

Worldwide Nuclear Industry's Views on:

- 1. Evolved RP System for this Century*
- 2. ICRP Draft Recommendations (June 2006)*
- 3. IAEA Revision of the BSS*

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GT-CIPR

*Paris, France
Le 7 décembre 2006*

*Révision des normes de
base internationales
en radioprotection*



What is the WNA

The trade association of the global nuclear industry with a worldwide membership

- Based in London, UK
- Web-site: <http://www.world-nuclear.org>



Our membership makes us unique, global and truly representative

- Over 130 industry enterprises from over 30 countries



What does the WNA do?

WNA supports the global nuclear industry

- Coordinates ongoing industry forums - Working Groups
- Acts in the international arena

WNA supports ten Working Groups (WGs)

- WGs consist of industry experts from around the world
- The WNA's engine is the WGs

RPWG Membership (by organization)

AREVA NC (France)	EPRI (USA)	OPG (Canada)
AREVA NC (Canada)	Rio Tinto/ERA (Australia)	Progress Energy (USA)
BARC (India)	Foratom (Europe)	RIARA (Russia)
Barsebackkraft (Sweden)	IBRAE (Russia)	RIAR (Russia)
BNFL-BNG (UK)	JAEA (Japan)	RWE NUKEM (UK)
Cameco (Canada)	JNFL (Japan)	Shikohu Electric Power (Japan)
CEZ (Czech Republic)	Janus (Japan)	Tenex (Russia)
CNNC (China)	KANSAI (Japan)	Tepco (Japan)
Conuar (Argentina)	Kazatomprom (Kazakhstan)	UCIL (India)
CRIEPI (Japan)	KHNP (South Korea)	WM Mining Inc (USA)
Duke Energy (USA)	KKG (Switzerland)	
EDF (France)	Kyushu Electric Power (Japan)	IAEA (International)
Enusa (Spain)	NEI (USA)	
E.ON (Germany)	NPCIL (India)	

Worldwide Nuclear Industry Views

The Evolved RP System for this Century

Evolved RP System - Challenge

It must help improve public understanding of the real risk from ionizing radiation, which can in turn impact greatly on public decisions

Easier to understand for “People” as well - not “RP Experts” alone

This should be one of the main drivers of the RP system evolution

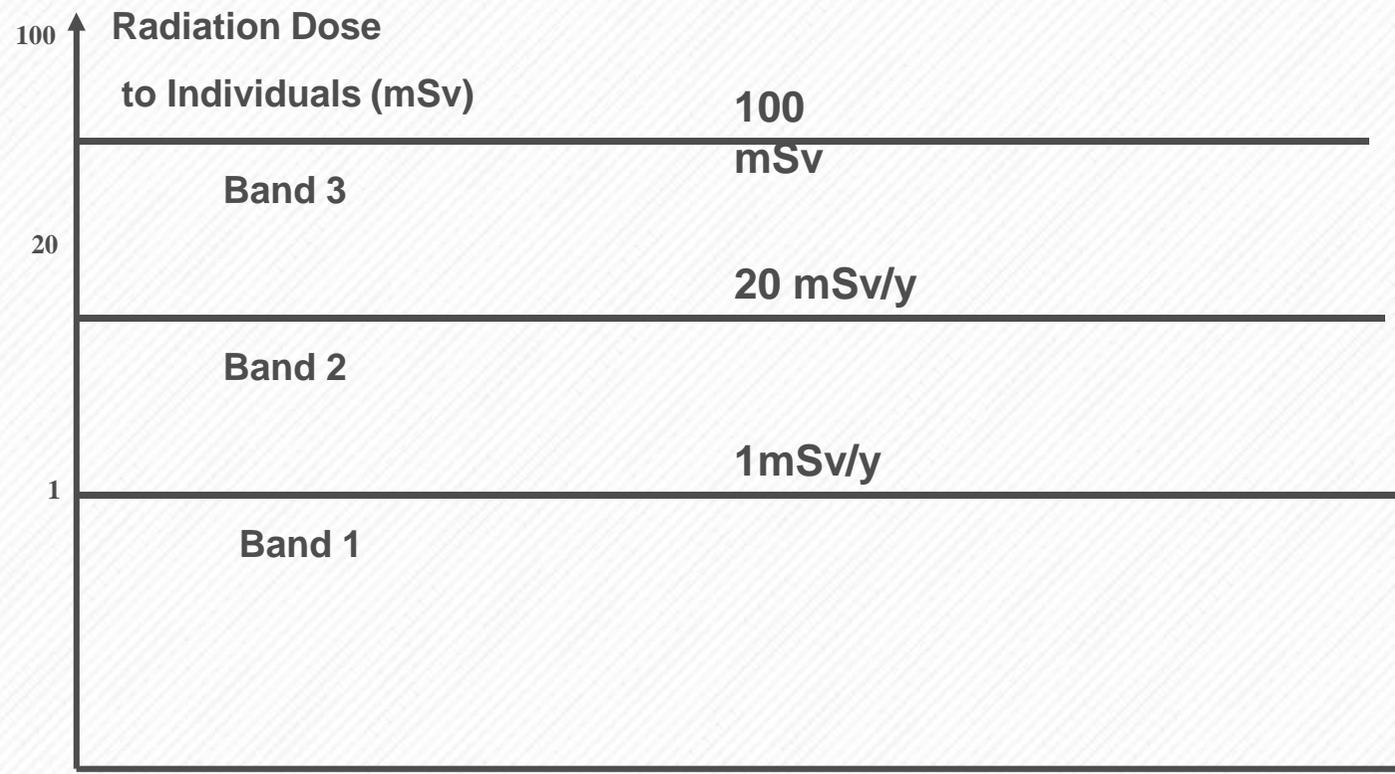
Evolved RP System - Challenge

Dealing with Common Situations with Greater Consistency & Coherence

Doses	Common Situations	Accounted for/controlled	Benefits
(mSv/y) 2-3 1-10	Worldwide individual exposure from natural background radiation: -Average - Typical variability	Unaccounted for	Not applicable
1	Discharges from NORM industry Practices	Often not accounted for	NORM industry products and services
0.1-0.3	Max DC for waste management: most exposed group of individuals	Accounted for and strictly controlled	Clean and safe large-scale source of energy
0.01-0.1 0.01-1	Exclusion, exemption and clearance for (as per IAEA RS-G-1.7) : -artificial radioactivity - artificial radioactivity (low probability event) and natural radioactivity	See RS-G-1.7	e.g. recover, re-cycle, and re-use material/waste or disposal of it
0.1	One transatlantic return air flight	Unaccounted for	Quick and comfortable travel
0.1	One single X-ray	Often unaccounted for	Useful medical diagnostic

