Instruments.....	11
3.10.3	Material Accountability.....	11
3.10.4	Occupational Dose.....	11
3.10.5	Public Dose.....	13
3.10.6	Emergency and Security Procedures.....	14
3.10.7	Maintenance.....	15
3.10.8	Transportation.....	16
3.11	Item 11: Waste Management—Backwash and Media Disposal.....	16
3.12	Item 12: License Fees.....	17
3.13	Item 13: Certification.....	17
4	LICENSE AMENDMENTS AND RENEWALS.....	18
5	TERMINATION OF ACTIVITIES.....	20
6	CONTENTS OF A GENERAL LICENSE APPLICATION.....	21
APPENDIX A	NJ RAD FORM-313.....	25
APPENDIX B	NJ RAD FORM-314.....	27
APPENDIX C	SUGGESTED FORMAT FOR PROVIDING INFORMATION REQUESTED IN ITEMS 5 THROUGH 11 OF NJ RAD FORM-313.....	29
APPENDIX D	WATER TREATMENT SYSTEMS AUDIT CHECKLIST.....	33
APPENDIX E	RADIOACTIVE MATERIALS GENERALLY LICENSED WATER TREATMENT SYSTEMS REGISTRATION FORM – 664W (RA) AND RADIOACTIVE MATERIALS GENERALLY LICENSED WATER TREATMENT SYSTEMS REGISTRATION FORM – 664W (U).....	37

1 PURPOSE OF REPORT

This report provides guidance to water treatment licensees when preparing applications for specific licenses issued by the NJDEP Bureau of Environmental Radiation (BER) for facilities which treat radioactivity in drinking water.

Section 3, "Contents of a Specific License Application," of this report identifies the information needed to complete NJRAD Form-313, "Application for Materials License" for the accumulation and possession of NORM in a water treatment system.

The format within this document for each item of technical information is as follows:

- Regulations—references the regulations applicable to the item
- Criteria—outlines the criteria used to evaluate the applicant's response
- Discussion—provides additional information about the topic
- Response from Applicant—provides suggested response or responses or indicates that no response is needed on that topic during the licensing process

NJRAD Form-313 does not have sufficient space for applicants to provide full responses to Items 5 through 11, as indicated on the form. Applicants should address those items on separate sheets of paper and submit them along with the completed NJRAD Form-313. For the convenience and streamlined handling of water treatment applications, Appendix C of this guidance document, "Suggested Format for Providing Information Requested in Items 5 through 11 of NJRAD Form-313," may be used to provide supporting information.

In this document, dose or radiation dose means absorbed dose, dose equivalent, effective dose equivalent, committed dose equivalent, committed effective dose equivalent, or total effective dose equivalent, as defined in N.J.A.C. 7:28-6.1 (10 CFR Part 20). To describe units of radiation exposure or dose, rem and its International System of Units equivalent, sievert (Sv) (1 rem = 0.01 Sv), are used. This is done because N.J.A.C. 7:28-6.1 (10 CFR Part 20) sets dose limits in terms of rem (Sv), rather than rad or roentgen. When the radioactive material emits beta and gamma rays, 1 roentgen is assumed to equal 1 rad, which is assumed to equal 1 rem. For alpha and neutron-emitting radioactive material, 1 rad is not equal to 1 rem. Determination of dose equivalent (rem) from absorbed dose (rad) from alpha particles and neutrons requires the use of an appropriate quality factor value. These Q values are used to convert absorbed dose (rad) to dose equivalent (rem). Tables 1004(b).1 and 2 in 10 CFR 20.1004, "Units of radiation dose," address the Q values for alpha particles and neutrons.

2 APPLICABLE REGULATIONS

It is the applicant's or licensee's responsibility to obtain and have available up-to-date copies of applicable regulations, to read and understand the requirements of each of these regulations, and to comply with each applicable regulation. The following parts of N.J.A.C. 7:28 contain regulations applicable to water treatment licenses.

- N.J.A.C 7:28-4, "Licensing of Diffuse Naturally Occurring or Diffuse Accelerator Produced Radioactive Materials"
- N.J.A.C. 7:28-6.1 10 CFR Part 20, "Standards for Protection Against Radiation"
- N.J.A.C 7:28-12, "Remediation Standards for Radioactive Materials"
- N.J.A.C. 7:28-50.1 (10 CFR Part 19, "Notices, Instructions and Reports to Workers: Inspection and Investigations")
- N.J.A.C. 7:28-61, "Packaging and Transportation of Radioactive Materials"
- N.J.A.C. 7:28-64 "Radioactive Materials License Fees"

3 CONTENTS OF A SPECIFIC LICENSE APPLICATION

The following information applies to the indicated items on NJRAD Form-313 (Appendix A of this guidance document).

All items in the application should be completed in enough detail for the reviewer to determine whether the proposed equipment, facilities, training and experience, and radiation safety and security programs satisfy regulatory requirements and are adequate to protect public health and safety and minimize danger to life and property. Consideration should be given, when developing the application, to the concepts of keeping exposure as low as is reasonably achievable (ALARA), minimizing contamination, and maintaining control of radioactive materials.

N.J.A.C. 7:28-6.1 (10 CFR 20.1101(b)) states: “The licensee shall use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA).” Regulatory Guide 8.10, “Operating Philosophy for Maintaining Occupational Radiation Exposures as Low as Is Reasonably Achievable,” discusses the ALARA concepts and philosophy. The application should document ALARA considerations, including establishing administrative action levels and monitoring programs.

N.J.A.C. 7:28-6.1 (10 CFR 20.1406, “Minimization of contamination”) requires applicants for licenses to describe how facility design and procedures for operation will minimize, to the extent practicable, contamination of the facility and the environment; facilitate eventual decommissioning; and minimize, to the extent practicable, the generation of radioactive waste. As with ALARA considerations, applicants should address concerns for all aspects of their programs.

The application should include information on how the licensee will implement the security requirements in N.J.A.C. 7:28 -6.1 (10 CFR 20.1801, 10 CFR 20.1802).

All information submitted during the licensing process may be incorporated as part of the license and will be subject to review during inspection.

3.1 Item 1: Name and Mailing Address of Applicant

List the legal name of the applicant’s corporation or other legal entity with direct control over use of the radioactive material. A division or department within a legal entity may not be a licensee. Provide the mailing address where correspondence should be sent. A post office box number is an acceptable mailing address.

BER must be notified of changes in the mailing address. These changes do not require a fee.

Note: BER must be notified, and the transfer approved before control of the license is transferred (see Section 4.1, “Timely Notification of Transfer of Control”). BER should also be notified when bankruptcy proceedings have been initiated.

3.2 Item 2: License Action Type

This is an application for (check appropriate item):

New License

Renewal of license number: _____

Check the first box for a new license request. Note that a pre-licensing visit may be conducted prior to issuance of the license.

Check the second box for a renewal of an existing license and provide the license number.

See "License Amendments and Renewals" in Chapter 4 of this report.

3.3 Item 3: Address(es) Where Licensed Material Will Be Possessed

Applicants must provide an address for each location of wells that will have treatment installed.

Specify the street address, city, municipality, county, state parcel block & lot, or other descriptive address (e.g., Highway 10, 5 miles east of the intersection of Highway 10 and State Route 423, Anytown, NJ) for each facility. The descriptive address should be sufficient to allow an NJDEP inspector to find the facility location. A post office box address is not acceptable. In addition, applicants are encouraged to provide global positioning system coordinates for each location.

A license amendment is required before treatment media can be used at an address or location not already listed on the license.

3.4 Item 4: Person to Be Contacted About This Application

Identify the individual who can answer questions about the application and include a telephone number where the individual may be contacted as well as business cell phone numbers and e-mail addresses. This individual, usually the radiation safety officer (RSO), will serve as the point of contact during the review of the application. If this individual is not a full-time employee of the licensed entity, their position and relationship to the licensee should be specified. BER should be notified if the person assigned to this function changes or if their telephone number, cell phone number, or e-mail address changes. Notification of a contact change is only provided for informational purposes and would not be considered an application for license amendment, unless the notification involves a change in the contact person who is also the RSO.

As indicated on NJRAD Form-313 (see Appendix A of this document), Items 5 through 11 should be submitted on separate sheets of paper. Applicants may use Appendix C of this document for this purpose and should note that using the suggested wording of responses and committing to use the model procedures in this report will facilitate BER's review.

