

# PROCEEDING CONVERSION NUCLEAR WARHEADS FOR PEACEFUL PURPOSES

## TABLE OF CONTENTS

FOREWORD	5
PROGRAMME OF THE SYMPOSIUM	11
PAPAL AUDIENCE IN THE VATICAN	19
INAUGURAL SESSION	
Message of the Hon. GIULIO ANDREOTTI	23
Address of Senator IVO BUTINI	27
Welcome to the Participants by Mons. ELIO SGRECCIA	31
Opening Adress by Amb. VINCENZO TORNETTA	35
CONCLUDING SESSION	
The Final Round Table	41
Annex: Possible Role of the OECD/Nuclear Energy Agency (NEA)	55
CONCLUSIONS	61
LIST OF PARTICIPANTS	67

## Indice

Prof. Arnaldo M. ANGELINI Presidente Onorario dell'ENEL	
Introduzione .....	1
Progetto integrato di sviluppo su base etica: DISARMO NUCLEARE, ENERGIA PER UNA STRATEGIA INDUSTRIALE, SVILUPPO DEL MONDO	
Documento di Riferimento .....	3
Comitato Promotore del Progetto .....	11

## Seminario di Studio

Mons. Prof. Elio SGRECCIA Presidente "Scienziati e Tecnologi per l'Etica dello Sviluppo"	
Saluto ai Partecipanti .....	15
Prof. Vittorio M. CANUTO Esperto di Armi Nucleari	
Giganti Nucleari e Pigmei Etici? .....	19
Prof. Edoardo AMALDI Presidente Accademia Nazionale dei Lincei	
Il Disarmo Nucleare e la Possibilità di Impieghi Civili dei Materiali Fissili Militari .....	33
Prof. Mario SILVESTRI Politecnico di Milano	
Processi Tecnologici per la Riconversione delle Testate Nucleari .....	41
Dott. Luigi ABETE Vice Presidente	
Dott. Maurizio LEBOFFE Responsabile "Ambiente ed Energia" - Confindustria -	
Industria Manifatturiera e Nuova Disponibilità di Energia .....	47

I

## Tavola Rotonda

Prof. Renato Angelo RICCI .....	55
Presidente della Società Europea di Fisica Presidente della tavola rotonda	
Prof. Carlo BERNARDINI .....	56
Presidente del Consiglio Scientifico della Unione Scienziati per il Disarmo (USPID)	
Prof. Johann SCHASCHING s.j. ....	58
Consulente - Pontificio Consiglio della Giustizia e della Pace Santa Sede	
Prof. Enrico JACCHIA .....	59
Direttore del Centro Studi Strategici - LUISS	
Amb. Vincenzo TORNETTA .....	60
Vice Presidente Fondazione "Alcide De Gasperi"	
Prof.ssa Elisabetta ZUANELLI SONINO .....	64
Consigliere per l'Informazione - Presidenza del Consiglio - Dipartimento per gli Affari Sociali	

## Comunicazioni

Prof. Giulio QUERINI .....	68
Università "La Sapienza" - Roma e Pontificia Università Gregoriana.	
Dott. Vittorio UGGA .....	69
"Scienziati e Tecnologi per l'Etica dello Sviluppo"	

## Conclusioni

Dott. Giovanni NOCCO .....	71
Direttore Amministrativo - LUISS Comitato di Collegamento di Cattolici	
Ing. Giuseppe ROTUNNO .....	72
Segretario "Scienziati e Tecnologi per l'Etica dello Sviluppo"	

