



STATENS
STRÅLSKYDD SINSTITUT

National Institute of Radiation Protection

1988-06-26

8205/386/87

Minister Birgitta Dahl
Department of Environment
and Energy
103 33 Stockholm

Dear Mrs Dahl,

On behalf of the International Workshop on Principles for Disposal of Radioactive and other Hazardous Wastes that was convened at Wijk, Lidingö June 7-10, 1988, I have the pleasure to send you a short report from the workshop. As can be seen from the summary, the workshop recommended that action should be taken to organize international cooperation in a number of fields as well as to organize an international symposium and/or meetings of experts in fields that are of importance when aiming at harmonizing both the environmental assessment of radioactive and non-radioactive substances and the choice of disposal options.

During the week many participants expressed their gratitude that you took the initiative to this workshop and as a consequence of this thought that Sweden should take upon itself the role as a Lead Country when trying to pursue the Recommendations from the workshop.

The participants also expressed their thanks for your hospitality during their stay at Wijk, and especially your dinner for them at Rosenbad. It seems that the interest that you showed in their work, which was expressed both by the opening address given by Suzanne Frigren and in your dinner speech, was very much appreciated. This, as well as the general arrangements made the atmosphere of the meeting a very informal one which was much appreciated by all the participants.

Generally I think we can say that the workshop was a success and that the work along the lines recommended by the workshop should be continued and that Sweden should actively take the initiative in these areas.

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A copy of this letter, together with the summary from the workshop will be distributed to all the participants as well as to other people interested in this work.

Yours sincerely

Ragnar Boge

Ragnar Boge

General Chairman of the workshop.



Short Summary of

INTERNATIONAL WORKSHOP ON PRINCIPLES FOR DISPOSAL OF RADIOACTIVE AND
OTHER HAZARDOUS WASTES,

Stockholm 7-10 June 1988

The workshop was initiated by Mrs Birgitta Dahl, Minister of Environment and Energy. The task to plan and organize the workshop was given to the National Institute of Radiation Protection. Ragnar Boge has been chairman of the organizing committee as well as general chairman of the meeting.

The workshop took place at Wijk, Lidingö, Stockholm 7-10 June 1988.

Background:

The purpose of the workshop has been to discuss legal, scientific and practical aspects of disposal of low and intermediate level radioactive waste (LLW and ILW) and other types of hazardous wastes.

The National Institute of Radiation Protection suggested that focus should be on disposal of waste from energy production, but that other types of radioactive and non-radioactive wastes should be considered in order to get some perspective on the problems and their possible solutions. For radioactive wastes all disposal options for LLW and ILW should be considered.

In the non-radioactive field, especially outside energy production, there is an enormous amount of different chemical species. This introduces both the problem to identify these substances in the biosphere as well as the possibility for their chemical transformation during their way through the biosphere. This makes the task of modelling their behaviour in the biosphere as well as predicting their environmental impact very difficult.

Thus, for non-radioactive wastes the more important issue at this workshop has been:

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- to identify the criteria to be used in assessing their environmental impact from a given disposal option
- to see if the basic philosophy and approach used in radiation protection can be applied in principle even for non-radioactive wastes.

During the plenary lectures as well as in the first three working groups we discussed the principles and problems met in establishing acceptance criteria for both radioactive and non-radioactive wastes, the different disposal options that are available and how their environmental impact could be assessed. In this way people from different disciplines could discuss the subject in a meaningful way and identify areas where further research is needed.

Furthermore, for all types of waste the aim has been to try to identify important areas for future work and to discuss how these areas could be handled in international co-operation.

PARTICIPANTS

The number of participants at the workshop was 41, representing 13 countries and 5 organizations:

- IAEA
- LDC
- NKA
- OECD/NEA
- Paris Commission

The list of participants is enclosed (Annex 1)

WORKING FORM AND PROGRAM

The subjects for invited papers have been:

- Legal and international aspects of waste disposal
- Technical aspects of disposal options for both radioactive and non-radioactive wastes
- philosophy and criteria used when selecting these options

The working program is enclosed (Annex 2)

During wednesday afternoon the work was performed in three working groups:

Group III A	Institutional Framework Chairman:	J P Olivier, OECD/NEA
Group III B	Principles for disposal of Radioactive Wastes Chairman:	P Barry, Canada
Group III C	Principles for disposal of Non-Radioactive Wastes Chairman:	G Bergvall, Sweden

- 1.3 to establish commonly agreed principles and methodologies which would permit the analysis of risks, costs and benefits for various disposals practices and assist in the choice of optimized disposal systems; and
- 1.4 to promote co-ordination of research.

