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NUCLEAR ENERGY AGENCY
RADIOACTIVE WASTE MANAGEMENT COMMITTEE

NEA/RWM/IGSC(2003)3
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Integration Group for the Safety Case (IGSC)

AMIGO "Approaches and Methods for Integrating Geologic Information in the Safety Case"

Workshop on:
BUILDING CONFIDENCE USING MULTIPLE LINES OF EVIDENCE

Yverdon-les-Bains, Switzerland
3-5 June 2003

FINAL PROGRAMME

JT00144852

English - Or. English

AMIGO
"Approaches and Methods for Integrating Geologic Information in the Safety Case"

First Workshop on

BUILDING CONFIDENCE USING MULTIPLE LINES OF EVIDENCE

YVERDON-LES-BAINS, SWITZERLAND
3-5 JUNE 2003

A workshop organised by
the OECD Nuclear Energy Agency

and hosted by
NAGRA, HSK and University of Bern

FINAL PROGRAMME

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1. RATIONALE AND BACKGROUND OF AMIGO

The IGSC (Integration Group for the Safety Case) approved the development of AMIGO: the OECD/NEA International Project on "Approaches and Methods for Integrating Geologic Information in the Safety Case". The new project is supervised by the IGSC Core Group, and implemented with the help of a small group of experts (the Steering Group, SG[1]) assisted by the NEA Secretariat. AMIGO will be devoted to the exchange of information and in-depth discussions on the collection and integration of all types of geologic information (e.g., geophysical, hydrogeological, geochemical, structural) in repository siting and design, PA models, and the overall Safety Case. This will include: consideration of how all types of field information contribute to a description (or conceptualisation) of the geosphere, geologic investigations supporting site selection and repository design, iteration between data collection and modelling, traceability of field information in a Safety Case, use of multiple lines of geological evidence within a Safety Case, and the development and application of alternative conceptualisations (or conceptual models). AMIGO is structured as a series of forum-like workshops. A proceedings and synthesis will be prepared for each workshop. The workshop topics and sequence are fully integrated within the current programme of work of the IGSC.

Through discussion of case studies, lesson learnt and on-going international geoscience work programs, AMIGO will explore and highlight techniques to strengthen the communication and understanding of geosphere performance in the Safety Case.

It is proposed that a focus for AMIGO be the integration of geologic information within and between Site Characterisation and Safety Assessment. This is to be achieved through a series of bi-annual topical workshops involving Site Characterisation and Safety Assessment practitioners with experience in both sedimentary and crystalline rock settings. The proposed workshops are structured to examine various elements of the iterative site-characterisation process and need for co-ordination with Safety Assessment. This includes the role of geologic data collection methods, alternative and complementary interpretative methods, conceptual geosphere model development, building confidence in numerical system analyses through reasoned geological arguments, and the presentation of the geosphere Safety Case to broad audiences.

Within this scope, the objectives of AMIGO are six-fold.

- To understand the state-of-the-art and identify means to improve geosphere support of the repository Safety Case;
- To contribute to the development of methods for geosphere representation in the repository Safety Case;
- To define terminology for communication and interaction between site characterisation and safety assessment groups in support of the repository Safety Case;

1. During its 2001 annual session, the IGSC nominated the following Steering Group: Klaus-Jürgen Röhlig (GRS Köln, chair), Johan Andersson (Streamflow AB), Rick Beauheim (SNL), Gérard Bruno (IRSN), Andreas Gautschi (NAGRA), Mark Jensen (OPG), Patrick Lebon (ANDRA), Sylvie Voinis (NEA).

- To clarify the role and application of geoscientific information and evidence applied in the repository Safety Case;
- To clarify the relationship and information requirements for site characterisation and safety assessment modelling; and
- To foster information exchange between international radioactive waste management geoscience programs, as well as, between academic, regulatory, and implementing bodies.