3.5 Item 5: Radioactive Material

3.5.1 Element & Mass #

For Radium treatment systems, the requested materials should be Radium-224, Radium-226, and Radium-228.

For Uranium treatment systems, the requested material should be Uranium.

3.5.2 Form

For all treatment systems, "Any" should be listed as the form.

3.5.3 Maximum Possession Limit

Possession limits should be set slightly above the activities of radium or uranium that could be expected to accumulate on the treatment media. This can be determined by assuming the treatment system is 100% effective (removes all radionuclides from the raw water). Based on the results of the raw water samples (pCi/L), the liters of water treated, and the amount of time between backwashes or media exchange, an estimate of the accumulated activity (in millicuries, mCi) may be calculated. For Uranium, mass units of kg, g or mg are used.

Response from Applicant: Identify each radionuclide and estimated activities to be possessed under the license. Include justification with detailed calculation inputs.

3.5.4 Financial Assurance and Recordkeeping for Decommissioning

Regulations: N.J.A.C. 7:28-4.15, N.J.A.C. 7:28-51

Discussion: Per regulations in N.J.A.C. 7:28-4.15(c)(1), the requirement for decommissioning financial assurance for Diffuse NARM licensees may be determined by the Department. Solely based on possession limits, all specifically licensed water treatment facilities would require some level of Financial Assurance due to the activities possessed when compared to values in 10 CFR 30.35(d). However, BER has considered the burden to municipalities and businesses that own water treatment facilities and determined that instead of requiring all water treatment licensees to provide financial assurance, this requirement can be determined on a case-by-case basis. An example of a case that may require Financial Assurance would be a site that has known contamination which would require additional remediation beyond that of a typical site decommissioning effort, is impacting other properties, or has deactivated a system but not made progress on implementing necessary remedial actions.

Regardless of Departmental requirement for Financial Assurance, applicants must be aware of typical costs associated with decommissioning of water treatment facilities, and commit to the responsibility to complete decommissioning in a timely manner once operations cease. Based upon a 2024 review, the costs for decommissioning may range from \$40,000 to \$175,000 for one treatment facility. Values will primarily depend upon the volume of media on site and condition of associated vessels, piping and other contaminated system components.

Applicants should also be aware that decommissioning should be completed for any facility within 24 months of deactivating a treatment system.

Response from Applicant: Unless directed to do so by the Bureau of Environmental Radiation, the applicant does not need to obtain Financial Assurance for decommissioning.

Provide the statement: *“We are aware that the typical costs necessary for decommissioning may range from \$40,000 to \$175,000 per treatment facility (based on a 2024 cost estimate). These funds will be secured or made available when necessary to decommission our facilities. The funds will be obtained sufficiently in advance of decommissioning to prevent delay of required activities, and to ensure decommissioning activities are completed as soon as practicable but no later than 24 months following the initiation of decommissioning. We are also aware that the requirement to obtain Financial Assurance may be prescribed by the Bureau on a case-by-case basis as site specific conditions dictate.”*

3.6 Item 6: Proposed Use

Regulation: N.J.A.C. 7:28-4.7

Criteria: An application for a license will be approved if the proposed activity meets the requirements of N.J.A.C. 7:28-4 and the New Jersey Radiation Protection Act.

1. The applicant is qualified by training and experience to manage radioactive material.
2. The applicant’s proposed equipment, facilities, and procedures are adequate to protect health, minimize danger to life and property, and prevent unnecessary radiation.

Discussion: Water treatment licenses do not “use” radioactive material in the traditional sense. Rather, they possess radioactive material incidental to the accumulation of nuclides on treatment media.

Response from Applicant: The proposed use should be listed as “Non-Human Use - Accumulation of naturally occurring radioactive materials (NORM) in a water treatment system.” Unusual uses will be evaluated on a case-by-case basis.

3.7 Item 7: Radiation Safety Officer Name, Training, Experience, Telephone #, and Email

Regulation: N.J.A.C. 7:28-4.7, N.J.A.C. 7:28-2.2

Criteria: The applicant must appoint a radiological safety officer (RSO) who shall be responsible for rendering advice and assistance. RSOs must have adequate training and experience. In the past, BER has found the following to be evidence of adequate training and experience:

- successful completion of Radiation Safety Officer training course

OR

- successful completion of a training course covering basic radiological safety and health topics including:
 - principles and practices of radiation protection,

- radioactivity measurements and monitoring techniques and instruments,
- mathematics and calculations basic to the use of radiation, and
- biological effects of radiation

AND

- hands-on experience working with water treatment systems which treat for radiological contaminants

Discussion: The person responsible for the radiation protection program is the RSO. The RSO is key to overseeing and ensuring safe operation of the licensee’s radiation protection program. The RSO must have adequate training to understand the hazards associated with radioactive material and be familiar with all applicable regulatory requirements. The RSO should have independent authority to stop operations that they consider unsafe. They should have sufficient time and commitment from management to fulfill their duties and responsibilities to ensure that radioactive materials are used in a safe manner, approved radiation safety procedures are being implemented, and the required records of licensed activities are maintained. Typical RSO responsibilities are:

- Stop unsafe licensed activities
- Ensuring proper use and maintenance of water treatment equipment
- Personnel training
- Incident response, investigation, and reporting
- Coordinating and overseeing media disposal
- Records maintenance
- Annual audits of radiation safety program

BER requires the name of the RSO to be listed on the license to ensure that licensee management always has a responsible, qualified person identified and that the named individual knows of their designation as RSO. The RSO may delegate certain day-to-day tasks of the radiation protection program to other responsible individuals, sometimes referred to as “alternate RSOs” or “site RSOs.” For example, a licensee with multiple treatment well locations may appoint “site RSOs,” who assist the RSO and are responsible for the day-to-day activities at these locations. Licensees may also appoint “alternate RSOs” who may act as an emergency contact when the RSO is unavailable. Such “alternate RSOs” or “site RSOs” do not need to meet all RSO qualifications; however, they should be qualified, experienced authorized users who have adequate knowledge of the activities to which they are assigned. These individuals should have the same management support and decision-making authority as the RSO that is necessary to accomplish the tasks to which they have been assigned. Please note that only the primary RSO is named on the license.

Response from Applicant: Provide the following:

- name of the proposed RSO
- documentation demonstrating that the proposed RSO is qualified by training and experience

Note: Licensees must notify BER and obtain a license amendment before making changes in the designation of the RSO responsible for the radiation safety program.

3.8 Item 8: Training Program for Individuals Working In or Frequenting Restricted Areas

Regulation: N.J.A.C. 7:28-4.7, N.J.A.C. 7:28-2.3

Criteria: Other individuals working under the supervision of the RSO in water treatment facilities are usually referred to as “authorized users.” Authorized users must have adequate training and experience working around water systems which treat for radiological materials. In the past, BER has found the following to be evidence of adequate training and experience:

- successful completion of a training course covering basic radiological safety and health topics

Discussion: Authorized users have the responsibility to ensure the surveillance, proper use, security, and routine maintenance of treatment systems containing licensed material.

Response from Applicant:

- demonstration that before using licensed materials, authorized users will have a training course covering basic radiological safety and health topics, and job duties which require them to work with or near radioactive sources

AND

- a description of the training program for proposed authorized users

AND

- a commitment for completion of refresher training (typically annual)

Note: BER does not list authorized users on the license. Only the RSO is listed. The RSO is responsible for maintaining records of training.

3.9 Item 9: Facilities and Equipment

Regulations: N.J.A.C. 7:28-4.7, N.J.A.C. 7:28-6.1 (10 CFR 20.1101(b), 10 CFR 20.1801)

Criteria: Licensees must propose equipment and facilities that are adequate to protect health and minimize danger to life or property. Such equipment and facilities should contribute to ensuring that radiation doses to authorized users and members of the public are maintained ALARA, and that all licensed material is secured from unauthorized access or removal. Applicants must also provide the treatment system’s operational specifications and describe the media to be used.

Discussion: The key elements for water treatment applicants are ensuring compliance with public dose limits and maintaining adequate security and control over treatment media. See Section 3.10, “Radiation Safety Program,” for additional information.

Response from Applicant: Describe the treatment facilities in detail. Provide diagrams of where the treatment facility will be located and proximity to occupied areas. Provide a facility diagram for each treatment location. Include on the diagram the use of adjacent areas, and

information relevant to public dose and security as discussed in Sections 3.10.5, “Public Dose,” and 3.10.6, “Operating, Emergency, and Security Procedures,” respectively.

