

Molten Aura Labs, LLC.
30 Westgate Pkwy #310
Asheville, NC 28806
828-633-2553

Application for Materials License, NRC 313 : Items 5-11

5.

Element: Uranium, U-238

Form: Depleted Uranium Dioxide Powder

Used to make glass rods containing not more than 2% by weight source material.

Maximum requested possession limit is based off of the minimum amount we can order from supplier. This would be 500lbs which is roughly 2.81 gigabecquerels. The material is packaged in steel drums, with an estimated external dose rate of less than 5mr/hr at 1 meter.

6.

Our company manufactures borosilicate glass rods. The Depleted Uranium will be used as a modifying ingredient in certain glass formulas. The final glass composition will contain no more than 2% Depleted Uranium by weight in accordance with 10 CFR 40.13(c)(2)(iii).

Source material will be accurately measured and mixed into powdered glass batch prior to melt. We measure and include no more than 2% depleted uranium by weight. The remaining 98% of the glass batch is a proprietary glass formula primarily containing Silica, Boric Acid, Alumina, and Sodium Carbonate. During the melting process, the glass is stirred with a high temperature stainless steel rod to ensure homogeneity throughout the batch. Once processed into glass rods, each rod is individually inspected to ensure there are no defects such as stones, air bubbles, or surface anomalies. Discarded glass pieces are simply recycled by re-melting and reprocessing. The finished glass product will be tested by sending a sample to Applied Technical Services, Inc. in Marietta, GA. They will use Inductively Coupled Plasma Mass Spectrometry to fully analyze the sample and send us a certified document stating the exact percentage of Uranium Dioxide present in the glass matrix. If the percentage is higher than 2%, the glass will not be sold and the formula reworked and retested until 2% or less is achieved in the final product. Any new glass formula made with the source material will be tested in this way to ensure nothing is being distributed that contains over 2% material.

The label will state:

"This glass product is manufactured by Molten Aura Labs, LLC. It contains depleted uranium and complies with NRC regulations for manufacture and distribution of glassware containing source material. For more information and a detailed analysis of exposure rates to a range of materials in this category, please refer to the following document: <https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1717/nureg-1717.pdf>"

7.

RSO: N/A

Authorized Users: N/A

8.

As owners, operators, and sole employees of Molten Aura Labs, Adam Wiens and Aaron Wiens have both completed a Radiation Safety Training course. The course is targeted to both radiological workers and non-radiological workers. This is for anyone who plays an active role in maintaining exposures to radiation and radioactive materials within regulatory (Nuclear Regulatory Commission or Agreement State) limits and in compliance with As Low As Reasonably Achievable (ALARA) principles.

The training covers:

- Fundamentals of Radiation and Radioactivity
- Radiation Biology
- Radiation Dose Limits and ALARA
- Personnel Monitoring
- Access Controls and Postings
- Emergency and Spill Procedures
- Contamination Control
- Employee Responsibilities

Both Adam and Aaron have a certificate of completion for the Radiation Safety Training. A copy of each certificate is enclosed.

9.

The glass production facility is a 5000 square foot steel building containing industrial grade ventilation and dust collection equipment. The material will be stored in a locked fire-proof cabinet accessible only to the radiation safety officers.

10.

Radiation Safety Program:

Audits will be performed every six months. The details of the audit program are included as a separate form Radiation Safety Checklist.

Radiation Monitoring Instruments:

We will use instruments that meet the radiation monitoring instrument specifications published in Appendix K to NUREG-1556, Vol. 12, 'Consolidated Guidance about Materials Licenses: Program-Specific Guidance About Possession Licenses for Manufacturing and Distribution.' We reserve the right to upgrade our survey instruments as necessary.

Currently, our main radiation detector is the SOEKS 01M – Radiation Meter. Measurements made with this device display exact background radiation levels in $\mu\text{Sv/h}$ or $\mu\text{R/h}$ along with a message describing the level of background radiation. This device provides a precision level from 5 to 100,000 $\mu\text{R/h}$.

Material Receipt and Accountability:

Physical inventories will be conducted at intervals not to exceed 6 months, to account for all sealed sources and devices received and possessed under the license.

Occupational Dose:

We have done a prospective evaluation and determined that unmonitored individuals are not likely to receive, in one year, a radiation dose in excess of 10% of the allowable limits in 10 CFR Part 20.

Safe Use of Radionuclides and Emergency Procedures:

We have developed and maintained a set of safe use procedures for working with the material. Emergency procedures have been developed for such things as minor spills, major spills, contamination, fires, injuries, or other emergency situations.

