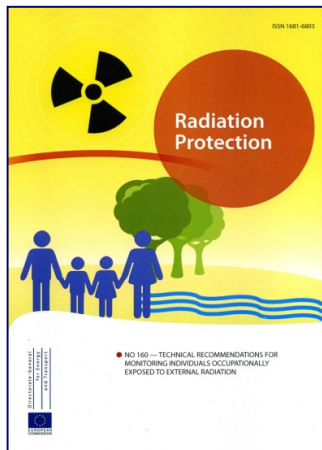


Dose reporting, Dose record keeping and information systems

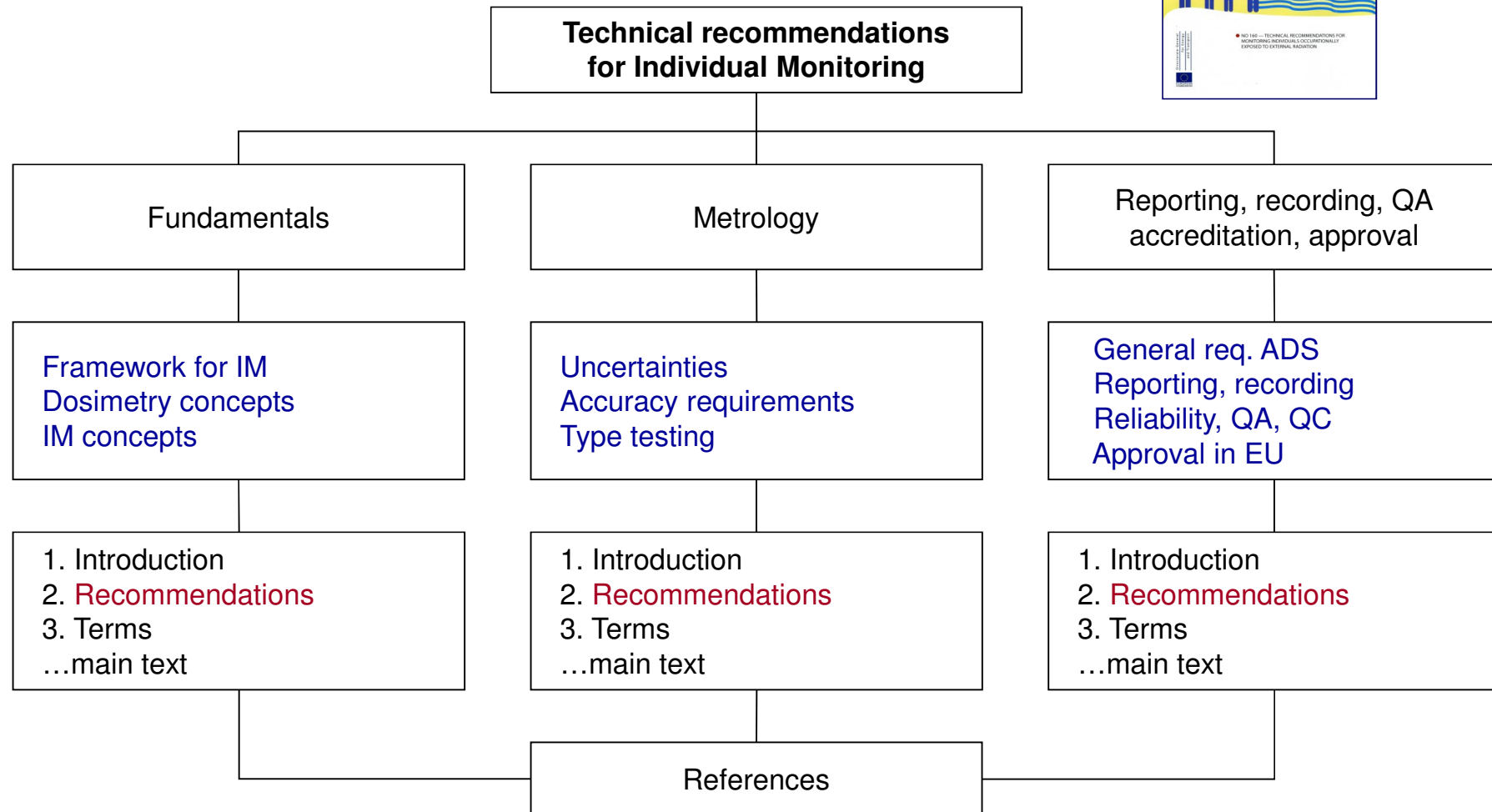
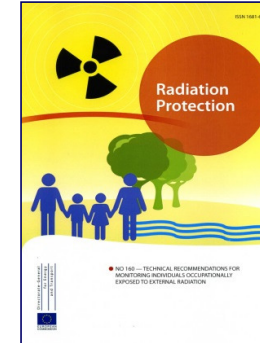
Basis for procedures and criteria for mutual recognition
of approved dosimetry services in Europe

