



HAVELLS

Q-5

39-31336-01
03037842

To: Rebecca Junod
Fax: 610-337-5269

Subject: License application.

Dear Rebecca Junod

I am writing you at the recommendation of Shirley Crutchfield. As you can see from the enclosed we submitted an application to the NRC back in June. At this point I have heard nothing from anyone regarding this this. Can you please help me find someone that can tell me what may be going on with this license application. Can you please take a look and see what might have happened to this application and what I need to do to move it forward.

You can reach me either via phone 916-765-2179, fax 678-4203720 or Email flemming.jensen@havells-usa.com. I greatly appreciate you help with this.

Sincerely

Flemming Jensen
Flemming Jensen
General Manager

576358

NMSS/RGN1 MATERIALS-002

Flemming Jensen
General Manager
HAVELLS USA

125 Villanova Dr. Suite A/B, Atlanta, GA 30336, 678-420-3700, www.havells-USA.com

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Date: 1 June, 2011

Objective of the application

In reference to our existing Materials License, in the name of erstwhile Sli Lighting Products, Inc, now the Havells USA, Inc., bearing License Number 39-31336-01, Docket No. 030-37842 dated 21 November 2008 we would like to request that the said license to be further extended.

Thus according to the **Atomic Energy Act of 1954**, as amended, the **Energy Reorganization Act, 1974**, **Title 10, Code of Federal Regulations of the United States of America**, under Sections - 10 C.F.R. § 30, 31, 32, 33, 34, 35, 36, 39, 40, 70, §110.5, 10 C.F.R. §20.1801 & 10 C.F.R. §34.3, 10 C.F.R. §§30.3, 40.3, and 10 CFR §150.15, **Havells USA Inc**, requests:

- authorization for import, export , distribution, storage, warehousing, stocking including but not restricting to installers, specifiers, customers and placing on the market of lamps, starters or other lamp components containing small amounts of encapsulated radioactive substances.
- exemption for further authorization requirements of approved lamp products for all handling processes from the moment following the transfer/sale of these products to the end-user.

Summary of the problem statement

Some of the lamps produced and sold by the Lamp Industry contain minimal amounts of encapsulated radioactive substances ("Affected Lamps"). The Affected Lamps are exclusively sold and used in a professional environment, public places. The ionising radiation emitted within the Affected Lamps is indispensable for the high performance of these light sources. All these lamps are produced and placed on the market in the countries of production, following regulatory approval by the competent national authorities. Independent studies demonstrate that the risk of exposure to the emitted radiation is negligible in the whole chain from the moment Affected Lamps leave the production facilities to be placed on the market, up to and including waste disposal when the produce has reached its end of life. Despite the negligible risk, and hence safe application, regulatory approval is required for Affected Lamps since 1984 following the implementation of considerably lower exemption levels (for radionuclides in Affected Lamps) in the current IAEA and EURATOM Directive 96/29 basic safety standards in comparison to the preceding basic safety standards (EURATOM Directive 84/467)

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Name and address of the applying company undertaking in the United States of America

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CTC, 1209 Orange Street,
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Delaware 19801
With company n° 2135148

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Office Location in USA
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info.us@havells-usa.com

Name of the person legally representing Havells USA Inc.

Name: Flemming Jensen
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Name: Kapil Gulati
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Local contact in United States of America concerning this application

Name: Flemming Jensen
Job title: Director
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Radiation Protection Advisor representing Havells Sylvania Lighting Belgium N.V. and the group

Patrick Beerten

Address details of the import and distribution warehouse in France

Havells Sylvania Lighting France SAS
53, route de Paris 60330 Le Plessis Belleville
France

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Information on foreign licenses or permission by the authorities related to this application

