Battelle
Pacific Northwest Laboratories
P.O. Box 999
Richland, Washington U.S.A. 99352
Telephone (509) 376-4601
Telex 15-2874
Facsimile (509) 375-2718

November 3, 1988

Mr. K. Chang
U.S. Nuclear Regulatory
Commission
Division of Waste Management
MS-623-SS
Silver Springs, MD 20910

Dear Mr. Chang:

Please find an attached copy of my foreign trip report for the 12th International Symposium on the Scientific Basis for Nuclear Waste Management, held on October 10-14, 1988, in West Berlin, West Germany. Contact me at FTS 444-4601 or at the number above for any further questions.

Sincerely,

Michael J. Apted
Japan Waste Management Office

MJA/dc

Enclosure

412
WM-1

DISTRIBUTION

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ATTN: D. H. Alexander
R. Stein

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Forrestal Building
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ATTN: J. F. Daly
M. W. Frei
J. L. Morris

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MS-623-SS
Silver Springs, MD 20910

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F. Bingham
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U.S. Department of Energy
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Las Vegas, NV 89114-4100
ATTN: H. Ahagan
D. Livingston

NAGRA
Parkstrasse 23
CH-5401 Baden
SWITZERLAND
ATTN: C. McCombie
I. McKinley

ONSITE

DOE Richland Operations Office

Sharon Crowder, International Activities Coordination Office (3)
D. C. Langstaff
D. L. Sours
J. J. Sutey

Pacific Northwest Laboratory

W. W. Ballard
D. J. Bradley
P. G. Doctor
M. R. Kreiter
Y. Onishi
P. W. Reimus
A. E. Van Luik
R. E. Westerman

A. SUMMARY OF FOREIGN TRAVEL

TRAVELER: M. J. Apted, Ph.D., Deputy Program Manager, Performance Assessment Scientific Support (PASS) Program, Waste Technology Center, Pacific Northwest Laboratory, Richland, Washington 99352

DATE OF REPORT: November 1, 1988

DESTINATIONS: 12th International Symposium on the Scientific Basis for Nuclear Waste Management, West Berlin, Federal Republic of Germany.

PURPOSE OF TRIP: To present an invited review of recent scientific progress made in the field of nuclear waste disposal.

SUMMARY OF RESULTS: The presentation was made to the assembled participants of the Symposium and was well received.

SUMMARY OF COMMITMENTS: An edited transcript of the presentation will be published in the upcoming proceedings volume.

SUMMARY OF RECOMMENDATIONS:

The RW, DP, and NE sections of the DOE should review their policy and comittment to participation in this Symposium. The DOE is the major sponsor that funds this meeting , yet DOE travel restrictions limited participation by DOE and support staff to about 2% of the total participants.

COSTS: The total cost for travel to and living costs in West Berlin was ~$3000. The funding source for this was the Performance Assessment Scientific Support Program, of the Office of Systems Integration and Regulations in the Office of Civilian Radioactive Waste Management.

B. DETAILED FOREIGN TRIP REPORT OF MICHAEL J. APTED

Dr. Michael J. Apted traveled to the 12th International Symposium on the Scientific Basis for Nuclear Waste Disposal in West Berlin, Federal Republic of Germany on October 9 to 14, 1988, to make an invited presentation on the recent technical progress in the field of nuclear waste disposal. A copy of the letter of invitation was attached to the traveler's original travel request. In addition, Dr. Apted was asked to co-chair a technical session on migration phenomena related to the transport of radionuclides in the environment. This activity and participation reflect the international recognition that Dr. Apted achieved in this area while working for the PASS Program in support of the OCRWM. Dr. Apted's participation in such international conferences is explicitly included in PASS's FY 1989 technical scope of work.

This Symposium is the pre-eminent international forum for technical and scientific studies related to nuclear waste disposal. Participants include national nuclear waste disposal programs from Canada, Sweden, Switzerland, the United Kingdom, France, Spain, Italy, Belgium, Germany, Japan, Finland, and Denmark, as well as individual contributors from Austrailia, Brazil, the Soviet Union, and China. It is held annually through the auspices of the Materials Research Society (MRS). Every third year the meeting is convened in Europe as a single Symposium; otherwise, the meeting is held in Boston, Massachusetts, in conjunction with the Annual Meeting of the MRS. The U.S. Department of Energy (DOE), through matching contributions from the RW, DP, and NE sections, is the major funding source that supports this Syposium.

A copy of the Final Program, including listings of titles of papers and authors, is included as Attachment A. Note that several papers, particularly those by U.S. authors, were withdrawn at the last moment because of problems in obtaining permission to publish or travel to the Symposium. Sessions on Glass and Crystalline Waste Forms, Spent Nuclear Fuel, Canister and Overpack Materials, Cement Waste Forms, Performance Assessment, Radionuclide Transport, and two Poster Sessions were held. Invited presentations were made by Dr. Charles McCombie of NAGRA in Switzerland, Dr. Werner Lutze of the Hahn-Meitner Institute in West Germany, Dr. David Shoesmith of the Atomic Energy of Canada Limited, Dr. Dan McCright of the Yucca Mountain Project in the U.S., Dr. Ivars Neretnieks of the Royal Institute of Technology in Sweden, Dr. Ghilan de Marsily of the Ecole Nationale Superieure des Mines de Paris in France, and Dr. Karsten Pruess from the University of California, Berkeley in the U.S., in addition to the presentation made by the traveler.

Dr. Apted's presentation focused on recent progress in the scientific basis for nuclear waste disposal, particularly with regard to reports made in the MRS

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Dr. Apted's presentation focused on recent progress in the scientific basis for nuclear waste disposal, particularly with regard to reports made in the MRS

Symposium series. Several key points were made in this presentation.

First, the central importance of performance assessment modeling was stressed; no experiments should be initiated without first having, at least, a conceptual model of the processes to be studied and some anticipated result (prediction) for the experiment. In essence the "scientific method" should be rigorously applied through a continuing series of model development, prediction, testing, and model revision (as necessary).

Second, recent mass-transfer modeling and assessment by Dr. Pigford and associates at Berkeley, Dr. Neretnieks and associates in Sweden, and Dr. Garisto and associates in Canada, among others, provide the necessary basis for determining the relevant information required for long-term (>100 years) assessment of nuclear waste forms in repository environments. Dissolution rate data, whether short-term "leach rates" or so-called "final rates", are now known to be irrelevant to defensible safety assessments; solubility limits will be the controlling mechanism for radionuclide release in the long-term. Unfortunately, essentially all tests on glass waste forms reported by the U.S., France, Japan, Switzerland, and other countries are limited to collecting leach rate data. This poor situation has arisen for several reasons, including the tendancy of waste glass producers to try and qualify their product's performance as separate from the performance of the glass in a repository/waste package environment. This has lead to a misplaced focus on the "fate-of-glass" approach, rather than a more realistic and defensible "fate-of-radionuclides" approach. It was noted that the dissolution behavior of glass waste forms does determine the local groundwater chemistry, hence the actual solubility of radionuclides. The current design of leach tests are, however, unsuitable for obtaining much meaningful information on this important relationship.

Third, specific recommendations for improving the test methodologies and associated solids and solution analyses were made. Dr. Apted cited, among others, the importance of solution filtration, anion analyses, characterization of corrosion products, the incorrect and misleading use of argon-pressurized test vessels, and normalization of temperature effects on solution speciation using geochemical codes.

