European legislation and guidance to prevent loss of control of sources and to recover orphan sources, and other requirements relevant to the scrap metal industry.

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EUROPEAN COMMISSION

Radiation Protection unit (TREN H.4)
Augustin Janssens,
Vesa Tanner

Scrap metal issues

- European legislation and guidance to prevent loss of control of sources and to recover orphan sources
  - » EU HASS Directive on the control of high-activity sealed radioactive sources and orphan sources
- …. and other requirements relevant to the scrap metal industry
  - » Requirements with regard to exemption and clearance
- Scrap metal policy within this legal framework

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Background

- Incidents
  - China 1992 a cobalt-60 source was lost and picked up by a man → 3 persons died
  - Georgia 1997 after illness of several border frontier guards more than 70 sources were found throughout the country → 3 of the most irradiated guards were treated in France and Germany
  - Turkey 1998 2 cobalt-60 sources in their shipping containers were sold as scrap metal → 10 persons suffered from acute radiation syndrome
  - Peru 1999 an iridium-192 source was left uncontrolled and was picked up by a worker → severe radiation injuries
  - Spain 1998 a caesium-137 source was accidentally melted in a steel factory → 270 tons of steel contaminated, 400 people monitored for internal contamination, financial loss of € 26 million
- Contaminated scrap/recycled metal
  - Incidents reported now through ECURIE
  - Metal originating from China, India …
- Safety/Security

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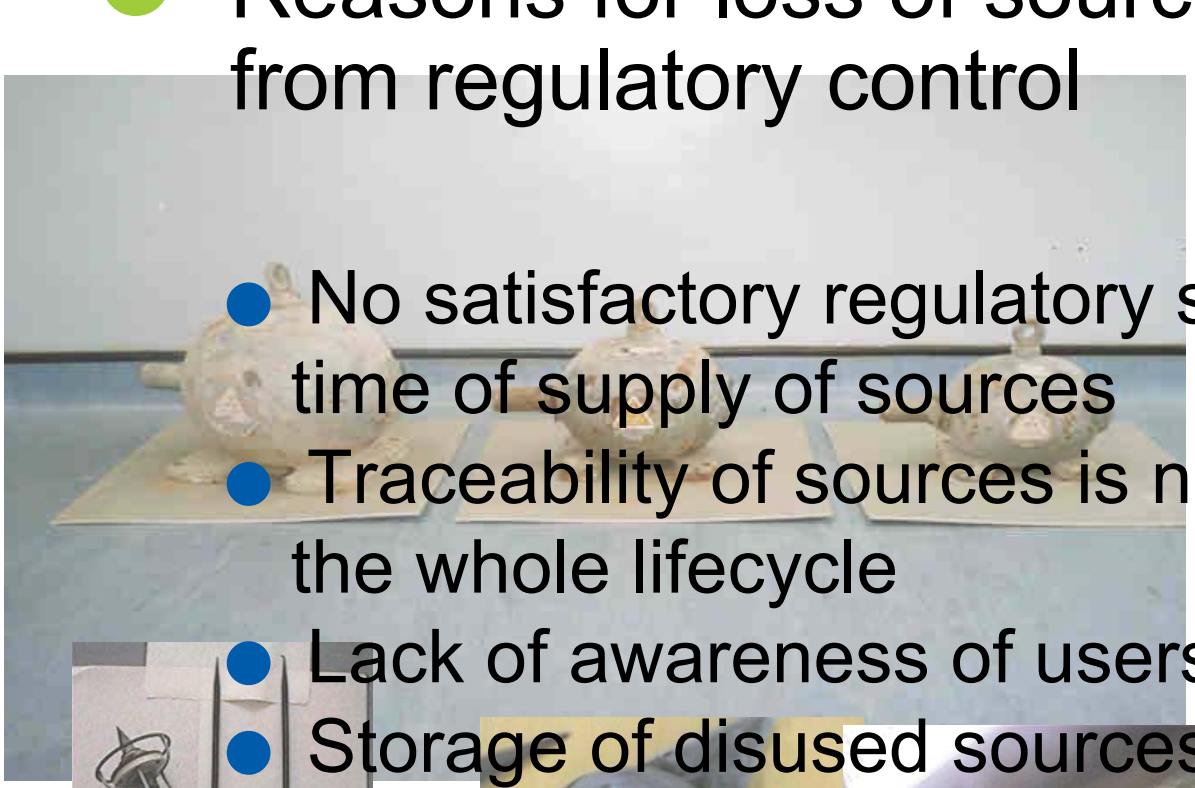
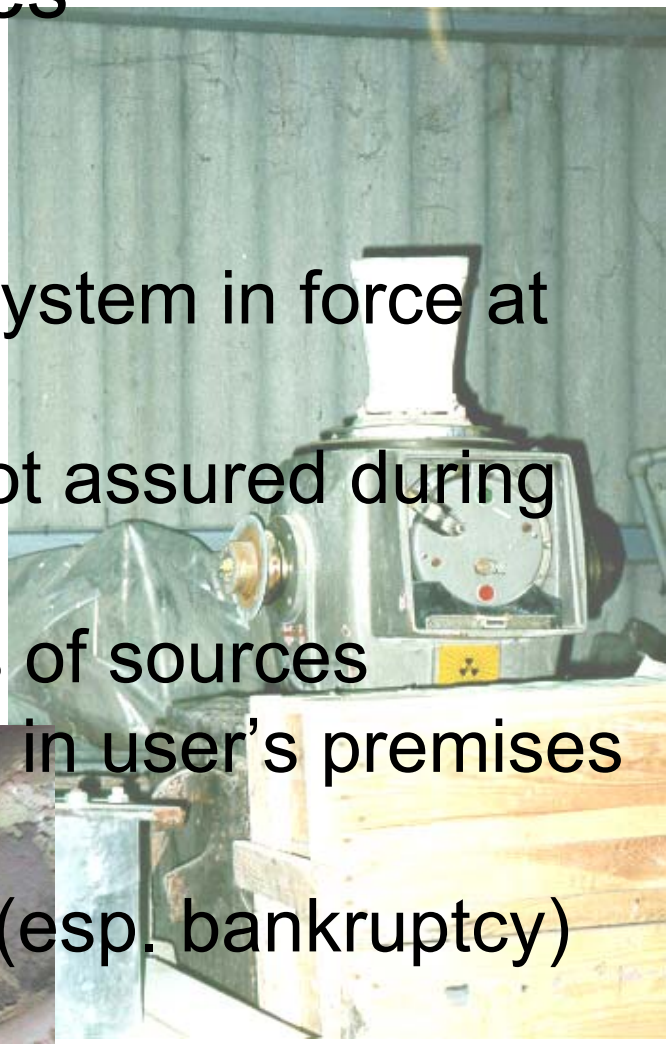
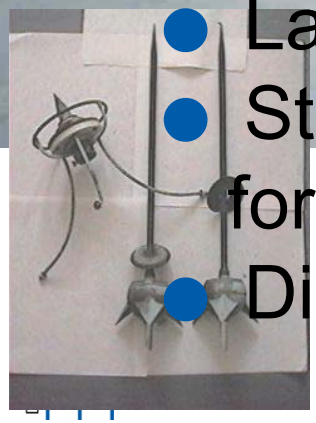
Reasons for loss of sources from regulatory control