- Havells Sylvania Lighting Belgium N.V., has a manufacturing license for lamps, ref.: 1553, from October 15, 2007;
- Havells Sylvania Germany GmbH., has a Import and export licence for lamps, ref.: "Genehmigung zur grenzüberschreitenden Verbringung von Konsumgütern - § 108 StrlSchV- "authorities ref.: 323-At 100.
- Havells Sylvania Finland, Oy., has an import and export of and trade in Lamps and Starters that contain radioactive substances, ref.: "STUK – Radiation and Nuclear Safety Authority in Finland – Section 16 of the Radiation Act, (592/1991)-" authorities ref.:5791/M2/11.
- Havells Sylvania Greece A.E.E., has an license for the import, storage and trading of the lamps, ref.: "GAEC - GREEK ATOMIC ENERGY COMMISSION - Greek radiation protection regulations (Government Gazette 216B, S/3/2001) -" authorities ref.: Ag. Paraskevi 9/9/2010, Prot. Nr. A.g/414/2259.
- Havells Sylvania Norway AS, has a permission from Norwegian Radiation Protection Authority (NRPA) to import and selling of the products, ref.:10/01265/337.1 dated – 18.04.2011.

Practice: import, storage and placing on the market

The involved products are listed in Annex 1 "ELC complete overview Radionuclides in lighting products". An overview of the involved products within Havalls Group is given in Annex 2 "Havells Group table product information/import" (Overview per marketing group).

Annual import and distribution figures

Detailed annual import figures are given in Annex 4

- The annual import and distribution of the following radionuclides expressed in MBq:
 - ^3H :
 - ^{85}Kr :
 - $^{232}\text{Th} / ^{228}\text{Th}$

All products are encapsulated and can, therefore, be considered as sealed sources. Based on our survey the activity in Becquerel of the products in our portfolio do NOT exceed the exemption limit listed for activity for ^3H , ^{85}Kr and $^{232}\text{Th} / ^{228}\text{Th}$, (the exemption levels are related to the values listed Annex1 of Euratom Directive 96/29).

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Havells USA Inc., requests authorisation / exemption for

- The annual import and distribution of the products containing radionuclides as listed in Annex 4 of this application.
- We kindly ask you to inform us as well whether our customers would be included by that authorization/ exemption?

Duration of the requested authorisation / exemption

- We request import and distribution authorisation / exemption (ref: Euratom council regulation 1493/93);
- For storage we request authorisation for an unlimited period.

Justification

The Affected Lamps are drivers of innovation, and enable research and production of more efficient lamps with lower energy consumption per lumen. They make a remarkable contribution to the reduction of CO₂ emissions. Therefore, the justification for using the Affected Lamps is evident (see notes in annex 2).

Risk assessment, including dose assessment for workers and members of the public

Independent studies demonstrate the safe nature of the Affected Lamps during all aspects of the life cycle of the finished produce. The exposure risk for any member of the public does never exceed the 10 µSv criterion that is defined for exemption from regulatory requirement for the justified application of sources of ionising radiation [Criterion 3 of Annex 1 of Euratom Directive 96/29, European Commission report 122]. This insignificant risk to exposure is valid during transport [NRPB-study], storage, use and disposal of the Affected Lamps [RIVM-2000, RIVM-2002]. This dose constraint of 10 µSv per year is neither exceeded during incidents with Affected Lamps and other Lighting products such as starters. These conclusions have been confirmed by the European Commission in a review of consumer products containing radioactive substances [European Commission Radiation Protection 146]. An overview of the dose assessment is given in Annex 4.

For and on behalf of Havells USA Inc.