Finally, Dr. Apted cited several areas where there had been significant progress recently. These include electrochemical studies applied to spent fuel dissolution, analysis of colloid formation and transport, application of well-considered natural analogs (e.g., Pocos de Caldas Project), determination of the stability of potential organic complexes, and identification of alternate sorption models that may be needed for far-field (but not needed for near-field) performance assessment.

One non-technical issue that was raised by European participants was the low attendence at the meeting by U.S. scientists working on nuclear waste disposal. During the years when the meeting is held in Boston, approximately 60 to 75% of the participants are from the U.S., dominately from scientists working for the DOE (RW, DP,

or NE). At the Symposium in Berlin this year, however, U.S. participants represented only ~2% of the total. Three basic points were made by the Europeans: 1) the USDOE is the major source of support funds for conducting the Symposium, but then severely limits participation by its own scientists, 2) the U.S. is failing to obtain timely results and information from studies by non-U.S. scientists because of its non-participation, and 3) European scientists are likewise unable to obtain timely information about U.S. studies that are of relevance to their own work. Because this trend has been occuring at least since the 1985 Symposium held in Sweden, the preminent leadership role that the DOE held in the area of scientific nuclear waste studies is now gone.

Therefore, it is recommended that the DOE, through its RW, DP, and NE sections, review its comittment to supporting and establishing a credible scientific basis for its nuclear waste disposal programs within the international community. It is not too late for the DOE to reclaim leadership in this area, but a consistent policy of support for such forums as this Materials Research Society Symposium is needed, at the least. If a decision is reached that such leadership role commensurate its resources and funding is not desirable, then the DOE should probably consider reducing its financial support for this Symposium and other, lesser international scientific forums.

C. APPENDICES AND REFERENCES

1) Itinerary

Name of Traveler: Michael J. Apted

October 5-6, 1988	Traveled from Pasco, Washington to DOE meeting, Denver, Co.
October 6, 1988	Traveled to Dallas, Texas, to initiate foreign travel.
October 7-8, 1988	Traveled from Dallas to West Berlin, FRG.
October 9-14, 1988	Attended MRS Symposium in West Berlin.
October 15-17, 1988	Personal business.
October 18, 1988	Returned to Pasco, Washington.

2) Persons Contacted

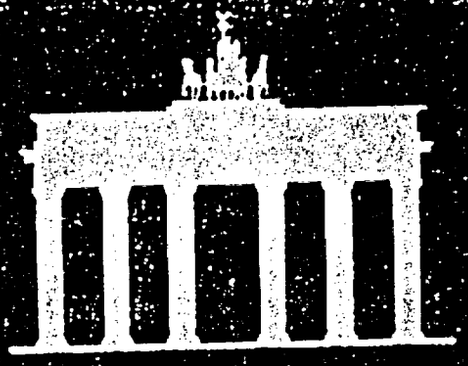
Dr. Werner Lutze, Chairman of the 12th International Symposium on the Scientific Basis for Nuclear Waste Management, Hahn-Meitner-Institut GmbH, Gliencker Strasse 100, D-1000 Berlin 39, Federal Republic of Germany.
(Telephone: 49 30 80092291; Telefax: 49 30 80092999)

3) Literature Obtained

See Attachment A, "Final Program of the 12th International Symposium on the Scientific Basis for Nuclear Waste Management"

4) Literature Supplied to Host

None.



BERLIN
Brandenburger Tor

TWELFTH
International Symposium

on the

Scientific Basis for Nuclear Waste Management

MRS

October 10-13, 1988
Internationales Congress Centrum
(ICC)
Berlin (West)
Germany

Final Program

The twelfth International Symposium on the Scientific Basis for Nuclear Waste Management succeeds the eleventh symposium held in Boston, Massachusetts, USA, December of 1987. There will be no such symposium in 1988 in Boston.

This symposium is organized by:

MATERIALS RESEARCH SOCIETY, U.S.A.

HAHN-MEITNER-INSTITUT BERLIN GmbH, FRG

The organizers of the meeting gratefully acknowledge the financial support of the following:

COMMISSION OF THE EUROPEAN COMMUNITIES

DEPARTMENT OF ENERGY, U.S.A.

APPLIED RESEARCH LABORATORIES GmbH, Düsseldorf, FRG

CANBERRA-PACKARD GmbH, Frankfurt, FRG

DWK Hannover, FRG

HAHN-MEITNER-INSTITUT BERLIN GmbH, FRG

KONTRON PHYSTECH GmbH, Eching b. München, FRG

LABORATORIUM PROF. DR. BERTHOLD, Wildbad, FRG

SIEMENS AG, Zweigniederlassung Berlin, FRG

HANS WÄLISCHMILLER GmbH, Markdorf, FRG

ERNST WINTER & SOHN GmbH & Co, Hamburg, FRG

Conference language:

English

Scientific Program:

This symposium will focus on the science underlying the following subjects:

- Waste Forms (vitreous, ceramic, spent fuel, cement)
- Waste Isolation (container materials, backfill, repository)
- Modeling and Performance Assessment

Contributed papers on the following subjects are especially solicited:

1. Spent fuel
2. Waste form characterization (glasses, ceramics, cement)
3. Waste package characterization and backfill
4. Leaching mechanisms
5. Natural analogues
6. Radionuclide migration and speciation studies
7. In situ testing of waste forms
8. Repositories: Performance assessment and safety analyses

Waste forms will be restricted to those that contain HLW, ILW or transuranic elements (others are excluded from the scope of this meeting). Review, summary and program-type papers will be by invitation only.

Proceedings:

All reviewed and accepted papers will be published in full length as a volume of the series „Scientific Basis for Nuclear Waste Management".

Program Committee:

W. Lutze, Hahn-Meitner-Institut (HMI), Berlin (chairman)
R. C. Ewing, University of New Mexico (UNM), Albuquerque
F. P. Glasser, University of Aberdeen, Old Aberdeen
J. I. Kim, Technische Universität München
G. de Marsily, Ecole Nationale Supérieure des Mines de Paris, Fontainebleau
Hj. Matzke, Europäisches Institut für Transurane, Karlsruhe
I. G. McKinley, Nationale Genossenschaft für die Lagerung radioaktiver Abfälle (NAGRA), Baden
I. Neretnieks, Royal Institute of Technology (KTH), Stockholm
V. M. Oversby, Lawrence Livermore National Laboratory, Livermore
K. D. Reeve, Lucas Heights Res. Lab., Sutherland
F. P. Sargent, Atomic Energy of Canada Ltd. (AECL), Whiteshell, Pinawa

Conference office:

During the conference the conference office will be on the first floor of the ICC. It will be opened during the following hours:

Sunday	October 9, 1988	18.00-21.00 h (Welcome-reception)
Monday	October 10, 1988	8.00-18.00 h
Tuesday	October 11, 1988	8.00-18.00 h
Wednesday	October 12, 1988	8.00-18.00 h
Thursday	October 13, 1988	8.00-18.00 h

Scientific Program:

Monday, October 10

Session I: Glass and Crystalline Materials

Chairs: *F. P. Sargent*, AECL, Pinawa, Manitoba, Canada;
Bernd Grambow, Hahn-Meitner-Institut Berlin GmbH, Germany

8:15 Opening Remarks – *W. Lutze*

8:30 I/1 Research Priority: Are We Tackling the Most Important Problems in Waste Management?
Ch. McCombie, NAGRA, Baden, Switzerland (invited speaker)

9:00 I/2 Comparsion of Glass and Crystalline Nuclear Waste Forms,
W. Lutze, Hahn-Meitner-Institut Berlin GmbH, Germany; *R. C. Ewing*, University of New Mexico, Albuquerque, NM, USA (invited paper)