- No satisfactory regulatory system in force at time of supply of sources
- Traceability of sources is not assured during the whole lifecycle
- Lack of awareness of users of sources
- Storage of disused sources in user's premises for undefined periods
- Disappearance of the user (esp. bankruptcy)

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Background

- "… the EC came to the conclusion that it would be appropriate to adopt specific legislation supplementing the BSS-Directive with a view to strengthen the control by the competent national authorities on those sealed radioactive sources posing the greatest risk and to emphasise the responsibilities of holders of such sources"
- Council Directive 2003/122/EURATOM of 22 December 2003 on the control of high-activity sealed radioactive sources and orphan sources

Article 1 – Definitions

- High activity sealed sources
  - *"sealed source containing a radionuclide whose activity …. is equal to or exceeds the activity level specified in Annex I"*
  - *different from IAEA classification*
- Orphan sources
  - *"sealed source, the activity level of which, at the time of discovery, is above the exemption level referred to in Art. 3(2)(a) of BSS-Directive, and which is not under regulatory control, either because it has never been under regulatory control or because it has been abandoned, lost, misplaced, stolen or transferred without proper notification of the competent authority, to a new holder or without informing the recipient"*
  - Member States may exclude sources once their activity level has fallen below the exemption levels of BSS-Directive

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Article 1 – Purpose and scope

- Purpose:
  - to prevent exposure of workers and the public to ionising radiation arising from inadequate control of high-activity sealed radioactive sources and orphan sources
  - to harmonise controls in place in the Member States by defining specific requirements ensuring that each such source is kept under control
- The minimum obligations resulting from this directive supplement those set out in directive 96/29/Euratom
  - Revision of Euratom BSS
  - Consolidation of existent Directives

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Consolidation of European Radiation Protection Legislation

