

INTERNATIONAL ATOMIC ENERGY AGENCY

**Technical Committee Meeting
on Feasibility and Motivation for Hybrid Concepts for
Nuclear Energy Generation and Transmutation,**
Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas
(CIEMAT)
Madrid, Spain, 17-19 September 1997.

Agenda

Wednesday, 17 September 1997

- 10:00 Opening: Mr. P. E. Juhn, Director, Division of Nuclear Power and the
Fuel Cycle, IAEA; Mr. Felix Yndurain, Director General, CIEMAT
Information - V. Arkhipov, Scientific Secretary
Introduction of participants
10:25 Approval of Agenda

**Workshop-pre-meeting seminar: ADS in future nuclear fuel cycles
and waste management**

Chair: Mr. Felix Yndurain, Director General, CIEMAT, Mr. J. L. Díaz Díaz, Director
DFN, CIEMAT

- 10:30 **W.1 CERN CONCEPT OF ADS**
(Prof. C. Rubbia)
- 11:50 Discussion
- 12:00 LUNCH
- 14:00 **W.2 OMEGA PROGRAM & NEUTRON SCIENCE PROJECT
FOR DEVELOPING ACCELERATOR HYBRID SYSTEM AT
JAERI**
(T. Mukaiyama, Japan Atomic Energy Research Institute)
- 15:20 **W.3 LOS ALAMOS ATT PROGRAMME**
(Mr. Francesco Venneri, LANL, USA)
- *** W.4 "French Project" paper will be presented on 18 September 1997

16:40 COFFEE BREAK (20 minutes)

Session 1: General Issues and Motivations

Chair: Mr. O. Shvedov, ITEP, Russia, Mr. H. Takahashi, BNL, USA

17:00 **S1.01 TRANSMUTATION OF MINOR ACTINIDES BY MEANS OF SUBCRITICAL REACTORS**

E. Mínguez, J. García, J.M. Martínez-Val and J.M. Perlado
Institute of Nuclear Fusion, UPM, Madrid, Spain

17:20 **S1.02 THE ACCELERATOR DRIVEN REACTOR FOR MEETING FUTURE ENERGY DEMAND**

H. Takahashi, Y. Yang and Y. An
Brookhaven National Laboratory, Upton, New York, 11973 USA

17:40 **S1.03 A PROTOTYPE ACCELERATOR DRIVEN SYSTEM IN BELGIUM: THE MYRRHA PROJECT**

L. Van Den Duerpel, H. Ait Abderrahim, P. D'hondt, G. Minsart ,
J.L. Bellefontaine, S. Bodart, B. Ponsard, F. Vermeersch,
W. Wacquier, SCK CEN, Boeretang 200, B-2400 Mol

18:00 **S1.04 A CONCEPTUAL STUDY OF HYBRID SYSTEM FOR NUCLEAR ENERGY GENERATION AND TRANSMUTATION AT CIAE**

Shi Yongqian
(China Institute of Atomic Energy, Beijing,- China 102413)

18:20 **S1.05 ELECTRONUCLEAR PROGRAMME OF ITEP AND COLLABORATION OF INSTITUTES OF RUSSIA**

Shvedov O.V. (SSC RF ITEP Moscow)

18:50 Discussion

19:00 End of the 1st day

Thursday, 18 September 1997

Session 1: General Issues and Motivations (continuing)