Name : Flemming Jensen
Title : Director
Date : 1 June, 2011

Name : Kapil Gulati
Title : Director
Date : 1 June, 2011

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Annex 1

ELC overview Radio nuclides in lighting products: Activity per product

Type of lamp	Typical application	Typical Activity per product	Max. Activity per product	Information on the nuclides
Mercury short arc lamps	Fluorescence microscopy; endoscopy Light guide applications; Schlieren photography Hologram projection; UV curing	50 - 500 Bq	< 1.000 Bq	<u>Th-232nat or Th-232sec</u> Thorium doped tungsten electrodes Thorium (Th14) in salts Thorium in coating material of tungsten electrodes Functions: 1) Reduces the electron discharge level at the cathode, start aid, prolongs life span 2) Improves metallurgical qualities 3) Improves colour properties of light output
Xenon short arc lamps	Classic film projection; Solar simulation; Digital film and video projection; Architecture lighting and effect lighting	50 - 500 Bq	< 1.000 Bq	
Automotive Xenon lamps or arc tubes	Car headlight	0,2 - 0,4 Bq	< 0,5 Bq	
Metal halide lamps or arc tubes	Shop lighting; Hotel and restaurant lighting Office lighting; Stadium lighting; Street - Area lighting	1 - 100 Bq	< 100 Bq	
Metal halide lamps or arc tubes	Shop lighting; Hotel and restaurant lighting Office lighting; Stadium lighting; Street - Area lighting	100 - 2.500 Bq	< 10.000 Bq	<u>Kr-85</u> Filling gas containing Kr-85 Function: Pre-ionisation of the filling gas, start aid in the dark
Entertainment short arc lamps	TV / Film studio lighting Stage / Concert lighting Sport Event lighting	1.500 - 9.500 Bq	< 10.000 Bq	
Induction lamps	High-Bay Indoor and outdoor applications	1.000 - 5.000 Bq	< 5.000 Bq	
Compact fluorescent lamps containing glow switches	Office lighting; Shop lighting Application at homes: Desk lights, down lights	50 - 150 Bq	< 200 Bq	
Starters, glow switches	Start unit for (compact) fluorescent lamps in combination with conventional control gears Application in homes: for (compact) fluorescent lamps with conventional control gear	50 - 600 Bq	< 2.000 Bq	
Starters, glow switches	Start unit for (compact) fluorescent lamps in combination with conventional control gears Application in homes: for (compact) fluorescent lamps with conventional control gear	500 - 600 Bq	< 1.000 Bq	<u>H-3</u> Function: Pre-ionisation of the filling gas, start aid

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Annex 2 Havells Group table of lamps and nuclides used

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Havells Group Overview Radio nuclides in lighting products: Activity per product

1) Lighting Products - Types of Radio Nuclides - Activity Range

Product Group	Radioactive Substance			Bq per piece	
	Kr 85	Tritium	Thorium	from	to
General Lighting Metal Halide	x		x	700	3000
CFL with integrated Glowbottle		x			160
Fluorescent Lamp Starters		x			500
Special Lighting Metal Halide	x		x	3000	<10000

2) Physical and Chemical Form

Isotope	Chemical Symbol	Physical Form	Radiation	Compound
Tritium	H-3	Solid (bounded)	Beta	Inner surface
Krypton 85	Kr-85	Gaseous	Beta, Gamma	Fill gas
Natural Thorium	Th-232	Solid	Alpha (Beta, Gamma)	Electrodes

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3) Justification

- The radioactive element Thorium is added in the form of ThO₂ to the tungsten electrodes of discharge lamps in order to improve the material characteristics. The material can easier emit electrons by which:
 - o the lamp ignites faster and easier
 - o the operating temperature of the electrode is lowered, by which:
 - the electrode lasts longer and
 - the lumen maintenance over life is better, as less electrode material is lost over life
 - The thoriated tungsten wire used by Havells Group contains 2% ThO₂.
 - Another use of Thorium is the addition in the form of Th₄ to the salts that contain the elements that emit together the required light, typical for example in Metal Halide lamps. The ionizing capability is used to make the lamps ignite under the worst conditions (complete darkness, low power conditions) within the standardized ignition time.
 - A second radioactive substance that is commonly applied in the lamp industry is the rare noble gas Krypton-85 as it is contained in trace amounts also in the open air. This gas is enriched and added to the filling gas in some types of discharge lamps in order to pre-ionize the filling gas and facilitate the ignition of the lamps. The Kr-85-activities of such lamps range up to some thousand Becquerel, but do not exceed the limit value of 10.000Bq/lamp. As the lamps are gas tight, the Kr85 cannot escape. The beta-radiation of the Kr-85 is absorbed by the quartz glass of the lamp.
 - Instead of Kr-85, the radio nuclide Tritium (H-3) can be used for the pre-ionization of the discharge filling gas. Havells Group is using in some glowswitches, starters and glow bottles Tritium and activities per glow-switch are well below the limit value of 10⁹ Bq.
- All applied radio nuclides inside the lamps are tight and unreachably enclosed and cause no measurable dose rate outside the lamp.