- Basic Safety Standards, Directive 96/29/Euratom
- Medical Exposures, Directive 97/43/Euratom
- Public Information, Directive 89/618/Euratom
- Outside Workers, Directive 90/641/Euratom
- Control of high-activity sealed radioactive sources and orphan sources, Directive 2003/122/Euratom
- Radon, Commission Recommendation 90/143/Euratom

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Outline of new Euratom BSS

- **Preamble**
- **Title I Subject matter and Scope**
- **Title II Definitions**
- **Title III: System of Protection**
- **Title IV: Responsibilities for regulatory control**
- **Title V: Requirements for Education and Training**
- **Title VI: Justification and Regulatory control of planned exposure situations**
- **Title VII: Protection of Workers, Apprentices and Students**
- **Title VIII: Protection of Patients and other individuals submitted to medical exposure**
- **Title IX: Protection of Members of the Public**
- **Title X: Protection of the Environment**
- **Title XI: Emergency exposure situations**
- **Title XII: Existing exposure situations**
- **Title XIII: Final provisions**

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HASS overview of requirements

- Prior authorisation
  - Close the cycle, including financial provisions
- Record keeping
  - Holder
  - Authority
- Traceability
  - Identification and marking, documentation
- Operational safety requirements
- Education and training
  - Awareness of the consequences of loss
- Orphan sources
  - Emergency preparedness
  - Recovery campaigns

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Article 3 – Authorisation

- Member States shall require the holder to obtain prior authorisation for any practice involving a source, including taking possession of a source
- The authorisation covers: responsibilities, minimum staff competences, minimum source performance criteria, requirements for emergency procedures and communication links, work procedures, maintenance, adequate management of disused sources
- Authorisation can only be issued if adequate provisions, by way of financial security or any other equivalent means, have been made for the safe management of disused sources, including the case where the holder becomes insolvent or goes out of business

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Article 5 – Records

- The holder shall provide the competent authority with a copy of all or part of the records
  - when the records are established
  - at least every 12 months
  - if the situation changes
  - when the records are closed
  - at request from competent authority
- The competent authorities shall keep records of
  - authorised holders
  - the sources they hold
- The competent authorities shall keep the records up to date, taking transfers into account

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Article 6 – Requirements for holders

- Each holder of a source shall:
  - regularly undertake leak tests
  - regularly verify that each source is still present and in apparently good condition
  - after termination of use
    - return each source to the supplier
    - or place it in a recognised installation
    - or transfer it to another authorised holder (unless otherwise agreed with competent authority)
  - ascertain before a transfer that the recipient holds appropriate authorisation

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Article 7 – Identification and marking

- Each source has to be identified by a unique number
- The manufacturer shall provide a photograph of each manufactured source design type and of the typical source container
- The holder shall ensure that each source is accompanied by specific written information

Article 8 – Training and information

- Information and training shall place particular emphasis on the necessary safety requirements and shall contain specific *information on possible consequences of the loss of adequate control of sources*

- Member States shall *provide encouragement* to ensure that the *management and workers in installations where orphan sources are most likely to be found* (e.g. large metal crap yards/recycling plants) and in significant nodal transit points are *informed and trained* in order to handle events where they detect a source

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Article 9 – Orphan sources

- Competent authorities must be prepared to recover orphan sources and to deal with radiological emergencies due to orphan sources

- Specialised technical advice and assistance must be available for persons who suspect the presence of an orphan source

Article 9 – Orphan sources

- Member States shall *encourage* the establishment of systems aimed at detecting orphan sources in places where orphan sources may generally be encountered (e.g. large metal scrap yards/recycling installations, customs posts)
- Member States shall ensure that campaigns are organised, as appropriate, to recover orphan sources left behind from past activities
- Member States shall ensure that a system of financial security (or any other equivalent means) is established to cover intervention costs relating to the recovery of orphan sources

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Article 11 – International cooperation and information exchange

- Each Member State shall promptly exchange information and cooperate with other MS, third States, international organisations as regards
  - loss
  - removal
  - theft
  - discovery of sources

Article 15 – Penalties

- Member States shall introduce effective, proportionate and dissuasive penalties for breaches of the national provisions transposing the HASS-Directive

Conclusion (sources)

- HASS Directive plays an important role in the safety and security of sources in the EU
  - In addition to Code of Conduct and export guidelines of IAEA
  - Need to harmonise definition with classification in international standards