(Chapters 9 and 11 of RP 160)



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IST, 18th to 22nd of May of 2015



Chapter 9. Dose reporting, Dose record keeping and information systems

RP 160 - Recommendations

- 1. Approval procedures for dosimetry services in relation to dose reporting should:
 - a) state the dose information needed, e.g. dose in meas period, annual and/or 5-year accum dose;
 - b) state detection limits of the dosimetry system;
 - c) detail background subtraction methods;
 - d) state the destination of the dose report;
 - e) give details on storage of monitoring records and reported dose values;
 - f) state monitoring and reporting periods.

- 2. Every MS should create and maintain a national dose register (NDR) where the dose values received by workers (as a minimum those in Category A) monitored in the country are kept for time intervals longer than the worker's working life and the life-time of the undertaking. In conformity with ISO/IEC 17025, all reported doses should be stored for an appropriate period.

Chapter 9. Dose reporting, Dose record keeping and information systems

- 3. The NDR should:
 - a) store of dose values reported by an ADS or by an undertaking, e.g. aircraft crew;
 - b) perform **statistical analysis** of data to characterize **occupational exposure** in the country;
 - c) define work activities (for example, nuclear, medicine, industry, or natural);
 - d) **regularly publish** occupational exposure reports;
 - e) provide and/or issue **radiation passbooks**.

- 4. Requirements on **security** of dose records:
 - a) **DB** with personal classified information should be **registered**;
 - b) **access** to premises, files, archives, computers, servers, etc where personal information is handled and stored should be **restricted**;
 - c) **access** to the classified information should be **allowed only** for radiation protection purposes;
 - d) circulating information, particularly when using IT networks should be **secure**;
 - e) there should be **back-up procedures** and equivalent security for copies;

Chapter 9. Dose reporting, Dose record keeping and information systems

9.4.6 National Dose Register

- Part of the RP authorities
- Responsible for the collection and maintenance of dose records provided by the ADS and in some cases, by undertakings.
- The information stored should allow the follow up of the doses received by a person during his working life and a time interval after the termination of work.

Chapter 9. Dose reporting, Dose record keeping and information systems

9.4.6 National Dose Register

- Long-term storage of dose records at a NDR is a way to prevent the loss of individual dose data in case the undertaking ceased its activities in the country.
- Should perform regular analyses of the dose data collected in order to characterize national occupational exposure and
- *Quantities stored at the NDR* - the effective dose E must be recorded in order to be compared to the (annual) dose limit. E will refer to all possible exposure pathways, that is $E = E_{ext} + E_{int}$. For external dose assessment $H_p(10)$ is normally stored as the surrogate for E .

Chapter 9. Dose reporting, Dose record keeping and information systems

- *Aircraft crew* – No specific recommendations,
Assessments provided by computer codes, and should be validated [EC 2004].