Specific details regarding the treatment system should be provided for each location, to include:

- A raw water radioanalytical result for the radionuclide(s) being treated*
- Media type and manufacturer
- Flow rate of the well(s)
- Number of treatment vessels/trains and configuration (parallel or series)
- Treatment vessel size
- Volume of media on-site
- System flow configuration (upflow or downflow)
- If backwashing is routinely performed, the backwash process and location
- Any system components designed to prevent media spills outside of vessels, such as internal vessel screens or post-treatment filtration
- Any facility design components intended to contain media spills outside of vessels, such as secondary containment trays, recessed floors and dry sumps

*For reference, a current list of certified laboratories is on NJDEP’s [DataMiner](#) website. The list may be accessed by clicking on “Search By Category,” selecting the Report Category, “Certified Laboratories,” and then viewing the report titled, “Radiological Lab Certifications.”

Labs should be certified to analyze the drinking water (DW) matrix for the applicable parameter (Radium-224, Radium-226, Radium-228, Uranium).

3.10 Item 10: Radiation Safety Program

3.10.1 Audit Program

Regulations: N.J.A.C. 7:28-6.1 (10 CFR 20.1101, 10 CFR 20.2102)

Criteria: Licensees must review the content and implementation of their radiation protection programs at least annually to ensure the following:

- Programs comply with the terms and conditions of the license.
- Occupational doses and doses to members of the public are ALARA.

Records of audits and other reviews of program content are maintained for at least 3 years after the record is made.

Discussion: Appendix D of this guidance document contains a suggested annual audit program that is specific to the use of water treatment facilities and is acceptable to BER. Since all areas indicated in Appendix D may not be applicable to every licensee and all items may not need to be addressed during each audit, licensees may wish to develop a program-specific audit checklist.

It is essential that once problems are identified, comprehensive corrective actions are taken in a timely manner. It is in the best interest of the licensee to identify potential violations of regulatory requirements and take necessary steps to correct them. BER can opt to exercise discretion and may elect not to cite the licensee for these violations if prompt and effective corrective actions are implemented.

Audit records must be maintained for at least 3 years after the record is made. BER has found audit records that contain the following information to be acceptable: date of audit, name of person(s) who conducted the audit, persons contacted by the auditor(s), areas audited, audit findings, corrective actions, and follow-up.

Response from Applicant: The applicant should not submit its audit program to BER for review during the licensing phase. The audit program will be reviewed during BER inspections.

3.10.2 Radiation Monitoring Instruments

Regulations: N.J.A.C. 7:28-4.7, N.J.A.C. 7:28-6.1 (10 CFR 20.1501, 10 CFR 20.2103(a))

Criteria: Licensees should possess, or have access to, radiation monitoring instruments, which are necessary to protect health and minimize danger to life or property, especially in circumstances related to incidents involving media spills at treatment facilities. Instruments used for quantitative radiation measurements must be calibrated periodically for the radiation measured.

Discussion: Radiation survey instruments are important for routine surveys, maintenance activities, and for incidents involving spills, to determine exposure rates that could pose threats to public health and safety. Applicants should preplan how they will obtain and properly use a radiation survey instrument (e.g., use a radiation survey instrument located on site or obtain one from another licensee, a consultant, or a local emergency response organization). The instruments used should also be appropriate for the type of radiation emitted and be capable of accurately measuring background levels of radiation. The applicant should also consider the availability of a survey meter during non-business hours.

Response from Applicant: Provide a description of radiation survey instruments to be used, and how they will be accessed, maintained, calibrated, and operated.

3.10.3 Material Accountability

Regulations: N.J.A.C. 7:28-4.8, N.J.A.C. 7:28-6.1 (10 CFR 20.2108)

Criteria: Licensees must maintain records of disposal of spent treatment media.

Discussion: Accountability must be maintained for licensed materials. For water treatment facilities, unused media is not radioactive upon receipt. During operation, possession limits can only be estimated, and cannot be tracked reliably. Thus, records need only be retained for disposal of spent media. Prior to disposal, licensees will be required to analyze spent media by gamma spectrometry at a laboratory certified by the NJDEP Office of Quality Assurance.

Disposal records must be maintained until the license is terminated and should contain the following information: the date of disposal, the name and license number of the recipient, and a description of the affected radioactive material (e.g., radionuclide, activity).

Response from Applicant: Describe procedures for disposal of spent media.

3.10.4 Occupational Dose

Regulations: N.J.A.C. 7:28-6.1 (10 CFR 20.1201, 10 CFR 20.1207, 10 CFR 20.1208, 10 CFR 20.1301, 10 CFR 20.1302, 10 CFR 20.1501, 10 CFR 20.1502), N.J.A.C. 7:28-50.1 (10 CFR 19.13)

Criteria: Licensees must do either of the following:

- perform a prospective evaluation demonstrating that unmonitored individuals are not likely to receive a radiation dose in excess of the limits in N.J.A.C. 7:28-6.1 (10 CFR 20.1502(a)) and maintain a record of this evaluation for inspection by BER.

OR

- provide and require the use of individual monitoring devices (dosimetry). All personnel dosimeters that require processing to determine the radiation dose must be processed and evaluated by a National Voluntary Laboratory Accreditation Program (NVLAP)-approved processor.

Discussion:

Under conditions of routine facility occupancy, water treatment employees will not require their own personnel monitoring devices (dosimetry). However, the potential doses received as part of routine operations should be demonstrated by the applicant. This can be done by using historical personnel/facility dosimetry records or by using operational knowledge from similar facilities and preparing a written evaluation demonstrating that employees are not likely to exceed the limits in N.J.A.C. 7:28-6.1 (10 CFR 20.1502(a)) and, therefore, are not required to have personnel dosimetry.

A written evaluation should include the expected dose rate of the radiation field, the amount of time an employee is expected to be exposed to the radiation in a given day, and the number of days an employee would be exposed in a year. For example:

- A. Dose rate: _____ (mrem/hour)
- B. Time working in radiation field: _____ hours/day
- C. Annual days spent performing this work: _____ days/year

Multiply A x B x C to receive the annual expected dose. If the resultant dose is less than 500 mrem/year, then personnel dosimetry is not required.

Licensees will be required to place dosimeter badges on each treatment vessel and at the closest routinely occupied space. A dosimeter will also be required at the facility fence line for licensees which do not routinely discharge backwash wastewater. As data from these badges is collected, it can be used to evaluate the potential dose to employees on an annual basis. For example, the annual dose to the badge placed in an occupied space may be directly compared to the limits in 7:28-6.1 (10 CFR 20.1502(a)), or may use an occupancy factor for actual time spent in that location by employees, to demonstrate compliance.

Response from Applicant: Describe the proposed dosimetry program for employees. Include a prospective evaluation demonstrating that unmonitored individuals are not likely to receive a

radiation dose in excess of the limits in N.J.A.C. 7:28-6.1 (10 CFR 20.1502(a)). Commit to placing area badges on each treatment tank, at the most frequently occupied space, and at the fence line (if routine backwashing is not anticipated).

Note: Some licensees choose to provide personnel dosimetry to their workers for reasons other than compliance with BER requirements (e.g., to respond to worker requests or to maintain records of personal exposure).

3.10.5 Public Dose

Regulations: N.J.A.C. 7:28-6.1 (10 CFR 20.1301, 10 CFR 20.1302, 10 CFR 20.1801, 10 CFR 20.1802, 10 CFR 20.2107)

Criteria: Licensees must do the following:

- ensure that members of the public will not receive more than 1 mSv [100 mrem] in a year, and the dose in any unrestricted area will not exceed 0.02 mSv [2 mrem] in any one hour, from licensed operations.
- place dosimeter badges on each treatment vessel, at the closest routinely occupied space, and at the facility fence line.

Discussion: Public dose is defined in N.J.A.C. 7:28-6.1 (10 CFR Part 20) as “the dose received by a member of the public from exposure to radiation or to radioactive material released by a licensee, or to any other source of radiation under the control of a licensee.” Public dose excludes doses received from background radiation and medical procedures. Whether the dose to an individual is an occupational dose or a public dose depends on the individual’s assigned duties. It does not depend on the area (restricted, controlled, or unrestricted) where the individual is when they receive the dose.

Members of the public include persons who live, work, or may be in locations where radiation levels are elevated nearby to treatment vessels or other locations of radionuclide-laden media and employees whose assigned duties do not include the use of licensed materials and who work in the vicinity where treatment media are used or stored.