Each workshop organised through a Scientific Programme Committee (SPC) will focus on the following main topics:

- Role of the geosphere and its representation in the safety concept and Safety Case
- Capabilities of Site Characterisation vs. needs of Safety Case and PA/modelling
- Procedures for integrating and taking into account all kinds of available information

The sections hereafter present the aim, the operational structure, the practicalities and the agenda of the 1st AMIGO Workshop.

2. THE ROLE OF CONCEPTUAL MODELS IN THE SAFETY CASE

The Safety Case for a geologic waste repository is intent on conveying reasoned and complementary arguments to illustrate and instil confidence in estimates of long-term performance. The long-term safety inherent in the geologic repository concept relies, in part, on the long-term stability of the surrounding/overlying geosphere and multiple barriers purposely selected or designed to immobilise radionuclides or retard their migration. These barriers include the waste form, the waste container, engineered sealing systems and the geosphere. With respect to the geosphere, an important element in the Safety Case is the derivation of a conceptual site model. The conceptual model(s) represents the integration of site-specific multi-disciplinary data into an internally consistent understanding or realisation of the geologic setting and its evolution. Ultimately, the conceptual model provides the scientific basis to communicate confidence and understanding in long-term geosphere performance and stability. The conceptual model also serves as a technical basis to rationalise Safety Assessment analyses and develop complementary geologic arguments that support the repository Safety Case.

The development of a conceptual geosphere model(s) provides a structured framework in which confidence in geosphere understanding is gained. The model is developed through an iterative process, in which geologic, structural, hydrogeologic, hydrogeochemical, paleohydrogeologic, geophysical and geomechanical data from successive and increasingly more detailed site-specific investigations are combined to test and, if required, revise the model. The model serves a number of purposes including: i) the development of hypotheses that aid co-ordination and planning of site-characterisation activities to strengthen the understanding of geosphere evolution; ii) a systematic method to identify and articulate alternative geologic arguments supporting long-term geosphere stability and flow system dynamics; and iii) the development of a transparent and logical scientific basis to substantiate and underpin Site Characterisation and Safety Assessment flow and mass transport modelling.

Various strategies may be invoked in conceptual model development that may not explicitly contribute to numerical model development but yet provide an important basis to constrain estimates of geosphere performance materially strengthening the repository safety case. In this context, the conceptual model may address gradual vs. episodic changes in flow system characteristics through combined studies of hydrogeochemical systematics, fracture network rejuvenation/propagation, and paleohydrogeology consistent with Pleistocene geologic and climate history. Another example would be the application of geostatistics to explore and visualise 3-dimensional spatial variability of fracture network geometries and physical and chemical property distributions and uncertainty, which influence interpretation of flow system evolution. In this capacity, communication between Site Characterisation and Safety Assessment groups is essential to ensure the utility of information presented in the conceptual geosphere model and the communication of an effective Safety Case.

The characterisation of a potential repository site is generally recognised as a complex undertaking. In this regard, a key challenge for site characterisation is the co-ordinated collection, interpretation, analysis and integration of geologic data to constrain conceptual model uncertainty. Given this uncertainty, corroborating geologic evidence, in addition to that supporting Safety Assessment analysis, should be brought forward as part of the repository Safety Case to bound predictions of long-term geosphere performance.

3. AIM OF THE WORKSHOP

The general structure of the 1st workshop is a prototype of the AMIGO workshop series, taking into account the general AMIGO topic of "integrating geologic information in the safety case", but focusing on "**building confidence using multiple lines of evidence"**.

The first day will be devoted to the presentation of the results of a recently finalised project (Safety Case and supporting geoscientific evidence) on the disposal of spent fuel, high-level vitrified waste, and long-lived intermediate-level waste in the Opalinus Clay formation of northeastern Switzerland. The presentation will focus on the general workshop topic. Three key reports of Nagra, a safety report (presenting the safety case), a geosynthesis report and a report on repository layout, construction and operation are available. The safety report will be available in English immediately; a translation of the geosynthesis report is scheduled at a later stage.

