



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION III
2443 WARRENVILLE RD. SUITE 210
LISLE, IL 60532-4352

August 19, 2024

Casey Domingue
Regional Manager / Corporate RSO
Empire Wireline LLC
1010 Garber Rd.
Broussard, LA 70518

Dear Mr. Domingue:

This letter is regarding the application dated April 23, 2024, signed by Matthew Chitwood, HSSE Manager, for issuance of a U.S. Nuclear Regulatory Commission (NRC) Materials License.

The U.S. NRC's guidance document for your type of license, which I refer to below as "the guidance," is NUREG-1556, Volume 14, Rev. 1, dated April 2018, "Consolidated Guidance About Materials Licenses Program-Specific Guidance About Well Logging, Tracer and Field Flood Study Licenses." This guidance is available on the U.S. NRC website at:

<https://www.nrc.gov/docs/ML1812/ML18120A129.pdf>

Upon review of the request, I identified the following areas requiring additional or clarifying information:

1. NRC Form 313, "Application for Materials License," indicates that the license application should be prepared following the instructions provided in the current volume of NUREG-1556, "Consolidated Guidance About Materials Licenses."

Your application was not prepared in accordance with the guidance and did not adequately address all required items. Therefore, you may revise and resubmit your application using Appendix B, "Suggested Format for Providing Information Requested in Items 5 through 11, of the U.S. NRC Nuclear Regulatory Commission Form 313," from the guidance.

Additional items in this letter address the specific areas in which additional or clarifying information is requested. Further information regarding completion of the license application may be found in Section 8, "Contents of an Application," of the guidance.

2. Section 8.3, "Item 3: Address(es) where Licensed Material will be Used or Possessed," of the guidance, requests that you specify the address where licensed materials will be used or possessed. For well logging applicants, it is common for "temporary job sites" to be included in the request.

Your application identifies a field station in Evansville, Indiana, with additional field stations being located and licensed by Agreement States. Though, there is no indication that you intend to use well logging sources at temporary job sites.

If applicable, please clearly state in Item 3 of the application if you intend to use and possess licensed material at temporary job sites in addition to the address provided. If seeking authorization to use temporary job sites, the guidance identifies that the address may be stated as, "temporary jobsites anywhere in the U.S. where the NRC maintains jurisdiction."

3. Section 8.5.1, "Sealed Radioactive Material," of the guidance, identifies that the applicant should provide the manufacturer/distributor's name and model number for each sealed source and, if applicable, the device. Further, the guidance specifies that the applicant should confirm that each sealed source, device, and source and device combination is registered as an approved sealed source or device by the NRC or an Agreement State, and will be possessed and used in accordance with the conditions specified in the registration certificate.

Your request did not include complete information and did not identify the applicable Sealed Source and Device (SS&D) Certificates of Registration. Based on the information provided, it appears that the applicable SS&D registration certificates may include:

- Texas SS&D Registry Sheet No. TX-1297-D-101-S, dated November 17, 2017, for the Hotwell US, LLC, Model ING-10-20-120-TBT downhole neutron accelerator, which incorporates an All-Russian Research Institute of Automation (VNIIA) Model BHT2-26 neutron tube; and
- Colorado SS&D Registry Sheet No. CO-1012-D-101-S, dated December 26, 2018, for the Thermo MF Physics, LLC, Model B-320 neutron generator accelerator head, which is compatible with the Model A-3062 neutron generator tube.

Your application separately requests authorization for both the Thermo MF Physics, LLC, Model B-320 neutron generator accelerator head and the Thermo MF Physics, LLC, Model A-3062.

While the Thermo MF Physics, LLC, Model A-3062 neutron generator tube may be used in any of the appropriate accelerator heads that will safely accommodate the neutron generator tube, the registry only identifies that the Thermo MF Physics, LLC, Model B-320 neutron generator accelerator head is designed for downhole use. The registry sheet restricts installation of the A-3062 neutron generator tube into the neutron generator accelerator head to an authorized representative of Thermo MF Physics, LLC. Once installed in the Thermo MF Physics, LLC, Model B-320 neutron generator accelerator head, it may then be integrated into a user-supplied logging tool.

Clarify the manufacturer/distributor name of the requested neutron generator tubes and neutron generator accelerator heads or combinations thereof and the number of each that you are seeking license authorization to possess and use.