Evolved RP System - Challenge

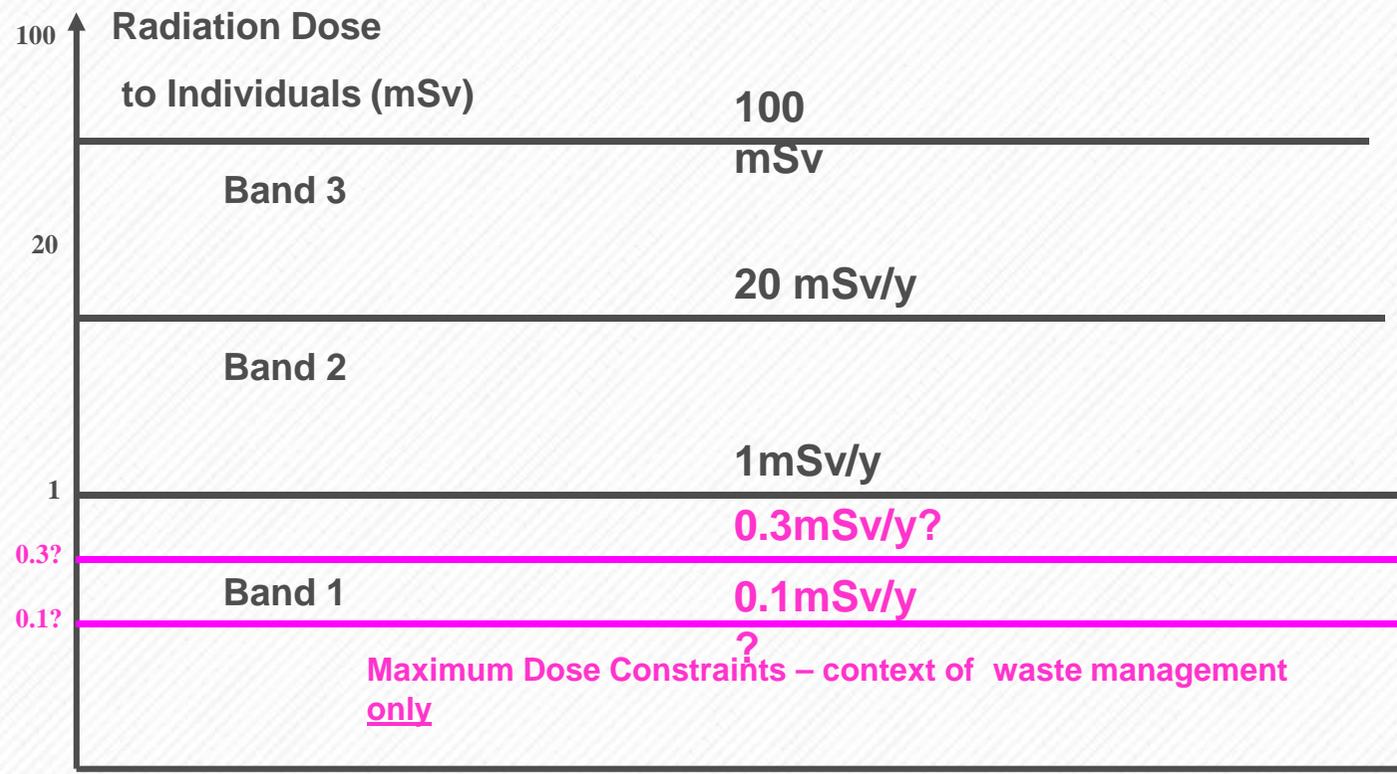
ICRP's Draft Proposal



Bands of projected effective dose : Acute or Annual

Evolved RP System - Challenge

ICRP's Draft Proposal (+ some "fine print" provisions)



Bands of projected effective dose : Acute or Annual

Evolved RP System - Challenge

Question:

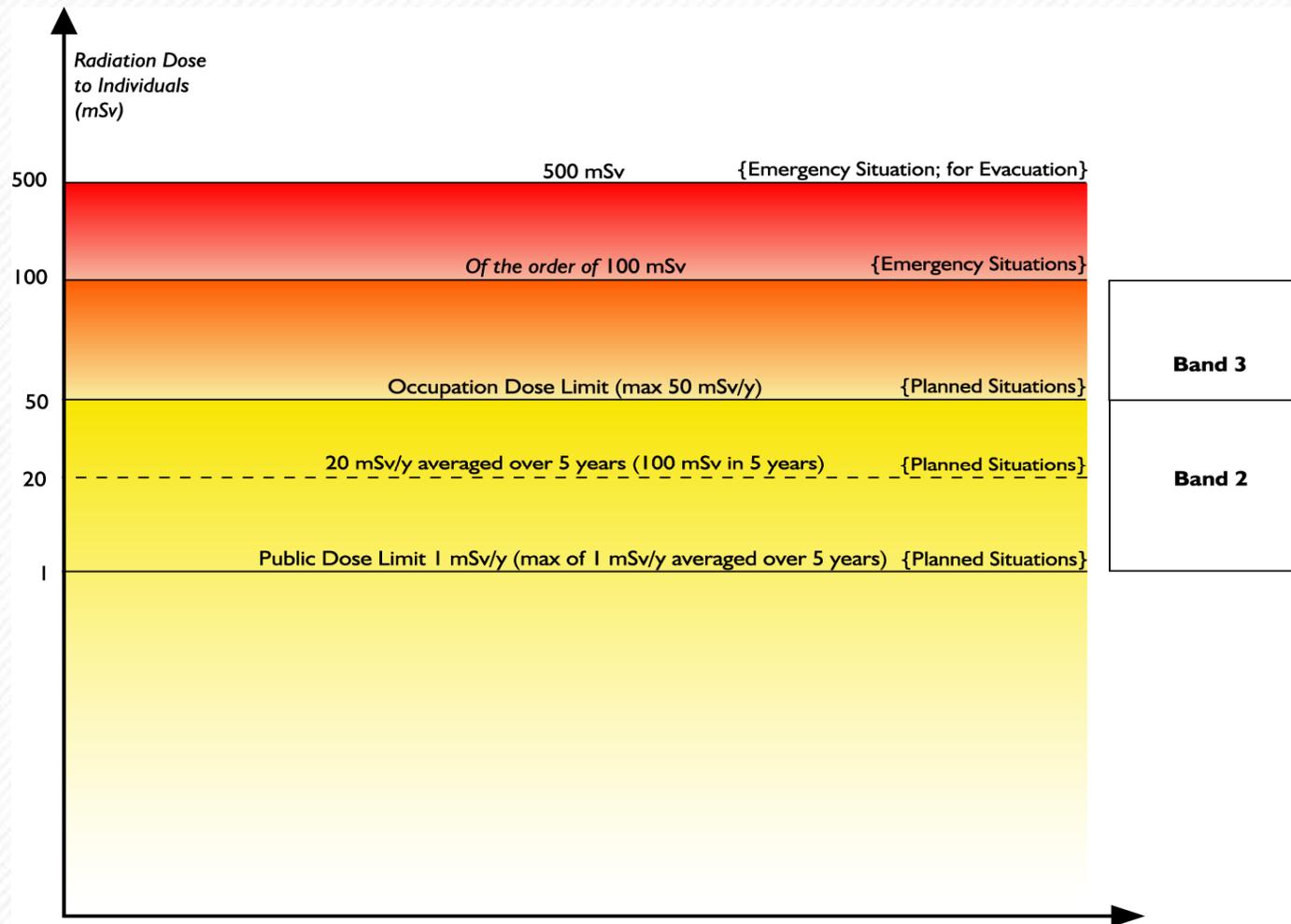
Would the ICRP proposal contribute to improving people's understanding of the real risk from ionizing radiation?

- The answer is not self evident.
- The RP system would remain unclear for too many common situations at very low doses (e.g. < 1 mSv/y)

How might a more suitable RP system look?