The presentation of the host organisation is followed by a series of invited papers, oral contributions and a poster session presenting examples from other safety cases or from ongoing efforts in performance assessment. Three key aspects (sessions 1 to 3) of the Safety Case have been identified in order to focus the content of the presentations.

Working Group Sessions will start late on the 2nd day.

There will be a possibility to visit the Mont Terri Underground Research Laboratory in Opalinus Clay in the Folded Jura of northwestern Switzerland on the 4th day.

4. TECHNICAL TOPICS FOR WORKING GROUPS

Three topics are to be addressed in working groups:

- Role(s) of the geosphere in the Safety Case
- Multiple lines of evidence involved in Safety Case arguments
- Practical guidelines for managing the interaction between different teams in order to build a Safety Case

Workshop registrants will be given their choice of working group topics, and the most popular topic(s) may be assigned to parallel working groups to keep the size of each working group manageable.

One SG member will be assigned to each working group to act as a rapporteur and assist the working group chairman in preparation of the summary of the discussions.

5. OPERATIONAL STRUCTURE

5.1 Workshop structure

The workshop will be organised into four plenary sessions, plus working group discussions and a poster session:

- The first plenary session will be a presentation of the Opalinus Clay Safety Case by the workshop hosts (Nagra, HSK, and the University of Bern).
- The second plenary session will consist of three keynote presentations providing examples of data integration outside the field of radioactive waste.
- The third plenary session will consist of presentations from those national programmes that are sufficiently advanced to have developed a comprehensive Safety Case. (Countries whose disposal programmes are at an earlier stage might wish to contribute a poster focusing on some specific aspects of data integration.
- The fourth plenary session will consist of the working group summaries and final discussion.

Workshop participants are invited to present posters focusing on specific examples of integration of different types of data and new technical advances. Those national programmes not giving oral presentations are especially encouraged to present posters. Poster dimensions will be specified at a later date by the host organisations. The presenters will be given one minute each to introduce their posters just before lunch on the second day of the workshop.

5.2 Participation

The workshop organisers (namely the SPC and the host organisations) will invite experts, speakers, and chairpersons for plenary and Working Group sessions from the participating organisations as well as from other IGSC organisations and from the scientific community. In order to ensure a workable size, no more than 80 participants per workshop will be allowed.

5.3 Preliminary work before the workshop

Extended abstracts will be required for all presentations and posters. The extended abstracts should be approximately four pages in length (including references and figures). Longer abstracts will be accepted, but it should be clear that four pages are adequate to meet the requirements of the workshop.

The extended abstracts will be submitted to the NEA. The NEA will distribute the extended abstracts of presentations among the SPC members so that each one is reviewed by three SPC members. The reviewers will provide feedback if necessary to the authors on the adequacy of their consideration of the questions they are to address. The extended abstracts for the posters will not be reviewed. Following the submission of revised abstracts, the NEA will prepare a compendium of the abstracts for distribution at least two weeks in advance of the workshop.

5.4 Proceedings

The OECD will publish proceedings of the Workshop. The reporting format as given below is to be understood as an approach to be tested at the first workshop. It might be subject to change for later workshops.

The SG and the Host Organisation will agree about an appropriate format to publish the results of the case presentation by the Host Organisation. Ideally, the Host Organisations will provide the workshop participants with a written version of the case presentation prior to the workshop. This might be either an unpublished draft or a formal report. The discussion about the case presentation will be summarised by the rapporteur of the session. The session chairperson and the SPC representative of the Host Organisation will review this summary within two months after the workshop.

Speakers and authors of posters are asked to provide extended abstracts (four pages including figures and references) of their presentations prior to the workshop (electronic versions). The abstracts will be distributed as an “NEA General Distribution Report” at least two weeks prior to the workshop. In addition, an electronic version of the report will be made available at the IGSC web site.