In addition, confirm that each requested sealed source, device, and source and device combination will be possessed and used in accordance with the conditions specified in the associated registration certificate.

4. Section 8.5.2, "Unsealed (Tracer) Radioactive Material," of the guidance, identifies that applicants should provide information for volatile materials, including the rate of volatility or dispersion.

Your application identifies that iodine-131 for tracer studies will be acquired from Iso-Tech, but did not identify the rate of volatility or dispersion.

Contact the manufacturer/distributor to obtain information concerning the rate of volatility or dispersion. Further, confirm that you will only be using pre-calibrated amounts or ready-to-use forms.

5. Section 8.5.2, "Unsealed (Tracer) Radioactive Material," of the guidance, indicates that Labeled Frac Sands consists of radionuclides(s) in liquid or solid forms that are chemically bonded to glass or resin beads and injected into a single well in a density controlled solution.

Your application requests authorization for scandium-46 beads.

Clarify if you are requesting authorization to possess scandium-46 for frac-tagging operations. If applicable, include applicable revisions to your Operating and Emergency Procedures addressing the items described in Section 8.10.13.4, "Frac-tagging Operations."

6. Section 8.7.1, "Radiation Safety Officer," from the guidance, identifies that the proposed Radiation Safety Officer (RSO) should have completed a well logging course, including hands-on experience with equipment and sources.

The application included documentation demonstrating that you completed a well logging course, but it is not apparent that the course included hands-on experience with equipment and sources.

Therefore, please elaborate on your previous experience with performing and/or supervising well logging operations. Describe the types of equipment, sources (including sealed sources, neutron generators and unsealed sources for tracer studies) and quantities handled. If applicable, include a copy of any licenses where you have been identified as a Logging Supervisor and/or Radiation Safety Officer.

7. Section 8.7.1, "Radiation Safety Officer," from the guidance, describes that the RSO may delegate certain day-to-day tasks of the radiation protection program to other responsible individuals (potential designees). This may include Site RSOs who assist the RSO with overseeing licensed operations at field stations or temporary job sites or other individuals who may "step in" as an emergency contact when the RSO is unavailable. Designees should have the same management support and decision-making authority as the RSO necessary to manage daily program activities.

The application identifies your intent to add Matthew Chitwood, Health Safety Security Environmental Manager, as the Assistant RSO.

Note that only the primary RSO is named on an NRC license. As this item is only advisory in nature, no response to this item is necessary.

8. Section 8.9, "Item 9: Facilities and Equipment," of the guidance, states that applicant's facilities and equipment must be adequate to protect health, minimize danger to life or property, minimize the possibility of contamination, and keep exposure to occupationally exposed workers and the public as low as reasonably achievable (ALARA).

Your application included a description of your facilities and equipment but lacked all necessary detail.

As indicated in the "Response from Applicant," section of the guidance, please submit a diagram, drawing, or sketch of the proposed facility, identifying areas where radioactive materials, including radioactive wastes, will be used or stored.

The submitted drawing should include the following, as applicable:

- Drawings should show, where applicable, adjacent buildings, boundary lines, security fences, and lockable storage areas.
- Illustrate area(s) where explosive, flammable, or other hazardous materials may be stored.
- Drawings should also show the relationship and distance between restricted areas and adjacent unrestricted areas.
- Drawings should specify shielding materials (e.g., concrete, lead) and means for securing radioactive materials from unauthorized removal.

In addition, describe items such as protective clothing (e.g., rubber gloves, coveralls, respirators, and face shields), auxiliary shielding, absorbent materials, injection equipment, neutron test barrels, test formations, secondary containers for waste-water storage for decontamination purposes, and plastic bags for storing contaminated items, which will be available at well sites when using tracer materials.

Further, describe proposed decontamination facilities for trucks, tracer injection tools, or other equipment contaminated by tracer materials, if applicable. Specify how the contaminated wastewater for these decontamination facilities is disposed.

9. Section 8.10.1, "Well Owner or Operator Agreements," of the guidance, states that well logging conducted with a sealed source or with unsealed material should only be performed if a written agreement with the employing well owner or operator is executed prior to the start of well logging operations.

Your application included a copy of Form No. 1021 (Agreement with Well Owner or Operator) but your Operating and Emergency Procedures lacked specific instruction to begin well logging operations only after a written agreement is executed.