4) Risk Assessment (Doses and 10 microSievert Concept)

Lighting products and starters contain very small amounts of radioactive isotopes.

The applied activity inside the lighting products and starters (consumer goods) range between a few and several thousand Becquerel / piece and follow the ALARA concept.

Affected products are entirely safe at any time of the life-cycle of the product (EU study 4.1020 / D / 99-006)




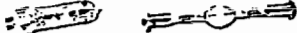

The annual exposition related to lighting products and starters is well below the 10 µSv/a concept (0,0023µSv/h, 12 hours daily exposure)

Typical exposition values (1 m distance, 1 piece) for products mentioned above are between 0,0000004 ...0,0000025 µSv/h

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Annex 3 Product Information of imported lighting products

See enclosed brochures/ CDs

Type of lamp	Typical application	Picture
Starters		
Ceramic Metal halide lamps or arc tubes	Shop ; Hotel and restaurant Office ; Stadium ; Street – Area	
Quartz Metal halide lamps or arc tubes	Shop ; Hotel and restaurant Office ; Stadium ; Street – Area	
Entertainment short arc lamps	TV / Film studio Stage / Concert Sport Event	
Compact fluorescent lamps containing glow switches	Office ; Shop Application at homes: Desk lights, down lights	

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Annex 5 Summary of risk assessment and dose estimates for workers and members of the public during the life-cycle of lamp products

Radionuclide in product	Max. act. Per product (Bq)	Transport (worker) μSv per year	Transport (public) μSv per year	Storage (worker) μSv per year	Storage (public) μSv per year	End-user (public) μSv per year	Disposal (public) μSv per year
⁸⁵ Kr	10 kBq	0,01	0,01	0.14 μSv/y ^(*) (per 1,000 items)	0.0012 ^(*) (per 1,000 items)	0.004 ^(*) (per 1 item)	1.7 E-6 ^(*) (per 1.0 E+6 lamps)
²³² Th / ²²⁸ Th (professional)	2,500 Bq	0,01	0,01	2 ^(*) (per 100 items)	0,015 ^(*) (per 1,00 items)	3 E-3 ^(**) (per 1 item)	1.9 E-4 ^(***) (per 7,200 items)
References		NRPB-study	NRPB-study	RIVM-2000 RIVM-2002 EU-report 146	RIVM-2000 RIVM-2002 EU-report 146	RIVM-2000 RIVM-2002 EU-report 146	RIVM-2000 RIVM-2002 EU-report 146

^(*) ⁸⁵Kr-dose assessment is described in RIVM-2000, data are summarized on p. 34.

^(*) Thorium-data are obtained from calculations made for ²³²Th_{sec}-containing welding electrodes (1,000 Bq per product). As the activity per lamp is 1 Bq, the reported doses are divided by 1,000. (RIVM-2000, summary of dose-estimation on p.38)

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- (***) Thorium-data are obtained from calculations made for $^{232}\text{Th}_{\text{sec}}$ -containing welding electrodes (1,000 Bq per product). The reported number of 18 E+6 lamps (1 Bq per lamp) equals to the number of 18,000 electrodes used for the dose calculations. (RIVM-2000, summary of dose-estimation on p.38).
- (**) Thorium-data for Automotive-products are obtained from calculations made for $^{232}\text{Th}_{\text{sec}}$ -containing lamp products (100 Bq per product). As the activity per lamp is 1 Bq, the reported doses are divided by 100. (RIVM-2002, summary in Table 9.3 on p. 45).
- (*) Thorium-data are obtained from calculations made for $^{232}\text{Th}_{\text{sec}}$ -containing welding electrodes (1,000 Bq per product). The maximal activity per lamp is 2.500 Bq. Taking into account the specific, the reported doses are divided by 1,000. (RIVM-2000, summary of dose-estimation on p.38)
- (**) Thorium-data for professional lamps are obtained from calculations made for $^{232}\text{Th}_{\text{sec}}$ -containing lamp products (3,000 Bq per product, RIVM-2002, summary in Table 9.3 on p. 45). As the sales of these lamps are considerably lower compared to other lamp types, a number of 100 lamps is used for the dose estimation during storage conditions.
- (***) Thorium-data are obtained from calculations made for $^{232}\text{Th}_{\text{sec}}$ -containing welding electrodes (1,000 Bq per product). The reported number of 7,200 lamps (2,500 Bq per lamp) equals to the number of 18,000 electrodes used for the dose calculations. (RIVM-2000, summary of dose-estimation on p.38).