9:30 I/3 Repository Source Term for Vitrified High Level Waste,
A. Hough, J. A. C. Marples, Harwell Laboratory, Didcot, Oxon OX11 ORA, UK

9:50 I/4 Hydration Mechanisms of Silicate Glasses: Respective Role of Ion Exchange and Water Permeation,
J.-C. Dran, CSNSM/CNRS, Orsay, France; *J.-C. Petit, L. Trotignon*, SESD/LECALT, CEN-FAR, Fontenay-aux-Roses, France; *A. Paccagnella, G. Della Mea*, Universita di Trento, Mesiano, Italy

10:10-10:30 Break

10:30 I/5 Short Time Leaching of Fractured Glass,
Th. Richter, G. H. Frischat, G. Borchardt, Technische Universität Clausthal, Clausthal-Zellerfeld, Germany; *S. Scherrer*, Ecole des Mines, Nancy, France

10:50 I/6 A New Insight into the Nature of the Leached Layers Formed on Basaltic Glasses in Relation to the Choice of Constraints for Long Term Modelling,
J. L. Crovisier[1], *H. Atassi*[2], *V. Daux*[1], *J. Honnorez*[1], *J. C. Petit*[3], *J. P. Eberhart*[2], [1]C.S.G.S. (CNRS), Strasbourg, France; [2]Univ. Louis Pasteur, Strasbourg, France; [3]SESD/LECALT, CEN-FAR, Fontenay-aux-Roses, France

11:10 I/7 Chemical Corrosion of COGEMA Glass R7T7 in High Saline Brines – Part II,
W. Lutze, R. Müller, Hahn-Meitner-Institut Berlin GmbH, Germany; *W. Montserrat*, DWK, Hannover, Germany

11:30 I/8 Investigation of the Long-Term Behaviour of the HLW Glass SON 68 in Salt Brines,
H. Roggendorf[1], *R. Conradt*[2], *H. Schmidt*[1], Fraunhofer-Institut für Silicatforschung, Würzburg, Germany; [2]Chulalongkorn University, Bangkok, Thailand

11:50 I/9 Effect of Environmental Materials on Aqueous Corrosion of R7T7 Glass,
N. Godon, E. Vernaz, CEN-VALRHO, Bagnols-sur-Cèze, France; *J. H. Thomassin, J. C. Touray*, Université d'Orléans, Orléans, France

12:10 I/10 R7T7 Light Water Reference Glass Sensitivity to Variations in Chemical Composition and Operating Parameters,
F. Pacaud, N. Jacquet-Francillon, A. Terki, C. Fillet, CEA/CEN/VALRHO, Bagnols-sur-Cèze, France

12:30-14:00 Lunch

Chairs: *W. Lutze*, Hahn-Meitner-Institut Berlin GmbH, Germany;
L. O. Werme, Swedish Nuclear Fuel and Waste Management Co., Stockholm, Sweden

14:00 I/11 Corrosion Behaviour of British Magnox Waste Glass in Pure Water,
H. U. Zwicky[1], *B. Grambow*[2], *C. Magrabi*[3], *E. T. Aerne*[1], *M. Mohos*[1], *L. O. Werme*[4], *R. Bradley*[3], *B. Barnes*[3], [1]Paul-Scherrer-Institute, Würenlingen, Switzerland; [2]Hahn-Meitner-Institut Berlin GmbH, Germany; [3]British Nuclear Fuels plc, Sellafield, Seascale, Great Britain; [4]Swedish Nuclear Fuel and Waste Management Co., Stockholm, Sweden

14:20 I/12 Behaviour of the Italian BEL 15 Borosilicate Glass Incorporating MTR HLW with Reference to the Disposal Conditions,
C. Cantale, S. Castelli, A. Donato, G. Guidi, ENEA, Fuel Cycle Division CRE-Casaccia, Rome, Italy

14:40 I/13 Thermal and Radiation Effects in the Range of the Glass Transition Temperature T_g,
G. Malow, Hahn-Meitner-Institut Berlin GmbH, Germany

15:00 I/14 Long Term Crystallization Behavior of Glasses at Temperatures $T<T_g$,
A. D. Stalios, R. De Batist, P. Van Iseghem, SCK/CEN, Mol, Belgium

15:20 I/15 Characterization of Waste Glasses Using Vickers Indentation, Short Rod Fractometry and Drop Tests,
Hj. Matzke, European Institute for Transuranium Elements, CEC, Karlsruhe, Germany, *H. G. Scheibel, V. Friehmelt*, Battelle-Institut e. V., Frankfurt/Main, Germany

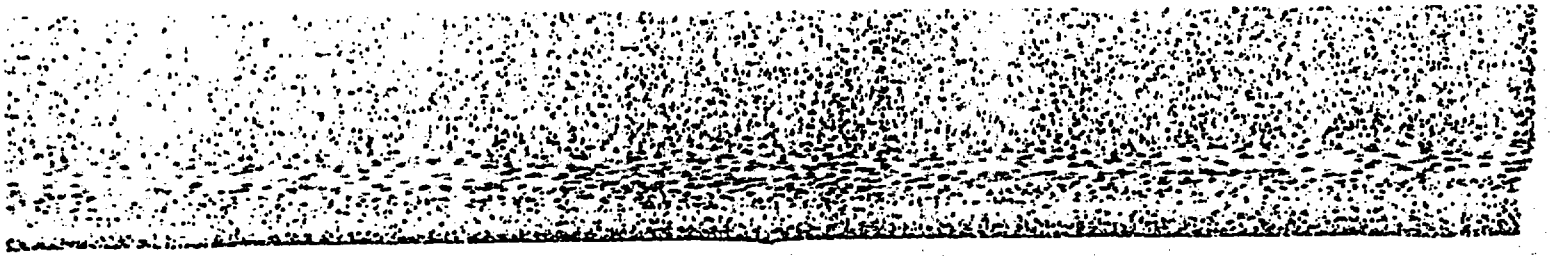
15:40 I/16 The Fracture and Aerosol Release of Impacted HLW-Glasses and -Canisters,
H. G. Scheibel, V. Friehmelt, Hk. Fröhlich, Battelle-Institut e. V., Frankfurt/Main, Germany

16:00-16:20 Break

Chairs: *R. C. Ewing*, University of New Mexico, Albuquerque, NM, USA;
K. D. Reeve, Australian Nuclear Science and Technology Organization, Lucas Heights, Menai, NSW, Australia

16:20 I/17 Alpha-Decay Damage and Annealing Effects in Natural Pyrochlores: Analogues for Long-Term Radiation Damage Effects in Actinide, Pyrochlore, Structure-Types,
G. R. Lumpkin, R. C. Ewing, University of New Mexico, Albuquerque, NM, USA

16:40 I/18 Mechanisms of Actinide Isotope Leaching from Monazite,
Y. Eyal, Technion – Israel Institute of Technology, Haifa, Israel; *D. R. Olander*, University of California, Berkeley, CA, USA



17:00 I/19 Fabrication and Leach Testing of Synroc Containing Actinides and Fission Products,
K. D. Reeve, D. M. Levins, B. W. Seatonberry, R. K. Ryan, K. P. Hart, G. T. Stevens, Australian Nuclear Science and Technology Organization, Lucas Heights, Menai, NSW, Australia