Routine operations and proximity to public spaces typically limit the exposure to the public from the operation of a water treatment facility. However, per the conditions in the license, licensees will be required to place dosimeter badges on each treatment vessel, at the closest routinely occupied space, and at the facility fence line. The fence line badge is typically placed along the perimeter of the property at a location nearest to an occupied public space (e.g., a residence, school). However, other locations may be more appropriate. For instance, at a facility without a fence, a badge may be placed on the side of the building where the dose potential is highest. The objective of the fence line badge is to provide a record of public dose. Public dose levels should be reviewed annually as part of the licensee’s audit program, to ensure compliance with N.J.A.C. 7:28-6.1 (10 CFR 20.1301).

Response from Applicant: No response is required from the applicant in a license application, but BER will examine this matter during inspections.

3.10.6 Emergency and Security Procedures

Regulations: N.J.A.C. 7:28-6.1(10 CFR 20.1101, 10 CFR 20.1801, 10 CFR 20.1802, 10 CFR 20.2201–2203)

Criteria: Each applicant should do the following:

- develop, implement, and maintain emergency procedures containing the following elements:
 - steps to take to keep radiation exposures ALARA
 - steps to control spills of treatment media, including:
 - Containing the spill and isolating the area (such as shutting off the water supply, keeping displaced media moist, and covering the spill with plastic sheeting)
 - Clearing the area of personnel and restricting access as necessary
 - Instructions to wash media or material from skin, flush eyes, and remove contaminated clothing
 - Proper disposal of contaminated PPE
 - Performing area/personnel contamination surveys
 - Reporting incident to RSO and BER
- post copies of emergency procedures at each treatment location
- develop procedures to ensure the security of material at treatment facilities

Discussion: Occasionally, treatment media may escape from vessels during maintenance activities or other unforeseen circumstances (e.g., fire, natural disaster). Although doses from media spills would be expected to be similar to doses from media inside treatment vessels, loose media poses the potential for contamination of surfaces and personnel. Emergency procedures should be developed to minimize these risks and ensure a survey instrument is acquired in a timely fashion to survey staff and areas involved.

It is possible that notifications may be required under N.J.A.C. 7:28-6.1 (10 CFR 20 Subpart M). The licensee should determine if a spill or loss of material is reportable. This includes loss outside of a treatment vessel, but still within a building. An estimation of the activity of the treatment media and the mass lost is necessary to determine if an event is reportable. Activity concentration may be assumed based upon calculations of media loading or based upon recent site-specific media exchange analyses in order to make quick decisions on an incident. For example:

$$1000 \text{ pCi/g Ra-226+Ra-228} * 2500 \text{ g} = 2.5\text{E}6 \text{ pCi}$$

10 CFR 20.2201 specifies that reports should be made within 30 days if a material is lost in a quantity greater than 10 times the quantity in 10 CFR 20 Appendix C. For Ra-226 and Ra-228, the listed quantity is 0.1 uCi, therefore a notification and report to the Bureau is required within 30 days when 1 µCi (Ra-226 + Ra-228) is involved and an immediate telephone notification is required if 1000 µCi (Ra-226 + Ra-228) is involved. In the example above, 2.5E6 pCi is equivalent to 2.5 uCi. Thus, a spill of this magnitude would be reportable within 30 days and

should be considered a major spill. A table to aid in determining reportable spills is presented below:

Ra-226 + Ra-228 Concentration (pCi/g)	Mass Requiring 30-day Report (kg)	Mass Requiring Immediate Report (kg)
500	2	2000
1000	1	1000
1500	0.67	670
2000	0.5	500
2500	0.4	400

Regardless of the requirement to report an incident, it is encouraged to notify BER immediately when media spills occur, in order to ensure that spills and cleanup are handled appropriately, and to determine if an official report notification is required.

The licensee shall also ensure that all treatment facilities are kept secure from unauthorized access. This is typically accomplished by keeping the facility gated and locked when unoccupied. Security cameras and other surveillance systems may also be used, but are not required.

Response from Applicant: Describe emergency and security procedures that will be employed and commit to posting emergency procedures at each facility.

3.10.7 Maintenance

Regulations: N.J.A.C. 7:28-6.1 (10 CFR 20.1101)

Criteria: Licensees should develop procedures for performing maintenance activities which maintain doses ALARA.

Discussion: Routine maintenance, repair, and/or replacement operations on components of radiological treatment systems should be performed by staff with adequate knowledge of radiation safety principles. Most routine system maintenance activities may be performed by facility staff with basic radiation safety training. However, non-routine maintenance activities must be performed by a company licensed to handle treatment media. Examples of both routine and non-routine maintenance activities are provided below.

Routine Maintenance

- Daily system inspections
- Collection of media samples
- Management of filter socks
- Backwashing
- Any activity occurring on system components other than the radionuclide treatment vessel(s)
- Any activity on radionuclide treatment system components which does not require repair or replacement
- Any activity which does not require direct contact with treatment media

Non-routine Maintenance

- Repair and/or replacement of radionuclide treatment system components

- Media installation and removal
- Media packaging and disposal
- Remediation of media spills
- Discovery of media in locations where it is not expected to be present

Response from Applicant: Provide procedures for routine activities which pose the potential for coming into contact with treatment media, such as collection of media samples and management of filter socks.

Provide the statement: *All non-routine maintenance activities will be handled by a service provider possessing a specific radioactive materials license for those activities.*

3.10.8 Transportation

Regulations: N.J.A.C. 7:28-6.1 (10 CFR 20.1101), N.J.A.C. 7:28-61.1 (10 CFR 71.5), 49 CFR 171–178, 390–397

Criteria: Applicants must follow DOT regulations for the offsite transport of radioactive material.

Discussion: BER uses the provisions of N.J.A.C. 7:28-61.1 (10 CFR 71.5, “Transportation of licensed material”), to examine and enforce transportation requirements found in 49 CFR, “Transportation,” applicable to water treatment licensees. These requirements must only be met during transportation of spent media. Packaging and shipment of waste must be performed by a service provider holding a radioactive materials license.

Response from Applicant: No response is needed.

3.11 Item 11: Waste Management—Backwash and Media Disposal

Regulations: N.J.A.C. 7:28-6.1 (10 CFR 20.2001, 10 CFR 20.2108)

Criteria: Licensed materials must be disposed of in accordance with BER requirements. Systems which backwash must meet the limits for release in effluents (e.g., to ground or surface water) or to a sanitary sewer system. Media disposal must occur at a low-level radioactive waste facility or at an alternative site as approved by BER. Appropriate records must be maintained.

Discussion: When backwashing of a treatment system occurs, either for routine regeneration of treatment media, or during unplanned occurrences, the licensee must meet the concentration limits in N.J.A.C. 7:28-6.1 (10 CFR 20 Appendix B). Systems which release backwash wastewater in effluents, and those which release to sanitary sewer must meet the limits in Table 2 and Table 3, respectively, of 10 CFR 20 Appendix B. When more than one nuclide is involved, the licensee shall determine compliance by utilizing the Sum-of-Fractions for each nuclide. The Sum-of-Fractions must not exceed unity (1). An example is provided below for a licensee which discharges to the sanitary sewer:

	Measured Concentration (pCi/L)	10 CFR 20 Appendix B, Table 3 Limit (pCi/L)*	Fraction of Limit

Ra-224	35	2000	0.0175
Ra-226	16.3	600	0.027
Ra-228	99.4	600	0.166
Sum-of-Fractions			0.21

*Limits converted from 10 CFR 20 Appendix B, which are provided in $\mu\text{Ci/ml}$.

In the example above, the licensee is in compliance, since 0.21 is less than 1.

When disposing of media, licensees must transfer the spent media to an authorized recipient. Treatment media is licensed radioactive material and must be disposed of at a Licensed Low-Level Radioactive Waste facility, unless an alternative disposal facility is identified and approved by BER, which meets the requirements of N.J.A.C. 7:28-6.1 (10 CFR 20.2002). Requests for alternative waste disposal approvals should be made during the license application process, or far enough in advance to allow time for Department review time, which may be significant.

Response from Applicant: Describe the methods of disposal for spent media which will be pursued, as authorized under N.J.A.C. 7:28-6.1 (10 CFR Subpart K). Describe general procedures for media exchanges and subsequent disposal at a facility licensed to accept technologically enhanced naturally occurring radioactive materials.

