



**Specialists' Meeting on Application of the Concepts of Exclusion,
Exemption and Clearance: Implications for the
Management of Radioactive Materials**

May 6 - 9, 1997

**ISSUES ARISING IN APPLYING
THE BSS CONCEPTS**

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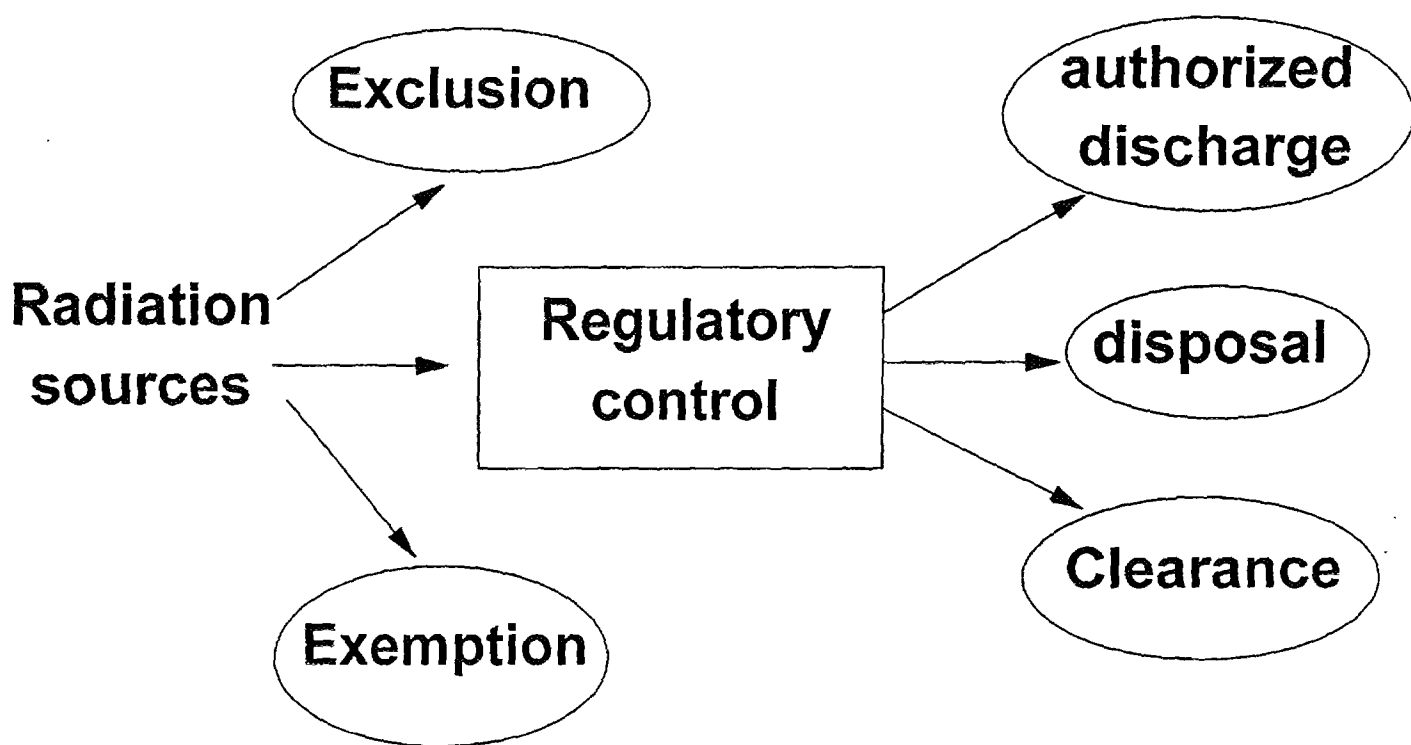
INTERNATIONAL ATOMIC ENERGY AGENCY

Issues

- 1. Terminology**
- 2. Naturally occurring radionuclides**
- 3. The exemption and clearance levels**
- 4. Management of very low level wastes**
- 5. Transboundary movements**
- 6. The Waste Convention**