- RECAST is an opportunity for putting the HASS requirements in a broader context, but
  - Many requirements with unique features
    - Safety (security)
    - Holder-manufacturer/undertaking
    - Orphan sources (existing/emergency)
    - Penalties, financial provisions
  - Some requirements may be broadened to all radiation sources
  - Arrange requirements among:
    - Title IV: Responsibilities for regulatory control
    - Title VI: Justification and authorisation (planned)
    - Title XI: Emergency situations
    - Specific Annexes with technical requirements

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Exemption and clearance
Council Directive 96/29/Euratom

- Article 3 allows exemption from reporting
  - Annex 1 contains exemption values
  - activity concentration and total activity
- Article 5 requires national competent authorities to set clearance levels
  - following the criteria in Annex 1 (10 µSv) and
  - taking into account guidance by EU

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Regulatory control
Graded approach

- Notification
- Registration
  - Cf. current « authorisation in cases of a limited risk, in accordance with conditions laid down in legislation »
  - No need for individual examination
  - Subject to inspection
- Licensing
  - Cf. “prior authorisation”
  - Licensing requirements for different types of practices
- List of practices subject to licensing, registration (or licensing)

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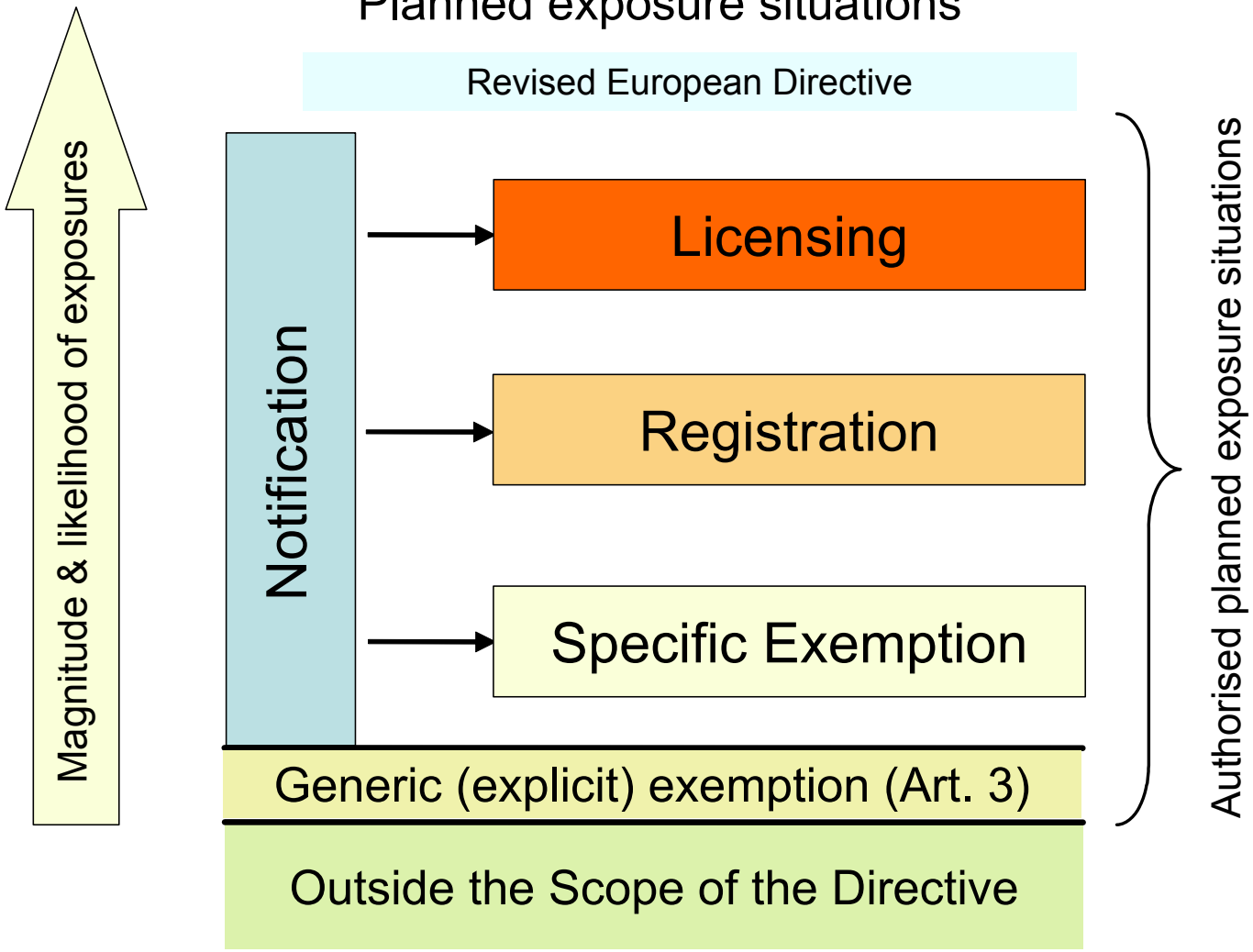
Regulatory Control of Planned exposure situations