As indicated in the "Response from Applicant," section of the guidance, provide the following with your response:

- A statement that: "We will obtain a written agreement that meets the requirements specified in 10 CFR 39.15 prior to well logging: (i) with a sealed source; (ii) with a neutron generator exceeding 30 Ci; or (iii) with a neutron generator in a well without a surface casing, and will provide an example of an agreement to the NRC."; and
- A statement that: "We will provide written instructions to the customer when conducting well logging using unsealed material that describes those subjects listed in the "Discussion" (unsealed material) portion of Section 8.10.1, "Well Owner or Operator Agreements" in NUREG-1556, Volume 14, Revision 1, "Consolidated Guidance about Materials Licenses: Program-Specific Guidance About Well Logging, Tracer, and Field Flood Licenses.""

10. Section 8.10.4, "Material Receipt and Accountability," identifies that licensed materials must be tracked from the time of receipt to disposal in order to ensure accountability at all times; to identify when licensed material may be lost, stolen or misplaced; and to ensure that possession limits listed on the license are not exceeded. Physical inventories, which must be conducted semiannually in accordance with [10 CFR §39.37](#) should account for all licensed material.

While your application included a commitment to perform physical inventories, a commitment to ensuring accountability of licensed sources at all times was not located.

As indicated in the "Response from Applicant," section of the guidance, provide the following with your response:

- A statement that: "Physical inventories will be conducted and documented at intervals not to exceed 6 months, to account for all licensed material (sealed sources, tracer materials, and unused or waste materials) and depleted uranium received and possessed under the license."; and
 - A statement that: "We will develop, implement, and maintain procedures for ensuring accountability of licensed materials at all times."
11. Section 8.10.7, "Operating and Emergency Procedures," of the guidance, states that each licensee must develop, implement and maintain operating and emergency procedures or submit a summary of the procedures that addresses the important radiation safety aspects of each procedure to the NRC as part of the application package in accordance with [10 CFR §39.63](#).

Additionally, if well logging and tracer personnel perform specific operations such as leak-testing, semi-annual inspection and maintenance of equipment, and removal and replacement of a sealed source "O" ring, appropriate procedures and instructions for these operations should be included in the applicant's operating and emergency procedures.

The submitted Radiation Safety Manual addressed several of the required components of your Operating and Emergency Procedures, but did not address all of the following areas, which should include:

- The handling and use of licensed materials including the use of sealed sources in wells without surface casing for protecting freshwater aquifers, if appropriate;
- The use of remote handling tools for handling sealed sources and radioactive tracer material except low-activity calibration sources;
- Methods and occasions for conducting radiation surveys, including surveys for detecting contamination, as required by [10 CFR §39.67\(c\) - \(e\)](#);
- Minimizing personnel exposure including exposures from inhalation and ingestion of licensed tracer materials;
- Methods and occasions for locking and securing stored licensed materials;
- Personnel monitoring and the use of personnel monitoring equipment;

- Transportation of licensed materials to field stations or temporary jobsites, packaging of licensed materials for transport in vehicles, placarding of vehicles when needed, and physically securing licensed materials in transport vehicles during transportation to prevent accidental loss, tampering, or unauthorized removal;
- Picking up, receiving, and opening packages containing licensed materials, in accordance with [10 CFR §20.1906](#) of this chapter;
- For the use of tracers, decontamination of the environment, equipment, and personnel;
- Maintenance of records generated by logging personnel at temporary jobsites;
- The inspection and maintenance of sealed sources, source holders, logging tools, injection tools, source handling tools, storage containers, transport containers, and uranium sinker bars as required by [10 CFR §39.43](#);
- Identifying and reporting to NRC defects and noncompliance as required by [10 CFR Part 21](#);
- Actions to be taken if a sealed source is lodged in a well;
- Notifying proper persons in the event of an accident; and
- Actions to be taken if a sealed source is ruptured including actions to prevent the spread of contamination and minimize inhalation and ingestion of licensed materials and actions to obtain suitable radiation survey instruments as required by [10 CFR §39.33\(b\)](#).

Note that your revisions should also account for the use of sealed sources in drill-to-stop (wireline) operations and use of sealed sources in measurement while drilling or logging while drilling well logging operations, as applicable. For additional information, please refer to Section 8.10.12.1, "Use of Sealed Sources in Drill-To-Stop (Wireline) Operations," and Section 8.10.12.2, "Use of Sealed Sources in Measurement While Drilling or Logging While Drilling Well Logging Operations."