Each rapporteur of the plenary and working group sessions will provide a summary of his session using the abstracts mentioned above and summarising the outcomes of the sessions’ discussion. Ideally, the summaries should list the issues defined prior to the workshop together with attempts to answer the questions or statements why a definite answer was not achievable. The draft summaries should be reviewed by the session chairpersons and given to the SPC two months after the workshop. Supported by a consultant, the SPC and the SG will produce a draft workshop summary consisting of an introduction, the case presentation summary, the extended abstracts, the (possibly revised) session summaries, and an overall summary of the workshop (not exceeding five pages) within another two months. The workshop participants will release the document for publication after review within six months after the workshop.

The SG and the Host Organisations will choose an appropriate format for publication. At the least, the document mentioned in the paragraph above will be published as a NEA proceeding report and on the World Wide Web. If the Host Organisation is willing to do so, it might publish a written version of the case presentation together with the summaries mentioned above as a joint NEA/Host Organisation publication.

5.5 The Scientific Programme Committee

The **Scientific Programme Committee** (SPC) will:

- define the topics and the workshop agenda,
- identify and invite speakers and chairpersons for the topical plenary sessions,
- define topics and chairpersons for the working groups,
- identify rapporteurs for the plenary and working group sessions,
- define lists of questions and problems the plenary and working group sessions have to deal with,
- review the abstracts,
- review the workshop reports.

The SPC consists of representatives of IGSC Member Country Organisations. Both the SG and the Host Organisation are represented in the SPC. Members of the SPC are Rick Beauheim [SNL, Chairman and member of AMIGO Steering Group (SG)], Andreas Gautschi (Nagra), Erik Frank (HSK), Martin Mazurek (University of Bern), Horst-Jürgen Herbert (GRS), Bruce Goodwin (GEA/OPG), Jan-Olof Selroos (SKB), Emmanuel Mouche (CEA, France), and Paul Smith (SAM, as consultant).

5.6 Workshop Chairpersons/Rapporteurs:

The work of a chairperson will be to introduce speakers, keep the session on schedule and motivate participants for discussion. S/he will also help the rapporteur to prepare an oral synthesis of discussions for the round-up plenary session and to provide the written contribution for the synthesis and review proceedings.

6. DATES AND LOCATION OF THE WORKSHOP

The workshop will be held at the **Grand Hotel des Bains**, Avenue des Bains 22, Yverdon-les-Bains, Switzerland, CH-1400 (+41 24 424 64 64) from Tuesday-Thursday, 3-5 June 2003, with an optional excursion to Mont Terri on Friday, 6 June 2003.

7. WORKING LANGUAGE

English will be the working language of the Workshop and the proceedings.

8. ORAL PRESENTATIONS

Please note that for the plenary session, a portable computer projector (for presentations using PowerPoint) will be available as well as an overhead projector. Regarding the working group meeting rooms, only an overhead projector will be available.

Please also note that it would be helpful if you could send to the NEA in advance of the workshop, or bring with you, an electronic copy of your presentation in order to provide a CDROM of all presentations. Paper copies will be delivered to participants upon request to the NEA Secretariat.

9. LOCAL ARRANGEMENTS

Nagra will offer the Workshop Dinner on 4 June evening, contribute to the general costs and provide transportation and lunch for the Mont Terri excursion.

HSK will provide lunches during the workshop and contribute to the general costs.

The University of Bern will provide secretariat support and make hotel and other local arrangements. Questions can be directed to the conference secretary Mrs. Sarah Antenen at 'sarah.antenen@geo.unibe.ch' or +41 31 631 87 81.

There will be a coffee break during each morning and each afternoon.

Accomodation

Grand Hotel des Bains
Avenue des Bains 22,
CH-1400 Yverdon-les-Bains, Switzerland
+41 24 424 64 64

The room rates are estimated to be around 185 Swiss Francs per night.

Travel to Yverdon-les-Bains

Direct trains operate every hour from Zurich airport (2,5 h) and Geneva airport (1 h). Basel airport is connected with the train station via bus or taxi (ca. 15 mn), and direct trains take 1,75 h to Yverdon. The hotel is within walking distance from the train station.