17:20 I/20 Artificial Compounds of the Crandallite-Type; A New Material for Nuclear Waste Handling,
R. Ballhorn, Uraphos Chemie GmbH, Oberursel, Germany; *H. Brunner,* Thermalkem, Rock Hill, SC, USA; *R. G. Schwab,* Mineralogisches Institut der Universität, Erlangen, Germany

17:40 I/21 Dissolution Mechanisms of $CaTiO_3$ – Solution Analysis, Surface Analysis and Electron Microscope Studies – Implications for Synroc,
D. K. Fham, F. B. Neall, S. Myhra, R. St. C. Smart, P. S. Turner, Griffith University, Nathan, Qld., Australia

18:00 I/22 Leaching Studies of SYNROC Crystalline Ceramic Waste Forms,
A. G. Solomah, KFA, Jülich, Germany; *Hj. Matzke,* European Institute for Transuranium Elements, CEC, Karlsruhe, Germany

Tuesday, October 11

Session II: Spent Fuel

Chairs: *Hj. Matzke,* European Institute for Transuranium Elements, CEC, Karlsruhe, Germany;
L. H. Johnson, AECL, Pinawa, Manitoba, Canada

8:30 II/1 Mechanistic Basis for Modelling Fuel Dissolution and Container Failures under Waste Vault Conditions,
D. W. Shoesmith, AECL, Pinawa, Manitoba, Canada (invited speaker)

9:00 II/2 Characterization of Low-Gas-Release LWR Fuels by Transmission Electron Microscopy,
L. E. Thomas, R. J. Guenther, Pacific Northwest Laboratory, Richland, WA, USA

9:20 II/3 Leaching of Whole, Defected Used CANDU™ Fuel Elements in Saline Solutions Under Argon Pressure,
S. Stroes-Gascoyne, L. H. Johnson, J. C. Tait, D. M. Sellinger, AECL, Pinawa, Manitoba, Canada

9:40 II/4 Leaching of Used CANDU™ Fuel in the Presence of Clay, Titanium and Granite Rock,
J. C. Tait, S. Stroes-Gascoyne, R. J. Porth, D. Wood, AECL, Pinawa, Manitoba, Canada; *R. B. Heimann,* Alberta Research Council, Edmonton, Alberta, Canada

10:00 II/5 Electrochemical and X-Ray Photoelectron Spectroscopic Studies of UO_2 Fuel Oxidation by Specific Radicals Formed During Radiolysis of Groundwater,
S. Sunder, D. W. Shoesmith, H. Christensen[1], *M. G. Bailey, N. H. Miller,* AECL, Pinawa, Manitoba, Canada; [1] Studsvik AB, Nyköping, Sweden

10:20-10:40 Break

Session III:
Corrosion of Canister and Overpack Materials

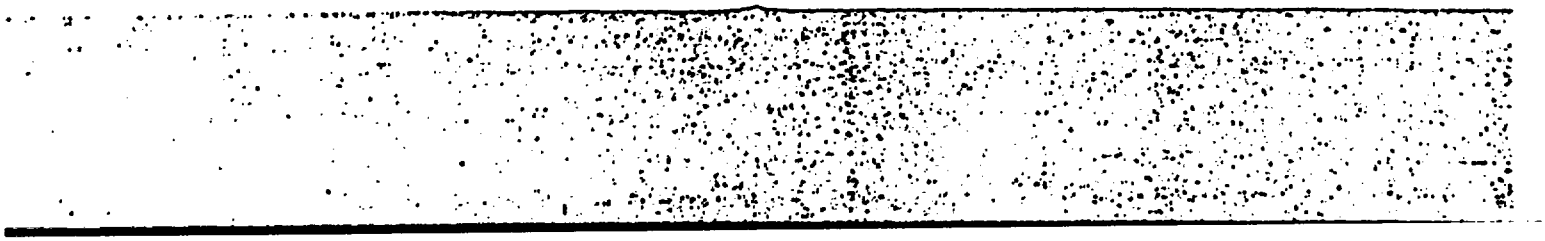
Chairs: *F. P. Sargent,* AECL, Pinawa, Manitoba, Canada;
P. Offermann, Hahn-Meitner-Institut Berlin GmbH, Germany

10:40 III/1 Localized Corrosion and Stress Corrosion Cracking of Candidate Materials for High-Level Radioactive Waste Disposal Containers,
J. C. Farmer, R. D. McCright, University of California, LLNL, Livermore, CA, USA (invited paper)

11:10 III/2 The Long-Term Prediction of Corrosion of Stainless Steel Nuclear Waste Canisters,
S. M. Sharland, C. J. Newton, Harwell Laboratory, Didcot, Oxon OX11 ORA, United Kingdom

11:30 III/3 Corrosion Resistance of Candidate Overpack Materials in Deep Argillaceous Disposal Environments,
W. Debruyn, H. Tas, J. Dresselaers, SCK/CEN, Mol, Belgium

11:50 III/4 Corrosion Induced Hydrogen Evolution on High Level Waste Overpack Materials in Synthetic Groundwaters and Chloride Solutions,
J. P. Simpson, R. Schenk, Sulzer Brothers Ltd., Winterthur, Switzerland



Session IV: Cement Waste Forms

Chair: *F.P. Glasser*, University of Aberdeen, Old Aberdeen, Scotland

12:10 IV/1 Basis for Selecting Cement-Based Waste Forms for Immobilizing Radioactive Waste,
E. W. McDaniel, O. K. Tallent, Oak Ridge National Laboratory, Oak Ridge, TENN, USA; *T. L. Sams*, Roane State Community College, Oak Ridge, TENN, USA; *D. B. Delzer, W. D. Bostick*, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, TENN, USA

12:30 IV/2 Leaching Scale Effect for Cement-Waste Forms,
J. C. Nomine, A. Billon, C. Courtois, CEA/CEN, Saclay, France TO BE PRESENTED BY J.C.-PETIT.

12:50-14:20 Lunch

Poster Session A

(Sessions I, II, III, IV) Our paper A26

14:20-18:00

Chairs: *F. P. Glasser*, University of Aberdeen, Old Aberdeen, Scotland;
N. A. Chapman, British Geological Survey, Keyworth, Great Britain;
J.-C. Petit, CEA, SESD/LECALT, CEN-FAR, Fontenay-aux-Roses, France

A/1 Effect of Groundwater Composition and Temperature on Leaching Behaviour of Sodium Borosilicate Glass,
D. L. Moir, A. Chatt, Dalhousie University, Halifax, Nova Scotia, Canada

A/2 Freshwater Alteration of Basaltic Glass, Hanauma Bay, Oahu, Hawaii: A Natural Analogue for the Alteration of Borosilicate Glass in Fresh Water,
R. Cowan, R. C. Ewing, University of New Mexico, Albuquerque, NM, USA

A/3 The Interaction Between Nuclear Waste Glasses and Clay – II
P. Van Iseghem, SCK/CEN, Mol, Belgium

A/4 Corrosion of Radioactive, Crushed Waste Glass,
I.-K. Björner, H. Christensen, H. P. Hermansson, Studsvik Nuclear, Nyköping, Sweden; *M. Tsukamoto*, Central Research Institute of Electric Power Industry, Tokyo, Japan; *L. Werme*, Swedish Nuclear Management Company, Stockholm, Sweden

A/5 Alteration of Basaltic Glass in Iceland as a Natural Analogue for Nuclear Waste Glasses: Geochemical Modelling with Dissol,
J. L. Crovisier[1], *T. Advocat*[1], *J.-C. Petit*[2], *B. Fritz*[1], [1]C.S.G.S. (CNRS), Strasbourg, France; [2]CEA, (SESD/LECALT) CEN-FAR, Fontenay-aux-Roses, France