2 International symposium

This international workshop was considered an extremely valuable initiative, which confirmed the need for further exchange of information on all aspects related to the management of hazardous wastes. It is therefore desirable to organize a symposium and/or appropriate meetings of experts with emphasis on the following topics:

- Basic principles and policies for the management of all types of wastes, including for example prevention, recycling, reuse, treatment, storage and disposal of wastes;
- Rationalizing the scientific basis for establishing criteria and standards for these wastes, and for evaluating effects on human health and the environment, including consideration of threshold and non-threshold effects; and
- Review of methodologies and the role of modelling in safety and environmental assessments, in particular with regard to longterm effects.

Given the fact that the items proposed above cover a rather broad field, review papers and the presentation of case studies (waste characterization, treatment technologies, cost/benefit considerations) should be encouraged.

Final remarks

During the autumn the National Institute of Radiation Protection will produce proceedings from the workshop. These proceedings will be published by the Department of Environment and Energy and will include opening addresses, invited papers, reports from discussions from plenary sessions as well as working groups and the recommendations agreed upon. In Annexes will be found reports from the different working groups as well as the more interesting parts of the national presentations that served as discussion material for the different working groups. All participants will get a copy of both this short report as well as the proceedings.

The Swedish initiative to arrange this workshop was highly appreciated by those participating. It gave experts from different disciplines an opportunity to come together and discuss the possibility for a common strategy regarding the management of radioactive as well as other hazardous wastes. As can be seen, there is still a long way to go.

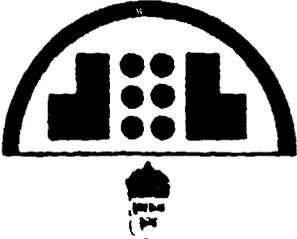
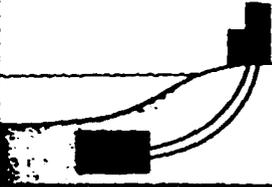
From several participants a wish was expressed that Sweden should act as a Lead Country for the proposals made in the Recommendations concerning international co-operation and the arrangement of an international symposium. The participants considered such a symposium to be an important step towards harmonizing the management of different genotoxic substances and their environmental impact.

Finally the participants expressed their great gratitude to the Ministry of Environment and Energy - and especially to Mrs Birgitta Dahl - who took the initiative to this workshop and for all the hospitality shown during the four days of the workshop.

Stockholm 1988-06-22

Ragnar Boge

Ragnar Boge

 <p>Ministry of Environment and Energy</p>	<p>International Workshop on Principles for Disposal of Radioactive and other Hazardous Wastes Stockholm June 7-10 1988</p>	 <p>NIRP National Institute of Radiation Protection</p>
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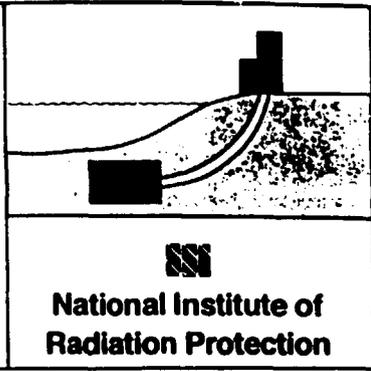
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**International Workshop
on
Principles for Disposal
of Radioactive and
other Hazardous Wastes
Stockholm June 7-10 1988**



1988-06-06

PROGRAM

(The list of session chairmen is preliminar)

Tuesday, 7 June 1988

- 11.00 -13.30 Registration
- 12.00-13.30 Lunch
- 13.30-14.00 OPENING SESSION
- 14.00-17.00 SESSION I: Legal aspects (plenary session)
Chairman: P Frigola, France

The Need for and Role of Legislation
System for Waste Disposal: J P Olivier, OECD/NEA
- 14.50 Coffee
- 15.10 An Overview of National Legislation on Waste Disposal:
B Ponsford, UK

Factors Relevant to Establish Public Acceptability
of Waste Disposal Options: T Lee, UK

General discussion on legal aspects.
- 18.00 Dinner
- 20.00-22.00 Archipelago tour

Wednesday, 8 June 1988

- 08.30-12.15 SESSION II: Principles (plenary session)
Chairman: H Hill, UK

Principles for Establishing Acceptance Criteria for
Releases of Chemicals: L Kirkeskov Jensen, Denmark.