Note on $^{232}\text{Th} / ^{228}\text{Th}$: The listed products contain $^{232}\text{Th} / ^{228}\text{Th}$, rather than $^{232}\text{Th}_{\text{sec}}$.
During manufacturing purified thorium is used; all daughter nuclides (except for ^{228}Th) of the $^{232}\text{Th}_{\text{sec}}$ decay chain are expelled during the separation process.

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References

NRPB-study (2001)

Transport of Consumer Goods containing Small Quantities of Radioactive Materials (2001)

Final report of EC contract number: 4.1020/D/99-006 (DG TREN)

NRPB, Chilton, Oxfordshire, UK and GRS, Cologne, Germany

European Commission, Radiation Protection 122 (2007)

Practical use of the Concepts of Clearance and Exemption, Part 1. Guidance on General Levels for Practices.

Recommendations of the Groups of Experts established under the terms of Article 31 of the Euratom Treaty

http://ec.europa.eu/energy/nuclear/radiation_protection/doc/publication/122_part1.pdf

European Commission, Radiation Protection 146 (2007)

A review of Consumer Products Containing Radioactive Substances in the European Union
(Final report of the study contract for the European Commission B4-3040/2001/327150/MAR/C4)

Guidance by the Groups of Experts established under the terms of Article 31 of the Euratom Treaty, study carried out by NRPB Occupational Services

Directorate- General for Energy and Transport
Directorate H – Nuclear Energy and Transport
Unit H.4 Radiation Protection

http://ec.europa.eu/energy/nuclear/radiation_protection/doc/publication/146.pdf

RIVM-2000

Schattingen van de individuele en collectieve doses als gevolg van consumentenproducten waarin radioactieve stoffen zijn verwerkt

Eleveld, H. and Pruppers, M.J.M. (2000)

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RIVM rapport 610310 005

RIVM Rijksinstituut voor Volksgezondheid en Milieu (National Institute of Public Health and The Environment), Bilthoven, The Netherlands

<http://www.rivm.nl/bibliotheek/rapporten/610310005.html>

RIVM-2002

Radioactiviteit in Nederlandse gebruiksartikelen

Janssen, M.P.M. (2002)

RIVM rapport 610230002/2002

RIVM Rijksinstituut voor Volksgezondheid en Milieu (National Institute of Public Health and The Environment), Bilthoven, The Netherlands

<http://www.rivm.nl/bibliotheek/rapporten/610230002.pdf>

A Draft Safety Report is now also published in the RASSC section on the IAEA Website. Link:
[http://www-ns.iaea.org/committees/files/RASSC/884/20100416 IAEA ELC final draft.pdf](http://www-ns.iaea.org/committees/files/RASSC/884/20100416%20IAEA%20ELC%20final%20draft.pdf)

Additionally, the Safety Report is explicitly on the RASSC Agenda under the Agenda Item 14. Link (Agenda): <http://www-ns.iaea.org/committees/files/RASSC/884/RASSC28-draftagenda.pdf>

Health and Protection Agency – Safety Report on Assessment of the Radiological Impact of the Transport and Disposal of Light Bulbs Containing Tritium, Krypton-85 and Radioisotopes of Thorium: http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1287143225736