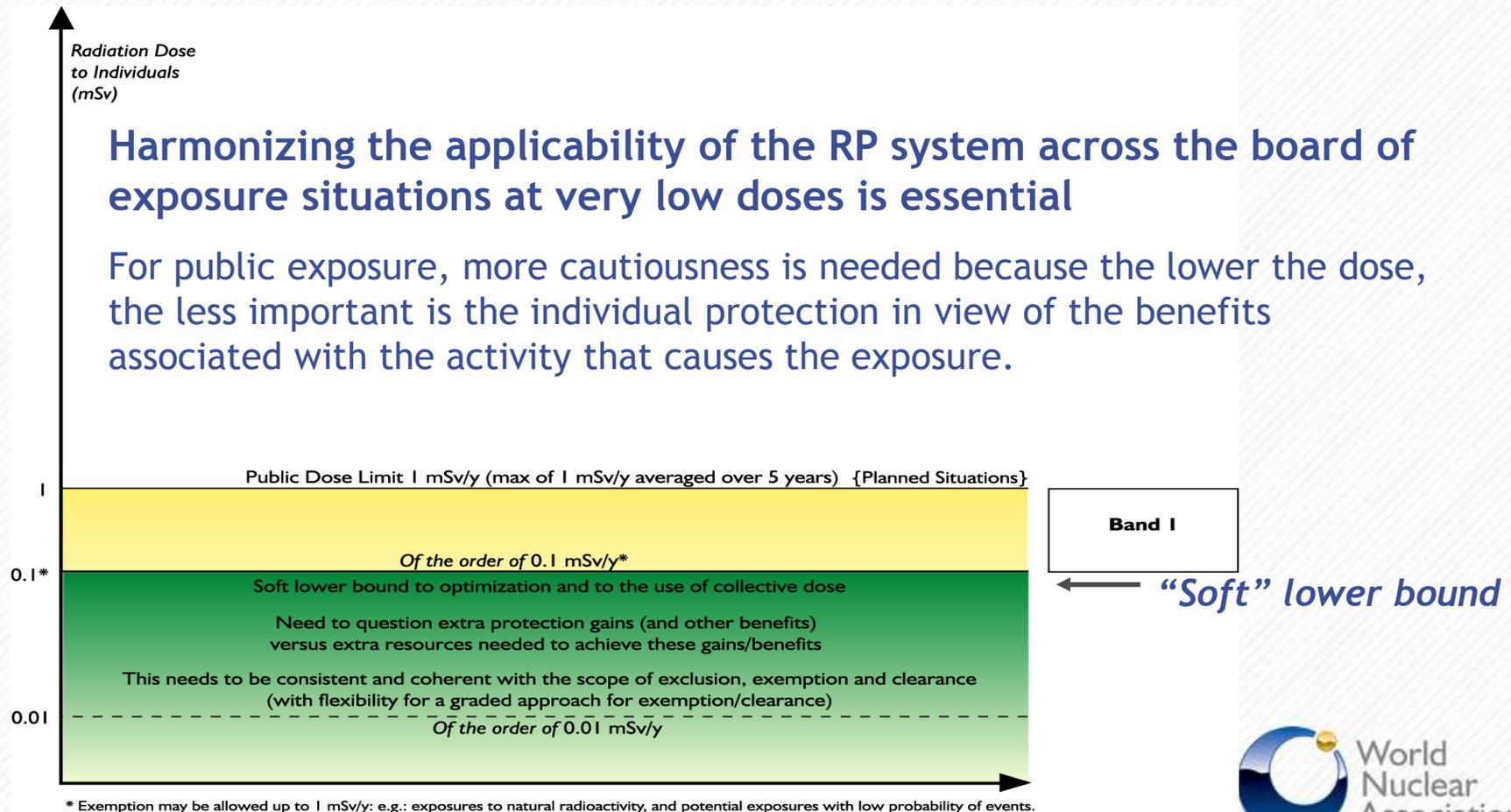
A Smooth & Careful Evolution of the RP System - *Towards greater consistency & coherence*

Proposed Evolution 1: Numbers = Current dose limits



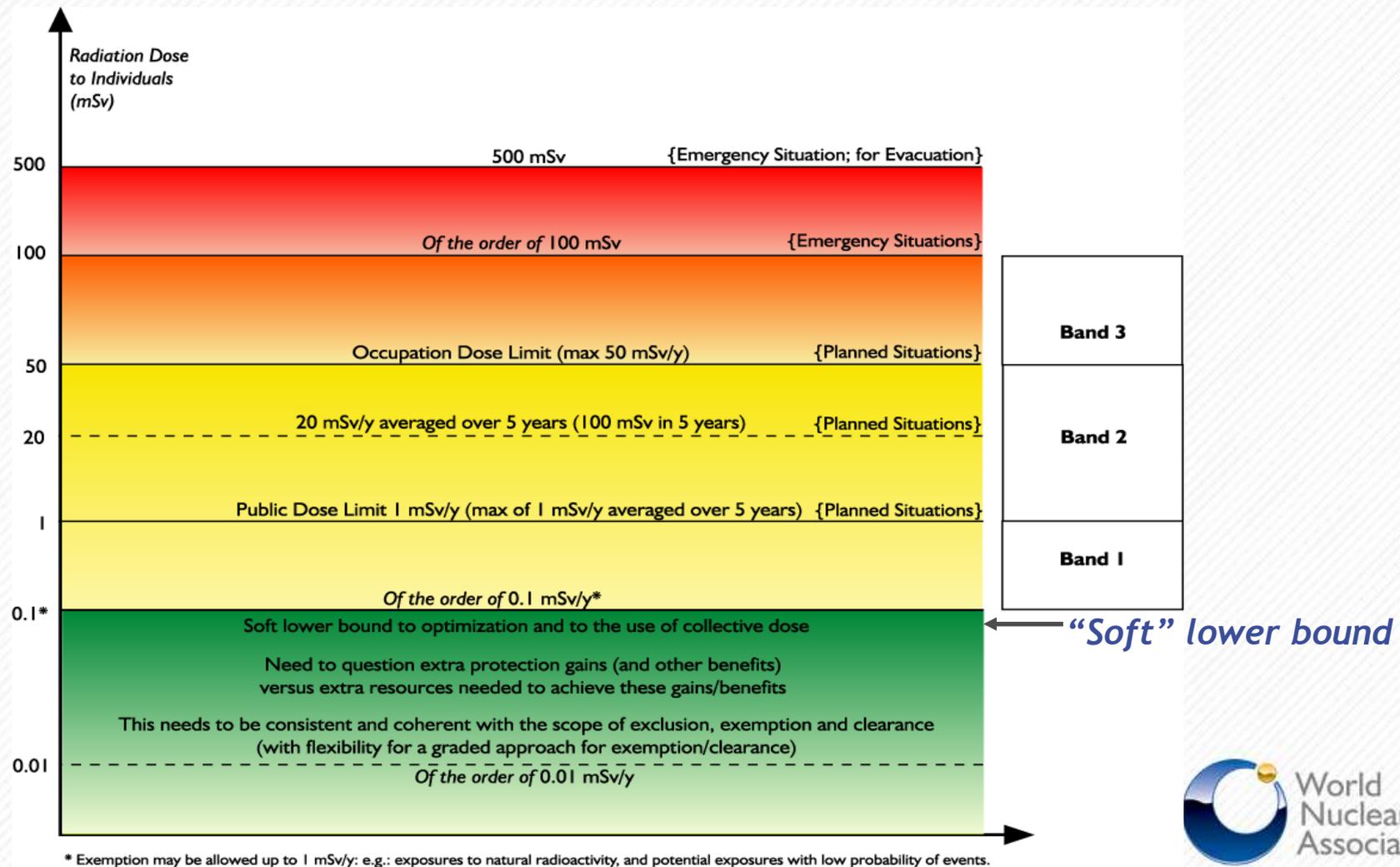
A Smooth & Careful Evolution of the RP System - Towards greater consistency & coherence

A clearer integration of a 'Soft' lower bound to Optimization and to the use of the collective dose



A Smooth & Careful Evolution of the RP System - Towards greater consistency & coherence

Proposed Evolution 2: Evolution 1 + the 'Soft' lower bound



A Smooth & Careful Evolution of the RP System - *Towards greater consistency & coherence*