- *Emergency dosimetry* – Not covered in the TR,
Where dose assessments have been made the assessed value of dose along with the personal data should be entered in the NDR following the event. **Provision should be made to identify these special circumstances.**

Chapter 9. Dose reporting, Dose record keeping and information systems

- *Outside workers* and *radiation passbook* – MS must ensure outside workers are afforded the same level of protection as that of workers employed on a permanent basis [EU 1990, OWD]
- A *radiation passbook* should be issued which includes: the identification of the outside worker and detailed information before and after the start of any activity, for example, medical classification of the worker and results of the worker's individual exposure monitoring. For practical reasons the radiation passbook should be in English and the MS language.
- *Notional doses* – “Administrative dose” may have been added to the dose record prior to it being sent to the NDR. In some MS this is a task of the NDR.

BSS 2013/59/EURATOM

96/29/Euratom	BSS Workers and members of public
97/43/Euratom	Medical exposures
89/618/Euratom	Radiological Emergencies
90/641/Euratom	Outside workers
2003/122/Euratom	HASRS and Orphan Sources
90/143/Euratom	Recomm on indoor exp to Radon

Art 43 Recording and reporting results

1. MS shall ensure that a record containing the results of IM is made for each category A worker and for each category B worker where such monitoring is required by the MS.

2. (...)

(a) *A record of exposures measured or estimated, as the case may be, of individual doses pursuant to Articles 41 Individual Monitoring , 42 Dose assessment in the case of accidental exp, 51 Protection of outside workers, 52 Specially authorized exp, 53 Emergency occ exp, and if decided by the MS pursuant to Article 35(2) Radon exp, 54(3) Radon in workplaces*

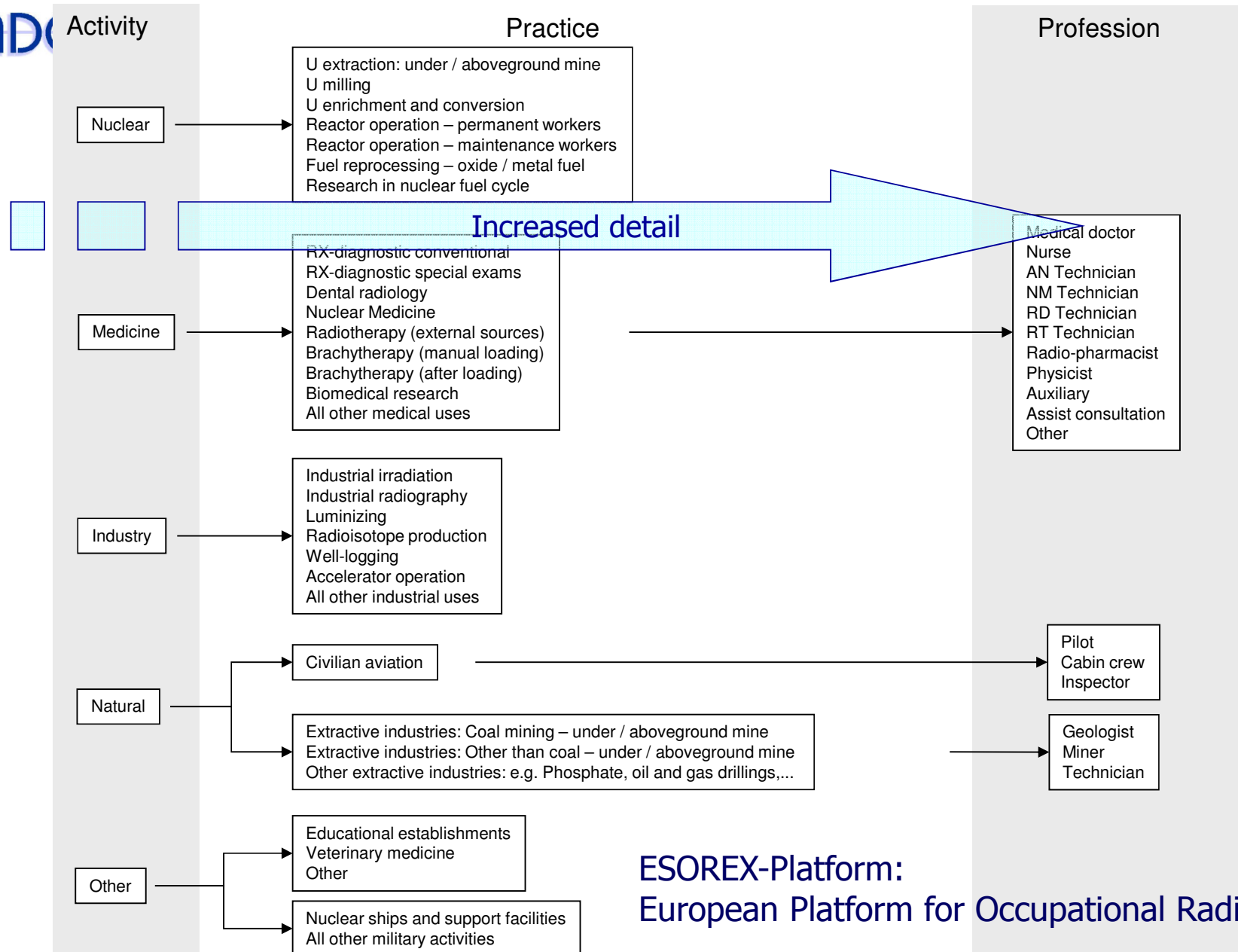
Chapter 9. Dose reporting, Dose record keeping and information systems