Surveys:

We will survey our facility and maintain contamination levels in accordance with the survey frequencies and contamination levels published in Appendix P to NUREG-1556, Vol. 12, 'Consolidated Guidance about Materials Licenses: Program Specific Guidance About Possession Licenses for Manufacturing and Distribution.' Leak tests will be performed at the intervals approved by NRC or an Agreement State and specified in the SSD Registration Certificate. Leak tests will be performed by an organization authorized by NRC or an Agreement State to provide leak testing services to other licensees or using a leak test kit supplied by an organization authorized by NRC or an Agreement State to provide leak test kits to other licensees and according to the sealed source or plated foil manufacturer's (distributor's) and kit supplier's instructions.

Transportation: N/A

11.

We will use the model waste procedures published in Appendix S to NUREG-1556, Vol. 12, 'Consolidated Guidance about Materials Licenses: Program-Specific Guidance About Possession Licenses for Manufacturing and Distribution.'

The amount of material we are measuring at any given time is quite small (less than 500 grams) so our main source of waste is paper towels used to clean measuring instruments and surfaces. These paper towels along with any residue are kept in closed plastic bags within sealed steel drums. The sealed drums are retrieved by a professional hazardous waste removal service. They can accept radioactive material. (<https://www.hazardouswasteexperts.com/hazardous-waste-transportation/>)

Hazardous Waste Experts
2693 Research Park Drive
Suite 201
Fitchburg, WI 53711
888-681-8923

From: [Adam Wiens](#)
To: [Lowman, Don](#)
Cc: [Xu, Shirley](#); [Herrera, Tomas](#)
Subject: [External_Sender] Re: Re: Re: Re: Application for Exempt Distribution License
Date: Thursday, February 13, 2020 9:05:12 AM
Attachments: [nrc_application5-11.pdf](#)

On Thu, Feb 13, 2020 at 8:13 AM Lowman, Don <Donald.Lowman@nrc.gov> wrote:

Hi Adam,

Thanks for the response...this is what we needed to proceed. We would like the responses in a separate document so please provide the updated pages for your application (Items 5-11).

Thanks,

Don

From: Adam Wiens <adam@moltenaura.com>
Sent: Wednesday, February 12, 2020 7:37 PM
To: Lowman, Don <Donald.Lowman@nrc.gov>
Cc: Xu, Shirley <Shirley.Xu@nrc.gov>; Herrera, Tomas <Tomas.Herrera@nrc.gov>
Subject: [External_Sender] Re: Re: Re: Re: Application for Exempt Distribution License

Here are revised responses. I can export a new pdf tomorrow if you need them in a separate doc.
thanks.

5. Source material will be accurately measured and mixed into powdered glass batch prior to melt. We measure and include no more than 2% depleted uranium by weight. The remaining 98% of the glass batch is a proprietary glass formula primarily containing Silica, Boric Acid, Alumina, and Sodium Carbonate. During the melting process, the glass is stirred with a high temperature stainless steel rod to ensure homogeneity throughout the batch. Once processed into glass rods, each rod is individually inspected to ensure there are no defects such as stones, air bubbles, or surface anomalies. Discarded glass pieces are simply recycled by re-melting and reprocessing. The finished glass product will be tested by sending a sample to Applied Technical Services, Inc. in Marietta, GA. They will use Inductively Coupled Plasma Mass Spectrometry to fully analyze the sample and send us a certified document stating the exact percentage of Uranium Dioxide present in the glass matrix. If the percentage is higher than 2%,

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On Wed, Feb 12, 2020 at 4:09 PM Lowman, Don <Donald.Lowman@nrc.gov> wrote:

Mr. Wiens,

Here's the information we need:

- Your answer to #5 is incomplete. Please describe how Molten Aura Labs will verify the final product (glass rods) contain less than 2% by weight of the source material. We understand the mixture is measured before the melting process, but you have not described how Molten Aura Labs will ensure all glass rods produced contain less the 2% by weight of the source material.
- Your answer to #6 is incomplete. 10 CFR 40.52(b)(4) states: *The proposed method of labeling or marking each unit, and/or its container with the identification of the manufacturer or initial transferor of the product and the source material in the product.* Your label must identify the manufacturer or initial distributor.

Please let me know if you have any further questions.