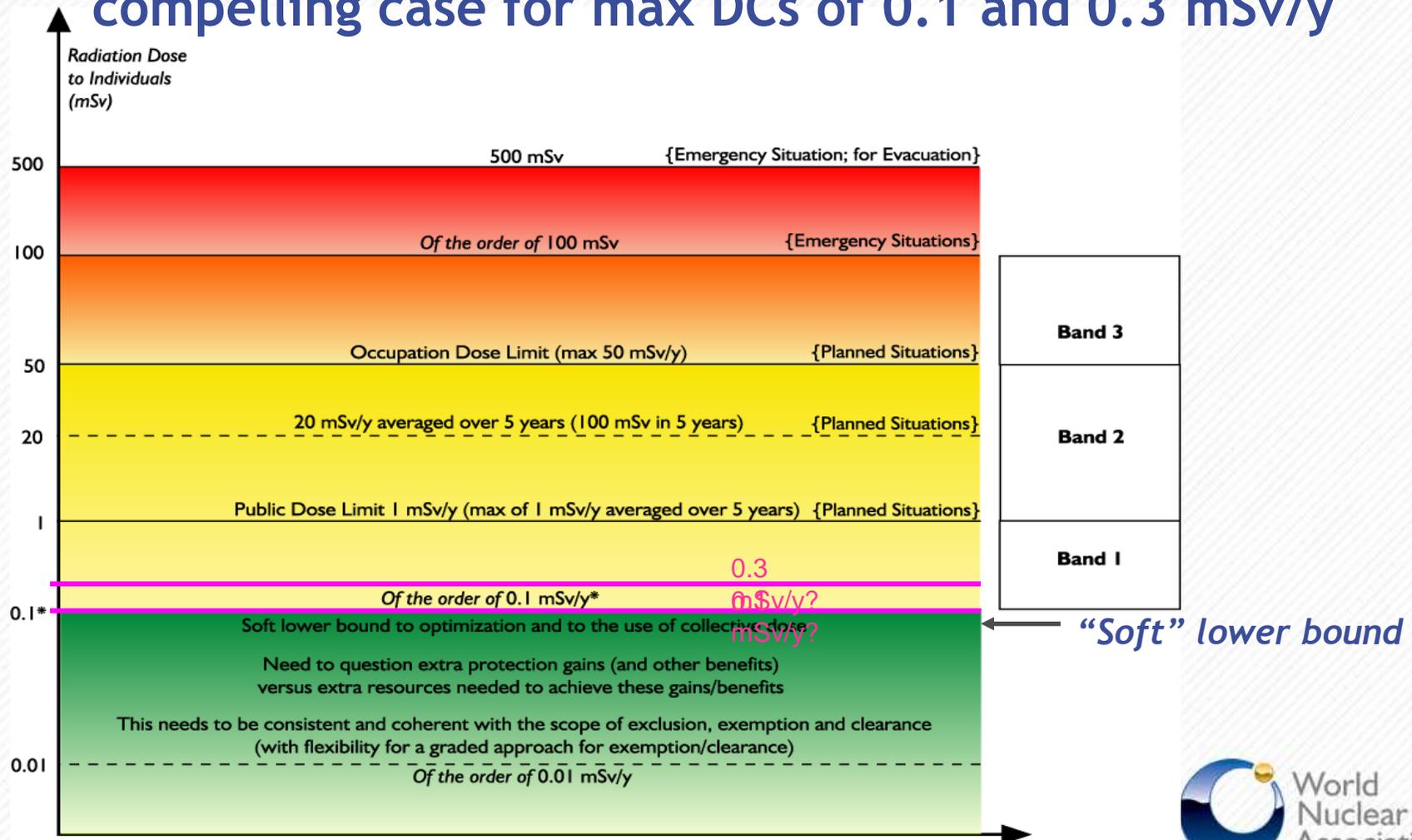
A comprehensive analysis by CRIEPI (Japan) of UNSCEAR data for 15 countries, concluded that:

- Doses of up to 0.5 mSv/y from man-made radiation sources would not much change the dose distribution for the public
- This is because of the overwhelming contribution from natural background radiation

This gives re-assurance that integrating more clearly a “Soft” lower bound is sound

A Smooth & Careful Evolution of the RP System - Towards greater consistency & coherence

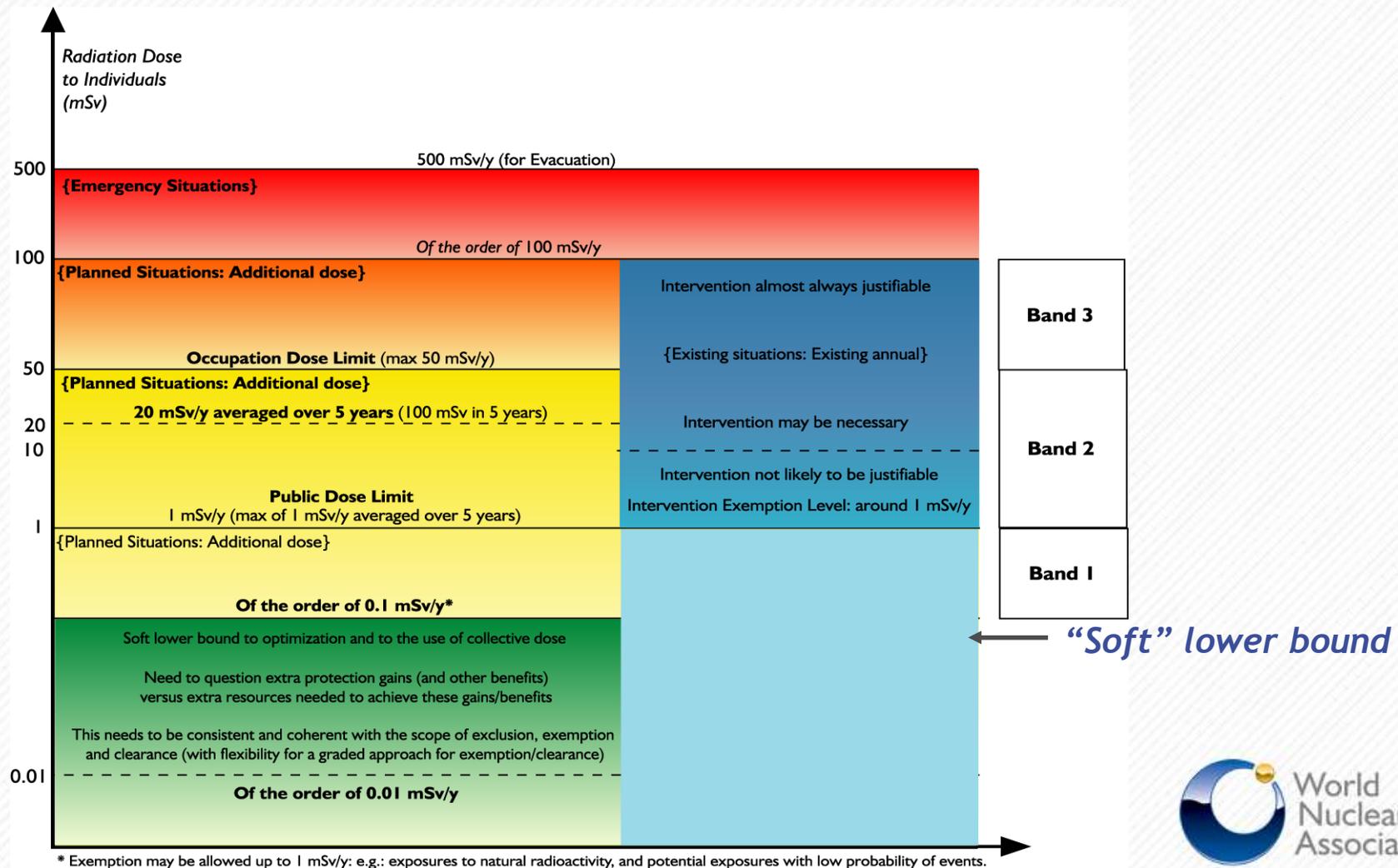
Proposed Evolution 2: Clearly, there is no longer a compelling case for max DCs of 0.1 and 0.3 mSv/y



* Exemption may be allowed up to 1 mSv/y: e.g.: exposures to natural radioactivity, and potential exposures with low probability of events.

A Smooth & Careful Evolution of the RP System - Towards greater consistency & coherence

Proposed Evolution 3: Evolution 2 + 'Intervention'



Worldwide Nuclear Industry Views

The ICRP Draft Recommendations (June 2006)

ICRP Draft Proposal: Overall Remarks

The draft is significantly improved in comparison to the previous version

However, more improvements are necessary, especially for the key outstanding issues of:

- Dose constraints (DCs)
- A clearer integration of a *'soft' lower bound*

ICRP Draft Proposal: Overall Remarks

Industry understood from the NEA/ICRP recent workshops that the new RP system:

- Would not disturb the current RP practices at nuclear industry sites. **Current practices should continue.**
- Would **maintain the necessary flexibility** that allowed the industry to reach its current high RP performance
- **Would not trigger regulatory changes**

ICRP Draft Proposal: Overall Remarks Concerning 'Sources'

We welcome a new broader-level orientation that:

- Focuses on the main principles and the science, and
- Leaves the necessary flexibility and responsibility to the implementers (regulators and operators)

Key issues

- The new 'source-related' approach and the concept of 'single source' do not necessarily fit well with 'practices'
- Especially in the context of occupational exposure

ICRP Draft Proposal: Concerning 'Dose Constraints' (DCs)

Some key issues

- Is it really the most fundamental level of protection - more than the dose limits (DLs)?
- The DC numerical values make *de facto* the DC concept confusing relative to the dose limits (DL)
- DC per 'source' is not sufficiently flexible to cover the whole range of commonly encountered situations
- 'Per source' not well adapted for occupational exposure
- Confusing about DC as an integral part of optimization or not

ICRP Draft Proposal: Concerning 'Dose Constraints' (DCs)

From numbers to commitment to management systems and their implementation

- By applying ALARA over decades, significant progress in reducing doses has been achieved worldwide by the nuclear industry: well before the concept of dose constraints
- Industry commitment to ALARA became fully integrated into the operator management systems that drive the continued success in dose reductions
- Nowadays, the implementation of management systems by operators, and their control by regulators, is key.