9.7 NDR Links to other data sources and databases

- NDR may periodically share information with international organizations concerned with the characterization of occupational exposure such as ISOE, ESOREX and UNSCEAR.
- The sharing of dose results to perform occupational exposure studies reveals the need for harmonized procedures for reporting and storing dose data:

Different dose measurement methods: entail background dose subtraction methods, detection limits versus *recording levels*.

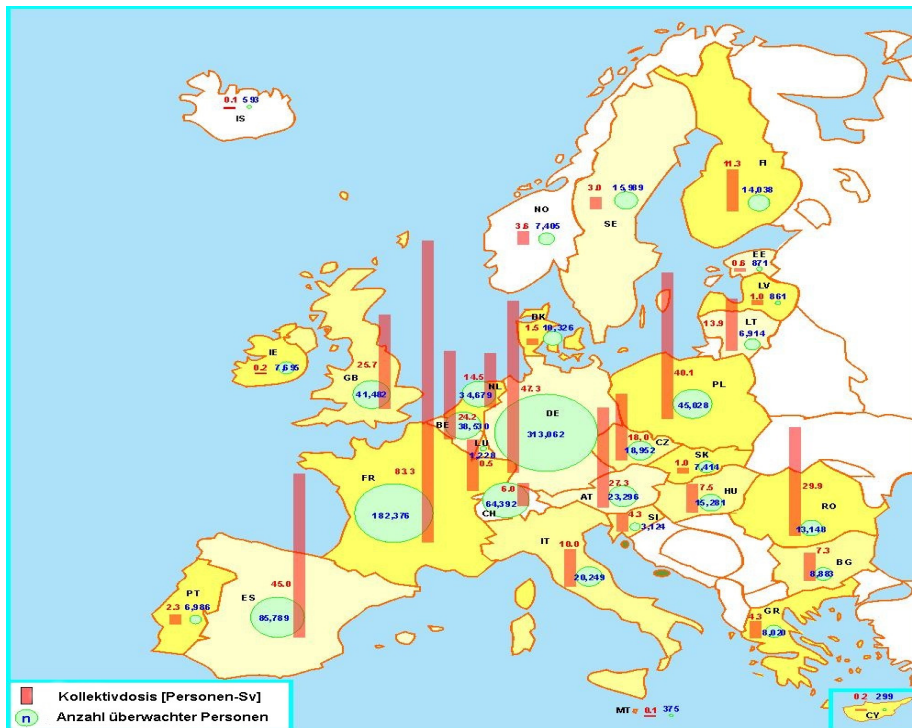
The use of notional doses (a dose value on a record but doesn't correspond to an actual dose received), should also be avoided.