CHRONOLOGY OF IAEA GUIDANCE ON EXCLUSION, EXEMPTION/CLEARANCE LEVELS

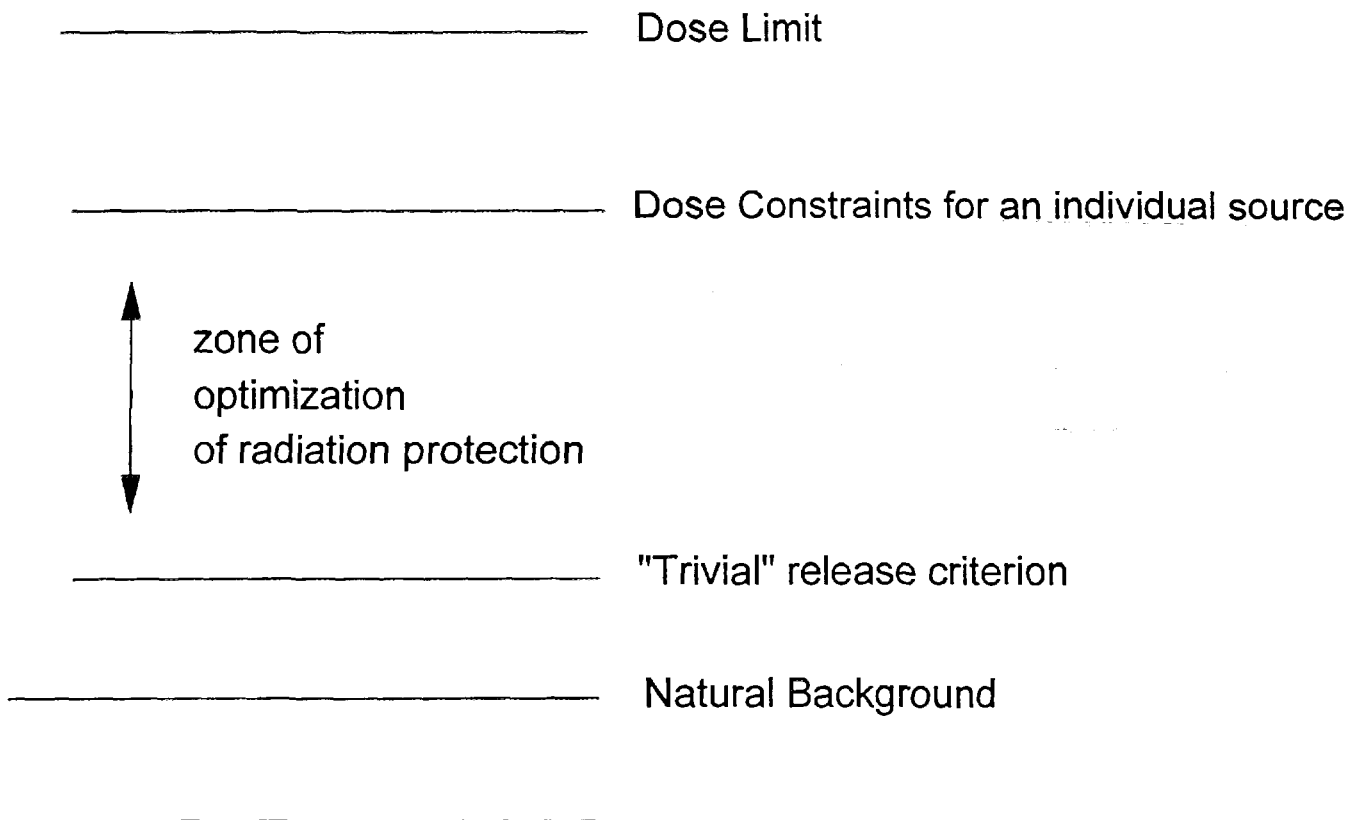
- 1981** Considerations concerning "de minimis" quantities of radioactive waste suitable for dumping at sea under a general permit (TECDOC-244).
- 1988** Exemption of Radiation Sources and Practices from Regulatory Control, Interim Report, (TECDOC-401).
- 1988** Principles for the Exemption of Radiation Sources and Practices from Regulatory Control, (jointly sponsored by IAEA and NEA) (Safety Series No. 89).
- 1992** Application of Exemption Principles to the Recycle and Reuse of Materials from Nuclear Facilities (Safety Series No. 111 P-1.1).
- 1994** International Basic Safety Standards for
1996 Protection Against Ionizing Radiation and for the Safety of Radiation Sources (Safety Series No. 115-I (1994) and 115 (1996)).
- 1995** Experience in the Application of Exemption Principles, Proc. Specialists Meeting, Nov. 1993, (TECDOC-807).
- 1996** Clearance Levels for Radionuclides in Solid Materials (TECDOC-855).



TERMINOLOGY

If "clearance" only applies to solid materials, what term should be used for "trivial" liquid and gaseous releases?

Control of Gaseous and Liquid Releases



Regulatory requirements for control of discharges

(from "Regulatory control of radioactive discharges into the environment" - draft IAEA Safety Standards report)

Authorized Discharges > 10 μ Sv/y

Formal authorization with specific conditions

Effluent and environmental monitoring

Recording of discharges

Reporting of measurements

Periodic reassessment of doses

Authorized Discharges < 10 μ Sv/y

Notification and periodic review

No monitoring requirements

TERMINOLOGY

CONTROL OF GASEOUS AND LIQUID RELEASES

"Authorized discharge"

Includes all releases up to those bounded by the dose constraint.

A special term for a release level based on triviality concepts would be useful - "automatic authorized discharge?"

**CONTROL OF EXPOSURE FROM
NATURALLY OCCURRING
RADIONUCLIDES**

Extract from BSS

EXCLUSIONS

1.4. Any exposure whose magnitude or likelihood is essentially unamenable to control through the requirements of the Standards is deemed to be excluded from the Standards².