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Notification

- All practices shall be notified, except those involving materials containing radioactive substances

  < quantities of activity (Bq) or

  < concentrations of activity (kBq/kg)

  - laid down in Annex 1, or
  - higher values for specific applications
  - two sets of values (moderate quantities)?
- MS's may exempt further types of practices
  - general exemption criteria (10 µSv)
  - best option (optimisation)

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Clearance
EC guidance reports

- RP 89 – Recycling of metals from nuclear installations
- RP 113 – Clearance of buildings and building rubble from nuclear installations
- RP 122 – Application of the concept of exemption and clearance to practices
  - Part I: Guidance on general clearance levels for practices
    Part II: Application of the concepts of exemption and clearance to Natural Radiation Sources

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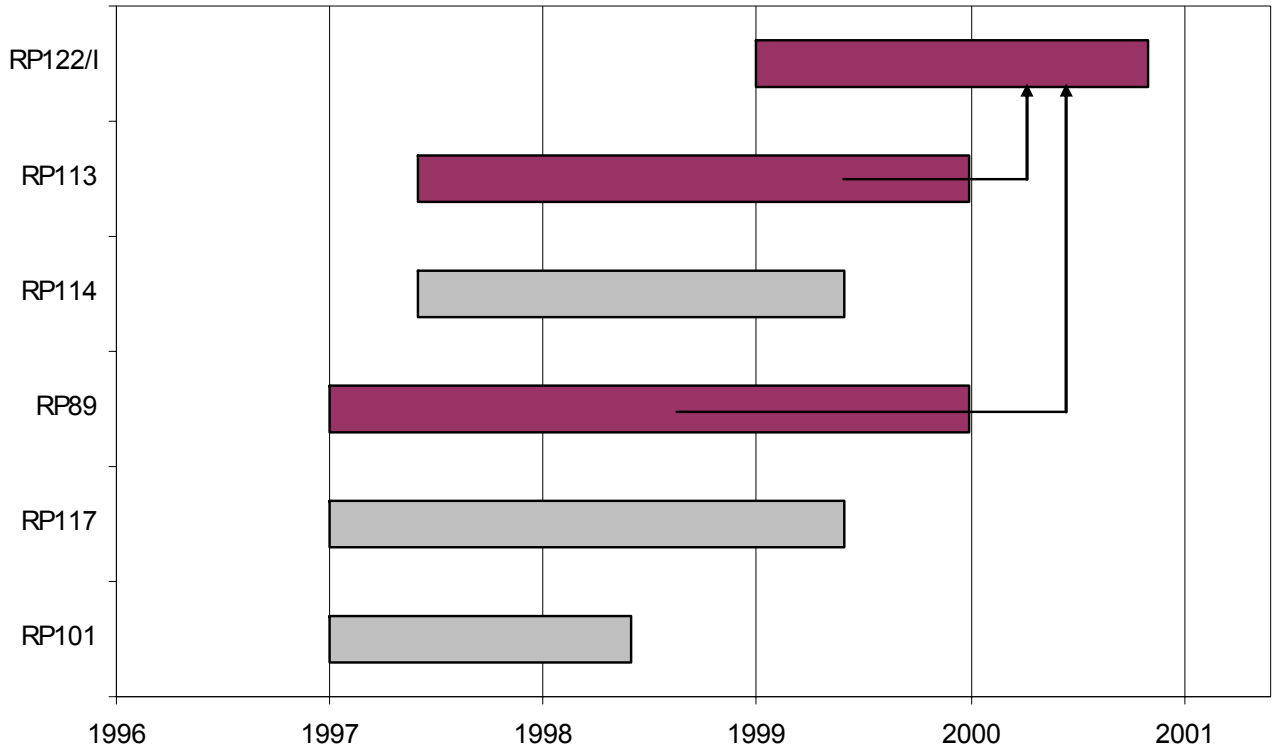
Graphical representation of the development of the recommendations on clearance of the European Commission



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IAEA RS-G-1.7

- Discusses the concepts of exclusion, exemption and clearance
- Development of the Safety Guide started in 1998 and it was adopted in 2004.
  - the issue was controversial and needed lengthy discussion
  - the purpose of the document changed in the process
  - eventual difficult consensus on text and set of values.
- Contains ”internationally harmonised clearance levels for unconditional clearance”
- Safety Report 44 contains the scenarios and calculations leading to RS-G-1.7 values