ESOREX

European Study on Occupational Radiation Exposures



Attempt to create a EU data base

End 1990s ESOREX East

ESOREX West

2004 ESOREX E+W

(...)

2010 ESOREX 2d Symposium

Need to "survive" no funds from EU

EU opened call for a tender:

IRSN + (BfS, SL, GR, EI, CH)

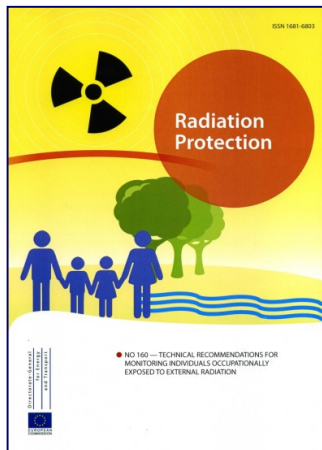
ESOREX-Platform:

European Platform for Occupational Radiation Exposures

([A. Rannou presentation at IAEA Dec.2014](#))

Basis for procedures and criteria for mutual recognition of approved dosimetry services in Europe

(Chapter 11 of RP 160)



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EURADOS Training Course – RP160
IST, 18th to 22nd of May of 2015

Chapter 11. Basis for procedures and criteria for mutual recognition of ADS in Europe

- Table with general (minimum) and additional criteria for:
 - ✓ satisfactory dosimetric characteristics
 - ✓ traceability
 - ✓ quality management system
 - ✓ accuracy of measurement of the personal dose equivalents
 - ✓ performance test for approval
 - ✓ periodic performance test
 - ✓ intercomparisons
 - ✓ internal audit
 - ✓ external audit
 - ✓ inspection
 - ✓ annual confirmation by the service
- Importance of harmonized approval procedures

Although EU Directives must be implemented into national law,

Member States are free:

- **how** directives are transposed
- **establishing** their radiation protection infrastructure (including approving bodies)
- differences in legal systems, can result in differences in approval procedures.

Member States may require that undertaking

- operates under its laws
- must use an ADS ➤ that is covered by its legislation,
 - that meets the specific approval requirements
 - that are administered by its approval authority.

Although in each MS: ADS may have different relationships with governmental bodies
approval authority,
the national dose registry,
accreditation body.

Wide agreement (MS) is needed

EU specifically asked
(conditions of the tender that were met)...

- RP 160 should be a wide *consensus* document
- RP 160 should contain Basis for *procedures and criteria* for mutual recognition of ADS in Europe
- RP 160 should be *approved* by the Group of Experts established under the Article 31 of EURATOM Treaty

Chapter 11. Basis for procedures and criteria for mutual recognition of ADS in Europe
If met, would be a significant step towards this goal.