ICRP Draft Proposal: Suggestions to Resolve Six (6) Key Outstanding Issues

Issue No.1

Clarify the distinction between DL and DC

Issue No.2

Modify the 'source-related' approach, the concept of 'single source', and the concept of 'dose constraints'

Issue No.3

Integrate more clearly a '*Soft*' lower bound to:

- optimization
- the use of the collective dose

ICRP Draft Proposal: Suggestions to Resolve Six (6) Outstanding Key Issues

Issue No.4

Remove the recommendation for maximum numerical DCs of 0.1 and 0.3 mSv/y for the context of WM alone

Issue No.5

Clarify the concept of DC for emergency/accident situations and for existing situations

Issue No.6

RP of the environment: Align more closely with the current international consensus

ICRP Draft Proposal: When and How

Time for changes:

⇒ No hurry, stability is more important by far

Process for changes:

⇒ A further improved draft is needed

⇒ Practical implications should then be assessed, step-by-step, by the IAEA (RASSC)

ICRP Draft Proposal: Conclusion

We urge the ICRP to undertake another round of consultation on an **updated draft** that reflects resolution of the key issues

Issue 1: Clarify the distinction between DL and DC

At the international level, the key numerical values of protection for 'planned situations' should be DLs alone

- This would avoid any confusion: e.g. **What are the adequate upper bound levels of worker and public health protection?**

ICRP and IAEA should **define the principle of DC**, whereas

Local stakeholders should have the responsibility and flexibility to **set numerical DCs** that are adequate to their specific context

Issue 2: Modify the ‘source-related approach’, and the concepts of ‘single source’ and ‘DCs’

DCs are tools of Optimization

They are an integral part of Optimization, taking into account socio-economic factors

DCs are target values for the purpose of improving protection and guiding performance

They are not the starting point of Optimization

‘Planning Values’ (PVs) are better than DCs

Issue 2: Modify the ‘source-related approach’, and the concepts of ‘single source’ and ‘DCs’

DC ‘per source’ alone is **not fine for occupational exposure**

- In fact, operators do also control occupational exposure per individual

DC ‘per source’ is **fine for public exposure provided that the application is more cautious:**

- The lower is the dose, the less important the individual protection in view of the benefits
- A ‘*Soft*’ lower bound is needed

Issue 2: Modify the ‘source-related approach’, and the concepts of ‘single source’ and ‘DCs’

Because of the wide range of applications, the principle should be kept **flexible** in order to best optimize the RP performance - under the prevailing circumstances:

- **DC types:** per source, per individual, per task, etc.
- **DC forms:** sub-limit, authorized level, dose target, dose budget, dose objective or goal, etc.

Issue 3: Integrate clearly a 'Soft' lower bound to Optimization and to the use of collective dose

This should be interpreted as the level from which the RP measures should be systematically applied

- Inverse of 'below regulatory concern'

In turn, below which, the lower is the dose, the more you need to question the extra gain in protection relative to:

- The effort needed to achieve this gain
- Other common types of exposure and risk

Issue 3: Integrate clearly a 'Soft' lower bound to Optimization and to the use of collective dose

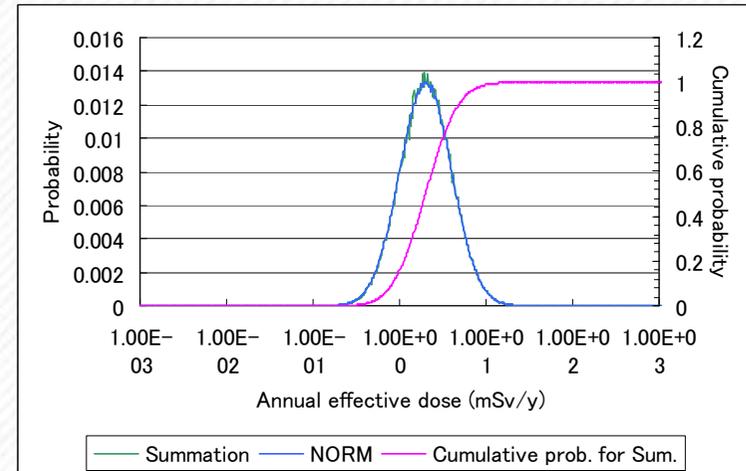
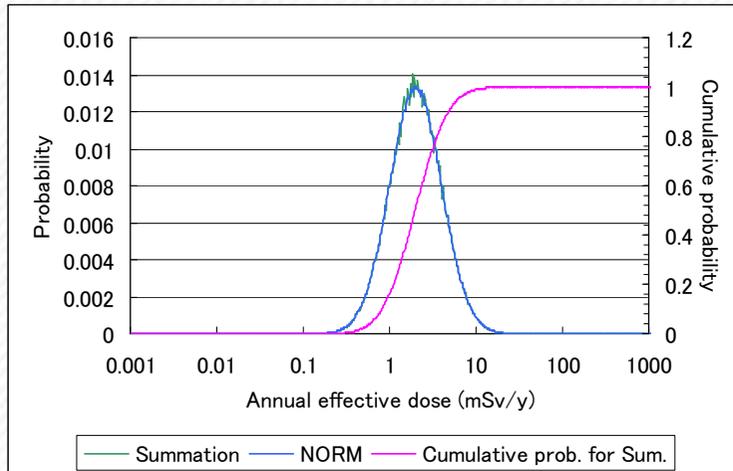
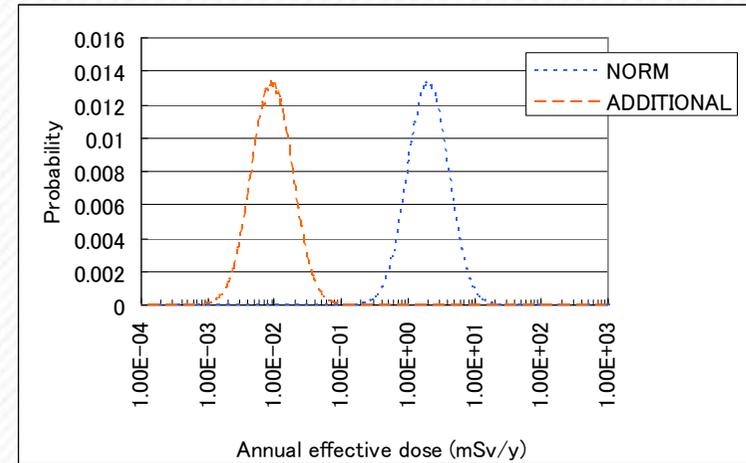
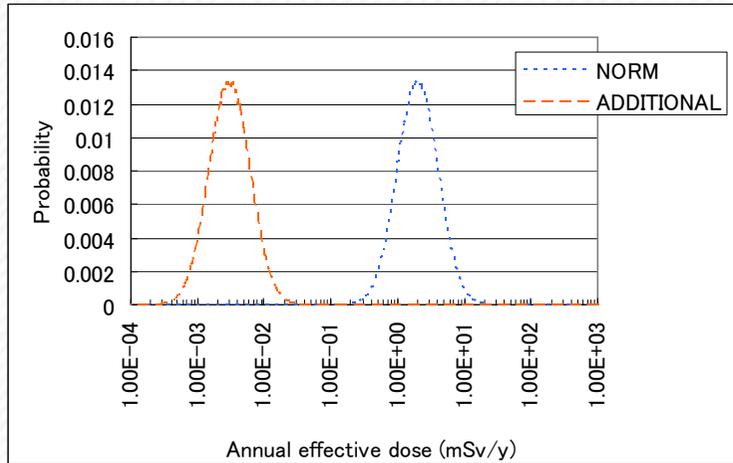
Such a *'Soft' lower bound* is particularly important for nuclear industry sites because operating unregulated is not an option - irrespective of doses