A/6 Formation and Evolution of Alteration Layers on Borosilicate and Basalt Glasses: Initial Stage,
T. Murakami, T. Banba, Japan Atomic Energy Research Institute, Tokai, Ibaraki, Japan; *M. J. Jercinovic, R. C. Ewing*, University of New Mexico, Albuquerque, NM, USA

A/7 Mechanism of Heavy Element Retention in Hydrated Layers Formed on Leached Silicate Glasses,
J.-C. Petit[1], *J.-C. Dran*[2], *L. Trotignon*[1], *J.-M. Casabonne*[3], *A. Paccagnella*[4], *G. Della Mea*[4], [1]SESD/LECALT, CEN-FAR, Fontenay-aux-Roses, France; [2]CSNSM/CNRS, Orsay, France; [3]Université de Bourgogne, Dijon, France; [4]Universita di Trento, Mesiano, Italy

A/8 Natural Analogue Study of Volcanic Glass – A Case Study of Basaltic Glasses in Pyroclastic Fall Deposits of Fuji Volcano, Japan –,
T. Arai, Y. Yusa, N. Sasaki, N. Tsunoda, Power Reactor and Nuclear Fuel Development Corporation, Tokai-mura, Ibaraki, Japan; *H. Takano*, Dia Consultants Company, Tokyo, Japan

A/9 Static Leaching of Actinides and Fission Products from Fully Radioactive Waste Glass of HLLW Generated in Tokai Reprocessing Plant,
K. Miyahara, T. Ashida, Y. Yusa, N. Sasaki, N. Tsunoda, Power Reactor and Nuclear Fuel Development Corporation, Tokai-mura, Ibaraki-ken, Japan

A/10 Devitrification Behaviour of GC-12/9B HLW-Glass,
S. Luo, Y. Jiang, L. Wang, Institute of Atomic Energy, China; *D. Liu*, Beijing University of Iron and Steel Technology, China

A/11 The Behaviour of Strontium-90 and Cesium-137 During High-Temperature Leaching of Radioactive Wastes Solidified on the Basis of Aluminium Phosphate Compositions,
M. K. Savushkina, V. D. Balukova, Institute of Physical Chemistry of the Academy of Sciences of the USSR, Moscow, USSR

A/12 Correlation of Laboratory and Stripa Field Leaching Studies,
D. E. Clark, B. K. Zoitos, University of Florida, Gainesville, FL, USA; *A. R. Lodding*, Chalmers University of Technology, Gothenburg, Sweden; *G. G. Wicks*, E. I. du Pont de Nemours & Co., Savannah River Laboratory, Aiken, SC, USA

A/13 Cooling and Cracking of Technical HLW Glass Products: Experimental and Numerical Studies,
B. Kienzler, KFK, Karlsruhe, Germany

A/14 A Process Model for the Vitrification of High Level Waste at West Valley,
P. B. Macedo, I. L. Pegg, W. P. Freeborn, E. E. Saad, The Catholic University of America, Washington, DC, USA

A/15 Investigation of the Redox Behavior of Technetium in Borosilicate Glass Melts by Voltammetry,
E. Freude, W. Lutze, Hahn-Meitner-Institut Berlin GmbH, Germany; *C. Rüssel*, Universität Erlangen, Germany; *H. A. Schaeffer*, Deutsche Glastechnische Gesellschaft e.V., Frankfurt, Germany

A/16 Thermochemical Comparison of the Systems Re-O and Tc-O,
H. Migge, Hahn-Meitner-Institut Berlin GmbH, Germany

A/17 The Reaction of Nitrate and Formate in Simulated Nuclear Waste Glass Melts,
J. C. Fanning, J. L. Stinecipher, A. E. Hawkes, N. A. Brock, Clemson University, Clemson, SC, USA

A/18 Oxygen Bubble Formation in the Simulated ICPP Nuclear Waste,
D. G. Howitt, H. W. Chan, University of California, Davis, CA, USA; *D. A. Knecht*, EG & G Idaho, Inc., Idaho Falls, ID, USA; *A. B. Harker*, Rockwell Science Center, Thousand Oaks, CA, USA

A/19 Time Dependence of pH in a Cementitious Repository,
A. Atkinson, N. M. Everitt, R. M. Guppy, Harwell Laboratory, Didcot, Oxon OX11 ORA, UK

A/20 The Surface and Pore Structure of Artificially Aged Cement,
S. M. Rowan, L. Donaldson, Trent Polytechnic, Nottingham, UK

A/21 Modelling of the Degradation of Cement in a Nuclear Waste Repository,
A. Haworth, S. M. Sharland, C. J. Tweed, Harwell Laboratory, Oxon OX11 ORA, UK

A/22 Hygroscopic Water Uptake and Dry/Wet Cycling Compared with Normal Water Exposure of Cemented Waste Forms,
K. Brodersen, Riso National Laboratory, Roskilde, Denmark

A/23 The Effects of Radiation on Intermediate Level Waste Forms,
C. R. Wilding, D. C. Phillips, C. E. Lyon, Harwell Laboratory, Oxon OX11 ORA, UK

A/24 Calculation of the Radiolytic Gas Production in Cemented Waste,
P. Offermann, Hahn-Meitner-Institut Berlin GmbH, Germany

A/25 Degradation and Material Transport for Thin Plates of Cement Pastes,
K. Nilsson, K. Brodersen, Riso National Laboratory, Roskilde, Denmark

A/26 Phase Development and Pore Solution Chemistry in Ageing Blast Furnace Slag-Portland Cement Blends,
D. E. Macphee, M. Atkins, F. P. Glasser, University of Aberdeen, Old Aberdeen, UK

A/27 Package Characterization by Laboratory Leaching and Diffusion Experiments Using Radionuclides,
H. A. Das, Netherlands Energy Research Foundation, ECN, Petten, The Netherlands

A/28 Leaching of Chlorine, Cesium, Strontium and Technetium from Cement-Fixed Intermediate Level Liquid Waste,
B.-G. Brodda, KFA Jülich, Germany; *Xu Mingxia*, Institute of Atomic Energy, Beijing, PR China

A/29 Physical Properties and Leachability of MLW Stream Containing Cr, Ni and Cd Immobilized in a Cement Matrix,
E. Zamorani[1], *I. A. Sheikh*[2], *A. Manara*[1], *G. Serrini*[1], CEC, JRC, Ispra, Italy; [2]Pakistan Atomic Energy Commission, Islamabad, Pakistan

A/30 Leaching of Cesium from a Cement Matrix,
B. Torstenfelt, G. Hedin, ABB Atom AB, Västerå, Sweden

A/31 Immobilization of Cs-137, Co-60, Mn-54 and Sr-85 in Cement-Waste Composition,
I. Plečaš, J. Drljača, A. Perić, A. Kostadinović, "Boris Kidrič" Institute of Nuclear Sciences-Vinča, Belgrade, Yugoslavia

A/32 The Release and Migration of Radionuclides in Magnox Reactor Decommissioning Wastes,
A. J. Hooper, Berkeley Nuclear Laboratories, Berkeley, Gloucestershire, UK (withdrawn)

A/33 Nondestructive Waste Form and Package Characterization by Computerized Tomography,
B. Illerhaus, J. Goebbels, A. Kettschau, P. Reimers, Bundesanstalt für Materialforschung und -prüfung (BAM), Berlin, Germany