Table 11.1: General criteria (Chapter 8) and additional criteria for approval

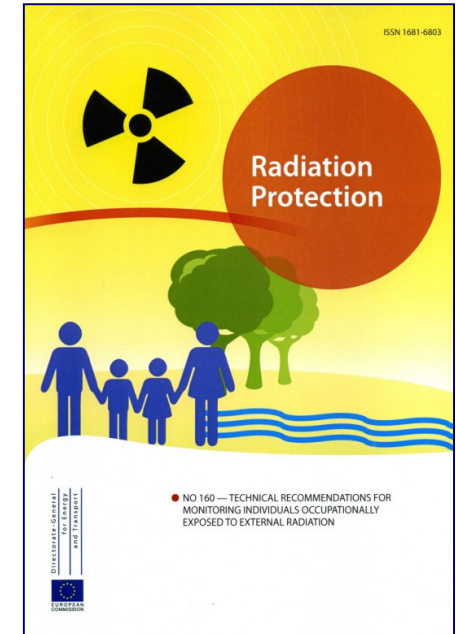
Issue to be demonstrated	General (minimum) criteria (Chapter 8)	Additional criteria (attainable in a reasonable time frame)
Satisfactory/suitable dosimetric characteristics	Type test against current international standard(s), including software. All data, including the rated ranges for each input quantity, graphs, combined standard uncertainty reported together with the laboratory at which the test has been performed	Type test to demonstrate full conformity, including software, with current international standard(s), or with European Council and Parliament requirements if these are introduced. All data, including the rated ranges for each input quantity, graphs, combined standard uncertainty reported together with the laboratory at which the test has been performed
Traceability	To a NMI or secondary standard laboratory	
Quality management system	In accordance with EN/ISO/IEC 17025	Accredited according to EN/ISO/IEC 17025

Table 11.1: General criteria (Chapter 8) and additional criteria for approval Cont...

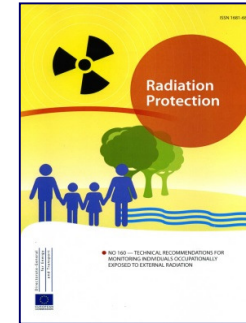
Issue to be demonstrated	General (minimum) criteria (Chapter 8)	Additional criteria (attainable in a reasonable time frame)
Accuracy of measurement of personal dose equivalents	Combined standard uncertainty for measurement of personal dose equivalents at the location of the dosimeter for photons and electrons of $\pm 30\%$ for doses greater than 1 mSv for $H_p(10)$ and 50 mSv for $H_p(0.07)$, and $\pm 20\%$ or factor of 1.5 at 95% confidence, for doses equal to dose limits, in both cases <i>pro rata</i> for wear period. Combined standard uncertainty for measurement of personal dose equivalents for neutrons of $\pm 50\%$ for doses greater than 1 mSv for $H_p(10)$ and 50 mSv for $H_p(0.07)$ (using dosimeters calibrated in terms of $H_p(10)$), <i>pro rata</i> for wear period.	
Performance test for approval	'Announced test' (see Chapter 8) with the satisfactory response of the dosimetry system within the rated ranges of all input quantities.	'Surprise test' (see Chapter 8) with the satisfactory response of the dosimetry system within the rated ranges of all input quantities.
Periodic performance test	For a small number of dosimeters for each of several irradiation conditions every 3 years	
Intercomparisons	Take part in national, European and international intercomparisons	
Internal audit	Every year	
External audit	Audit by approval authority condition for approval	Audit according to accreditation requirements.
Inspection	Condition for approval + repeated at least every 3 years	Condition for approval + repeated on a 'surprise' basis
Annual confirmation by the service	Annual declaration that everything is in accordance with approval requirements and annual report on operations	

RP160: What does it offer?

- based on the relevant legislation and standards in force
- compilation of documents
- basic knowledge for the IM and metrology community
- specific and clear technical advices and guide lines
- filled the gap between RP73 and ICRP publications
- basis for harmonization
- basis for mutual recognition
- consensus and acceptance from the scientific community



Last three paragraphs:



Harmonization through the **implementation of standards** could be achieved if the competent authority or another legal body of Member State set out requirements for **approval based on international standards and/or international recommendations**.

In the EU, national accreditation bodies sign the Mutual Recognition Agreement. This would imply that an ADS **accredited in one of these countries would also be accredited in any other signing countries**. This is **not the case for approval**.

It is **recommended that for approval** individual monitoring services should follow the recommendations on accuracy, type-testing, dose record keeping and reliability given in these Technical Recommendations.

Thank you for your attention !