Exemption/clearance levels

- EC study (Brenk System-planung)
- Issued by the EC after proposal from working group of the article 31 GoE
- Scope:
  - Check the differences between the set of clearance values in RP 122 part I and RS-G-1.7 by analysing scenarios and parameters, deliver a sensitivity analysis
  - Assess practical implications of the differences
  - Exemption levels equal to clearance levels?
  - Investigate if lower values would have implications for consumer goods

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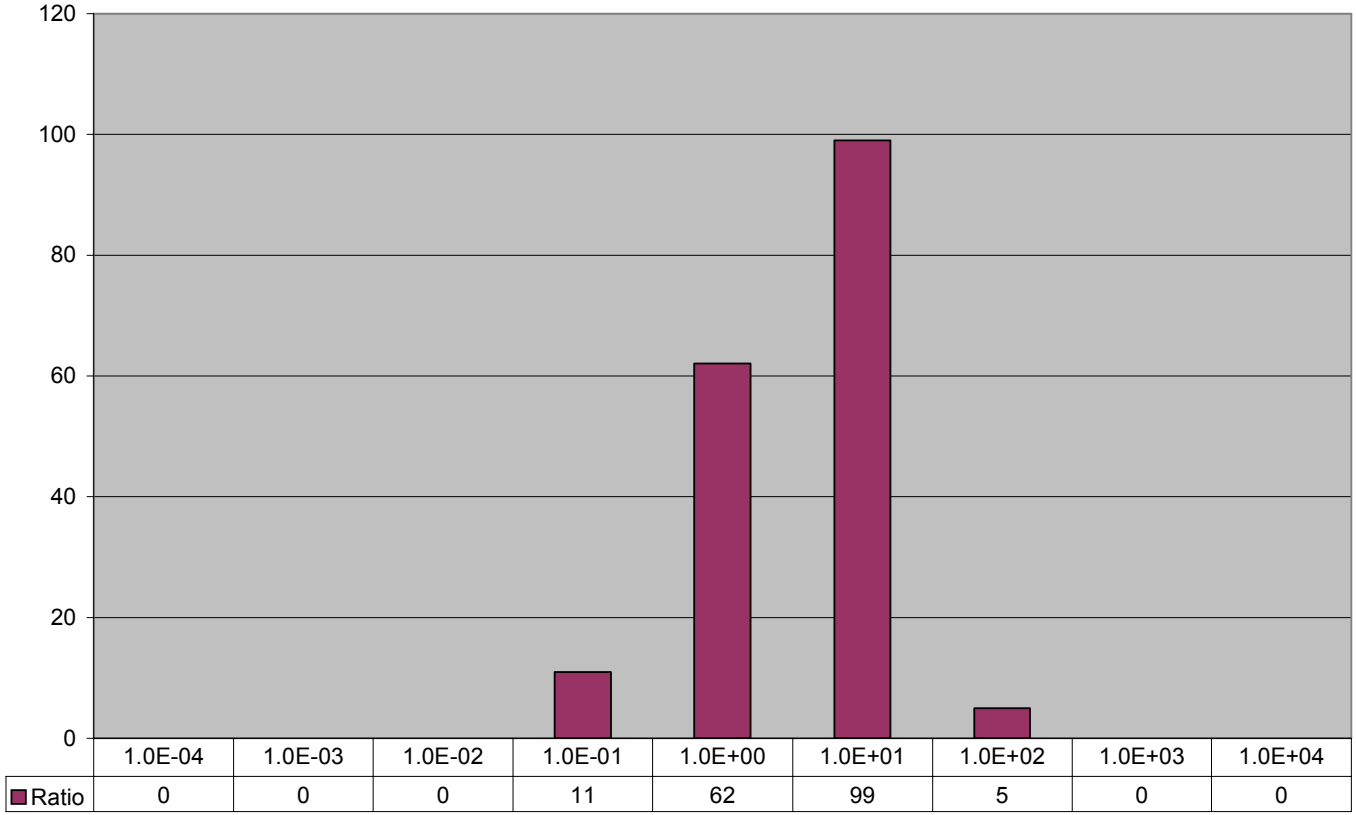
Histogram of the ratios of values in RS-G-1.7 and RP 122 Part I