Thanks,

Don

From: Adam Wiens <adam@moltenaura.com>

Sent: Wednesday, February 12, 2020 10:16 AM

To: Lowman, Don <Donald.Lowman@nrc.gov>

Cc: Xu, Shirley <Shirley.Xu@nrc.gov>; Herrera, Tomas <Tomas.Herrera@nrc.gov>

Subject: [External_Sender] Re: Re: Re: Application for Exempt Distribution License

Hi, I did answer those questions in a previous email (additional_items.pdf from my email sent January 17th). I attached it here and pasted the text below. I also sent a photo of what the label will look like on our product. The glass rods are bundled into 1lb packages and the label will be included with every order of this product. Please let me know if there is additional information we need to include on the label.

thanks,

Adam

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<https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1717/nureg-1717.pdf>"

On Wed, Feb 12, 2020, 8:18 AM Lowman, Don <Donald.Lowman@nrc.gov> wrote:

Hi Adam,

Yes we do need more information on your application. Questions #5 and #6 from my original email (see below) were not answered. Please provide answers to these questions:

5. [Per 10 CFR 40.52](#)(b)(3) – please provide applicable quality control procedures. These procedures should include steps taken during the fabrication of the glass rods to ensure the 2% by weight limit of source material is met.
6. [Per 10 CFR 40.52](#)(b)(4) – please provide proposed of labeling or marking of each unit. Placement and drawings of the labeling would be helpful.

Please reply with these answers by Friday if possible and let me know you have any more questions.

Thanks,

Don

From: Adam Wiens <adam@moltenaura.com>

Sent: Friday, February 07, 2020 9:32 AM

To: Lowman, Don <Donald.Lowman@nrc.gov>

Cc: Molten Aura Labs <info@moltenaura.com>; Xu, Shirley <Shirley.Xu@nrc.gov>; Herrera, Tomas <Tomas.Herrera@nrc.gov>

Subject: [External_Sender] Re: Re: Application for Exempt Distribution License

Hi, just wanted to check in and make sure you had everything you needed from me at this point.

Thanks,

Adam

On Tue, Jan 21, 2020, 11:08 AM Lowman, Don <Donald.Lowman@nrc.gov> wrote:

Hi Adam,

Thanks for your quick response. Unfortunately I forgot to request a signed cover letter your responses...could you email me a signed cover letter for the attachments?

Thanks,

Don

From: Adam Wiens <adam@moltenaura.com>
Sent: Friday, January 17, 2020 9:55 AM
To: Lowman, Don <Donald.Lowman@nrc.gov>
Cc: info@moltenaura.com; Xu, Shirley <Shirley.Xu@nrc.gov>; Herrera, Tomas <Tomas.Herrera@nrc.gov>
Subject: [External_Sender] Re: Application for Exempt Distribution License

Mr. Lowman,

I have attached responses to the above request. The revised items 5-11, as well as the additional information requested.

Let me know if you have further questions.

Thank you,

Adam

On Thu, Jan 16, 2020 at 5:57 PM Lowman, Don <Donald.Lowman@nrc.gov> wrote:

Mr. Wiens,

This email is in response to your application, U.S. Nuclear Regulatory Commission (NRC) Form 313, dated November 7, 2019 requesting a new exempt distribution license. We do not have sufficient information to complete the review of your application. Below is the list of items not addressed in your application:

1. Item 5 – Radioactive Material:

- Please update to U-92 to U-238.
- Please provide the physical form (e.g. powder) for each product and specify each product containing not more than 2 percent by weight source material.

2. Please detail the purpose of each product (e.g. decorative, drinking glass,

- dinnerware, etc.).
3. Do any of the products you currently sell online contain depleted uranium? If so, please identify which products.
 4. Per 10 CFR 40.52(b)(2) – please provide details of construction and design of the product.
 5. Per 10 CFR 40.52(b)(3) – please provide applicable quality control procedures.
 6. Per 10 CFR 40.52(b)(4) – please provide proposed of labeling or marking of each unit.

We will continue our review upon receipt of this information. If we do not receive your reply within 30 calendar days from the date of this letter, we will consider your application as having been abandoned by you. This action would be without prejudice to the resubmission of another application with the required information.

Don Lowman

Health Physicist

U.S. Nuclear Regulatory Commission

NMSS/MSST/MSTB

301.415.5452

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Adam Wiens

Molten Aura Labs, LLC

adam@moltenaura.com

828-633-2553

Asheville, NC USA

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Adam Wiens

Molten Aura Labs, LLC

adam@moltenaura.com

828-633-2553

Asheville, NC USA

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adam@moltenaura.com

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