Nagra will provide buses to Mont Terri and will also take the participants of the excursion to a major train station from where they can travel to the airport of their choice.

AGENDA

of the First AMIGO Workshop

3-5 June 2003

Yverdon-les-Bains, Switzerland

3 June 2003	**DAY 1**
09:00 - 09:20	Welcome addresses *Nagra, HSK and NEA*
	Session I: **OPALINUS CLAY SAFETY CASE**
	Chairperson: R. Beauheim (SNL, USA)
09:20 - 09:40	Overview of project *Entsorgungsnachweis*: Aims and boundary Conditions for making the safety case *P. Zuidema (Nagra, Switzerland)*
09:40 - 10:00	Geoscientific basis for making the safety case for a SF/HLW/ILW repository in Opalinus clay In NE Switzerland (project Entsorgungsnachweis) – I: Overview and main conclusions (20 minutes) *A. Gautschi (Nagra, Switzerland)*
	Geosphere performance: Building confidence using multiple lines of evidence
10:00 - 10:30	Geoscientific basis for making the safety case for a SF/HLW/ILW repository in Opalinus clay in NE Switzerland (project Entsorgungsnachweis) – II: The geosphere as a transport barrier: hydraulic, diffusion and sorption properties *A. Gautschi (Nagra, Switzerland)*
10:30 - 11:00	*Coffee break*
11:00 - 11:35	Geoscientific basis for making the safety case for a SF/HLW/ILW repository in Opalinus clay in NE Switzerland (project Entsorgungsnachweis) – III: Repository-induced effects: EDZ, repository gas release, self-sealing *P. Marschall (Nagra, Switzerland)*
11:35 - 12:10	Geoscientific basis for making the safety case for a SF/HLW/ILW repository in Opalinus clay in NE Switzerland (project Entsorgungsnachweis) - IV: Geosphere stability: learning from the past to predict future long-term evolution *M. Mazurek (University of Bern, Switzerland))*
12:10 - 13:30	*Buffet Lunch*
13:30 - 14:10	Project *Entsorgungsnachweis*: Summary of the safety case *J. Schneider (Nagra, Switzerland)*
14:10 - 14:40	Regulatory review: General comments, current status of review, identification of critical issues *J. Vigfusson and E. Frank (HSK, Switzerland)*
14:40 - 15:00	Lessons learned with respect to the main AMIGO topics *Nagra and HSK*

15:00 - 15:30 General discussion of the Opalinus clay safety case

15:30 - 16:00 *Coffee Break*

Session II
KEYNOTE PRESENTATIONS

Chairperson: K. Röhlig (GRS-Köln, Germany)

Questions to be considered (not all can be addressed) by each of the keynote speakers are:

- What types of data have been integrated in your model?
- How has soft (qualitative) data been integrated into your model?
- How would you assess the value of each type of data you used?
- What data would you have liked to have had, but didn't?
- What data did you have, but found no use for?
- What is the dimensionality of your model?
- What are the time and space scales of confidence in your model?
- How have you handled temporal and spatial scaling and simplification?
- What processes were simplified in your model, and how was this accomplished?
- What were the objectives, and what are the predictive uses of your model?
- Were extreme or pessimistic cases considered, or only what you thought was "realistic"?
- How have you validated or tested your model?
- What possibilities, if any, do you see for alternative models of your system?
- What is most important in making you think your model is correct or unique?
- What innovations in presentation or visualisation of your results have you made?
- How was this project managed?

