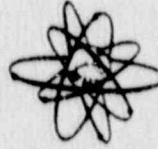


OCDE

ORGANISATION DE COOPÉRATION ET  
DE DÉVELOPPEMENT ÉCONOMIQUES



To: S. Caplan  
OECD

ORGANISATION FOR ECONOMIC  
CO-OPERATION AND DEVELOPMENT

AGENCE POUR L'ÉNERGIE NUCLÉAIRE/NUCLEAR ENERGY AGENCY

RÉFÉRENCE

38, boulevard Suchet  
75016 PARIS  
Tél. 45 24 82 00

EN/S/2333

Paris, 28th November 1990

To: All members of the NEA Performance Assessment Advisory Group (PAAG)

Dear Colleague,

Re: NEA Working Group on the Assessment of Future Human Actions  
at Radioactive Waste Disposal Sites.

At its meeting in October PAAG agreed to set up a "working group on human intrusion". As a first action I have drafted the enclosed terms of reference for your comments. I would also like to receive nominations for experts to serve on the group. May I please ask you to coordinate with other PAAG-members in your country concerning these nominations. Please note also that we would like to keep the group small and that participants (at most two per country) should be ready to take active part in the work.

We are tentatively planning to hold the first meeting of the group on 3-5 April in Paris. In order to prepare the agenda for this first meeting I need, in addition to your general comments on the terms of reference, your proposals for presentations or highlights of work and ideas that you feel should be brought to the attention of the group or discussed by it. A response form is attached to this letter for your convenience. I should need your answer before 20th January 1991.

Thank you for your co-operation on this matter.

Claes Thegerström  
Division of Radiation Protection  
and Waste Management

encl. response form  
NEA/PAAG/DOC (90) 7

cc: national delegation to the OECD

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TELEGRAMMES NUCLAGENCE PARIS/TELEX 630668/TELEFAX (33-1) 45 24 96 24

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Form to be sent to: Claes Thegerström OECD/NEA  
38 boulevard Suchet  
75016 Paris, France

before 20th January 1991

NEA Working Group on the Assessment of Future Human Actions at  
Radioactive Waste Disposal Sites

Form filled in by:

Name: .....

Organisation: .....

Address: .....

Tel: .....

Fax: .....

1. I have the following comments on the draft terms of reference:

2. My country can/cannot contribute to the work of the working group:

3. The following expert(s) is(are) proposed as member(s) of working group:

Name: .....

Organisation: .....

Address: .....

Tel: .....

Fax: .....

3. I suggest the following items or aspects be presented and/or discussed at the first meeting of the Working Group:

4. Any other comment:



RADIOACTIVE WASTE MANAGEMENT COMMITTEE

Performance Assessment Advisory Group (PAAG)

DRAFT TERMS OF REFERENCE FOR AN NEA WORKING GROUP  
ON THE ASSESSMENT OF FUTURE HUMAN ACTIONS  
AT RADIOACTIVE WASTE DISPOSAL SITES

INTRODUCTION

In the evaluation of the long-term safety of radioactive waste repositories one concern is future human actions at the disposal site. Questions being considered are:

- what types of future human actions might be undertaken?
- how likely are they and how might they influence the disposal system?
- what might be the consequences in terms of release of radionuclides to the environment and exposure to future human beings?
- what can be done by the generation that selects the site and builds the repository to minimize the probability for human actions that could initiate or enhance releases and what can be done to mitigate the consequences should such actions take place.

In June 1989 NEA organised the first international workshop on "Risks Associated with Human Intrusion at Radioactive Waste Disposal Sites". The objectives of the workshop were:

- i/ to review general approaches to assessing human action aspects of the safety of radioactive waste repositories and,
- ii/ to discuss regulatory aspects, scenario definitions, consequence assessments and probability estimates.

20 papers were presented at the workshop and the proceedings were published late 1989 (1). Based on the discussions an overview presentation concerning human intrusion issues was given at the Safety Assessment Symposium in Paris October 1989 (2).

The results of the workshop have been discussed within PAAG at its recent meetings. Some aspects of human intrusion were also discussed at the workshop on "Radiation Protection and Safety Criteria for the Disposal of High-level Radioactive Waste" held in Paris 7th-9th November 1990.

Recommendations from the intrusion workshop, discussions within PAAG and the Safety Criteria Workshop, for further actions by NEA in this area include:

- development of a rationale/philosophical framework for how to approach and present assessments of human intrusion.
- promotion/organisation of further exchange of information and documentation at an international level, for instance by creation of a forum for a systematic and detailed comparison of models and data used in human intrusion assessments.
- methods for conservation/retrieval of information at an international level about nuclear waste repositories.
- discussions about "very low probability but high-consequence" scenarios of human intrusion.

Due to the interest of many member countries for further international work on issues like those mentioned above, it has been decided by the RWMC, on proposal by PAAG, to set up an NEA working group on the "Assessment of Future Human Actions at Radioactive Waste Disposal Sites". This document presents the scope and objective for the work of the group.

#### SCOPE

The scope of the work embrace issues related to potential future human actions at radioactive waste disposal sites for near-surface as well as deep disposal. That includes safety assessments aspects as well as practical or administrative measures to lower the probability of disruptive human actions and to mitigate the consequences in case such actions would occur.