If applicable, describe the method of backwash wastewater disposal, which will be either a discharge to a sanitary sewer or in effluents. Provide a copy of the NJPDES permit from the DEP or other permit(s) from the delegated local agency, as available.

3.12 Item 12: License Fees

On NJRAD Form-313, enter the appropriate fee category from [N.J.A.C. 7:28-64, Table 2](#) and the amount of the fee enclosed with the application. Fees are updated annually. The appropriate fee depends on the type and size of the treatment system. The type of system is either community or non-transient non-community. Sizes of community systems are based on the number of persons served by the system as follows:

- Very Small Water Systems (<500 persons)
- Small Water Systems (500 – 3,300 persons)
- Medium Water Systems (3,300 – 10,000 persons)
- Large Water Systems (>10,000 persons)

3.13 Item 13: Certification

A representative of the corporation or legal entity filing the application must sign and date NJRAD Form-313. The representative signing the application must be authorized to make binding commitments and to sign official documents on behalf of the applicant. BER will return all unsigned applications for proper signature.

Note: When the application references commitments, those items will be incorporated into the license and, therefore, will become binding regulatory requirements.

4 LICENSE AMENDMENTS AND RENEWALS

It is the licensee's obligation to keep the license current. If any of the information provided in the original application is to be modified or changed, the licensee must apply for a license amendment before the change takes place (N.J.A.C. 7:28-4.11). The change is not in effect until the amendment has been issued. Also, to continue the license after its expiration date, the licensee must apply for a license renewal at least 30 days before the expiration date (N.J.A.C. 7:28-4.10).

Applicants for license amendment or renewal should do the following:

- Submit NJRAD Form-313 for renewals.
- Submit a letter/email for amendment requests accompanied by the appropriate fee specified in N.J.A.C. 7:28-64, Table 2
- Provide the license number.
- For renewals, provide a complete and up-to-date application, including all required program elements outlined in Appendix C of this guidance document. Training documentation for personnel currently listed on the license does not need to be submitted as part of the renewal application.

4.1 Timely Notification of Transfer of Control

Regulation: N.J.A.C. 7:28-4.8(b)

Criteria: Licensees must provide all supporting information and obtain the BER's prior, written consent before transferring control of the license, also referred to as a "change of ownership" and/or "transferring the license."

Discussion: Transferring control may be the result of mergers, buyouts, or majority stock transfers. Although it is not BER's intent to interfere with the business decisions of licensees, it is necessary for licensees to obtain prior BER written consent to ensure the following:

- radioactive materials are possessed, used, or controlled only by persons who have valid Agreement State licenses
- materials are properly handled and secured
- persons using these materials are capable, competent and committed to implementing appropriate radiological controls
- a clear chain of custody is established to identify who is responsible for disposition of records and licensed material
- public health and safety are not compromised by using such materials

Response from Applicant: No response is required from an applicant for a new license. However, current licensees should refer to Appendix E of NUREG–1556, Volume 15, “Consolidated Guidance About Materials Licenses: Guidance About Changes of Control and About Bankruptcy Involving Byproduct, Source, or Special Nuclear Materials Licenses,” for more information about what is required to document a transfer of control (i.e., ownership).

5 TERMINATION OF ACTIVITIES

Regulations: N.J.A.C. 7:28-4.16, N.J.A.C. 7:28-12, N.J.A.C. 7:28-51

Criteria: A licensee seeking to terminate their license must furnish close-out surveys, wipe tests, and/or soil samples demonstrating that the facility and any potentially impacted materials and equipment (such as treatment vessels and piping) meets the requirements for release. The licensee shall also provide a disposition certificate attesting to the disposal of radioactive material. Decommissioning of facilities must be completed for any facility within 24 months of initiation of decommissioning, per 10 CFR 30.36(h)(1) (N.J.A.C. 7:28-51).

Discussion: If a specific license is not to be renewed or if a licensee requests termination of its license, appropriate documentation must be submitted which demonstrates the facility is acceptable for release. Release standards are published in N.J.A.C. 7:28-12.9, or alternative standards may be proposed in accordance with N.J.A.C. 7:28-12.11. Close-out surveys should be performed using guidance in the most recent version of NUREG-1575, and include a combination of scanning surveys, static measurements, wipe samples, and soil samples, as necessary.

The licensee must also submit NJRAD Form-314 (Appendix B) as part of the termination process. Applicants should be aware that a service provider specifically licensed for decommissioning activities should be hired to plan and implement radioactive materials disposal, treatment system dismantlement, and final status surveys. These activities are outside the scope of a water treatment licensee.

Response from Applicant: The applicant is not required to submit a response to BER during the initial application. The licensee's obligations in this matter begin when the license expires or at the time the licensee ceases operations, whichever is earlier. These obligations are to undertake the necessary decommissioning activities and to submit NJRAD Form-314.

6 CONTENTS OF A GENERAL LICENSE APPLICATION

The following information applies to the indicated items on Generally Licensed Water Treatment Systems Registration Form 664W(Ra) for radium systems and Form 664W(U) for uranium systems (Appendix E of this guidance document).

All items in the application should be completed in enough detail for BER to determine whether the treatment system is licensed appropriately and is being properly maintained.

Systems may initially be identified after BER receives notification from NJDEP's Bureau of Safe Drinking Water that a facility will be installing radionuclide removal treatment. Once notified, BER will contact the facility to determine if a registration or license will be required. This determination is made by having the facility complete the appropriate registration form and assessing the quantity of radionuclides anticipated to be possessed within the system.

N.J.A.C. 7:28-4.5 allows for radium treatment systems to be generally licensed if the maximum quantity of radium possessed within a treatment system at any one time is greater than 0.1 μCi and less than 10 μCi . Systems with greater than 10 μCi must be specifically licensed. Systems with less than 0.1 μCi are exempt from licensing or registration requirements.

For uranium systems, N.J.A.C. 7:28-58.1 (10 CFR 40.22(a)(3)) establishes a general license such that no more than 7 kg (15.4 lb.) of uranium may be removed during the treatment of drinking water at any one time, and no more than 70 kg (154 lb.) may be removed during a calendar year. If removal of uranium exceeds these limits, a specific license is required. There are no exempt quantities for uranium systems.

After a registrant is initially established, blank registration forms are mailed annually at the start of each fiscal year (July 1) for recompletion. Guidance on how to complete a registration form is provided in the remainder of this section.

6.1 Item 1: Licensee Name and Administrative Address

List the legal name of the applicant's corporation or other legal entity with direct control over use of the radioactive material. A division or department within a legal entity may not be a licensee. An individual may be designated as the applicant only if the individual is acting in a private capacity and the possession of the radioactive material is not connected with employment in a corporation or other legal entity. Provide the mailing address where correspondence should be sent. A post office box number is an acceptable mailing address.

6.2 Item 2. Responsible Person

Identify and provide contact information for the individual that will be responsible for overseeing the system and coordinating its upkeep. This person should be able to answer general questions about the system and be knowledgeable of its operation. This person may not necessarily be present at the site frequently (e.g., a property owner).

6.3 Item 3: Address where licensed material will be used

Applicants must provide an address for each location of wells that will have treatment installed.

Specify the street address, city, and State or other descriptive address (e.g., Highway 10, 5 miles east of the intersection of Highway 10 and State Route 234, Anytown, NJ) for each facility. The descriptive address should be sufficient to allow an NJDEP inspector to find the facility location. A post office box address is not acceptable. In addition, applicants are encouraged to provide global positioning system coordinates for each location.

6.4 Contact person for this location

Identify and provide contact information for an individual who is present at the site on a more frequent basis. This person does not have to be knowledgeable about the system or its operation, but should be able to respond to requests from BER, as needed.

6.5 Water Treatment System

Information provided in this section will largely be used to assist BER staff in determining the licensure requirements for the applicant.

6.5.1 Well# (or name)

Identifying information for the well that is being treated should be provided here. This may be the number the facility uses to identify the well, or a Public Water System Identification (PWSID) number issued by the State.

6.5.2 Type of Treatment

The type of treatment being used should be provided. Appropriate examples include “ion exchange,” or a specific media type, such as Z-92. Salt used for backwashing the media (e.g., “Solar Naturals,” “Salt Crystals”) is inappropriate to list in this section.

6.5.3 Backwash Frequency

Systems that backwash typically do so automatically, based on a computer connected to the treatment system. This may be done either based on volume of throughput (e.g., 5,000 gallons) or time (e.g., 3 days). The registrant should specify this here.