(45-minute talks and 15 minutes discussion)

16:00 - 17:00 Integrating geologic and engineering data into 3D reservoir models: An example from Norman Wells field, NWT, Canada
L.A. Yose (ExxonMobil, USA)

17:00 - 18:00 Thermo-chemical controls on diagenetic processes: Impact on geologic models for geopressure, fluid migration, biodegradation, and operational safety.
P. Nadeau (Statoil, Norway)

4 June 2003	**DAY 2**

08:30 - 09:00 Poster set-up (posters to stay up through lunch on day 3)

Session II continued:
KEYNOTE PRESENTATIONS

09:00 - 10:00 3D basin modelling of the Paris Basin: Diagenetic and hydrogeologic implications
S. Violette, J. Gonçalvès, A. Jost and G. de Marsily (Université Pierre et Marie Curie – Paris 6, France)

Session III
PRESENTATION FROM RADIOACTIVE WASTE PROGRAMMES ON INTEGRATION WITHIN THEIR SAFETY CASES

Chairperson: M. Jensen (OPG, Canada)

(20-25 minute talks and 5 minutes discussion)

Each presentation is to focus on integrating multiple lines of evidence in a Safety Case. Questions to be considered (not all can be addressed) by each speaker from an implementing agency are:

- What types of data or lines of evidence have been integrated in your Safety Case? (these should be listed on a single overhead)
- What are the roles of the geosphere in your Safety Case?
- How do you weigh (prioritise) evidence directly supporting dose/risk calculations versus evidence supporting other types of arguments for safety (some of which may be more qualitative) or used in conceptual model development?
- (How) Does this weighting change with time?
- How has the work of different teams been integrated?

Questions to be considered (not all can be addressed) by each speaker from a regulatory agency are:

- How do you weigh (prioritise) evidence directly supporting dose/risk calculations versus evidence supporting other types of arguments for safety (some of which may be more qualitative) or used in conceptual model development?
- (How) Does this weighting change with time?
- Which arguments do you find most and least convincing, and why?
- What value do you attach to multiple lines of evidence?
- What are important aspects of the Safety Case in addition to the results of calculation of dose and risk, including non-quantitative aspects?
- To what extent are you interested in the way in which the implementer manages integration, including the interaction between different teams?
- In what depth do you develop an independent view?

10:00 - 10:30	The Konrad safety case:
	The Konrad safety case: Licensee point of view *P. Brennecke (BfS, Germany)*
	The Konrad safety case: Regulator point of view *H. Besenecker (NMU, Lower Saxony Ministry of Environment, Germany)*
10:30 - 10:45	Break (posters available for viewing)
10:45 - 11:10	The integration of geosphere data into a safety case: An example: the safety function "diffusion and retention" in the Boom clay *A. Dierckx and P. Lalieux (Ondraf/Niras, Belgium); N. Maes and L. Wang (SCK•CEN, Belgium)*
11:10 - 11:35	Site descriptive modelling and use of the Rock Visualisation System tool *J. Andersson (JA Streamflow AB, Sweden); R. Munier, M. Stigsson and J-O. Selroos (SKB, Sweden)*
11:35 - 12:00	Integration of geosphere conceptual model in the safety case: Lessons learnt from "Dossier 2001 Argile" and open questions, *P. Landais (Andra, France)*
12:00 - 12:10	Brief (~2 minute) oral presentation of posters by authors
12:10 – 14:00	Lunch and **Poster Session** (authors present at posters from 13:15 to 14:00 see ANNEX A)

Session III continued:
PRESENTATION FROM RADIOACTIVE WASTE PROGRAMMES ON INTEGRATION WITHIN THEIR SAFETY CASES

14:00 - 14:25	Integration of geologic information in the WIPP safety case *R. Beauheim (SNL, USA) and D. Powers (USA)*
14:25 – 14:50	The ENRESA 2003 performance assessment exercise for clay *J. Astudillo and J. Alonso (ENRESA, Spain)*
14:50 - 15:15	Groundwater flow system stability in shield settings: A multi-disciplinary approach *M. Jensen (OPG, Canada) and B. Goodwin (GEA, Canada)*

15:15 - 17:30 **MEET IN WORKING GROUPS** (break while forming into groups)

WORKING GROUP TOPICS

The questions to be considered by each working group are as follows:

Topic A: Role(s) of the geosphere in the Safety Case

Chair: J. Bruno *Rapporteur: P. Smith*

- What roles does the geosphere take in Safety Cases?
- How does the role of the geosphere vary among disposal concepts?
- How can PA/SA be used to define requirements on the geosphere?
- What is the influence of repository construction on geosphere performance?
- What is needed (link to site characterisation) to make the Safety Case?
- Are some data currently under utilised?