12. Section 8.10.8, "Leak Tests," of the guidance, identifies that the U.S. NRC requires testing of sealed sources containing greater than 100 microcuries of beta/gamma or 10 microcuries of alpha radioactive material in order to determine whether there is any radioactive leakage from sealed sources in accordance with [10 CFR §39.35](#).

While Section 2 of your Radiation Safety Manual provides instructions regarding collection of leak test samples and retention of leak test records, your procedures lack all information needed.

According to the "Response from Applicant," section of the guidance, your response should include:

- A statement that: "Leak tests sample collection and analysis will be performed by an organization authorized by the NRC or an Agreement State to provide leak testing services to other licensees. Leak tests may be collected by the licensee, using a leak test kit supplier's instructions. Such leak test kits will be supplied by an organization authorized by the NRC or an Agreement State to provide leak testing services."; or
- A statement that: "Leak test sample collection and analysis will be done by the applicant." Provide the information in Appendix L of this NUREG supporting a

request to perform leak test sample collection and sample analysis and either state that “The applicant will follow the model procedures in Appendix L of NUREG–1556, Volume 14, Revision 1, “Consolidated Guidance about Materials Licenses: Program-Specific Guidance About Well Logging, Tracer, and Field Flood Licenses”, or submit alternative procedures.

In addition, please note that [10 CFR §39.35\(a\)](#) specifies that leak test records must be retained for inspection for three years after the leak test is performed. This varies from the retention interval described in your procedures.

13. Section 8.10.15, “Neutron Accelerators Using Licensed Material,” of the guidance, states that applicants requesting to use neutron generators must state if the generators are going to be calibrated by an NRC or Agreement State licensee who is specifically authorized to conduct this type of activity. If the applicant desires to conduct calibration of neutron generators, procedures describing facilities, specialized equipment and tools, and personnel training specific for this type of activity must be submitted for NRC review.

Your application requests authorization to use neutron accelerators but does not provide all applicable information.

According to the “Response from Applicant,” section of the guidance, your response should include:

- a statement that: “We will not use neutron generators (accelerators) in our well logging operations.”; or
- a statement that: “We will use neutron generators (accelerators) in accordance with the guidance in Section 8.10.15 of NUREG–1556, Volume 14, Revision 1, “Consolidated Guidance About Materials Licenses: Program-Specific Guidance About Well Logging, Tracer, and Field Flood Study Licenses” and will provide step-by-step operating and emergency procedures for NRC review. Calibration of neutron generators will be performed by an NRC or Agreement State licensee that is specifically authorized to conduct this activity.”; or
- A statement that: “We will use neutron generators (accelerators) in accordance with the guidance in Section 8.10.15 of NUREG–1556, Volume 14, Revision 1, “Consolidated Guidance About Materials Licenses: Program-Specific Guidance About Well Logging, Tracer, and Field Flood Study Licenses” and will provide step-by-step operating and emergency procedures for NRC review. We will perform calibration of neutron generators and will provide step-by-step procedures for conducting calibration of neutron generators for NRC review.”

Please respond by providing the applicable statement, including any applicable revisions to your facility and equipment description and operating and emergency procedures.

14. [10 CFR §30.4](#) defines research and development as:
- (1) theoretical analysis, exploration, or experimentation; or
 - (2) the extension of investigative findings and theories of a scientific or technical nature into practical application for experimental and demonstration purposes, including the experimental production and testing of models, devices, equipment, materials and processes. "Research and development" as used in this part and parts 31 through 35 does not include the internal or external administration of byproduct material, or the radiation therefrom, to human beings.

Section 3 of your Radiation Safety Manual discusses the performance of above ground testing outside of an unshielded neutron generator with authorization by the Site RSO or Corporate RSO.

Clarify if you are seeking authorization to conduct research and development of well logging tools and equipment. Note that if you are seeking license authorization to conduct research and development of well logging tools and equipment, you may be subject to the assessment of an additional application fee in accordance with [10 CFR §170.31](#).