²*Examples are exposure from ^{40}K in the body, from cosmic radiation at the surface of the earth and from unmodified concentrations of radionuclides in most raw materials.*

Extract from BSS

2. REQUIREMENTS FOR PRACTICES

APPLICATION

Practices

2.1 *The practice to which the Standards shall apply include:*

- (c) *practices involving exposure to natural sources specified by the Regulatory Authority as requiring control; and***

- (d) *any other practice specified by the Regulatory Authority***

Extract from BSS

3. REQUIREMENTS FOR INTERVENTION

APPLICATION

3.1 *The intervention situations to which the Standards apply are:*

(b) *chronic exposure situations requiring remedial action to reduce or avert chronic exposure, including:*

(ii) *natural exposure, such as exposure to radon in buildings and workplaces;*

(ii) *any other chronic exposure situation specified by the Regulatory Authority or the Intervening Organizations as warranting intervention.*

NATURAL SOURCES AND THEIR CONTROL

<u>Exposure</u>	<u>Controllable?</u>	<u>Annual Effective Dose Equivalent $\mu\text{Sv/y}$</u>	<u>Regulation Cost Beneficial?</u>	<u>Existing BSS Guidance</u>
⁴⁰ K	No	165	-	Excluded
<i>Cosmic Rays:</i>				Excluded
Global Average	No	380	-	-
La Paz	Possible	2000	No	-
Aircrew	Possible	3000 (Concorde)	No?	-
<i>Radon:</i>				
Outdoors	No	130 (Average)	No	-
Indoors	Possible	1000 (Average) ~10,000 (max.)	No Yes	- Intervention
Mineral Sands (Kerala)	Possible	6,000 (Average) 35,000 (max.)	No May be	- -
Process materials with high natural radioactivity	Possible	up to 2000 (worker) ~10 (public)	May be	-

CLEARANCE

Unconditional clearance - **release without conditions on route after release or on subsequent use.**

(Clearance levels for radionuclides in solid materials - (Interim report for comment) IAEA-TECDOC-855, (1996)).

Conditional clearance - **release with conditions on route after release and on subsequent use.**

(Application of exemption principles to the recycle and reuse of materials from nuclear facilities, IAEA Safety Series No. 111-P1.1, (1992)).

EXEMPTION/CLEARANCE LEVELS

Too restrictive?

a) Basic criteria

- **National regulatory authorities have some flexibility (BSS)**
- **but for internationally derived values probably need to stay with $10\mu\text{Sv/y}$ / 1 man Sv. (SS89 and BSS).**

b) Derived criteria

(i) unconditional clearance values (IAEA TECDOC 855)

- **too conservatively derived?**
- **not sufficiently based on real industrial situations?**

(ii) for application to metal recycle

- **conditional clearance values might be less restrictive**
- **but could they be used for transboundary movements?**

(iii) what values to use for exemption of "bulk quantities" of materials

MANAGEMENT OF VERY LOW LEVEL WASTES

WASSAC Subgroup on VLLW identified six options:

- (1) Reuse/recycle in the nuclear industry (controlled);**
- (2) Disposal in engineered facilities (controlled);**
- (3) Disposal in special VLLW disposal facilities (controlled);**
- (4) Reuse/recycle outside the nuclear industry (cleared);**
- (5) Disposal in public landfills (cleared);**
- (6) Incineration and landfill disposal of wastes (cleared)**

PUBLIC ACCEPTANCE

- In some countries**
- **opposition to clearance policies of nuclear industry**
 - **for example, landfill disposals**

What alternatives are there?

French approach of zoning:

- (i) all waste/materials from within "nuclear" zone go for controlled disposal at special sites, or recycle/reuse within the nuclear zone;**
- (ii) waste/materials from outside zone are free from restrictions.**

TRANSBOUNDARY MOVEMENTS

Mostly metals - steel, scrap - international trade

FREE MOVEMENT

Need for internationally accepted clearance levels

Unconditional clearance levels - because fate after movement between countries is not certain.

Conditional clearance levels - if it is certain that scrap is used for a specific purpose.

- bilateral agreements?

DETECTION AT BORDERS

Simple monitoring system at borders cannot demonstrate compliance with clearance criteria.

Need to combine monitoring with agreed administrative and QA arrangements.

DRAFT Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

Article 30 Reporting

.....each Contracting Party shall submit a national report.....

.....the report shall address the measures taken to implement each of the obligations of the Convention. For each Contracting Party the report shall also address its:

- (i) spent fuel management policy;***
- (ii) spent fuel management practices;***
- (iii) radioactive waste management policy;***
- (iv) radioactive waste management practices;***
- (v) criteria used to define and categorize radioactive waste.***

The term "radioactive waste" is to be defined by each Contracting Party.

Movement towards a common international definition of radioactive waste?

If so, what would be the basis?