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Brenk study - results

- Comprehensive report providing background information and comparing the two set of values
- Only for a few ”artificial” radionuclides of significance could lowering the RP 122 values to RS-G-1.7 values be a ”problem”. For C-14 and I-129 the limiting pathway in Safety Report 44 is the water pathway and it is very conservative
- Nothing suggests that introducing the RS-G-1.7 values as exemption values for specific activity concentrations would cause major problems
  - as long as present exemption values for total activity are maintained

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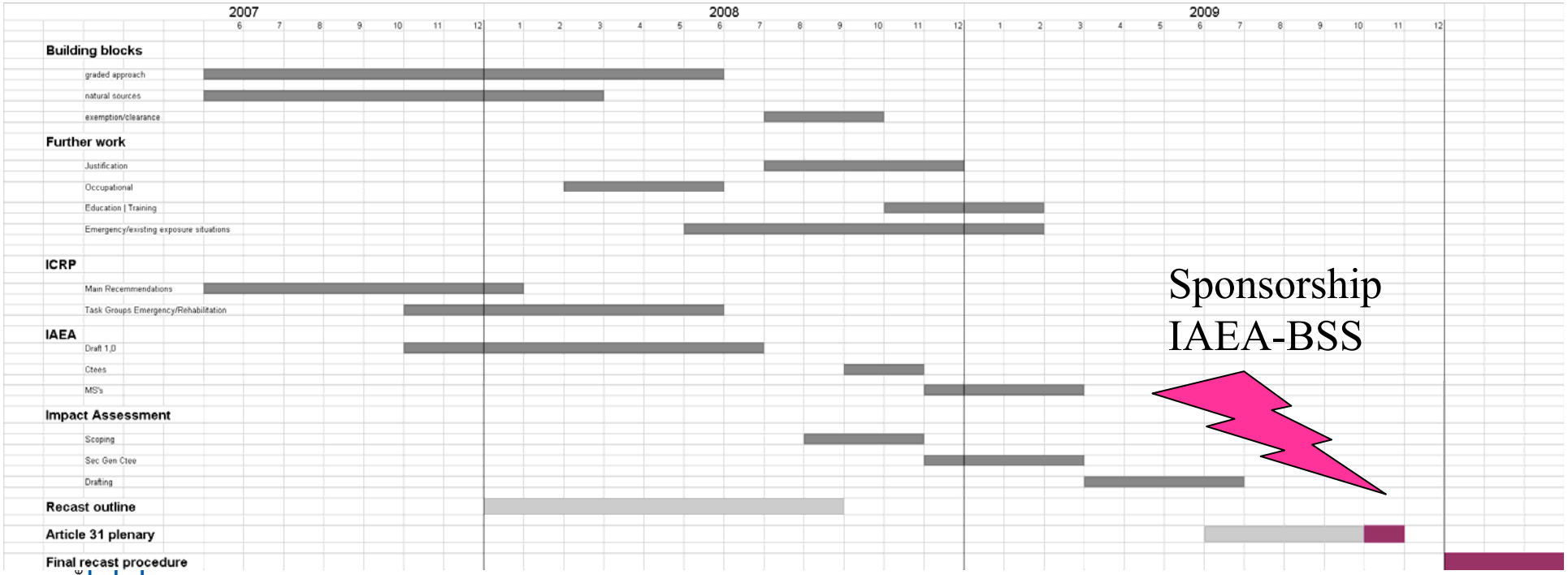
Timeline revision/recast BSS



Conclusions

- Revision and Recast of EURATOM Directives
  - » New ICRP recommendations
    - Publication 103
    - on emergency planning and response (TG reports)
- Harmonisation with international Standards
- Integration of natural and artificial sources
- Good progress with revision and recast
  - » Three Titles endorsed in principle
  - » Article 31 Opinion in November 2009 or Spring 2010
- Formal recast procedure or new Directive?
- HASS Directive incorporated with modifications
- Graded approach to regulatory control
  - » Clear concepts for exemption and clearance
  - » Clearance levels agreed internationally
- Key elements for a policy with regard to scrap metal

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http://www.tuev-nord.com/english/clearance.asp