A/34 Characterization of Bituminous, Intermediate-Level Waste Products,
Z. Kopajtic, D. Laske, H. P. Linder, M. Mohos, M. Nellen, H.U. Zwicky, Paul Scherrer Institute, Würenlingen, Switzerland

A/35 Characterization of Radiation Damage at the Nb Site in Natural Pyrochlores and Samarskites by X-Ray Absorption Spectroscopy,
R. B. Greegor, F. W. Lytle, The Boeing Company, Seattle, WA, USA; *B. C. Chakoumakos*, Oak Ridge National Laboratory, Oak Ridge, TN, USA; *G. R. Lumpkin, J. K. Warner, R. C. Ewing*, University of New Mexico, Albuquerque, NM, USA

A/36 Detailed Characterization of LWR Fuel Rods for the U.S. Repository Testing Program,
R. J. Guenther, D. E. Blahnik, T. K. Campbell, U. P. Jenquin, J. E. Mendel, C. K. Thornhill, Battelle, PNL, Richland, WA, USA

A/37 Dissolution of UO_2 at Various Parametric Conditions: A Comparison Between Calculated and Experimental Results,
K. Ollila, Technical Research Centre of Finland, Espoo, Finland

A/38 UO_2 Corrosion Study in Mineral Water: A Surface Analysis Approach,
P. Franco, P. Trocellier, F. Menes, CEA/CEN Saclay, Gif-sur-Yvette, France

A/39 Surface Analysis of UO_2 Leached in Mineral Water Studied by X-Ray Photoelectron Spectroscopy,
M. P. Lahalle, J. C. Krupa, R. Guillaumont, M. Genet, Institut de Physique Nucléaire, Orsay, France, *G. C. Allen, N. R. Holmes*, Berkeley Nuclear Laboratories, Berkeley, Gloucestershire, UK

A/40 Creep Properties in Welded Joints in Copper Canisters for Nuclear Waste Containment,
B. Ivarsson, J.-O. Österberg, R. Sandström, Swedish Institute for Metals Research, Stockholm, Sweden, *L. Werme*, Swedish Nuclear Fuel and Waste Management Company, Stockholm, Sweden

A/41 The Corrosion of Copper in NaCl Solution and Under Simulated Disposal Conditions,
F. King, C. Litke, AECL, WNRE, Pinawa, Manitoba, Canada

A/42 Corrosion of Mild Steel in Sea Sediment under a Thermal Gradient,
F. Lanza, C. Ronsecco, CEC/JRC, Ispra, Italy

A/43 In-Situ Corrosion Studies on Cast Steel for a High-Level Waste Packaging in a Rock Salt Repository,
W. Schwarzkopf, E. Smailos, R. Köster, KFK, Karlsruhe, Germany

Wednesday, October 12

Session V: Repositories (Performance Assessment, In Situ Tests, Backfill Materials)

Chairs: *V. M. Oversby*, University of California, Livermore, CA, USA;
I. G. McKinley, NAGRA, Baden, Switzerland

8:30 V/1 The Swedish Repository for Low and Intermediate Reactor Waste – SFR. Radioactivity Release and Transport Calculations.
I. Neretnieks, The Royal Institute of Technology, Stockholm, Sweden (invited paper)

9:00 V/2 Safety Analysis Including the Disposal of Transuranic Elements and Toxicity Comparisons.
H. P. Berg, D. Ehrlich, B. Thomauske, PTB, Braunschweig, Germany

9:20 V/3 Performance Assessment with Realistic Data for a Hypothetical High-Level Waste Repository in a Salt Dome.
R.-P. Hirsekorn, R. Storck, GSF, Braunschweig, Germany

9:40 V/4 Performance Assessment of a High-Level-Waste Repository in Clay.
J. L. Marivoet, G. Volckaert, A. A. Bonne, SCK/CEN, Mol, Belgium

10:40 V/6 The Brine Migration Test – A Nuclear Waste Repository Simulation Experiment at the Asse Salt Mine – Federal Republic of Germany.
T. Rothfuchs, K. Wieczorek, GSF, Braunschweig, Germany; *E. G. McNulty, S. K. Gupta*, Battelle Memorial Institute, Hereford, TEX, USA; *D. Clark*, Battelle Pacific Northwest Laboratories, Richland, WA, USA

11:00 V/ 7 Retrieval and Analysis of Simulated Defense HLW Package Experiments at the WIPP.
M. A. Molecke, N. R. Sorensen, Sandia National Laboratories, Albuquerque, NM, USA

11:20 V/8 Mechanism of Ionic Diffusion in Dense Bentonite.
S. C. H. Cheung, M. N. Gray, AECL, Pinawa, Manitoba, Canada

11:40 V/9 Evaluation of the Efficiency of Creating Additional Barriers During the Disposal of Solidified Radioactive Wastes.
M. K. Savushkina, V. D. Balukova, Institute of Physical Chemistry of the Academy of Sciences of the USSR, Moscow, USSR

12:00-13:30 Lunch

Session VI: Reactions and Transport of Radionuclides and of Water. Speciation

Chairs: *J. I. Kim*, Universität München, Germany;
M. J. Apted, Battelle Pacific Northwest Laboratories, Richland, WA, USA

13:30 VI/1 Modelling the Chemical Speciation of a Solution as it Migrates Through a Heterogeneous Medium.
G. de Marsily, Ecole Nationale Superieure des Mines de Paris, Fontainebleau, France (invited speaker);
A. Coudrain-Ribstein, Centre National de la Recherche Scientifique, Paris, France

14:00 VI/2 Possible Complex Formation of Actinides with Organic Matter and Phosphate in Deep Groundwaters. Speciation Calculations and Data Evaluation.
K. Andersson, Lindgren o Andersson HB, Surte, Sweden

14:20 VI/3 Equilibrium Concept for the Assessment of the Actinide Release from Waste Forms into salt Brines.
G. Rudolph, P. Vejmelka, R. Köster, KFK, Karlsruhe, Germany

14:40 VI/4 Modelling the Behaviour of Organic Degradation Products.
J. E. Cross, F. T. Ewart, B. F. Greenfield, Harwell Laboratory, UKAEA, Oxon OX11 ORA, UK

15:00 VI/5 A Method for Determining the Oxidation State of Uranium at Concentration as Low as 10^{-10}M,
M. Hussonnois, R. Guillaumont, L. Brillard, M. Fattahi, Institut de Physique Nucléaire, Orsay, France

15:20-15:40 Break

Chairs: *G. de Marsily,* Ecole Nationale Supérieure des Mines de Paris, Fontainebleau, France;
I. Neretnieks, The Royal Institute of Technology, Stockholm, Sweden

15:40 VI/6 Near-Field Geochemistry of Vitrified HLW in a Sedimentary Host Rock,
I. G. McKinley, NAGRA, Baden, Switzerland; *M. Bradbury,* Paul Scherrer Institut, Würenlingen, Switzerland

16:00 VI/7 Theory and Simulation of Water Distribution in Bentonite in a Thermal Field,
C. L. Carnahan, Lawrence, Berkeley Laboratory, University of California, Berkeley, CA, USA

16:20 VI/8 Role of Geocolloids in Transport of Naturally Occurring Radionuclides,
G. Longworth, M. A. Wilkins, M. Ivanovich, Harwell Laboratory, Oxon OX11 ORA, UK

16:40 VI/9 The Influence of Microbial Activity on the Movement of Uranium at Osamu Utsumi Mine, Poços de Caldas, Brazil,
J. M. West, British Geological Survey, Keyworth, Nottingham, UK; *I. G. McKinley,* NAGRA, Baden, Switzerland, *A. Vialta,* Nuclebras, Poços de Caldas MG, Brazil