It must also be consistent and coherent relative to the application of the concepts of exclusion, exemption and clearance (IAEA RS-G-1.7)

A *'Soft' lower bound* would also help balance the new emphasis put on stakeholder involvement

Issue 3: Integrate clearly a 'Soft' lower bound to Optimization and to the use of collective dose

CRIEPI (Japan) analysis results which support that doses of up to 0.5 mSv/y would not much change public dose

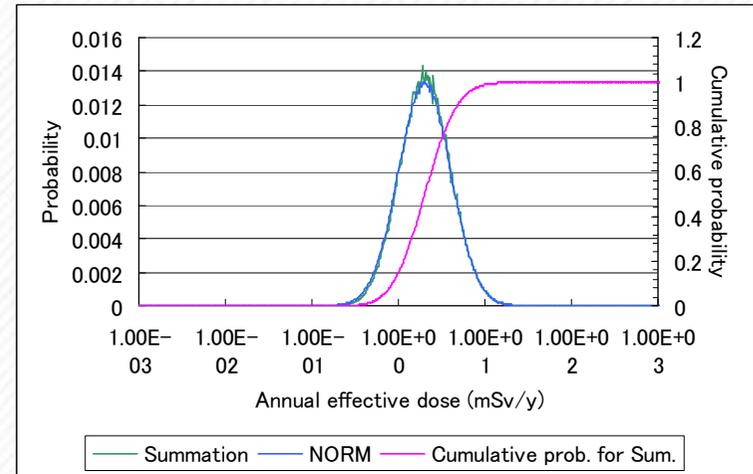
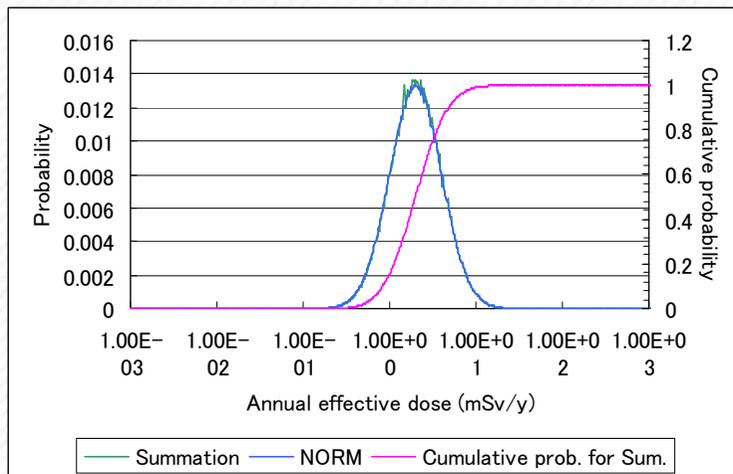
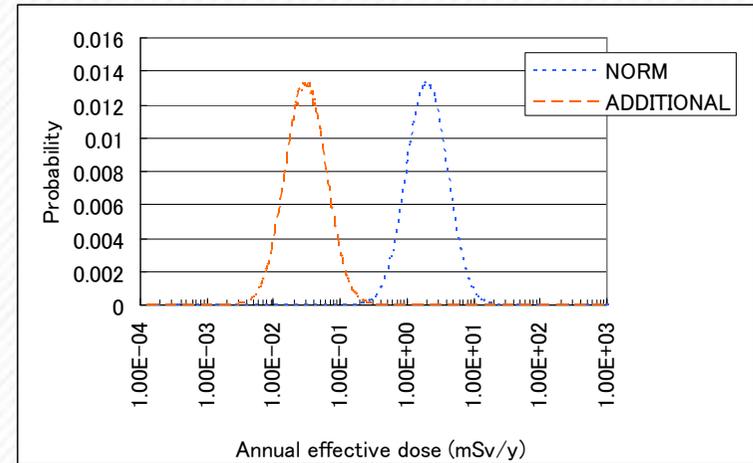
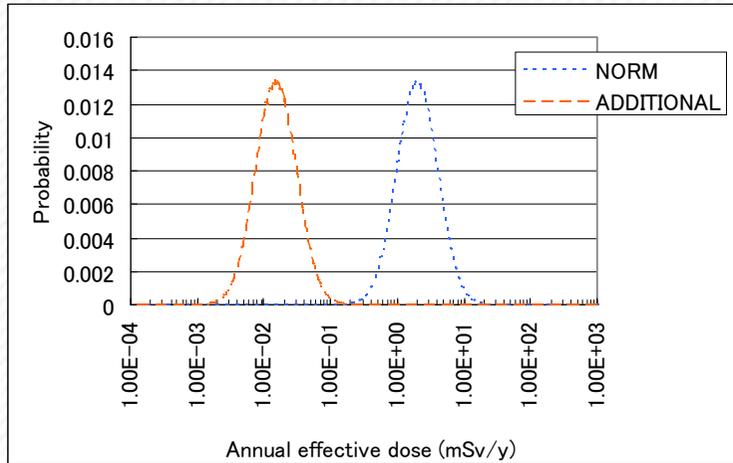


Dose constraint 0.01mSv/y, GSD=2.0

Dose constraint 0.03mSv/y, GSD=2.0

Issue 3: Integrate clearly a 'Soft' lower bound to Optimization and to the use of collective dose

CRIEPI (Japan) analysis results which support that doses of up to 0.5 mSv/y would not much change public dose