6.5.4 Backwash Volume

When a system backwashes, some volume of saltwater solution will be pumped through the system to remove the radionuclides from the treatment media. This volume should be entered here, and will be used by BER to make an initial determination on compliance with discharge limits in N.J.A.C. 7:28-6.1 (10 CFR 20 Appendix B).

6.5.5 Water Volume Treated

The total average volume of water treated should be provided here. This value should be supported with documentation if possible. This can be done by providing Bureau of Safe Drinking Water form BSDW-040 (Monthly Operating Report) from the previous year, or specifications within a permit for the approved radiological treatment.

6.5.6 Raw (Untreated) Sample Results for Combined Radium or Uranium

A raw result for the nuclides being treated should be provided here. For combined Radium-226 and Radium-228, the result should be provided in pCi/L. For total Uranium, the result should be provided in µg/L. The applicant must confirm this is a raw (untreated) water sample, and not a treated drinking water sample. A copy of the most recent raw water sample laboratory analysis should be provided. A new raw sample does not need to be collected each year, but will be requested when deemed necessary by BER (e.g., a new well is drilled or significant time has passed since the previous sample).

6.6 System Maintenance

Information provided in this section provides evidence that the treatment system is being maintained appropriately. The contact information for the system's Licensed Operator (LO) should be provided. A Licensed Operator is an individual approved by the DEP holding any local title, designation, or job description who is on-site at a system a significant amount of time, although not necessarily full time, and who has active involvement in and is responsible for the operation, maintenance, and effectiveness of the system, and who holds a license equal to or higher than that required for the system.

The expected frequency of complete replacement of the treatment media should be provided to give an idea of when a media changeout might be expected. Note that the conditions of a general license registration require the registrant to sample spent treatment media by gamma spectrometry for analysis of Radium-224, Radium-226, and Radium-228, and notify BER 15 days prior to waste disposal of spent media. Spent treatment media must also be disposed of in accordance with N.J.A.C. 7:28-6.1 (10 CFR 20 Subpart K). Prior to disposal, consultation with BER is required.

The backwash discharge location is important, along with the backwash volume, to perform an initial screening of compliance with discharge limits in N.J.A.C. 7:28-6.1 (10 CFR 20 Appendix B). Different discharge locations (e.g., a septic field vs. sanitary sewer) have different discharge limits.

Proof of system maintenance should be provided. This is most easily accomplished by providing a copy of a current maintenance agreement. It can also be demonstrated by providing T-reports completed by the LO, or obtaining a service call report from the maintenance provider. These all show that someone has been actively engaged at the site to ensure its upkeep.

6.7 Conditions

N.J.A.C. 7:28-4.8 specifies terms and conditions for general and specific water treatment systems. As part of this regulation, the NJDEP may incorporate, at any time, additional requirements and conditions as it deems appropriate or necessary to assure compliance. Such additional conditions which NJDEP has incorporated for general licensees are listed in this section. Importantly, these conditions specify notification requirements for spent media

sampling and disposal. It is the responsibility of the registrant to read and adhere to these conditions.

For reference, a current list of certified laboratories is on NJDEP's [DataMiner](#) website. The list may be accessed by clicking on "Search By Category," selecting the Report Category, "Certified Laboratories," and then viewing the report titled, "Radiological Lab Certifications."

Labs should be certified to analyze the Solid and Chemical Materials matrix for the applicable parameter (Radium-226, Radium-228, Uranium).

6.8 Certification

A representative of the corporation or legal entity filing the application must sign and date Form-664W. The representative signing the application must be authorized to make binding commitments and to sign official documents on behalf of the applicant. BER will return all unsigned applications for proper signature.

APPENDIX A
NJRAD FORM-313

New Jersey Department of Environmental Protection NJRAD Form-313

Please use the most current version of this form, which may be found at:

<https://www.state.nj.us/dep/rpp/rms/agreedown/SpecificLicense.pdf>

NJRAD Form-313 (Revised 9/2024) APPLICATION for RADIOACTIVE MATERIALS LICENSE		New Jersey Department of Environmental Protection Bureau of Environmental Radiation Radioactive Materials Program P.O. Box 420 (Mail Code 25-01) Trenton, NJ 08625-0420 Tel. (609) 984-5462 Fax. (609) 633-2210 Website: http://www.agreementstate.nj.gov		
1. Name and mailing address of licensee applicant		2. This application is for: <input type="checkbox"/> New License <input type="checkbox"/> Renewal of license number: _____		
3. Address(es) where licensed material will be used or possessed (attach additional sheets if necessary)				
3a.		3b.		
3c.		4. Person to be contacted about this application Name: _____ Telephone: _____ Fax: _____ E-mail: _____		
5. Radioactive Material:				6. Proposed use
Element & Mass #	Form	Maximum possession limit		
a				
b				
c				
d				
e				
f				
7. Radiation Safety Officer name, training, experience, telephone #, and email				<input type="checkbox"/> Attachments Enclosed
8. Training program for individuals working in or frequenting restricted areas				<input type="checkbox"/> Attachments Enclosed
9. Facilities and equipment				<input type="checkbox"/> Attachments Enclosed
10. Radiation safety program				<input type="checkbox"/> Attachments Enclosed
11. Waste Management				<input type="checkbox"/> Attachments Enclosed
12. License fee Categories: _____ Amount enclosed \$				
13. Certification: I, CERTIFY UNDER PENALTY OF LAW THAT THE INFORMATION PROVIDED IN THIS DOCUMENT IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT CIVIL AND CRIMINAL PENALTIES FOR SUBMITTING FALSE, INACCURATE OR INCOMPLETE INFORMATION, INCLUDING FINES AND/OR IMPRISONMENT. I also acknowledge management's commitment and responsibility for the following: <ul style="list-style-type: none"> • Radiation safety, security and control of radioactive materials, and compliance with regulations • Completeness and accuracy of the radiation safety records and all information provided to NJDEP • Knowledge about the contents of the license and application • Compliance with current NJDEP and Department of Transportation (DOT) regulations and the licensee's operating and emergency procedures. • Commitment to provide adequate resources (including space, equipment, personnel, time, and, if needed, contractors) to the radiation protection program to ensure that the public and workers are protected from radiation hazards and meticulous compliance with regulations is maintained • Notifying NJDEP regarding changing the Radiation Safety Officer (RSO). • Prohibition against discrimination of employees engaged in protected activities. • Commitment to provide information to employees regarding the employee protection and deliberate misconduct provisions in N.J.A.C. 7:28-1 et seq. • Obtaining NJDEP's prior written consent before transferring control of the license. • Notifying NJDEP, Bureau of Environmental Radiation in writing, immediately following filing of petition for voluntary or involuntary bankruptcy. 				
THE CERTIFICATION SHALL BE SIGNED BY THE HIGHEST RANKING CORPORATE, PARTNERSHIP OR GOVERNMENTAL OFFICER OR OFFICIAL AT THE FACILITY OR THE INDIVIDUAL FOR WHICH OR FOR WHOM THE SPECIFIC STATE LICENSE IS REQUESTED.				
Name & Title of Certifying Official (Administrator)		Signature		Date
				Telephone number:

APPENDIX B
NJRAD FORM-314

New Jersey Department of Environmental Protection NJRAD Form-314

Please use the most current version of this form, which may be found at:

<https://www.state.nj.us/dep/rpp/rms/agreedown/Termination.pdf>

NJRAD FORM-314 (Revised September 2024) <u>CERTIFICATE of DISPOSITION of RADIOACTIVE MATERIALS</u>	New Jersey Department of Environmental Protection Bureau of Environmental Radiation (BER) P.O. Box 420, Mail Code 25-01 Radioactive Materials Program Trenton, NJ 08625-0420 Tel. (609) 984-5557 Fax. (609) 633-2210 Website: www.agreementstate.nj.gov	
Instructions: This form is to be used to officially request termination of a license or release of a site which stored or used radioactive material. Disclosure of this information is required. Failure to provide any information will result in this request not being processed. Retain one copy and submit original of the entire request to the (BER) at the address above.		
A. LICENSE STATUS INFORMATION		
LICENSEE NAME AND ADDRESS	LICENSE NUMBER	EXPIRATION DATE
	LICENSEE CONTACT NAME	TELEPHONE #
If license termination is <u>not</u> being requested, address of site(s) to be released:	If restricted use of the terminated site is requested, attach details and check this box. <input type="checkbox"/>	
B. DISPOSAL OF RADIOACTIVE MATERIALS		
The licensee executing this certificate certifies that:		
<input type="checkbox"/> (A) No radioactive materials have ever been procured or possessed by the licensee under this license at this(these) site(s).		
<input type="checkbox"/> (B) All activities authorized by this license have ceased at this(these) location(s), and all radioactive materials procured and/or possessed by the licensee under this license number cited above have been disposed of in the following manner: [(i) and/or (ii) below must be completed]		
<input type="checkbox"/> (i) Transfer of radioactive materials to the licensee listed below: License Name: _____ License Number: _____ Issuing Agency: _____		
<input type="checkbox"/> (ii) Disposal of radioactive materials (explain and provide Waste Manifests):		
<input type="checkbox"/> (a) Directly by the licensee: _____		
<input type="checkbox"/> (b) By licensed disposal site: _____		
<input type="checkbox"/> (c) By waste contractor: _____		
<input type="checkbox"/> (C) Devices returned to manufacturer and converted to exempt devices.		
<input type="checkbox"/> (a) Documentation of exempt conversion and most recent leak test attached.		
C. SURVEYS PERFORMED AND REPORTED (Check all that apply)		
<input type="checkbox"/> (A) A radiation survey was conducted by the licensee*. The survey confirms:		
(i) the absence of licensed radioactive materials.		
<input type="checkbox"/> (B) A copy of the radiation survey results:		
<input type="checkbox"/> (i) is attached; or		
<input type="checkbox"/> (ii) is not attached (provide explanation); or		
<input type="checkbox"/> (iii) was forwarded to NJDEP on: _____		
<input type="checkbox"/> (C) the required leak tests were performed for all sealed sources:		
<input type="checkbox"/> (i) The results of the latest leak test are attached; <u>and</u>		
<input type="checkbox"/> (ii) No leaking sources have ever been identified.		
*A radiation survey is not required if only sealed sources were ever possessed under this license and box (C)(ii) is checked. A radiation survey should include contamination survey results with MDA when unsealed material was used.		
D. RETENTION OF RECORDS		
Records required to be maintained following license termination shall be available at the following address:		
E. CERTIFICATION		
I certify under penalty of perjury that the information contained on this form and all attachments are true and correct. It is therefore requested that the above referenced site be released for unrestricted use or restricted use if the box in Section A is checked.		
NAME & TITLE	SIGNATURE	DATE

APPENDIX C

**SUGGESTED FORMAT FOR PROVIDING INFORMATION REQUESTED
IN ITEMS 5 THROUGH 11 OF NJRAD FORM-313**

Item 5: Radioactive Material

Element & Mass Number

- Radium-224
- Radium-226
- Radium-228
- Uranium

Form

Any

Maximum Possession Limit

Provide an estimate of the activity of radionuclides that could be captured on the media at any one time. To support the possession limit, attach:

- Raw (untreated) water sample with specific radionuclide analysis
- Backwash frequency, if regenerative media
- Expected media disposal frequency, if non-regenerative media
- Average daily amount of water treated

Item 6: Proposed Use

Non-Human Use - Accumulation of naturally occurring radioactive materials (NORM) in a water treatment system.

Item 7: Radiation Safety Officer name, training, experience, telephone #, and email

Radiation Safety Officer name, telephone, email:

Attach applicable training/experience:

- Radiation Safety Officer course certificate
- Radiation safety training
- Documentation of hands-on experience working with water treatment systems which treat for radiological contaminants
- Résumé
- Other

Item 8: Training program for Individuals working in or frequenting restricted areas

- Demonstration that before using licensed materials, individuals will receive a training course covering basic radiological safety and health topics
- A description of the training program for proposed individuals working in restricted areas
- A commitment for completion of refresher training at a specified timeframe

Item 9: Facilities and Equipment

Describe the treatment facilities in detail. Provide diagrams of where the treatment facility will be located and proximity to occupied areas. Provide a facility diagram for each treatment location. Include on the diagram the use of adjacent areas, and information relevant to public dose and security.

Specific details regarding the treatment system, to include:

- A raw water radioanalytical result for the radionuclide(s) being treated
- Media type and manufacturer
- Flow rate of the well(s)
- Number of treatment vessels/trains and configuration (parallel or series)
- Treatment vessel size
- Volume of media on-site
- System flow configuration (upflow or downflow)
- If backwashing is routinely performed, the backwash location
- Any system components designed to prevent media spills outside of vessels, such as internal vessel screens or post-treatment filtration
- Any facility design components intended to contain media spills outside of vessels, such as secondary containment trays, recessed floors and dry sumps

Item 10: Radiation Safety Program

Audit Program

The applicant should not submit its audit program to BER for review during the licensing phase. The audit program will be reviewed during BER inspections.

Radiation Monitoring Instruments

Provide a description of radiation survey instruments to be used and how they will be accessed, maintained, calibrated, and operated.

Material Accountability

Describe procedures for disposal of spent media.

Occupational Dose

Describe the proposed dosimetry program for employees. If personnel dosimetry is not to be used, provide a prospective evaluation demonstrating that unmonitored individuals are not likely to receive a radiation dose in excess of the limits in N.J.A.C. 7:28-6.1 (10 CFR 20.1502(a)).

Public Dose

No response is required from the applicant in a license application, but BER will examine this matter during inspections.

Emergency and Security Procedures

Describe emergency and security procedures that will be employed and commit to posting emergency procedures at each facility.

Maintenance

Provide procedures for routine activities which pose the potential for coming into contact with treatment media, such as collection of media samples and management of filter socks.

State that: All non-routine maintenance activities will be handled by a service provider possessing a specific radioactive materials license for those activities.

Transportation

No response is needed.

Item 11: Waste Management – Backwash and Media Disposal

Describe the method of disposal planned at N.J.A.C. 7:28-6.1 (10 CFR 20 Subpart K).

Describe general procedures for media exchanges and subsequent disposal at a facility licensed to accept technologically enhanced naturally occurring radioactive materials.

If applicable, describe the method of backwash wastewater disposal, which will be either a discharge to a sanitary sewer or in effluents.

APPENDIX D
WATER TREATMENT SYSTEMS AUDIT CHECKLIST

Water Treatment Systems 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 _____

License No. _____

Date of This Audit _____

Date of Last Audit _____

_____ Auditor Signature	_____ Auditor Printed Name	_____ Date
_____ Management Signature	_____ Management Printed Name	_____ Date

1. Audit History

- a. Were previous audits conducted periodically (at least annually)?
- b. Were records of previous audits maintained?
- c. Were any deficiencies identified during the last two audits or 2 years, whichever is longer?
- d. Were corrective actions taken? (Look for repeated deficiencies.)

2. Organization and Scope of Program

- a. If the mailing address or places of use and/or storage changed, was the license amended?
- b. If ownership changed, did the licensee obtain NJDEP Bureau of Environmental Radiation (BER) consent or notify BER?
- c. If the licensee changed the radiation safety officer (RSO), was the license amended?

3. Training and Instructions to Workers

- a. Were all workers working around radioactive materials trained?
- b. Was refresher training provided, as needed?
- c. Were training records maintained?

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

4. Posting and Labeling

- a. Is each tank posted/labeled with a sign that says, "Caution, Radioactive Materials?"
- b. Is the treatment building/room posted with a sign that says, "Caution, Radioactive Materials?"
- c. Are emergency procedures for spills posted at each treatment facility?
- d. Is a copy of the license posted at each treatment facility or at the main office location?
- e. Is Form RPP-14, "Notice to Employees," posted at each treatment facility?

5. Radiation Survey Instruments

- a. If the licensee possesses its own survey meter, does the survey meter meet NRC requirements?
- b. Are calibration records maintained, if applicable?
- c. If the licensee does not possess a survey meter, are specific plans made to have one available in the event of an emergency?

6. Public and Occupational Dose

- a. Were badges posted on each tank, in an area most frequently occupied by staff, and at the fence line?
- 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)]?
- c. If personnel dosimetry is provided:
 - i. Is the dosimetry supplier approved by the National Voluntary Laboratory Accreditation Program?
 - ii. Are the dosimeters exchanged at the appropriate frequency?
 - iii. Are dosimetry reports reviewed and signed by the RSO when they are received?
- d. Are routine area dose rate surveys performed? If yes, do unrestricted area radiation levels exceed 2 mrem in any one hour?
- e. Are records of exposures, surveys, monitoring, and evaluations maintained?