Chair: Prof. Rubbia, CERN, Mr. T. Mukaijama, JAERI

9:00 **S1.06 NUCLEAR WASTE INCINERATION - THE CASE FOR ADS?**

J. Magill, P. Peerani, and J. van Geel, TRU, Karlsruhe, Germany.
H. Rief

Institute for Systems, Informatics, and Safety (ISIS), Ispra, Italy

- 9:20 S1.07 **ROLE OF HYBRID SYSTEMS IN WASTE
TRANSMUTATION**
P. Wydler, PSI, Switzerland
- 9:50 S1.08 **ACCELERATOR DRIVEN SUBCRITICAL SYSTEMS
WITH ENHANCED NEUTRON MULTIPLICATION**
S.R. Dogwekar, S.V. Lawande and S. S. Kapoor, BARC, India
- 10:10 S1.09 **IMPACT OF NUCLEAR WASTE TRANSMUTATION
USING HYBRID SYSTEMS ON US NUCLEAR WASTE
MANAGEMENT STRATEGIES**
Mr. Francesco Venneri, LANL, USA
- 10:30 S1.10 **ACCELERATORS IN ARGENTINA**
A. J. Kreiner, CNEA

10:50 COFFEE BREAK

Session 2: Accelerator Technology: Specific requirements and features

Chair: Mr. S. S. Kapoor, BARC, Mr. G. Heusener (Karlsruhe, Germany)

- 11:10 S2.01 **HYBRID SYSTEM CONCEPTS FOR NUCLEAR WASTE
TRANSMUTATION**
T. Takizuka
Head, Transmutation Engineering Division of Nuclear Reactor
Engineering, JAERI, 319-11 Japan
- 11:30 S2.02 **DEVELOPMENT OF HIGH INTENSITY PROTON
ACCELERATOR**
Motoharu Mizumoto, Japan Atomic Energy Research Institute
- 11:50 S2.03 **PROTON BEAM ACCELERATOR REQUIREMENT
FOR ACCELERATOR DRIVEN REACTOR**
H. Takahashi, Y. Zhao, Y. An, Y. Yamazaki.
Brookhaven National Laboratory, Upton, NY 11973.
- 12:10 LUNCH

Session 3: Development of ADS-oriented codes and methods

Chair: Mr. Salvatores, CEA, Cadarache, France, Mr. J. Magill, TRU, Karlsruhe

- 14:00 S3.01 **A HEURISTICAL SENSITIVITY APPROACH TO THE
ANALYSIS OF SOURCE DRIVEN SYSTEMS**

Mr. Augusto Gandini, ENEA-DRI, CRE-Cassacia, Italy

- 14:30 **S3.02 REACTIVITY CALCULATIONS ON MOLTEN-LEAD HYBRID REACTORS**
J.M.Martínez-Val, M.Perlado, E.Mínguez
E.T.S.I. Industriales, Madrid Polytechnic University, Spain
- 14:50 **S3.03 SELECTED PROPERTIES OF ACCELERATOR-DRIVEN SUBCRITICAL SYSTEMS FOR TRANSMUTATIONS**
Mr. Stefan Taczanowski
Faculty of Physics and Nuclear Techniques, University of Mining and Metallurgy, Cracow 30 059, Poland
- 15:10 **S3.04 METHOD OF TRANSMUTATION TRAJECTORIES ANALYSIS IN ACCELERATOR-DRIVEN SYSTEMS**
Jerzy Cetnar
Faculty of Physics and Nuclear Techniques, University of Mining and Metallurgy, Cracow 30 059, Poland
- 15:30 COFFEE BREAK (20 minutes)

Session 3: Development of ADS-oriented codes and methods (continuing)

Chair: Mr.S.Chigrinov, IRPCP, Belarus, Mr. A. Gandini, ENEA, Italy

- 15:50 **S3.05 CREATION OF NUCLEAR DATA BASE UP TO 150 MEV AND CORRESPONDING SCALING APPROACH FOR ADS**
Iouri Choubin, IPPE, Obninsk, RF
- 16:10 **S3.06 NEUTRONIC DESCRIPTION OF ACCELERATOR DRIVEN SYSTEMS: COUPLING OF MC AND LOW ENERGY NEUTRON TRANSPORT CODES AS APPLIED IN THE FIELD OF ADS**
L. Van Den Duerpel, H. Aït Abderrahim, G. Minsart, W. Wacquier
SCK CEN, Boeretang 200, B-2400 Mol
- 16:30 **S3.07 IAEA ADS-NEUTRONIC BENCHMARK**
I. Slessarev, CEA, France
- 17:00 **S3.08 IAEA ACCELERATOR DRIVEN SYSTEM NEUTRONIC BENCHMARK**
J.A.T. Wallnius, W. Gudowski, A Solean