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Principles for Environmental Assessment of
Disposal of Non-Radioactive Wastes: M Schnurer, FRG

Criteria and Principles for Environmental Assessment
of Disposal of Radioactive Wastes: M Hill, UK

General Discussion on the principles.

10.00-10.30

Coffee

Review of Established Practice for Disposal of
Radioactive Wastes: H Forsström, Sweden.

Review of Established Practice for Disposal of Non-
Radioactive Wastes: G Bergvall, Sweden.

Sea Disposal of Hazardous Wastes in Theory and Prac-
tice; Application of International Conventions:
A Fretheim, Norway.

General discussion

12.15-13.30

Lunch

13.10-17.00

SESSION III: Working groups
Working group III A: Institutional Framework
Chairman: J P Olivier, OECD/NEA

Working group III B: Principles; Radioactive Wastes.
Chairman: P Berry, Canada.

Working group III C: Principles; Non-Radioactive
Wastes.
Chairman: G Bergvall, Sweden.

18.00

Buss to Rosenbad for dinner hosted by the Minister of
Environment and Energy.

Thursday, 9 May, 1988

09.00-10.30

SESSION III: cont. (Plenary)
Chairman: B Wieland, CH.

Presentation of Results from the Working groups.
Discussion.

10.30

Coffee

10.50-12.00

SESSION IV: Risk comparison (Plenary)
Comparison of Risks from Energy Production
Systems (including Waste Disposal): F Niehaus, IAEA

Discussion

Preparation of Working groups for the afternoon
session.

Thursday cont.

12.00-13.00

Lunch

13.00-17.00

SESSION V: Working groups

Working group V A: comparison between Radioactive and Non-Radioactive Wastes.

Chairman: M Schnurer, FRG.

Working group V B: Identification of Unresolved Questions to be Dealt with.

Chairman: J Cunningham, Ireland.

Working group V C: How to proceed?

Chairman: M Nauke, LDC.

19.00

Dinner

Friday, 10 June 1988

09.00-10.30

SESSION V: cont. (Plenary)

Chairman: B Ponsford

10.30-10.50

Coffee

10.50-12.00

CLOSING SESSION

Chairman: R Boge, SSI, Sweden

Summary of the workshop: B Ponsford, UK

12.00

Closing remarks: R Boge

12.15

Lunch

RESULT OF WORKING GROUP V AComparison between Radioactive and Non-Radioactive Wastes

1. The group pointed out, that the organizer of the workshop did give no detailed explanation about the goals of such a comparison.
2. The time for discussion and exchange of informations was far too short for drawing well balanced conclusions. The group therefore was only able, to prepare a very rough, preliminary synopsis. In order to avoid wrong conclusions, such a synopsis should be worked out in more details.
3. When trying to compare two different areas like radioactive wastes and non radioactive wastes, one has to have in mind the different benefits, which are related. Radioactive wastes are the outcome of energy supply and utilization of radio-isotops in medicine, technique and research. Non-radioactive wastes are the outcome of production a large variety of goods.
4. The group ^{made} under the following intepretations to the attached synopsis:
 - 4a Tne largest differences between radioactive wastes and non-radioactive wastes are seen in the different characteristics of the wastes and in the different efforts, which have been spent to solve the associated problems (money, interest, manpower, priorities).
 - 4b Deeper discussions are necessary especially for the items 7 a, 7 b, 8 a, 8 b, 9, 10 and 11.
 - 4c Non radioactive wastes are more complex and need more efforts.
 - 4d Results from better solving the disposal of non radioactive wastes can also be utilized to the non-radioactive aspects of radioactive wastes.