#### OBJECTIVE

The objective of the working group would be to provide an international forum for information exchange and discussion of approaches and work on assessment of potential human actions at disposal sites. The aim is to promote consistency in approaches and methods being used. In meeting this objective the group would:

Review what has been done in member countries and internationally.

Exchange information and experiences on approaches and results in this area.

Identify issues that need special attention and discussion at an international level.



Discuss these issues in depth.

Consider if some general guidelines on a set of suitable generic approaches and methods could be formulated and agreed upon.

Prepare a report reflecting the discussions and conclusions of the working group.

The working group will deal with several topical issues mentioned below through information exchange and discussions. It seems, however, that the potentially most useful contribution that could be made at the international level through NEA would be to reach some common ground concerning the general philosophy regarding reasonable approaches to the issue of future human actions at disposal sites. It might also be useful to start discussions concerning the needs and possibilities for keeping information at an international level about waste repositories. The possible implementation of any system of that kind would need active involvement by IAEA.

Radioactive waste disposal sites are just a small part of existing or planned sites for disposal of hazardous waste in general. Therefore, although the work proposed here focusses on radioactive waste disposal, it should be done in awareness of this broader perspective. In particular an attempt should be made to clarify the philosophies and approaches in use, if any, concerning human actions at existing or planned hazardous waste sites.

#### TOPICAL ISSUES

The main issue for discussion will be:

##### 1. Philosophical framework and general approaches to the problem of future human actions.

Any attempt to predict effects of future human activities on a radioactive waste repository will be subjective in nature because man himself is involved. Explicit or implicit assumptions on future human beings' way of life, level of technology and social organisation, ability to keep and understand information etc. will form a basis for the scenarios selected and the models and data used for consequence and risk calculations. Thus before even entering into the details of safety assessment, it might be fruitful to try to provide some systematic way of thinking about human intrusion that can serve as a rationale for how to approach assessment of this issue. Questions that could be discussed include: Are safety assessments of future human actions meaningful? How comprehensive and detailed should they be? What are reasonable assumptions about future society? Can intentional intrusion be disregarded in the safety evaluations? What approaches and criteria should be applied to low-probability/high consequence scenarios of human intrusion?

Discussions of these questions should clarify if it is possible to derive a set of generic approaches and conclusions which would constitute a kind of consensus or reference basis at international level to be used later in national assessments.

Other topical issues for discussion are:

**2. Methods for safety assessments of potential future human actions at disposal sites.**

There are many questions that may need discussion concerning assessment approaches, models, data and methods for consequence calculations. They will be directly related to the type of repository studied and the techniques being used for the consequence calculations. Three types of consequences may need to be considered:

- alteration to undisturbed geosphere behaviour or to the engineered barriers;
- consequences to intruders directly contacting extracted material;
- consequences due to wider dispersion of extracted material.

A particularly difficult issue is the estimation of probabilities for future human actions. Approaches to integration of models for human actions into probabilistic system assessments are discussed in some countries.

**3. Administrative and practical measures in the planning, siting, design and construction of waste repositories motivated by consideration concerning potential future human actions.**

Examples of planning measures to lower the probability of human actions that could disturb the disposal system are:

- the provision of institutional control. This is an obvious measure that in principle should continue as long as the waste represents a potential danger, but that, in practice cannot be relied upon beyond a period of maximum a few centuries. Associated with this point is the question of conservation of information about the waste and the disposal system. Part of this could be the establishment of an international data file for waste repositories.
- physical means at the site itself to record its use as a repository.

Examples of technical measures to mitigate intrusion risks are:

- criteria for waste forms and activity concentrations. Low solubility, low tendency to form dust if exposed in open air, a strong canister providing shielding, etc., are qualities of waste packages that would contribute to lower the consequences of a direct intrusion should it occur;



- intrusion barriers, i.e. a thick concrete cover above disposed waste, are sometimes being used, or considered, to lower the probability of inadvertent direct intrusion;
- the detailed design of a repository in general and its location (above water-table, below water-table, at greater depth, etc.) could sometimes be adopted to lower intrusion risks to an acceptable level.

#### MEMBERSHIP OF THE WORKING GROUP

Participation in the working group is open to NEA countries having an interest in the subject and an ongoing programme in this field. To limit the size of the group there should only be one (maximum 2) regular members of the group from each country. Members of the group must be well aware of what is being done in their country in this area and should be ready to take active part in the work of the group. Depending upon the topics to be discussed at each meeting, the group members could arrange for additional contributions.

#### TIME TABLE AND WORK PLAN

It is planned that the group would be active over a period of 2-3 years, (i.e. 1991-93) holding 1-2 meetings each year. The first meeting will be held in spring 1991. In preparation for that meeting the secretariat will consider all comments and proposals received through the review by PAAG-members of this document and prepare an agenda that allows a discussion of all items of relevance for the work of the group. Subsequent meetings might then focus on subjects selected as of particular interest during the first meeting. A plan for the drafting of the final report should also be set out at the first meeting.

#### REFERENCES

1. Risks Associated with Human Intrusion at Radioactive Waste Disposal sites. Proceedings of an NEA Workshop. OECD/NEA Paris 1989.
2. Grimwood, Thegerström Assessment of the Risks Associated with Human Intrusion at Radioactive Waste Disposal Sites - Some Observations from an NEA Workshop. Paper published in "Safety Assessment of Radioactive Waste Repositories" Proceedings of an NEA/IAEA/CEC Symposium, OECD Paris 1990.