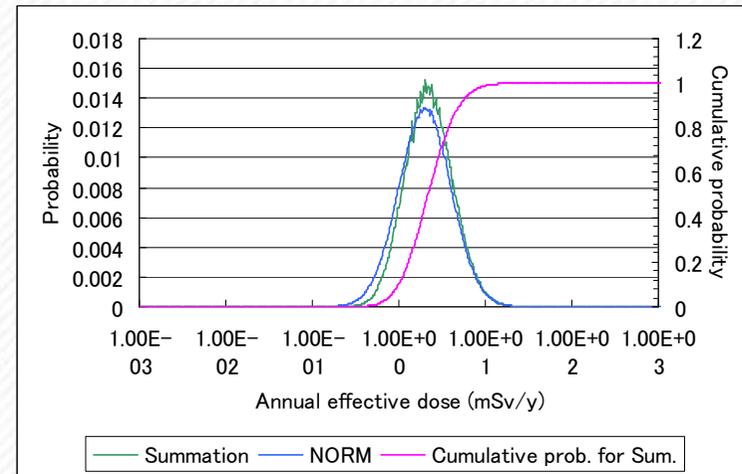
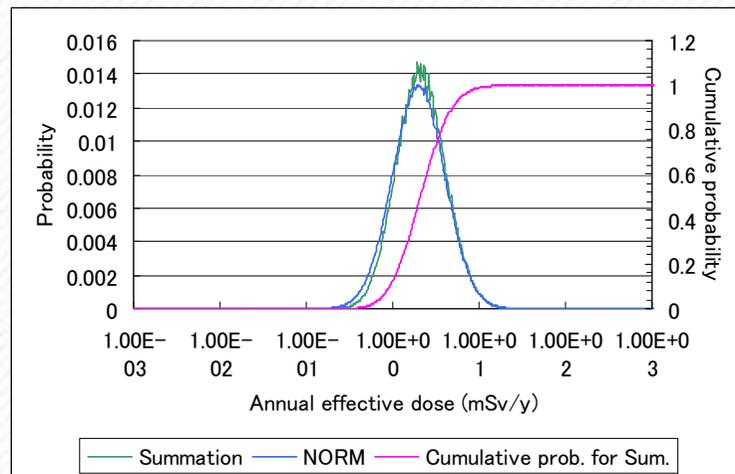
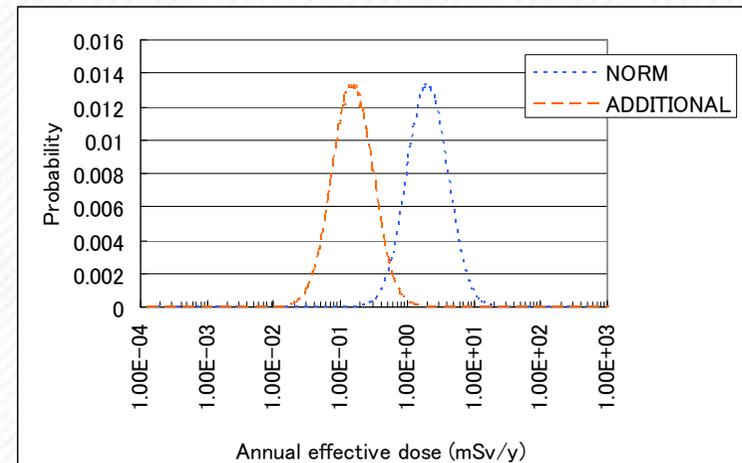
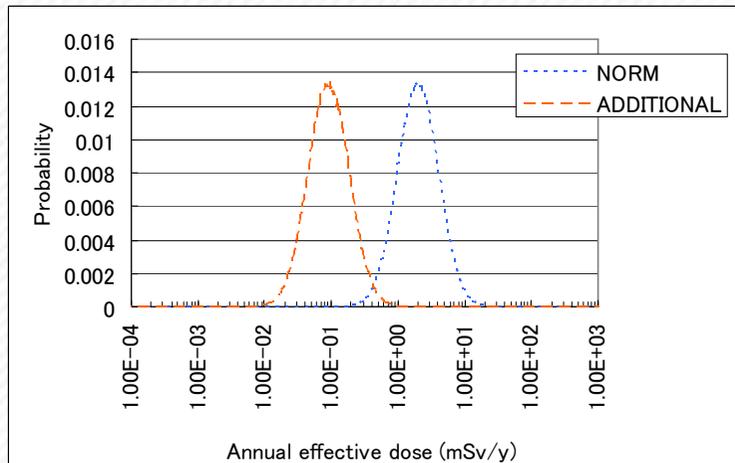


Dose constraint 0.05mSv/y, GSD=2.0

Dose constraint 0.1mSv/y, GSD=2.0

Issue 3: Integrate clearly a 'Soft' lower bound to Optimization and to the use of collective dose

CRIEPI (Japan) analysis results which support that doses of up to 0.5 mSv/y would not much change public dose



Dose constraint 0.3mSv/y, GSD=2.0

Dose constraint 0.5mSv/y, GSD=2.0

Issue 4: Remove the maximum numerical DCs of 0.1 and 0.3 mSv/y for the context of WM alone

Otherwise, it would be contrary to the broad policy of leaving the responsibility and flexibility for setting numerical DCs to local stakeholders

The meaning and basis of these more stringent DCs remain unclear - at both the ICRP/IAEA level

Issue 5: Clarify the concept of DC for emergency & accident situations and for existing situations

Simply extending the DC (as part of Optimization) to emergency/accident situations and to existing situations is inappropriate

Using the same terms (DC) for 'practices' and 'intervention' would be confusing because the meaning and application would differ

The case for this change needs to be demonstrated, and if relevant, to be clarified

Issue 5: Clarify the concept of DC for emergency & accident situations and for existing situations

We welcome that ICRP has set-up WGs on each of these two important matters

We note that for emergencies/accidents:

- DCs seem more related to post-emergency situations
- The concept of ‘intervention level’/‘action level’ to react during an emergency/accident) may have been overlooked

Issue 6: RP of the Environment - Align more closely with the current international consensus

Align the content to reflect the international consensus that the current RP standards do provide an adequate level of environmental protection (EP)

- As per the IAEA plan of activities and related coordinating group
- Speculation about this should be avoided as there is no widely recognized evidence that suggest the contrary

Prematurely introducing future plans for potential ICRP guidance and recommendation should be avoided

Issue 6: RP of the Environment - Align more closely with the current international consensus

At the IAEA level:

“There is a consensus on the need for establishing an iterative process to determine the need for, and if necessary, the form and content of, additional or revised standards.”

In other words, the case for additional and revised standards is not actually made

Worldwide Nuclear Industry Views

IAEA Revision of its Safety Standards (SS)

IAEA Revision of the Safety Standards (SS)

The planned revision is just beginning

It is due to extend over a three year period, culminating by the end of 2009

As part of this effort, IAEA RP standards are expected to be revised

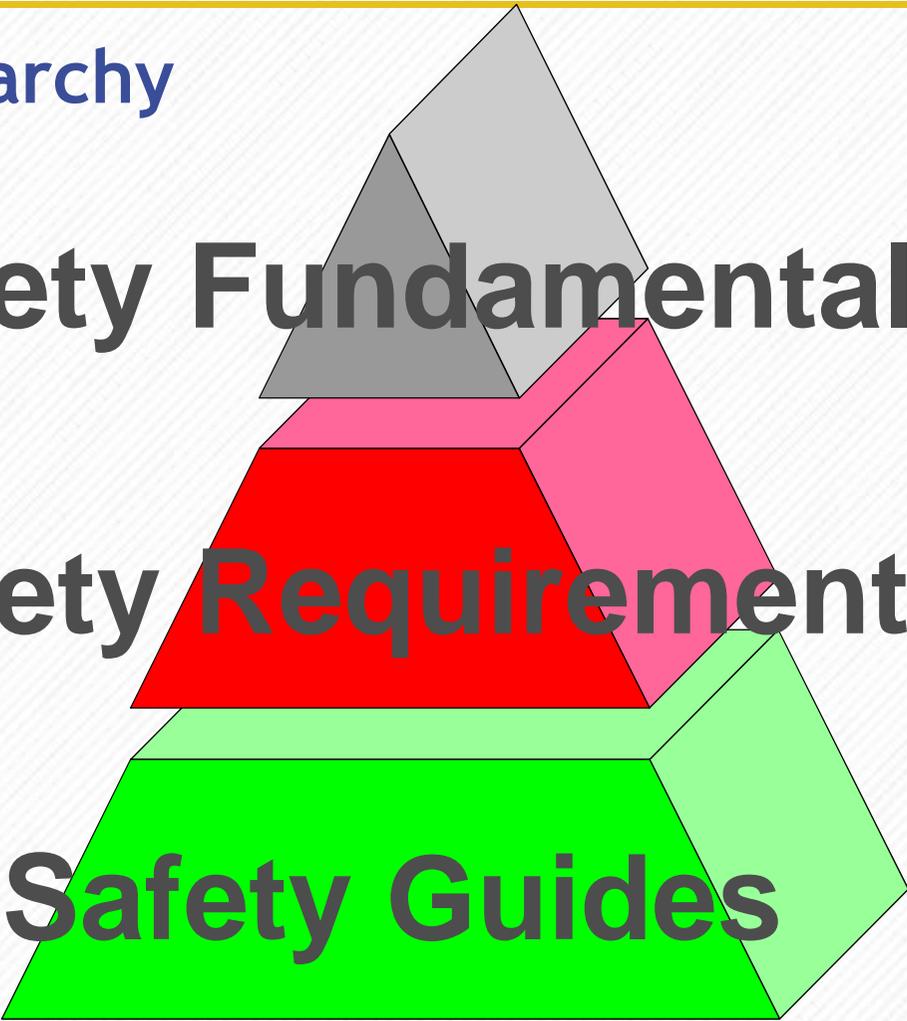
IAEA Revision of the Safety Standards (SS)

Regulators and operators both see value in a convergence towards a set of IAEA SS that can be applied worldwide

