

RADIOACTIVE WASTE MANAGEMENT COMMITTEE

PERFORMANCE ASSESSMENT ADVISORY GROUP

CO-ORDINATING GROUP ON SITE EVALUATION AND DESIGN
OF EXPERIMENTS FOR RADIOACTIVE WASTE DISPOSAL

NEA WORKSHOP ON
GAS GENERATION AND RELEASE
FROM RADIOACTIVE WASTE REPOSITORIES

Aix-en-Provence, France
23rd-26th September 1991

GENERAL INFORMATION NOTE

Organized by the
OECD NUCLEAR ENERGY AGENCY

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PDR WASTE
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NEA WORKSHOP ON GAS GENERATION AND RELEASE FROM RADIOACTIVE WASTE REPOSITORIES

I. BACKGROUND

There is broad agreement that gas will be generated in radioactive waste repositories owing to corrosion of steel, microbial degradation of organic materials, and, to a lesser extent, radiolytic decomposition of water and organic materials. The resulting gas pressures should be considered in the design requirements for the engineered barriers as well as in the performance calculations since they provide a driving force for gas transport in the host rock, and excessive gas pressure may facilitate a potential radionuclide release to the biosphere.

The potential importance of gas generation in repositories was first noted in a NEA workshop (1987) on "Near-field assessment of repositories for the low and medium level radioactive waste". Increasing attention has been given since then to studies on the amount and rates of gas generation and the influence of gas pressure build-up and transport in and around the repository. The extent to which gas generation and gas release have to be taken into account in the planning, design and safety assessment of radioactive waste repositories has to be further specified.

Many theoretical as well as experimental investigations have been performed for the potential of gas generation and pressure build-up over long periods. In some cases, these studies have influenced the detailed design of repositories. Thusly, both PAAG and SEDE at their recent meetings during Autumn 1990 recommended that the new work and results in this area merit a workshop.

As a preparatory step, the NEA Secretariat sent a questionnaire to PAAG and SEDE Co-ordinating Group in November 1990 to explore informally the potential contributions that could be made from different countries. Many PAAG and SEDE members responded to this questionnaire, indicating a strong interest and demonstrating the existence of a large number of ongoing studies.

II. OBJECTIVES AND SCOPE

The objectives of the workshop are to give Member countries an opportunity to exchange recent information, to assess at international level the significance of gas generation and release from radioactive waste repositories, and to identify future needs in this area.

The workshop will focus on the problems associated with the generation, release and transport of gases in the different types of waste and host rock of radioactive waste repositories. It will encompass modelling and experiments on the relevant gas sources

and generation processes, the transport of gases in repositories, diffusion and migration in the near field and far field, two phase flow, etc. Theoretical studies with experimental observations for practical implications such as waste form and repository designs in both shallow land and deep underground repositories in varying geological media will also be discussed.

III. PARTICIPATION

Participants in the workshop should be specialists in the subject areas defined by the scope of the workshop, should be actively involved in relevant theoretical or experimental research activities, and should be qualified to contribute actively to the discussions. Nominations of participants should be submitted - using the attached form - through national representatives to the PAAG and/or the SEDE Co-ordinating Group, so as to be received by the NEA Secretariat by 10th July 1991. Participation forms submitted should be commensurate with a total participation at the Workshop of about 50 scientists, in order to maintain an optimal environment for the discussions. PAAG and SEDE members from the same country are therefore asked to co-ordinate their nomination.

IV. CONTRIBUTIONS TO THE WORKSHOP

A limited number of contributed proposals which are relevant to the topics of the workshop have been reviewed by the Programme Committee, and final selection needs to be supported by an abstract (1 page) to be sent to the NEA by 15th April 1991 at the latest. Abstracts should be submitted to the NEA via the appropriate national delegate to the PAAG and/or the SEDE Co-ordinating Group. Authors who submitted their proposals in December 1990 will have to re-send their abstract(s) and should indicate which session is most relevant to their proposed contributed paper.

After papers for presentation at the Workshop (approximately 20) have been selected by the Programme Committee, all authors of selected papers will be sent a package of information by the NEA Secretariat on preparing and presenting papers, including details on format, length, etc. Authors will be required to send to the NEA in advance of the meeting (by 15th July 1991) a camera-ready copy of their paper, plus bring 60 copies of their paper to the Workshop for distribution to participants.

V. STRUCTURE OF THE WORKSHOP

The workshop will be composed of five sessions and additional informal mini-workshops for detailed discussion of selected topics.

The Opening Session (Session I) will include two invited papers, which will cover the overall aspects of gas generation and gas release in low/medium level waste repositories and in high level waste repositories, respectively. The following three technical sessions (Session II, III and IV) may be divided into subsessions on A) Modelling Aspects and B) Experimental Aspects, depending on the nature of the contributed papers. In this case each subsession will be opened by an invited keynote paper, which will give an overview of the particular subject, followed by a set of contributed technical papers and discussion. The time allotted for presentation of contributed papers will be restricted to 20 minutes, with 5-10 minutes provided for questions or clarifications. Additional discussion time will be provided at the end of each session for further discussion of general issues raised by the papers and formulation of issues to be discussed in the concluding session. A panel consisting of the keynote speakers will be asked to present these issues in the concluding Session V, where ample time will be provided for discussion of the issues raised, formulation of the general conclusions, and identification of future research and investigation priorities.