17:00 VI/10 Channeling in Fractured Zones and its Potential Impact on the Transport of Radionuclides,
L. Moreno, I. Neretnieks, The Royal Institute of Technology, Stockholm, Sweden

17:20 VI/11 Modeling Flow and Transport in Fractured Crystalline Rock Using the Discrete Fracture Network Concept,
B. Dverstorp, W. Nordqvist, J. Andersson, The Royal Institute of Technology, Stockholm, Sweden

17:40 VI/12 Numerical Simulation of Cesium and Strontium Migration through Sodium Bentonite Altered by Cation Exchange with Groundwater Components,
J. S. Jacobsen, C. L. Carnahan, University of California, Berkeley, CA, USA

Thursday, October 13

Session VI continued

Chairs: *J. I. Kim,* Universität München, Germany;
J. M. West, British Geological Survey, Keyworth, Nottingham, UK

8:30 VI/13 Modeling Studies of Multiphase Fluid and Heat Flow Processes in Nuclear Waste Isolation,
K. Pruess, University of California, Berkeley, CA, USA (invited paper)

9:00 VI/14 Mass Transfer in the London Clay, Southeast England,
P. J. Bourke, D. Gilling, N. L. Jefferies, D. A. Lever, T. R. Lineham, Harwell, Laboratory, UKAEA, Oxon OX11 ORA, UK

9:20 VI/15 Transport of Uranium in Topopah Spring Tuff: An Ion-Microscope Investigation,
D. Phinney, K. McKeegan, V. M. Oversby, M. Buchholtzten Brink, D. K. Smith, Lawrence Livermore National Laboratory, Livermore, CA, USA

9:40 VI/16 Interactions and Transport of Plutonium-Humic Acid Particles in Groundwater Environments,
G. Bidoglio, A. De Plano, CEC, JRC, Ispra, Italy; *L. Righetto,* University of Milano, Italy

10:00 VI/17 Colloid Investigations in the "Poços de Caldas" Natural Analogue Project,
N. Miekeley, H. C. Jesus, C. L. P. Silveira, I. L. Kuechler, Pontifical Catholic University, Rio de Janeiro, Brazil

10:20-10:40 Break

10:40 VI/18 Modeling of Nickel Sorption and Speciation in a Natural Sediment-Groundwater System,
V. Koß, TU Berlin, Germany

11:00 VI/19 The Migration Behaviour of Transuranium Elements in Gorleben Aquifer Systems: Colloid Generation and Retention Process,
J. I. Kim, G. Buckau, H. Rommel, B. Sohnius, TU München, Garching, Germany

11:20 VI/20 Investigation into the Migration Behaviour of Problemelements and Leachates from Intermediate Level Waste,
Ch. Keiling, G. Marx, FU Berlin, Germany

11:40 VI/21 Testing Safety Assessment Models Using Natural Analogues in High Natural-Series Groundwaters. The Second Year of the Poços de Caldas Project,
J. A. T. Smellie, Swedish Geological Co. Uppsala, Sweden; *N. Chapman*, British Geological Survey, Nottingham, UK; *I. McKinley*, NAGRA, Baden, Switzerland; *E. Penna Franca*, Federal University of Rio de Janeiro, Brazil; *M. Shea*, Battelle Project Management Division, Chicago, USA

12:00 A Far Side Look in the Scientific Basis for Nuclear Waste Management,
M. J. Apted, Battelle, PNL, Richland, WA, USA (invited speaker)

12:30-14:00 Lunch

Poster Session B
(Sessions V, VI)
14:00-18:00
Chairs: *V. M. Oversby*, University of California, CA, USA;
I. G. McKinley, NAGRA, Baden, Switzerland;
K. D. Reeve, Australian Nuclear Science and Technology Organization, Lucas Heights, Menai NSW, Australia

B/1 Borosilicate Waste Glass as a Component of the Engineered Barrier System in a Geologic Repository,
K. A. Chacey, U.S. Department of Energy Headquarters, Washington, D C. USA; *D. A. Turner*, Westinghouse Hanford Company, Richland, WA, USA (withdrawn)

B/2 MELODIE: A Code for Risk Assessment of Waste Repositories in Deep Geological Formations,
J. Lewi[1], *M. J. Mejon-Goula*[1], *P. Goblet*[2], *A. Cernes*[1], [1]CEA, Fontenay-aux-Roses, France; [2]Ecole Nationale Supérieure des Mines de Paris, Fontainebleau, France

B/3 Condiment: Source Code for Risk Assessment of French Nuclear Waste Repository,
J. P. Mangin, E. Mouche, P. Lovera, CEA/DRDD/SESD, Fontenay-aux-Roses, France; *H. Nguyen Ngoc*, CISI/II, Gif-sur-Yvette, France

B/4 The Incorporation of Spatial and Temporal Variability in the Near-Field Thermal Environment into a Repository Source-Term Model,
A. M. Liebetrau, M. K. Altenhofen, D. W. Engel, Pacific Northwest Laboratory, Richland, WA, USA

B/5 Safety Analysis of a Sub-Seabed Repository of HLW,
A.-D. Karpf, Dornier System, Friedrichshafen, Germany

B/6 A Preliminary Safety Analysis for Selecting Candidate Disposal Sites,
C.-K. Park, H.-S. Lee, K.-W. Han, H.-H. Park, Korea Advanced Energy Research Institute, Choongnam, Korea (Rep. of)

B/7 Application of the Monte Carlo Method in the Performance Assessment of a Hypothetical HLW Repository in Salt,
A. Nies, GSF, Braunschweig, Germany

B/8 In-Situ Migration Experiments in the Boom Clay at Mol,
M. Monsecour[1], *A. Fonteyne*[1], *M. Put*[1], *H. Yoshida*[2], *P. De Regge*[1], [1]SCK/CEN, Mol, Belgium, [2]PNC CHUBU OFFICE, Tokyo, Japan

B/9 In-Situ Stress Measurements – Results of Experiments Performed at the Asse Salt Mine – Federal Republic of Germany,
H.-K. Feddersen, GSF, Braunschweig, Germany

B/10 In-Situ Testing of Nuclear Waste Forms in a Clay Laboratory – Results After Two Years Corrosion,
P. Van Iseghem, W. Timmermans, B. Neerdael, SCK/CEN, Mol, Belgium

B/11 Chemical Evolution of Water and Brines in Contact with Different Zechstein Salt Formations,
H.-J. Herbert, W. Sander, GSF, Braunschweig, Germany

B/12 A Channeling Experiment to Study Flow and Transport in Natural Fractures,
H. Abelin, L. Birgersson, T. Ågren, CHEMFLOW AB, Stockholm, Sweden; *I. Neretnieks,* The Royal Institute of Technology, Stockholm, Sweden

B/13 Engineered Barriers for High Level Waste Disposal in Granite. Mechanical Properties of Swelling Clays,
D. Broc, F. Plas, CEA, DRDD/SESD, CEN, Fontenay-aux-Roses, France; *J. C. Robinet,* Lille University, France

B/14 Water Uptake and Swelling Pressure in a Bentonite-Based Backfill,
G. Kahr, F. Bucher, P. A. Mayor, ETH Zürich, Switzerland

B/15 The Speciation of Uranium and Thorium at the Broubster Natural Analogue Site, Caithness, Scotland,
D. Read, WS Atkins Engineering Sciences, Epsom, Surrey, UK; *P. J. Hooker,* British Geological Survey, Keyworth, Notts, UK

