Substitution of thoriated tungsten electrodes in Switzerland

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Brief Introduction

- TIG = Tungsten Inert Gas
- in Germany TIG-welding was established around 1940
- thoriated tungsten electrodes contain 1 to 4% ThO₂
- Th-nat/Electrode typically ➔ 0.8 – 4 kBq
- Advantages:
  - good ignition
  - low electrode consumption
  - high temperature operating
  - high quality welding
- Widely spread
Legal Basis I

- Legal regulation:
  - Swiss Radiological Protection Act (StSG)
  - Swiss Radiological Protection Ordinance (StSV)
  - various technical prescriptions

- Licensing Authority:
  - Swiss Federal Office of Public Health (SFOPH)

- Regulatory Agency (Industry):
  - Swiss National Accident Insurance Fund (Suva)

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Legal Basis II

- The activity of one thoriated tungsten electrode (WT) exceeds the authorisation threshold of the Swiss Radiological Protection Ordinance
- every application of WT would have to be authorised
- The Swiss Federal Office of Public Health (SFOPH) can issue approvals

<table>
<thead>
<tr>
<th>Exemption limit</th>
<th>LE</th>
<th>Authorisation threshold</th>
<th>LA</th>
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<tbody>
<tr>
<td>6 Bq/kg and/or LE_{abs}</td>
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<td>20 Bq</td>
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Legal Basis III

- Approvals for thoriated tungsten electrodes (VWT) have been issued by SFOPH:
  - by consideration of various terms such as:
    - Justification = no alternative available
    - Optimisation = different solutions compared with each other
  - Approvals are limited in time (= 10 years)
  - they have to be adjusted to the technical development

Health Aspects, Doses

- Investigations* at workplaces showed that:
  - use of VT- electrodes can lead to doses > 1 mSv/year
  - under certain conditions it is possible to accumulate doses up to 20 mSv/year

*BG Feinmechanik und Elektrotechnik, T. Ludwig, 1999
*BSLU, München, A. Reichelt, K.-H. Lehmann, 1993

- These facts were initial for the following steps
Clarification

Activities 1998 – 2000:
- verification of thorium free products with comparable results such as $\text{LanthanO}_2 = \text{WL}$ and $\text{CerO}_2 = \text{CL}$
- inquiries: experts, welding- institutes and -shops
- sales-figures: percentage WT (<30%) to WL, CL
- Meetings with producers, trade- and professional associations

Introduction of the substitution strategy

Our ambition:
to achieve the substitution of the thoriated tungsten electrodes until December 31st 2003

Information

Activities 2001 - 2003
- written notice to all trading companies and WT producers in Germany and Austria:
SFOPH will terminate all approvals in force for WT until Dec. 31st 2003 which means that from Jan. 1st 2004 on, WT-users have to comply with the compulsory licensing requirements
- distribution of information leaflets via trading companies announcing this substantial change to the WT-users
- Publishing of technical papers in professional journals, on the internet etc.
- Formation centres for welding promote substitutes
Information II
Compulsory licensing procedure

- Requirements for trading Companies after Dec 31.2003:
  - recognized qualification in radiation protection
  - presentation of radiation protection instructions
  - duty of care => delivery of WT only to license holders
  - suitable storage room for WT

- Additional requirements for WT users:
  - Justification of the use of WT for the specific work by presentation of a formal questionnaire
  - set up of separate workplaces for WT welding
  - dosimetric => analysis of urine once a year
  - workplace monitoring => airfilter and contamination

Current situation

- no more WT on the market
- remainder of stock to be used (pragmatical solution)
- number of enquiries until now: 10
- Number of requests for licence: 0
- SFOPH offers the possibility to dispose WT
Perspective

- in the future, thoriated products have to be substituted
- close contact to the producers
- monitoring of the market
- publishing of relevant facts

are there any other known products?

electrodes for metal-coating

suvaPro