Topic B: Multiple lines of evidence involved in Safety Case arguments

Chair: S. Norris *Rapporteur: E. Mouche*

- In what field do you see the lines of evidence?
- What parameters/processes/issues can be supported by multiple lines of evidence?
- What are the specific lines of evidence for each of the parameters/processes/ issues?
- How are the lines of evidence used in the Safety Case (explicitly, numerically, qualitatively, etc.)?
- At what stage in the making of your Safety Case (e.g., conceptualisation, model abstraction, formulation of arguments for safety) do the lines of evidence come into play?
- Which are the most effective and efficiently used lines of evidence?
- What data and potential lines of evidence for safety are currently under utilised?

This working group should provide results in table form.

Topic C: Practical guidelines for managing the interaction between different teams in order to build a Safety Case

Chair: M. Jensen *Rapporteur: P. Lebon*

- How do you ensure that those responsible for acquiring data understand and support the use of their data in the Safety Case?
- How do you focus investigations early in a programme to produce information relevant to a Safety Case?
- How are different teams involved in decisions on future activities?
- How is interaction among teams managed?
- What are the means to enforce interdisciplinary communication?
- What specific steps can be taken to ensure interdisciplinary communication?
- How do you define a common basis of key issues among different groups?
- How are priorities established for collection of data that will be used in a supporting role (qualitatively)?

Workshop dinner hosted by Nagra

5 June 2003	**DAY 3**

Working Group Meetings continued

09:00 - 11:30	Meet in Working Groups (break as desired)
11:30 - 12:30	Introduction to Mont Terri URL (prologue for field trip) (Working Group Chairmen and SG rapporteurs to prepare WG summaries)
12:30 - 14:00	Lunch

Session IV
WORKING GROUP SUMMARIES AND FINAL DISCUSSION

Chairperson: J. Andersson (JA Streamflow, Sweden)

14:00 - 14:20	Working Group A
14:20 - 14:40	Working Group B
14:40 - 15:00	Working Group C
15:00 - 15:30	Discussion of Working Group summaries
15:30 - 15:50	Break
15:50 - 16:45	Final discussion (15 minutes of observations from G. de Marsily and 40 minutes of discussion)
16:45 - 17:00	Closing remarks NEA, SG and hosts

6 June 2003	**DAY 4**

Optional excursion to Mont Terri Underground Research Laboratory
(details to be provided later)

Annex A

POSTER SESSION

P1 **"**Use of stratigraphic, petrographic, hydrogeologic, and geochemical information for hydrogeologic modelling based on geostatistical simulation"

Klaus-Jürgen Röhlig, Heidemarie Fischer, and Brigitta Pöltl (GRS Köln, Germany)

P2 "Development of JNC Geologic Disposal Technical Information Integration System -- An approach to integrate and share technical information among safety assessment, repository design and site investigation"

Masahiro Uchida, Hitoshi Makino, Keiichiro Wakasugi, and Katsushi Shibata (JNC, Japan)

P3 "Integration of geologic information in a structured approach to development of a safety case"

Hiroyuki Umeki, Hiroyuki Tsuchi, and Toshihiro Seo (NUMO, Japan) and Hiroyasu Takase and Richard Metcalfe (Quintessa, Japan)

P4 "The 2002 Drigg post-closure safety case: Implementation of a multiple factor safety case"

Candida Lean, P.D. Grimwood, L. Watts, L. Fowler, G. Thomson, E. Kelly, and D. Hodgkinson[#] (BNFL, UK; *Enviros, UK; [#]Quintessa, UK)*