KTN, Stockholm, Sweden

- 17:10 **S3.09 CALCULATION MODEL FOR ACCELERATOR DRIVEN SYSTEMS**
S.Chigrinov, A.Kievitskaia, I.Rakhno, C.Routkovskaia
Institute of Radiation Physics and Chemistry Problems, National
Academy of Sciences, Republic of Belarus, 220109, Sosny, Minsk
- 17:20 **W.4 HYBRID SYSTEMS FOR NUCLEAR WASTE TRANSMUTATION PROJECT IN FRANCE**
(M. Salvatores, CEA)
- 18:00 End of the 2nd day

Friday, 19 September 1997

Session 4 ADS Development and Experiments

Chair: Mr. F. Venneri, LANL, Mr. M. Hron, NRI, CZ

- 9:00 **S4.01 THE LA-0 PROJECT FOR COMPLEX TESTING OF NUCLEAR INCINERATION SYSTEMS**
Miloslav Hron and Vladimir Lelek,
Nuclear Research Institute Rez plc, CZ-250 68 Rez, Czech Republic
- 9:20 **S4.02 EXPERIMENTAL FACILITY FOR RESEARCH OF ACCELERATOR DRIVEN SYSTEMS**
S.Chigrinov, A.Kievitskaia, I.Rakhno, C.Routkovskaia,
A.Khilmanovich*
Institute of Radiation Physics and Chemistry Problems, National
Academy of Sciences, Republic of Belarus 220109, Sosny, Minsk
*Institute of Physics, National Academy of Sciences,
Republic of Belarus, 220095, Skorina pr. Minsk
- 9:40 **S4.03 UPDATE OF TARC EXPERIMENT RESULTS**
Enrique M. González, CIEMAT, Spain (on behalf of the TARC
collaboration)
- 10:00 COFFEE BREAK

Session 5 ADS Targets (solid and liquid)

Chair: Mr. Hugon, EC, Mr. W. Gudowski, KTN, Sweden

- 10:20 **S5.01 ACCUMULATION OF LONG-LIVED ACTIVITY AND OTHER CHARACTERISTICS OF HEAVY METAL LIQUID TARGETS**

Iouri Choubin, IPPE, Obninsk, RF

10:40 **S5.02 MOLTENSALT REACTOR TECHNOLOGY & HYBRID CONCEPTS FOR NUCLEAR ENERGY GENERATION AND TRANSMUTATION**

V. Ignatiev, P. Alekseev, S. Konakov, N. Ponomarev-Stepnoi,
V. Prusakov, S. Subbotine, RRC - Kurchatov Institute, Moscow, RF

11:10 **S5.03 NEUTRON DAMAGE OF SOME REFRACTORY, CORROSION RESISTANT CANDIDATE MATERIALS**

J.M. Perlado, J.M. Martínez-Val, E. Mínguez, E. Alonso,
R. Fernández, J. García, C. Rubbia**, J.A. Rubio**
Institute of Nuclear Fusion - ETSII - UPM, Madrid
**Emerging Technologie - CERN, Geneve

11:30 Discussion

12:00 LUNCH

14:00 **Session 6: Panel discussion**

Chair: Mr. J. M. Aragonés Beltrán, (Spain); Mr. José L. Díaz, (Spain)

Incentives and Motivations

10 min's Chairmen's statements to summarize the outcome of the topical sessions and to draw conclusions.

5 min's Statements of delegations on **Incentives and Motivations**

Closing remarks: (CIEMAT, IAEA)

17:00 End of AGM

Invited papers are underlined