Their wide practical knowledge and expertise is of central importance and so are their contributions to the revision process

IAEA Revision of the Safety Standards (SS)

SS Hierarchy



Safety Fundamentals

Safety Requirements

Safety Guides

IAEA Revision of the Safety Standards (SS)

Safety Fundamentals (SF)

Set out principles of protection and safety

Safety Requirements (SR)

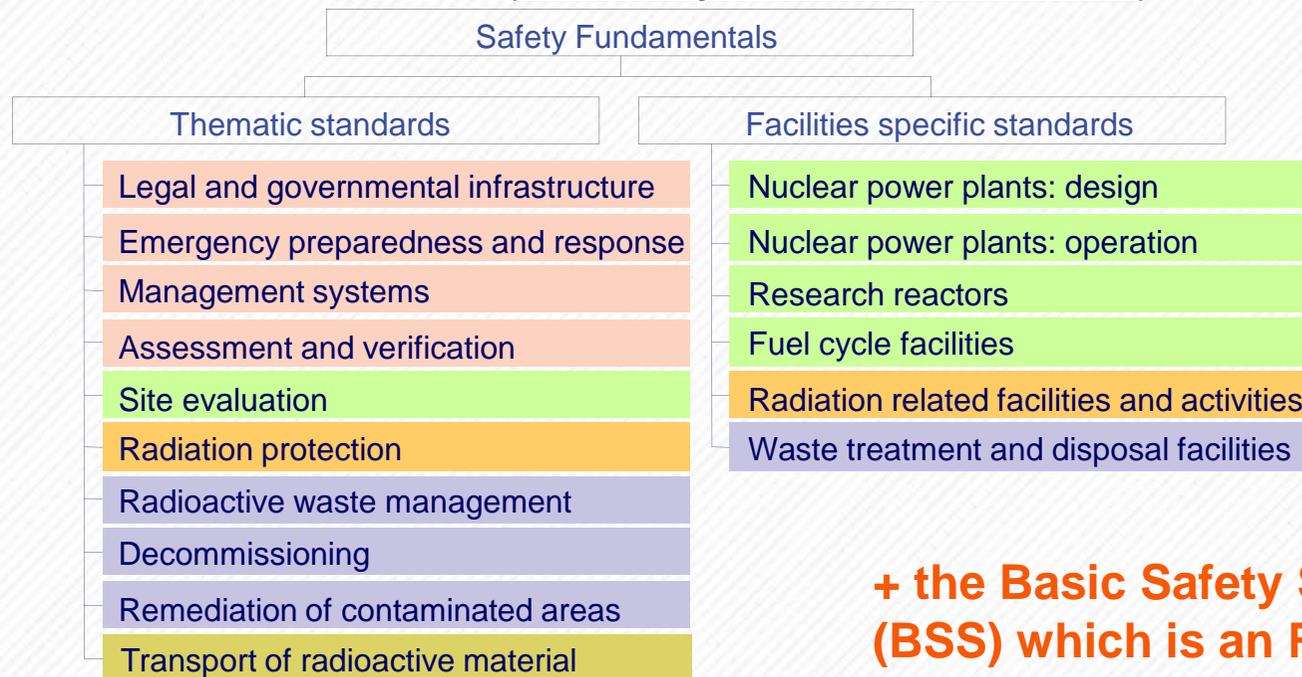
Establish requirements: what has to be done ('shalls') to apply these principles in meeting objectives

Safety Guides (SG)

Set out recommended ways ('shoulds') of meeting the requirements

IAEA Revision of the Safety Standards (SS)

SS Structure (currently under discussion)



- General safety (cross-cutting themes)
- Safety of nuclear facilities
- Radiation protection and safety of radiation sources
- Safe management of radioactive waste
- Safe transport of radioactive material

+ the Basic Safety Standards (BSS) which is an RP document that crosses both types of SS ?

IAEA Revision of the Safety Standards (SS)

Current Status

The SF (top tier document) has been approved

Concerning the SR + SG, the two main decisions at a recent IAEA meeting were:

- To carefully develop the **overall structure** of the SS
- To adopt a **rigorous revision process** for dealing with proposed changes

IAEA Revision of the Safety Standards (SS)

Structure of the SS

We agree with the Commission on SS (CSS) that the revision should include:

- **The consolidation of the detailed info**
- **A reduction in the number of SR and SG**

A proposed revised structure is expected at the next round of meetings in April 2007. A WG has been created

Then, the revision should proceed more normally

IAEA Revision of the Safety Standards (SS)

Structure of the SS

Early in the revision process, we would see value in:

1. Laying-out the full set of SR and SG
2. Describing the objectives, scope and interfaces of each of the SR and SG (also relative to the SF)
3. Scheduling the development of SR and SG

IAEA Revision of the Safety Standards (SS)

Rigorous revision process

We would recommend that the process should include basic QA management features

This would help the process to address all proposed changes systematically and would build confidence as the final standards emerge

IAEA Revision of the Safety Standards (SS)

Rigorous revision process

Rigour seemed lacking in the recent adoption of more stringent radiation dose criteria (0.1 and 0.3 mSv/y) in some SS without sufficient basis and deliberation

We trust that this matter can be re-examined as part of the overall revision

IAEA Revision of the Safety Standards (SS)

Rigorous revision process

As the revision proceeds, two points to bear in mind for all participants are:

- The overwhelming consensus that regulatory stability is essential
- The necessity that the analysis of proposed changes must include consideration of practical implications

IAEA Revision of the Safety Standards (SS)

Industry's involvement/contribution:

As 'Users', we look forward to providing our feedback and perspective throughout the revision process so that we can constructively contribute to this important project



- Thank you for your attention
- Questions ?
- Contact us: <http://www.world-nuclear.org>

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Annex - Issue 4: Remove the maximum numerical DCs of 0.1 and 0.3 mSv/y for the context of WM alone

If their adequacy cannot be supported by relevant international studies, they should no longer be recommended

- Such basis are not in ICRP77, 81 and 82
- TECDOC-664 may be of relevance but experience shows that it was unduly conservative
- Recently, the ICRP Chairman stated that **such dose criteria have been set arbitrarily by ICRP as a “rule of thumb”: 1/3 and 1/10 of the dose limit of 1 mSv/y**

Annex - Issue 6: RP of the Environment - Align more closely with the current international consensus

ICRP should take note that key stakeholders have expressed the need to consider environmental protection as a whole and that viewing it from RP alone would be ill-advised

The common understanding is that ICRP thoughts should be part of the IAEA's plan of activities, which involves several institutions as well as Member States

Annex - IAEA Revision of the BSS

The overwhelming consensus at the IAEA/NUSSC meeting in October 06 was:

1. Regulatory stability is by far the most important factor
2. Changes should not be substantial (if at all) and they should not trigger any change to current regulatory regimes
3. No hurry to make any change to the BSS

Annex - IAEA Revision of the BSS

The review/revision process must:

- Take the necessary time to thoroughly assess each of the proposed changes
- Be systematic through a well-defined step-by-step approach

Annex - IAEA Revision of the BSS

A comprehensive assessment of each proposed change is necessary:

- Rationale and basis
- Universal applicability
- Potential practical implications

The input/feedback from both regulators and operators is essential for this

Annex - IAEA Revision of the BSS

A Specific Key Issue: The proposed introduction of a more stringent generic dose criterion (0.3 mSv/y)

We are unclear about how such a proposal arose to the level of the BSS revision [IAEA report, Aug 9, p.9-10]

We question the basis for this. We also question the introduction of the 0.1 and 0.3 mSv/y dose criteria in the lower documentation that supports the BSS:

- DS332, 172, 376, etc.

Annex - IAEA Revision of the BSS

The proposed introduction of a more stringent generic dose criteria (0.1 and 0.3 mSv/y)

Contrary to expectations, no basis for this can be found in ICRP documentation (ICRP77, 81 and 82) nor in IAEA's own documentation (TECDOC-664)

Recently, the ICRP Chairman stated that such dose criteria have been set arbitrarily by ICRP as a “rule of thumb”: 1/3 and 1/10 of the dose limit of 1 mSv/y