WORKING GROUP V A

	<u>Remarks</u>	<u>Rad. Wastes</u>	<u>Non-rad. Wastes</u>	<u>Differences</u>
1. Quantity		little/small (kg/pa)	large (t/pa)	$\approx 10^3$
2. No categories	Nuclides/ Chem species	80	n. thousand "	$\approx 10^3$
2. Sites of generation	Origin	NPR + Fuel cycle, hospital Rad. Isotopes utilization (limited + licenses) F 500	every where, special waste at special facilities	large (very)
3. Intermediate site	storage reprocessing condition	▲ t up to 60 a few	hours decades large	
4. Sites of disposal	destination (U-mining tailings)	1-very few	many/very many old	10^2-10^3
5. Involved parties		few, supervision centralized	many, decentralized	10^2
6a Categories of exposure		1 equivalent action → dose	very many	large
6b Effects on man	measures + food chain	damage to cells	very many	
7a Effects on the environment		not known in detail, probably small	disturbance of ecosystems	
7b Impact evaluation			long term disturbances	
8. Techniques for the waste		activity mostly easy	technology available, but lack of standardized procedures for compounds difficult	
9. Measurement in the environment		smaller than derived limit	similar, only where derived limits are available change of species during transfer to environment	
10. Degree of characterization	need for identification by producer	high	low	
11. National standards (background)		precisely known (mrem/a)	partly available for essential elements and species, not for xenobiotics	
12. Lifetime decay		for isotope known	∞ for some; present but not well known for organics	

	<u>Remarks</u>	<u>Rad. wastes</u>	<u>Non-Rad. wastes</u>	<u>Differences</u>
13. reactions within landfill		transfer depends on chemical form, decay products known	complex reaction-products	
14. dose limits	a) protection of individual man b) protection of eco-system	} →	" similar in principal (may be different praxise)	
15. How to control	generation transport treatment disposal standardization		easy, high efficiency due to detailed regulation	very difficult high escape rate
16. Potential for avoid/ recycle		small	large, increasing, up to 10-20 % incl. energy recycling	
17. Possibility to change improve		rather small	high	
18. Need for development	disposal technique expanditive/money			
19. Manpower money (per kg)		large	small	$10^3/t$

SUMMARY OF WORKING GROUP V B DISCUSSIONS"UNRESOLVED QUESTIONS"

WG VB discussed quite a number of topics, some related, others not related, with a view to identifying unresolved questions associated with the management of radioactive and other hazardous wastes. It became rapidly apparent that solutions would require not only scientific contributions but also decisions at senior administrative levels. The topics addressed below are not exhaustive and are not presented in any order of priority.

Question No 1

The working group recognized that the population (collective) dose commitment for radioactive and non-radioactive wastes may be used for optimization purposes but is not suitable for assessing the detriment arising from a particular practice. Questions remain unanswered regarding the methodology for assessing detriment or if it has a meaningful application. The question of truncation of dose in time and space also remains unresolved.

Question No 2

The working group noted that some uncertainty exists in the definition of who and what should be protected from hazards associated with hazardous wastes. The group ~~do~~ ^{to} be protected should be clearly defined and it should be noted that this may not necessarily be confined to man but may be some component of the environment.

Question No 3

No consensus has been reached on acceptable risk levels as a basis for environmental quality standards.

Question No 4

CONSIDERATION

There is an absence of the use of modelling techniques in assessing the potential hazards arising from the operation and closure of waste storage ~~or~~ disposal facilities in the non-radioactive area. This would include ~~construction~~ of a wide range of possible consequences ranging from subsidence. ~~to~~ exposure of the public through the consumption of contaminated foodstuffs

The group concluded that there is an absence of long term commitment and liability with regard to these facilities. In many cases there is no identification of responsibilities ~~or~~ financial liability in the long term. An important question which should be

is of what extent should central government be responsible for these issues.

Question No 5

A defined base is required for the establishment of limits for non-radioactive wastes. In the case of radioactive wastes the effects of acute doses of radiation have been extrapolated to low doses to determine in association with animal and epidemiological studies to determine risk factors.

The group was uncertain how uniformly methods are applied in different countries to determine the risk levels associated with non-radioactive pollutants. It questioned the comparability of the risk estimates used in radiation protection with those developed for non-radioactive wastes from limited animal studies.

Question No 6

Clarification is required to ensure that safety standards are not unjustifiably restrictive.

Question No 7

The working group noted that there are unresolved difficulties in the public acceptance of waste storage and disposal facilities. Further attention should be given identifying the relevant factors and the question of how much weight should be given to public perception in determining waste management policies, sites and controls.

Question No 8

There is a need to compare the existing different classification schemes and their associated data bases and to examine to what extent these should be harmonized.

Question No 9

The group draw attention that for certain types of pollutant releases, multiple sources make it difficult to apply ambient quality standards on a rational basis.

Question No 10

The development of a cohesive system is hindered by the existence of different types of standards such as quality standards, emission standards, various ranges of restrictions etc. Two related questions remain unanswered:

- how feasible are common standards for non-radioactive pollutants
- To what extent should the "precautionary approach" be adopted.

June 9 1988