B/16 The Solubility of Amorphous and Crystalline Schoepite in Neutral to Alkaline Aqueous Solutions,
J. Bruno, A. Sandino, The Royal Institute of Technology, Stockholm, Sweden

B/17 The Solubility and Sorption of Radium and Tin in a Cementitious Near-Field Environment,
S. Bayliss, F. T. Ewart, R. M. Howse, S. A. Lane, N. J. Pilkington, J. L. Smith-Briggs, S. J. Williams, Harwell Laboratory, UKAEA, Oxon OX11 ORA, UK

B/18 Validation of the SKBU1 Uranium Thermodynamic Data Base for its Use in Geochemical Calculations with EQ 3/6,
J. Bruno, The Royal Institute of Technology, Stockholm, Sweden; *I. Puigdomenech,* Studsvik AB, Nyköping, Sweden

B/19 Complexation of Europium (III) with Carbonate Ions in Groundwater,
A. Chatt, R. R. Rao, Dalhousie University, Halifax, Nova Scotia, Canada

B/20 Speciation of Transuranic Ions in Groundwater by Laser-Induced Photoacoustic Spectroscopy (LPAS),
R. Klenze, J. I. Kim, TU München, Germany

B/21 Determining the Importance of Radiolysis on Waste Package Performance,
M. G. Plepho, P. J. Turner, P. W. Reimus, Pacific Northwest Laboratory, Richland, WA, USA

B/22 Laboratory Investigation into the Radiolytic Gas Generation from Rock Salt. A Study Related to the Disposal of High Level Radioactive Waste,
N. Jockwer, J. Mönig, GSF, Braunschweig, Germany

B/23 Geochemical Analogue Study in the Krunkelbach Mine, Menzenschwand, Southern Germany.
I Geology and Water-Rock Interaction.
II Uranium Transport and the Partitioning of U, Th and Ra Isotopes Between Solid and Aqueous Phases.
B. Hofmann, Mineralogisch-petrographisches Institut, Bern, Switzerland; *J. P. L. Dearlove, D. C. Green,* Cambridgeshire College of Arts and Technology, Cambridge, UK; *M. Ivanovich,* Harwell Laboratory, UKAEA, Oxon OX11 ORA, UK

B/24 A Uranium Geochemical Study at the Natural Analogue Site of Needle's Eye, S. W. Scotland,
P. D. Roberts[1], T. K. Ball[1], P. J. Hooker[1], A. B. MacKenzie[2], A. E. Milodowski[1], R. D. Scott[2], [1]British Geological Survey, Keyworth, Nottingham, UK; [2]Scottish Universities Research and Reactor Centre, Glasgow, UK

B/25 U-Th-REE Mobility and Diffusion in Granitic Environments during Alteration of Accessory Minerals and U-Ores: A Geochemical Analogue to Radioactive Waste Disposal,
M. Cathelineau, M. Vergneaud, CREGU and GS CNRS-CREGU, Vandoeuvre-lès-Nancy, France

B/26 Modeling of the Mixing of Cement Pore Water and Groundwater Using the PHREEQE Code,
I. Lundén, Chalmers University of Technology, Göteborg, Sweden; *K. Andersson,* Lindgren o Andersson HB, Surte, Sweden

B/27 Coupled Chemical Reaction and Transport: Results of Experiments with Granite and Groundwater,
J. A. Dill, N. H. Uziemblo, F. N. Hodges, M. J. Apted, D. L. Lane, Pacific Northwest Laboratory, Richland, WA, USA

B/28 Equilibrium Leach Testing of Intermediate Level Waste,
W. Heafield, P. Barlow, A. Hunt, BNFL, Warrington, Cheshire, UK

B/29 The Mathematical Modelling of the Radionuclide Migration Around Uranium Ore Bodies – A Natural Analogue of Nuclear Waste Repositories,
D. Hu, Tsinghua University, Beijing, China
(withdrawn)

B/30 Measurement of In-Situ Distribution Factors for Longer-Lived Radionuclides in the U and Th Decay Chains,
M. Ivanovich, G. Longworth, M. A. Wilkins, S. E. Hasler, M. J. Lloyd, Harwell Laboratory, Oxon OX11 ORA, UK

B/31 Coupling Between a Geochemical Model and a Transport Model of Dissolved Elements,
P. Jacquier, CEA, Fontenay-aux-Roses, France; *A. Coundrain-Ribstein, A. Vinsot*, Ecole Nationale Supérieure des Mines de Paris, Fontainebleau, France; *J. M. Vinson*, CEA, Saint Paul lez Durance, France

B/32 Determination of Technetium and Selenium Transport Properties in Laboratory Soil Columns,
J. A. Del Debbio, T. R. Thomas, Westinghouse Idaho Nuclear Co., Idaho Falls, Idaho, USA

B/33 The Effect of Ground Water – Rock Interactions on the Migration of the Redox Sensitive Radionuclides,
S. Suksi, M. Siitari-Kauppi, E.-L. Kämäräinen, University of Helsinki, Finland; *A. Lindberg*, Geological Survey of Finland, Espoo, Finland

B/34 Sorption Properties of Natural Sulfides with Respect to Technetium,
W.-D. Bock, H. Brühl, C. Trapp, A. Winkler, FU Berlin, Germany

B/35 Effect of Humic Substances on Americium (III) Retention onto Silica,
V. Moulin, D. Stammose, CEA, SESD, Fontenay-aux-Roses, France

B/36 Diffusion of Plutonium (IV) in Dense Bentonite-Based Materials,
H. D. Sharma, University of Waterloo, Ontario, Canada; *D. W. Oscarson*, AECL, WNRE, Pinawa, Manitoba, Canada

B/37 Diffusion of Chloride and Uranium in Compacted Sodium Bentonite,
A. Muurinen, P. Penttilä-Hiltunen, K. Uusheimo, Technical Research Centre of Finland, Espoo, Finland

B/38 Migration of Cesium in Buffer Material of Natural Mordenite,
Chun-Nan Hsu, Hwai-Ping Cheng, National Tsing Hua University, Taiwan, R. O. C.

B/39 Thermal Simulation of Drift Emplacement for Direct Disposal of Spent Fuel – Evaluation of the Backfilling Technique –,
H.-J. Engelmann, B. Hartje, C. Schrimpf, K.-H. Wildt, DBE, Peine, Germany

B/40 Dams as Sealing Systems in Rock Salt Formations – Test Dam Construction –,
H.-J. Engelmann, H. Fischer, DBE, Peine, Germany; *M. Schmidt*, GSF, Braunschweig, Germany; *M. Wallner*, BGR, Hannover, Germany

B/41 A Sorption Information Database on Micro-Computer,
B. Rüegger, J. C. Parneix, OECD Nuclear Energy Agency, Paris, France; *K. V. Ticknor*, AECL, WNRE, Pinawa, Canada

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Social program

Sunday, October 9, 1988 6 p.m. - 9 p.m.
Welcome-reception at the ICC

CHANGE IN SCHEDULE

Monday, October 10, 1988 7.30 p.m.
Reception by the Senate of Berlin in the Martin-Gropius-Bau

Transportation: Buses leave ICC at 7 p.m. and leave Gropius-Bau at 9.30 p.m.

Registration fee:

The registration fee is DM 500,-- if payed until September 1st. Late registration fee (after September 1st) will be DM 550,--. The registration fee includes:

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- reception by the Senate of Berlin on Monday

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