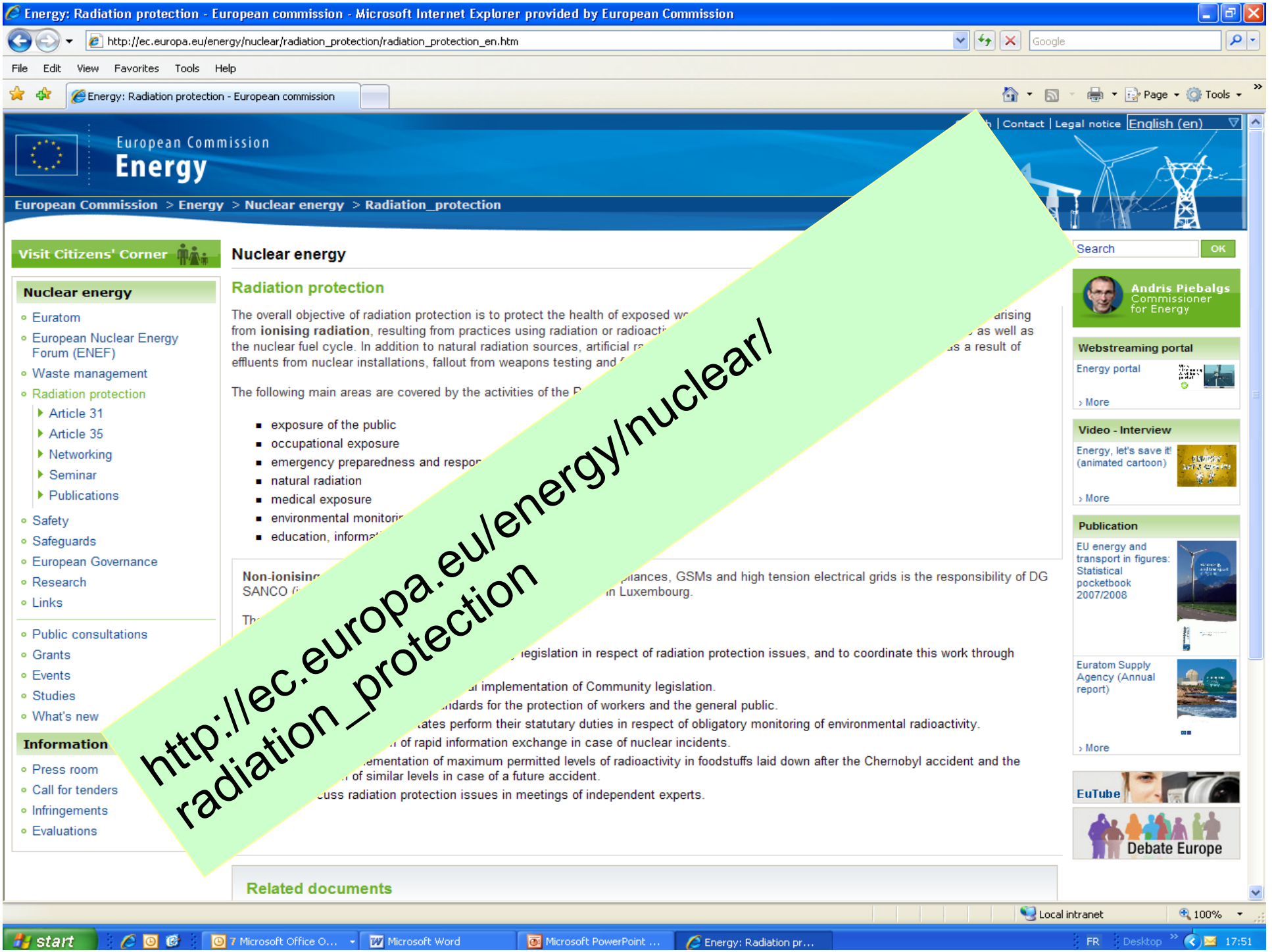
6th International Symposium

Release of Radioactive Materials from Regulatory Requirements

Provisions for Exemption and Clearance

21. – 23.09.2009, Wiesbaden, Germany

TÜV-Nord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Radiation protection
The overall objective of radiation protection is to protect the health of exposed wo
arising from ionising radiation, resulting from practices using radiation or radioacti
as well as the nuclear fuel cycle. In addition to natural radiation sources, artificial ra
as a result of effluents from nuclear installations, fallout from weapons testing and
The following main areas are covered by the activities of the R
exposure of the public
occupational exposure
emergency preparedness and respon
natural radiation
medical exposure
environmental monitori
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Non-ionising
liances, GSMs and high tension electrical grids is the responsibility of DG SANCO (i
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Th
legislation in respect of radiation protection issues, and to coordinate this work through
l implementation of Community legislation.
ndards for the protection of workers and the general public.
tates perform their statutary duties in respect of obligatory monitoring of environmental radioactivity.
of rapid information exchange in case of nuclear incidents.
lementation of maximum permitted levels of radioactivity in foodstuffs laid down after the Chernobyl accident and the
of similar levels in case of a future accident.
cuss radiation protection issues in meetings of independent experts.
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