If not intended for research and development purposes, please describe the circumstances which require the operation of a neutron generator above ground without shielding. In addition, describe the applicable administrative and engineering controls, safety equipment and procedures that will be adhered to during these procedures. This may include:

- A description of survey meters (including survey meters that are optimized for the detection of fast neutrons) that will be available for the testing.
- To minimize the potential for exposure to individual members of the public for this above ground testing and to prevent potential interference from surrounding structures, a remote location may be best suited to serve as the test location.

Clarify if you are proposing to perform the testing at the field station or if the testing will be performed at a remote location, which could include a temporary job site that you identify for the performance of this test.

- Clarify if the logging tool will be hung from a crane or other structure for testing purposes. Identify the height from which the tool will be hung. Identify the acceptable atmospheric conditions at the time of the test. Provide applicable dose rate calculations accounting for ground correction factors and variances in humidity and atmospheric density.
- Identify the maximum voltage to be applied to the neutron tube at the time of the test.
- Clarify if barrier tape or rope with applicable caution signage will be erected around the perimeter of the testing location to demarcate the boundary of the radiation area and to discourage unauthorized access.

In addition, confirm that access to test site will be continuously monitored during and immediately following the above ground test. In the event of an unauthorized entry, confirm that you will immediately shut off the neutron generator.

- Describe how you will prevent the neutron generator from being turned on while personnel are accessing the site. Clarify if the neutron generator is key controlled. If applicable, will the key be removed and given to the individual accessing the test site for safekeeping?
- Confirm that entry to the test site will be delayed after operation of the neutron generator is suspended to allow for the decay of activation products. Upon entry, confirm that your personnel will approach the test site with a calibrated and operable survey meter and make measurements as they approach the tool to confirm the absence of ionizing radiation.
- Identify if environmental and/or area monitoring dosimeters will be placed around the test site.
- Confirm that all individuals (including the crane operator) that may be in the vicinity of the test site will be provided appropriate personnel monitoring dosimeters (which are capable of recording neutron exposure).

In accordance with [10 CFR §2.390](#) of the NRC's "Rules of Practice," a copy of this letter will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC website at <https://www.nrc.gov/reading-rm/adams.html>.

To continue review of your application, please submit your response to this letter within 20 calendar days from the date of this letter. In your response, please refer to the docket and control number specified below. I will assume that you do not wish to further pursue this licensing action if I do not receive a reply within the specified timeframe noted above.

If you have questions, require additional time to respond, or require clarification on any of the information stated above, I encourage you to contact me at (630) 829-9737 or Jason.Kelly@nrc.gov.

Sincerely,



Jason M. Kelly, MPH, CPH
Health Physicist
Materials Licensing Branch

Digitally signed by JASON KELLY
Date: 2024.08.19 17:53:11 -05'00'
Adobe Acrobat version: 2024.002.20895

Docket No.: 030-39385
Control No.: 641483

Martha Pavon

From: Jason Kelly
Sent: Tuesday, August 20, 2024 7:51 AM
To: Martha Pavon
Cc: Sandy Pavon
Subject: FW: U.S. NRC Materials License - Request for Additional Information
Attachments: JK24-06-641483DLT-17-35757-01 (Signed).pdf; Form 665 (RAI Letter - 8-19-2024).pdf

Martha,

Attached is a Request for Additional Information Letter dated August 19, 2024, for Materials License No. 17-35757-01 (Empire Wireline, LLC), Docket No. 030-39385 for Control No. 641483. I have also attached a completed Form 665.

Jason M. Kelly, MPH, CPH
Health Physicist
U.S. NRC Region III – DRSS MLB
Phone: (630) 829-9737
E-mail: Jason.Kelly@nrc.gov

From: Jason Kelly
Sent: Monday, August 19, 2024 5:56 PM
To: Casey@Empirewireline.com
Cc: Matthew@Empirewireline.com
Subject: U.S. NRC Materials License - Request for Additional Information

Mr. Domingue:

I have reviewed the application dated April 23, 2024, for issuance of a U.S. NRC Materials License. Attached is a request for additional or clarifying information letter dated August 19, 2024.

I have also attached a copy of a form-fillable version of Appendix B from NUREG-1556, Volume 14, Rev. 1. I noted that your application was responsive to some of items in this Appendix B, but the application did not include all applicable statements as expected.

Please respond to this letter within 20 days. As you will not receive a hardcopy of this letter, please respond to this e-mail verifying that you have received this e-mail and were able to open the attachments.

Jason M. Kelly, MPH, CPH
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