

**From:** Anthony Kirkwood  
**To:** Pr12235@aol.com  
**Date:** 09/28/2006 11:01:21 AM  
**Subject:** Response to questions on tritium

Don Price  
Advanced Design and Engineering  
Eugene, Oregon

Mr. Price,

I am responding to your e-mail sent to Mr. Scott Burnell, dated September 27, 2006, regarding your questions on tritium. Below in bold are our answers, following your original questions. Attached at the end is our general guidance for applying for a Nuclear Regulatory Commission (NRC) sealed source and device engineering safety review and exempt distribution license.

I have seen references made to "Tritiated Polymer" or "Tritiated Polyethylene", evidently the embedding of Tritium and a Phosphor into a plastic substrate. Are such substances still: Legal? Safe? Currently manufactured or used in industry? **Tritiated polymers or tritiated polyethylenes may require an NRC license. NRC is typically concerned with the physical form of the radioactive material (material), that is, gas, liquid, or solid, and does not generally question the chemical aspects of materials unless a release of material is more likely because of the substrate, etc. The manufacturers of materials, containing radioactive elements for distribution to persons without a license, must have a license in accordance with the regulatory requirements in 10 CFR 32.18(c) which states that byproduct materials in the form of processed chemical elements or compounds are subject to the regulations.** I have seen references to "Tritium Paint", probably similar to the above. As above, is such a use of Tritium: Legal? Safe? Currently manufactured or used in industry? **The only use of tritium paint that I am aware of was formerly in the watch industry. All watches nowadays are licensed to use tritium in glass vials. However, tritium painted hands and dials would still be acceptable for licensing should NRC receive an application for such.**

Glass Encapsulated Tritium: I am aware Tritium and a Phosphor coated glass capsule is widely used in many industries today. My question: what are current size/volume limits to such devices? Would a new device different in size, shape or other configuration need to be submitted for approval? For example, would a .135" cube be considered safe? **No specific size, shape, or volume restrictions exist, however, the activity level of the radioactive material in relation to one unit of each product, designed for distribution to persons exempt from the regulations, would have to be carefully reviewed for safety in accordance with the provisions of the regulations in 10 CFR 32. For example, the provisions of 10 CFR 30.15(a)(1)(i) authorize the public to possess timepieces containing less than or equal to 25 millicuries of tritium without a license. Also 10 CFR 32.14 does not require the manufacturer/distributor of timepieces containing 25 millicuries or less of tritium to obtain a sealed source and device engineering safety review/registration. However, timepieces exceeding 25 millicuries of tritium, and authorized for possession by the public pursuant to 10 CFR 30.19(a), would require the manufacturer/distributor of such timepieces to obtain a sealed source and device engineering safety review/registration and a license pursuant to 10 CFR 32.22. How long does such approval of prototypes usually take? (I am a designer, not a manufacturer, I would be subcontracting or licensing a device to someone already authorized to undertake such manufacture). **Combined reviews of new NRC design approvals/registrations and exempt distribution licenses are generally given a goal of completion within 180 days.****

Are you aware of any other self-luminous substance that is considered safer to use than Tritium, in use in industry today? **There are other light-emitting/sensitive substances used to illuminate exit signs and other products that do not contain radioactive material. For example:**

[http://www.betalight.com/index\\_ledsigns.htm](http://www.betalight.com/index_ledsigns.htm)  
<http://lumiglo.com/pages/signs.htm>

Sincerely,

Anthony Kirkwood

cc: Sandra Wastler, Tim Harris, Patricia Rathbun, John Jankovich, Scott Burnell

ATTACHMENT:

This refers to your recent request for information concerning the application process for obtaining a sealed source device registration and exempt distribution license pursuant to, 10 CFR 32.22, for products containing tritium vials, such as gun sights.

In order to possess and use byproduct material, you must first satisfy the general requirements of 10 CFR 30.33. Therefore, you must apply for and obtain a specific license authorizing the possession and use of byproduct material. Based on the state(s) from which a device will be manufactured and/or distributed, either submit an NRC Form 313 to the appropriate U.S. Nuclear Regulatory Commission (NRC) regional office or, since the NRC has no regulatory jurisdiction in an Agreement State, contact the appropriate Agreement State office(s) for application information.

An applicant wishing to distribute or initially transfer products containing byproduct material, such as tritium gun sights, to persons exempt from licensing, must also obtain an exempt distribution license. Prior to licensing tritium gun sights it will be necessary for our Sealed Source Safety Staff to perform an engineering safety device review pursuant to the issuance of a device registration sheet. The product information to be submitted for a distribution license and a device registration is outlined in 10 CFR Part 32, specifically in Sections 32.22, 32.23, and 32.25, and in Regulatory Guide 6.9 and NUREG-1556, Vol. 3, Rev. 1, "Applications for Sealed Source and Device Evaluation and Registration," and NUREG-1556, Vol. 8, "Program-Specific Guidance About Exempt Distribution Licenses." All this information is available at the NRC web site: [www.nrc.gov/materials/miau/mat-toolkits.html](http://www.nrc.gov/materials/miau/mat-toolkits.html). While it is not necessary that you provide a sample of the tritium product, you should submit detailed drawings of the product indicating the location and content of the required labeling.

An application for an exempt distribution license should not contain information concerning the possession and use of radioactive material as covered in a possession license. Therefore, you should only answer questions 1 through 6, 12 and 13 on the enclosed NRC Form 313, "Application for Material License."

Regarding the fees required for NRC, you should contact Ms. Brenda Brown, of the License Fee and Debt Collection Branch, at (301) 415-6055, [beb@nrc.gov](mailto:beb@nrc.gov) for fee information. Payment of the fee should be mailed, along with the application package, to the U.S. Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards, Division of Industrial and Medical Nuclear Safety, Washington, DC 20555. Please note that this fee is only for an NRC exempt distribution license and/or a device review.

If I can be of further assistance for exempt distribution licensing, please contact me at (301) 415-6140, or e-mail: [www.ask@nrc.gov](mailto:www.ask@nrc.gov) or Dr. Richard Struckmeyer, at (301) 415-5477, or e-mail: [www.rks@nrc.gov](mailto:www.rks@nrc.gov). For questions on the product registry review please call Dr. John Jankovich at (301) 415-7904, or e-mail [www.jpj2@nrc.gov](mailto:www.jpj2@nrc.gov).

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NRC/NMSS/IMNS/MSIB-A  
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**CC:** John Jankovich; Patricia Rathbun; Sandra Wastler; Scott Burnell; Tim Harris

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