II

## TABLE OF CONTENTS

FOREWORD .....	9
OPENING REMARKS .....	11
FIRST SESSION THE NUCLEAR DISARMAMENT PROCESS: A GLOBAL VIEW	
R.L. GARWIN Steps Toward the Elimination of Almost All Nuclear Warheads .....	17
Safe, secure dismantlement and destruction of 50,000 excess nuclear warheads? .....	21
V.N. MIKHAILOV Nuclear weapons complex conversion and nuclear disarmament in the Russian federation .....	23
A. ROSSBACH Prospects of Nuclear Disarmament in a Changing World .....	29
J. JOBLIN S.J. Ethical Values, Disarmament and Development .....	35
C.E. PAINE T.B. COCHRAN The U.S. Go-It-Alone Arms Reduction Plan .....	43
SECOND SESSION TECHNOLOGIES OF CONVERSION OF NUCLEAR MATERIALS	
M. SILVESTRI The feasibility studies of the Italian Working Group .....	51
Y.J. MIKERIN Elimination of nuclear weapons management of recovered materials .....	54
R. ADINOLFI The Burning of Uranium Originated by Nuclear Disarmament in Nuclear Power Stations .....	56
G. VENDRYES Plutonium Burning in Fast Reactors and as MOX Fuel .....	61
J. SCHULZE Burning of Plutonium in Light Water Reactors (MOX fuel Elements) Compared to Other Treatment .....	65
C. LOMBARDI E. CERRAI Burning weapon-grade PU in ad hoc designed reactors? .....	75
M. CUYPERS H. DWORSCHAK Safeguards in an Evolving Nuclear Environment .....	78
K. UEMATSU Comments on "the dilution process of uranium from nuclear warheads" .....	88
THIRD SESSION ECONOMIC ASPECTS OF CONVERSION	
Prof. C. SALVEITI .....	93
M. CUMO General Economic Evaluation of the Reconversion of Nuclear Warheads Into Electric Power .....	95

V.N. SOLOVIN Development of production processes for U-Pu fuel on military material base to be used in nuclear power .....	98
E. LAZZARINI A few considerations on the utilization of Nuclear Materials from Disarmament .....	106
R. UEMATSU The technological and economic aspect of Plutonium Utilization in Fusion Reactors .....	109
Comments on "weapon grade uranium and the nuclear fuel market" .....	116
F. von HIPPEL Control and Disposition of Nuclear-Weapons Materials .....	119
T.B. COCHRAN Disposition of Plutonium and HEU from Weapons .....	129
FOURTH SESSION OUTLOOK OF A SAFE AND FEASIBLE CONVERSION PROGRAM RESPONSIBILITIES OF INTERNATIONAL ORGANIZATION	
R.A. RICCI .....	135
S.A. ZELENTSOV Nuclear warheads conversion project. General objectives .....	136
S.A. PETER Control and Disposition of Nuclear-Weapons Materials .....	144
U. FARINELLI International Scientific Cooperation in the Disarmament Process .....	149
H.M. AGNEW Demilitarization: Future Potential for Worldwide Nuclear Energy .....	158
V. LEBECK Abilities of Nuclear Research in Czechoslovakia: participation of countries not possessing nuclear weapons .....	166
K. UEMATSU The international community and the disarmament process .....	173
Y. van DIEVOET Conversion of Nuclear Warheads: for peaceful purposes an Industrial Point of View .....	177
Author's address and programme in volume III	

## Contents

<i>Gen</i>	Conversion of nuclear warheads into energy for the development of the world .....	3
Feasibility study: <i>Amuldo</i>	Design guide for technical-industrial studies .....	25
Feasibility study: <i>Enes - Amuldo</i>	Treatment of fissile material recovered from dismantled nuclear warheads for use as fuel for nuclear power plants .....	63
Feasibility study: <i>Enel</i>	The problems associated with enrichment plants in relation with the peaceful use of uranium coming from nuclear warheads .....	85
Feasibility study: <i>Enes</i>	Foreseeable market impact of uranium recovered from dismantled nuclear warheads .....	115
Feasibility study: <i>Amuldo</i>	Burning in civil nuclear power plants of the uranium from nuclear disarmament .....	157
Feasibility study: <i>Enel</i>	An economic evaluation of the reconversion of uranium from nuclear warheads into electric power .....	203
Feasibility study: <i>Amuldo-Enes-Enel</i>	Peaceful utilization of the military nuclear material for the production of electricity .....	221

## Contents

<i>See</i>	Conversion of nuclear warheads into energy for the development of the world .....	3
Feasibility study: <i>Arnaldo</i>	Design guide for technical-industrial studies .....	25
Feasibility study: <i>Enea - Arnaldo</i>	Treatment of fissile material recovered from dismantled nuclear warheads for use as fuel for nuclear power plants .....	63
Feasibility study: <i>Enef</i>	The problems associated with enrichment plants in relation with the peaceful use of uranium coming from nuclear warheads .....	85
Feasibility study: <i>Enea</i>	Foreseeable market impact of uranium recovered from dismantled nuclear warheads .....	115
Feasibility study: <i>Arnaldo</i>	Burning in civil nuclear power plants of the uranium from nuclear disarmament .....	157
Feasibility study: <i>Enef</i>	An economic evaluation of the reconversion of uranium from nuclear warheads into electric power .....	203
Feasibility study: <i>Arnaldo-Enea-Enef</i>	Peaceful utilization of the military nuclear material for the production of electricity .....	221