7. Emergency and Security Procedures

- a. Have emergency and security procedures been developed to address spills and facility security?

- b. Did any emergencies occur? If so,
 - i. Was BER notified?
 - ii. Was the event reportable under N.J.A.C. 7:28-6.1 (10 CFR 20 Subpart M)? Reportable events may include loss of material and overexposures.
 - iii. How were they handled?
 - iv. What corrective actions were taken?
 - v. Was a written report available documenting the incident and response?
- c. Is the facility kept secure from unauthorized access?

8. Notifications

- a. Were appropriate notifications made to BER within 15 days of the following:
 - i. Dosimetry results?
 - ii. Laboratory analyses for spent media?
 - iii. Laboratory analyses of backwash prior to discharge?
 - iv. Significant water use changes?
 - v. Backwash frequency changes?
 - vi. System replacement or redesign?

9. Deficiencies Identified in Audit and Corrective Actions

Summarize problems and/or deficiencies identified during the audit. If problems and/or deficiencies were identified in this audit, describe the corrective actions planned or taken. Provide any other recommendations for improvement.

APPENDIX E

**RADIOACTIVE MATERIALS GENERALLY LICENSED
WATER TREATMENT SYSTEMS REGISTRATION FORM – 664W (RA)**

AND

**RADIOACTIVE MATERIALS GENERALLY LICENSED
WATER TREATMENT SYSTEMS REGISTRATION FORM – 664W (U)**



State of New Jersey
 Department of Environmental Protection
 Bureau of Environmental Radiation
 Radioactive Materials Program
 P.O. Box 420 (Mail Code 25-01)
 Trenton, New Jersey 08625
 Phone (609) 984-5462



Radioactive Materials Generally Licensed Water Treatment Systems Registration Form – 664W(Ra)

Pursuant to the Radiation Protection Act (N.J.S.A. 26:2D) and the Radiation Code (N.J.A.C. 7:28, et seq.), as amended, and in reliance on statements and representations heretofore made by the registrant, the listed registers generally licensed materials with the Department. This registration is subject to all applicable rules, regulations, and orders of the New Jersey Department of Environmental Protection, now or hereafter in effect, and to any conditions specified below.

DOCUMENT INFORMATION

Program Interest (PI) ID:
Registration Number:
Fiscal Year: FY24: July 1, 2023 to June 30, 2024

ADMINISTRATIVE INFORMATION

1. Licensee Name and Administrative Address	2. Responsible Person: _____ Phone Number: _____ Facsimile: _____ Email Address: _____ Title: _____
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3. Address where licensed material will be used (attach additional sheets if necessary):	4. Contact person for this location Name: _____ Phone Number: _____ Facsimile: _____ Email Address: _____ Title: _____
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5. WATER TREATMENT SYSTEM

Well # (or name)	Type of treatment	Backwash frequency (gallons or days)	Backwash Volume (gallons)	Water Volume Treated (Gallons per day)	Combined Radium Raw (Untreated) Water Sample (pCi/L & analysis date)

6. SYSTEM MAINTENANCE

Licensed Operator Name: _____

Company: _____

Phone Number: _____

Facsimile: _____

Email Address: _____

Expected frequency of complete replacement of treatment media (years): _____

Backwash Discharge/Disposal Location (select one):

Groundwater – Septic Field

Groundwater – Drywell

Sanitary Sewer

Surface Water – Field

Surface Water – Storm drain to water body

Surface Water – Direct to water body

No Discharge – Periodic solid waste disposal, approximately every ___ years

Attach a copy of current maintenance agreement, and/or proof that the system has been maintained properly during the previous year (such as T-reports)

7. CONDITIONS

1. The licensee must notify the NJDEP Bureau of Environmental Radiation:
 - (A) Within 15 days of any significant water usage changes or backwash frequency changes.
 - (B) 15 days prior to any replacement or redesign of the system or system components or waste disposal of spent media.
2. Prior to disposal, spent treatment media must be sampled by gamma spectrometry for analysis of Radium-224, Radium-226, and Radium-228. If a regenerative media, a backwash cycle is recommended prior to sampling and subsequent disposal (if it is continually used while awaiting results). Analyses shall be performed by a laboratory certified by the NJDEP Office of Quality Assurance to analyze for Radium or photon emitters in a Solid and Chemical Materials matrix.
3. Spent treatment media must be disposed of in accordance with N.J.A.C. 7:28-6.1 (10 CFR 20 Subpart K). Prior to disposal, consultation with NJDEP Bureau of Environmental Radiation is required.

8. CERTIFICATION

I certify under penalty of law that the information provided in this document is true, accurate and complete. I am aware that there are significant civil and criminal penalties for submitting false, inaccurate, or incomplete information, including fines and/or imprisonment. The certification shall be signed by the highest ranking corporate, partnership or governmental officer or official at the facility or the individual for which or for whom the specific state registration is requested. I am aware of the requirements of the general license, provided in N.J.A.C. 7:28-4.1 et seq. and N.J.A.C 7:28-6.1 et seq.

Name of Certifying Officer: _____

Title of Certifying Officer: _____

Signature of Certifying Officer: _____

Date of Signature: _____



State of New Jersey
 Department of Environmental Protection
 Bureau of Environmental Radiation
 Radioactive Materials Program
 P.O. Box 420 (Mail Code 25-01)
 Trenton, New Jersey 08625
 Phone (609) 984-5462



Radioactive Materials Generally Licensed Water Treatment Systems Registration Form – 664W(U)

Pursuant to the Radiation Protection Act (N.J.S.A. 26:2D) and the Radiation Code (N.J.A.C. 7:28, et seq.), as amended, and in reliance on statements and representations heretofore made by the registrant, the listed registers generally licensed materials with the Department. This registration is subject to all applicable rules, regulations, and orders of the New Jersey Department of Environmental Protection, now or hereafter in effect, and to any conditions specified below.

DOCUMENT INFORMATION

Program Interest (PI) ID:
Registration Number:
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ADMINISTRATIVE INFORMATION

1. Licensee Name and Administrative Address	2. Responsible Person: _____ Phone Number: _____ Facsimile: _____ Email Address: _____ Title: _____
--	--

3. Address where licensed material will be used (attach additional sheets if necessary):	4. Contact person for this location Name: _____ Phone Number: _____ Facsimile: _____ Email Address: _____ Title: _____
---	---

5. WATER TREATMENT SYSTEM

Well # (or name)	Type of treatment	Backwash frequency (gallons or days)	Backwash Volume (gallons)	Water Volume Treated (gallons/day)	Raw (Untreated) Water (Uranium ug/L & analysis date)	Treated Water (Uranium ug/L & analysis date)

6. SYSTEM MAINTENANCE

Licensed Operator Name: _____

Company: _____

Phone Number: _____

Facsimile: _____

Email Address: _____

Expected frequency of complete replacement of treatment media (years): _____

Backwash Discharge Location (select one):

Groundwater – Septic Field

Groundwater – Drywell

Sanitary Sewer

Surface Water – Field

Surface Water – Storm drain to water body

Surface Water – Direct to water body

No Discharge – Periodic solid waste disposal, approximately every ___ years

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2. Prior to disposal, spent treatment media must be sampled by alpha spectrometry for analysis of Uranium. If a regenerative media, a backwash cycle is recommended prior to sampling and subsequent disposal (if it is continually used while awaiting results). Analyses shall be performed by a laboratory certified by the NJDEP Office of Quality Assurance to analyze for Uranium in a Solid and Chemical Materials matrix.
3. Spent treatment media must be disposed of in accordance with N.J.A.C. 7:28-6.1 (10 CFR 20 Subpart K). Prior to disposal, consultation with NJDEP Bureau of Environmental Radiation is required.

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I certify under penalty of law that the information provided in this document is true, accurate and complete. I am aware that there are significant civil and criminal penalties for submitting false, inaccurate, or incomplete information, including fines and/or imprisonment. The certification shall be signed by the highest ranking corporate, partnership or governmental officer or official at the facility or the individual for which or for whom the specific state registration is requested. I am aware of the requirements of the general license, provided in N.J.A.C. 7:28-4.1 et seq. and N.J.A.C 7:28-6.1 et seq.

Name of Certifying Officer: _____

Title of Certifying Officer: _____

Signature of Certifying Officer: _____

Date of Signature: _____

