

Heraeus

Heraeus Noblelight Fusion UV Inc.
910 Clopper Road
Gaithersburg, MD 20878-1357

Phone +1 301 527 2660
Fax +1 301 527 2661
info.hnfn@heraeus.com
www.fusionuv.com

Date September 17, 2014

Address Mr. Richard Struckmeyer
Licensing Branch - Division of Materials Safety and State Agreements
Office of Federal and State Materials & Environmental Management Programs
US Nuclear Regulatory Commission

Re Control Number 581000 (Docket number 030-32547)

Dear Mr. Struckmeyer,

Thank you for the reply dated 22 August 2014 on our calculations addressing the radiation levels from our [electron tube] products, in response to the 10 CFR 21.14(b)(7) requirements for Heraeus Noblelight Fusion UV's Exempt Distribution License. Your clear and direct questions are extremely helpful in completing the NRC requirements.

Instead of continuing with the previous questionable cylindrical geometry in the Varskin simulation, the simulation was repeated with the slab (Cartesian) geometry to better match the recommended scenario. In the new calculation, the bulb is now approximated by a rectangular cross section 30 cm long by 13 mm high, which corresponds to the bulb length and diameter, respectively. Technically, the bulb now has a square cross section along its major axis instead of circular, but this is considered a small perturbation on the calculation results.

The following page contains the new Varskin calculation, with annotations describing the values used for the calculation. We have used the same source strength in this calculation as discussed in previous correspondence that we requested the NRC keep as a trade secret under 10 CFR 2.390. To reduce the number of these requests, we have removed the actual source strength value from the present table.

Please let me know if there are any questions or additional information needed once you have had time to review these responses. Thank you again for your patience and consistent effort on this license renewal application.

Sincerely,



Darrin Leonhardt, PhD
HNFN Radiation Safety Officer
Darrin.Leonhardt@heraeus.com
tel: 301-990-8700 X8751.

Varskin 3

Version 3.0.1

Date: 8/27/2014

Time: 9:40:31 AM

Kr-85_slab_glass_1 cm air gap

Slab Source Geometry

Skin Density Thickness: 7 mg/cm²
Air Gap Thickness: 1.00E+00 cm
Cover Material Thickness: 1.00E+00 mm thickness of quartz envelop
Cover Material Density: 2.20E+00 g/cm³ density of quartz
X-side Length: 3.00E+02 mm bulb length
Y-side Length: 1.30E+01 mm bulb width (diameter)
Source Thickness: 1.30E+01 mm bulb width (diameter)
Source Density: 3.48E+00 kg/m³ Kr-85 density at STP
Irradiation Time: 60 min
Irradiation Area: 10 cm²

Nuclide: Kr-85
Half Life: 93971.52 h
Average Beta Energy: 0.251 MeV
X-99 Distance: 0.200 cm
Average Photon Energy: 0.000 MeV
Specific Photon Dose Constant: 0.000 R-cm²/(mCi-h)
Source Strength: [REDACTED] µCi

	Initial Dose Rate	Dose (No Decay)	Decay-Corrected Dose
Beta	0.00E+00 rad/h	0.00E+00 rad	0.00E+00 rad
		Photon Dose Not Calculated	
Total	0.00E+00 rad/h	0.00E+00 rad	0.00E+00 rad