The provisional programme of the Workshop has been suggested as follows:

Monday 23rd September 1991 to Wednesday 25th September 1991

INTRODUCTION

SESSION I - OPENING SESSION

General overview and perspective on gas generation and release from radioactive waste repositories. It includes two invited papers covering the LLW/MLW and HLW, plus one paper on WIPP.

SESSION II - GAS GENERATION

Session II is devoted to work on the mechanisms, rates and supporting experiments of gas generation in radioactive waste repositories.

SESSION III - NEAR-FIELD EFFECTS OF GAS RELEASE

Session III is devoted to near-field phenomena, and recent advances made to improve understanding of the role of gas on physico-chemical environments which

determining the migration behavior of radionuclides, evaluation of degradation of the physical integrity, etc.

SESSION IV - FAR-FIELD EFFECTS OF GAS MIGRATION

Session IV is devoted to migration of gases in the geosphere, such as studies on conductivities and diffusivities in the host rocks.

SESSION V - DISCUSSION, REMARKS AND FINAL CONCLUSION

Session V is a panel discussion with contributions from the participants. This session is devoted to the Summary and Conclusions of the Workshop, and will deal with state of knowledge, new observations, remaining questions, and suggestions for priorities in future work.

Thursday 26th September 1991

ADDITIONAL "MINI-WORKSHOPS" FOR DETAILED INFORMAL TECHNICAL DISCUSSIONS OF SELECTED AREAS

The responses obtained from PAAG and SEDE have provided a clear indication that there is a significant amount of detailed experimental and modelling work undertaken in several countries. All of this work cannot be presented and discussed during the regular sessions of the workshop, which should provide a concise and succinct overview of the most important aspects of gas generation and release issues and allow their thorough discussion. Therefore, the Programme Committee suggested that it may be useful to provide an opportunity, directly after the workshop, for scientists within the different main areas of research to discuss in detail their technologies for experimental work and modelling. It is foreseen to organize a few parallel informal workshops on selected topics based on the response to this information note and the number of paper abstracts submitted. Each of these mini-workshops will provide a short summary of deliberations and conclusions to be considered in the follow-on work and reporting from the workshop.

VI. SECRETARIAT

All correspondence and questions concerning the programme, submission of papers, or participation should be addressed to the Workshop Secretariat:

Dr. Hong L. Chang
Division of Radiation Protection and Waste Management
OECD Nuclear Energy Agency
38, boulevard Suchet
F-75016 Paris
France

Tel: 33 (1) 45 24 96 25

Telex: 630668

Fax: 33 (1) 45 24 96 24

VIII. REPORT OF THE WORKSHOP

A report of the Workshop, its conclusions and recommendations will be presented to the NEA Performance Assessment Advisory Group (PAAG), the NEA Co-ordinating Group on Site Evaluation and Design of Experiments for Radioactive Waste Disposal (SEDE) and the Radioactive Waste Management Committee (RWMC) following the Workshop. Proceedings of the Workshop will be published by the NEA.

IX. ORGANISATION

The workshop is being organized by the OECD Nuclear Energy Agency, and has been planned by a Programme Committee consisting of F. Besnus (CEA/IPSN, France), G. Ouzounian (CEA/ANDRA, France), J. Mönig (GSF, Germany), A. Wohanka (BSF, Germany), S. Vomvoris (NAGRA, Switzerland), P. Sumner (AEA/Harwell, U.K.), H.L. Chang, D. Galson and C. Thegerström (NEA, Paris).

X. WORKING LANGUAGES

The working languages of the Workshop will be English and French.

XI. LOCAL ARRANGEMENTS

The Workshop will be held in Aix-en-Provence France. Participants should note that they will be responsible for making their own travel and accommodation arrangements. Information on accommodation in Aix-en-Provence will be provided later to the participants.

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For transmission by
PAAG and SEDE Co-ordinating Group Members to:

Hong L. Chang
Radiation Protection and Waste Management Division
OECD Nuclear Energy Agency
38, boulevard Suchet
F-75016 Paris, France

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Fax: 33 (1) 45 24 96 24

before 10th July 1991

PARTICIPATION FORM

Family Name:

First Name:

Nationality:

Title:

Institution/Organization:

Address:

Telephone: Telex: Telefax:

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This form, together with a paper summary (max. 400 words in English or French) should be sent, no later than 15th April 1991 to: Hong L. Chang, Division of Radiation Protection and Waste Management, OECD Nuclear Energy Agency, 38, boulevard Suchet, 75016 Paris, France. Authors will be notified individually in June 1991 as to whether or not their paper(s) have been accepted for oral presentation at the workshop.

FORM FOR SUBMISSION OF A PAPER

TITLE of the paper:		
Desired Session:		
Language in which the paper will be written: English French		
AUTHOR(S) Initial(s) and Family Name(s)	Scientific establishment(s) in which the work has been carried out	Town/Country
1.		
2.		
3.		
4.		
5.		
AUTHOR who will present the paper:		Mailing address:
Mr./Ms.		
Initial(s)		
Family name:		
For urgent communication please indicate:		
Teletex No.:	Telex No.:	Cable address: