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OF ATOMIC ENERGY

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## FOREWORD

The Fourth International Conference on the Peaceful Uses of Atomic Energy, held at Geneva from 6 to 16 September 1971 under the Presidency of Glenn T. Seaborg, was jointly sponsored by the United Nations and the International Atomic Energy Agency. The conference sessions were held at the Palais des Nations. During the same period a Governmental Scientific Exhibition on the theme "Atoms for Development" was displayed at the Palais des Expositions in Geneva.

The Proceedings are published in 15 main volumes, fourteen of which contain all the 514 papers presented at the conference. The papers are printed in English, French, Russian or Spanish, and the abstracts in all four languages; the discussions are in English. The fifteenth volume contains a Subject Index, an Author Index (including discussion contributors), a Paper Number Index, a complete Contents List of all volumes, and a List of Delegations. There are three supplementary volumes containing the discussions in French, Russian and Spanish respectively.

The conference, which attracted more than four thousand participants, observers and journalists, was planned to interest not only scientists and technologists but also public officials, economists and planners. It thus had a somewhat broader scope than the conferences of 1955, 1958 and 1964. The main topics were grouped under the following six headings: nuclear power; nuclear fuels and materials; health, safety and legal aspects; isotopes and irradiation; international and administrative aspects; and selected subjects of particular interest to developing countries.

The fourth Geneva Conference proved again to be an exceptional forum enabling those working throughout the world on the peaceful application of atomic energy to exchange the latest information on the discoveries, projects and problems of both developed and developing nations.

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- VOLUME 2 Performance of nuclear plants; costing of nuclear plants; fuel management.
- VOLUME 3 Safety aspects of nuclear plants; legal aspects of nuclear energy.
- VOLUME 4 Integration of nuclear plants in electrical networks; integrated planning of nuclear industry; fuel materials technology.
- VOLUME 5 Breeder and advanced converter reactors.
- VOLUME 6 Small and medium power reactors; desalination and agro-industrial complexes; role of research reactors; impact of nuclear energy in developing countries.
- VOLUME 7 Advanced energy concepts; peaceful nuclear explosions; special applications, including ship propulsion; controlled thermonuclear reactions; application of transuranium isotopes.
- VOLUME 8 Uranium and thorium ore resources; fuel fabrication and reprocessing.
- VOLUME 9 Isotope enrichment; fuel cycles; safeguards.
- VOLUME 10 Effects of irradiation on fuels and materials.
- VOLUME 11 Health physics and radiation protection; radioactive waste management; the environment and public acceptance.
- VOLUME 12 Nuclear methods in food production; education and training, and public information.
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## **SUBJECT INDEX**

## COMPILER'S NOTE

The compiler used, as the starting point for this Subject Index, the sets of descriptors chosen by the INIS staff from the INIS Thesaurus. However, the prime aim of INIS indexing is document retrieval, for which several descriptors are normally used in combination. For the present index, therefore, terms have been rearranged, added and omitted in order to obtain a suitable 'keyword' listing. Cross-referencing has been included to aid the user.

An attempt has been made to index in some depth, giving attention to sections in a paper that touched on topics or items not implicit in the title or abstract: the Panels and the discussions have also been indexed.

In general, therefore, the Subject Index contains keywords of a more-or-less narrow subject scope. However, it is possible to search a broader concept by:

- (i) either consulting the list below or the Topical Agenda on pages 172-175, noting the volume of interest, *and then*  
consulting the relevant contents from among the collected contents lists on pages 3-42 of the present volume to obtain the titles of individual papers;  
*and finally*
- (ii) looking up associated keywords in the Subject Index to find related references in the other volumes.

## SUMMARY OF VOLUME CONTENTS

- 1 Opening and closing speeches; special talks; world energy needs and resources, and the role of nuclear energy; national and international organizations; narrative of the exhibits.
- 2 Performance of nuclear plants; costing of nuclear plants; fuel management.
- 3 Safety aspects of nuclear plants; legal aspects of nuclear energy.
- 4 Integration of nuclear plants in electrical networks; integrated planning of nuclear industry; fuel materials technology.
- 5 Breeder and advanced converter reactors.
- 6 Small and medium power reactors; desalination and agro-industrial complexes; role of research reactors; impact of nuclear energy in developing countries.
- 7 Advanced energy concepts; peaceful nuclear explosions; special applications, including ship propulsion; controlled thermonuclear reactions; application of transuranium isotopes.
- 8 Uranium and thorium ore resources; fuel fabrication and reprocessing.
- 9 Isotope enrichment; fuel cycles, safeguards.
- 10 Effects of irradiation on fuels and materials.
- 11 Health physics and radiation protection; radioactive waste management; the environment and public acceptance.
- 12 Nuclear methods in food production; education and training, and public information.
- 13 Medical applications; radiation biology.
- 14 Applications of nuclear techniques in industry and natural resources.

## ACKNOWLEDGEMENT

The compiler wishes to express his appreciation of the generous assistance given by the staffs of both the INIS Section and the Computer Section of the IAEA, without which the early appearance of this material would not have been possible.

## SUBJECT INDEX

Bold numerals refer to volume numbers, other numerals to pages within the volume previously indicated.

Both 'see also under . . .' and 'see . . . for . . .' cross-references are indicated by (see . . .).

Some terms have been abbreviated to comply with the computer-program requirement that both main and second-level terms contain only 30 characters. Only lower-case characters are used.

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 Андриевский, Р.А.  
**Андрюшин, И.А.**  
 Анисимова, И.А.  
 Аристархов, Н.Н.  
 Арцимович, Л.А.  
 Астрахан, Б.В.  
 Афонин, Г.С.

Abramov, V.M.  
 Agapova, N.P.  
 Agranat, V.Z.  
 Aleksandrov, A.P.  
 Aleksandrov, Yu.I.  
 Aleksakhin, R.M.  
 Aleksenko, Yu.N.  
 Aleshchenkov, P.I.  
 Alimarin, I.P.  
 Amaev, A.D.  
 Anan'ev, V.D.  
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## Б

Бабикова, Ю.Ф.	Babikova, Yu.F.
Багдасаров, Ю.Е.	Bagdasarov, Yu.E.
Байсоголов, Г.Д.	Bajsogolov, G.D.
Баканов, А.В.	Bakanov, A.V.
Баласанов, Ю.Г.	Balasanov, Yu.G.
Балукова, В.Д.	Balukova, V.D.
Барабас, К.	Barabas, K.
Барский, М.Л.	Barskij, M.L.
Батов, С.	Batov, S.
Батуров, В.В.	Batuров, B.B.
Батыгин, Н.Ф.	Batygin, N.F.
Бахуров, В.Г.	Bakhurov, V.G.
Башлыков, С.Н.	Bashlykov, S.N.
Беранек, И.	Beránek, J.
Берновская, Р.Н.	Bernovskaya, R.N.
Беспалов, Д.Ф.	Bespalov, D.F.
Бесчинский, А.А.	Beschinskij, A.A.
Беэр, А.А.	Beehr, A.A.
Бибилашвили, Ю.К.	Bibilashvili, Yu.K.
Блохин, Н.Н.	Blokhin, N.N.
Блохинцев, Д.И.	Blokhintsev, D.I.
Бобровская, Н.Д.	Bobrovskaya, N.D.
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Брежнева, Н.Е.	Brezhneva, N.E.
Брумовски, М.	Brumovský, M.
Бубнов, В.П.	Bubnov, V.P.
Бугарчев, Б.Б.	Bugarchev, B.B.
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Буров, Н.И.	Burov, N.I.
Бухтеев, В.А.	Bukhteev, V.A.
Быков, В.Н.	Bykov, V.N.

## Б

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Вотинов, С.Н.	Votinov, S.N.

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Гинзбург, К.Е.	Ginzburg, K.E.
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Головинин, И.С.	Golovnin, I.S.
Головченко, В.И.	Golovchenko, V.I.
Голутвина, М.М.	Golutvina, M.M.
Гольданский, В.И.	Gol'danskij, V.I.
Гольдин, Л.Л.	Gol'din, L.L.
Гольцев, В.П.	Gol'tsev, V.P.
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Гуров, В.М.	Gurov, V.M.
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## Ж

Жемчужников, Г.Н.	Zhemchuzhnikov, G.N.
Жернов, В.С.	Zhernov, V.S.
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Зефиров, А.П.	Zefirov, A.P.
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Зуев, В.А.	Zuev, V.A.

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 Каменецких, В.К.  
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 Карпов, В.Л.  
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 Керманов, В.П.  
 Киселев, Б.Л.  
 Клименков, В.И.  
 Князева, Г.Д.  
 Ковальская, Л.П.  
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 Ковыршин, В.Г.  
 Кодюков, В.М.  
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 Колесников, А.Г.  
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 Кондратьев, А.Н.  
 Константинов, Л.В.  
 Коротченко, К.А.  
 Корякин, Ю.И.  
 Костромина, К.Н.  
 Косяков, В.Н.  
 Котов, А.П.
- Kazachkovskij, O.D.  
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 Kalugin, A.K.  
 Kamenetskikh, V.K.  
 Kantor, S.A.  
 Kapshaninov, Yu.I.  
 Kapyrin, G.I.  
 Kardashev, A.V.  
 Karelin, E.A.  
 Karpov, V.L.  
 Karus, E.V.  
 Kermanov, V.P.  
 Kiselev, B.L.  
 Klimenkov, V.I.  
 Knyazeva, G.D.  
 Koval'skaya, L.P.  
 Kovda, G.A.  
 Kovyrshin, V.G.  
 Kodyukov, V.M.  
 Kozlov, A.G.  
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 Kolesnikov, A.G.  
 Komar, E.G.  
 Komarov, V.I.  
 Kondrat'ev, A.N.  
 Konstantinov, L.V.  
 Korotchenko, K.A.  
 Koryakin, Yu.I.  
 Kostromina, K.N.  
 Kosyakov, V.N.  
 Kotov, A.P.

Кочетков, В.К.	Kochetkov, V.K.
Кошелев, И.В.	Koshelev, I.V.
Крамеров, А.Я.	Kramerov, A.Ya.
Красин, А.К.	Krasin, A.K.
Красина, Т.А.	Krasina, T.A.
Краснояров, Н.В.	Krasnoyarov, N.V.
Крейндлин, И.И.	Krejndlín, I.I.
Крживанек, М.	Křivánek, M.
Круглов, А.Б.	Kruglov, A.B.
Кузнецов, В.А.	Kuznetsov, V.A.
Кузнецов, С.П.	Kuznetsov, S.P.
Кулемешов, Н.Ф.	Kuleshov, N.F.
Куличенко, М.Н.	Kulichenko, M.N.
Кулиш, Е.Е.	Kulish, E.E.
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Куприн, Б.И.	Kuprin, B.I.

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Ладыгин, А.Я.	Ladygin, A.Ya.
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Лаушкина, Г.А.	Laushkina, G.A.
Лебедев, И.А.	Lebedev, I.A.
Лебедев, И.Г.	Lebedev, I.G.
Лейпунский, А.И.	Lejpunskij, A.I.
Летавет, А.А.	Letavet, A.A.
Лихачев, Ю.И.	Likhachev, Yu.I.
Лобанов, В.С.	Lobanov, V.S.
Логунов, А.А.	Logunov, A.A.
Ломанов, М.Ф.	Lomanov, M.F.
Ломашев, Б.И.	Lomashev, B.I.
Ломов, В.И.	Lomov, V.I.
Лошаков, Г.А.	Loshakov, G.A.
Лугинина, Т.Н.	Luginina, T.N.
Лунина, Л.И.	Lunina, L.I.
Луценко, И.К.	Lutsenko, I.K.
Лыткин, В.Б.	Lytkin, V.B.
Лярский, П.П.	Lyarskij, P.P.
Лясс, Ф.М.	Lyass, F.M.

**М**

Мазурек, Ю.В.	Mazurek, Yu.V.
Макаров, В.М.	Makarov, V.M.
Макарова, Л.П.	Makarova, L.P.

Малов, Г.А.	Malov, G.A.
Малых, В.А.	Malykh, V.A.
Малых, Ю.А.	Malykh, Yu.A.
Малышев, С.Д.	Malyshev, S.D.
Мамиконян, С.В.	Mamikonyan, S.V.
Марей, А.Н.	Marej, A.N.
Маринич, А.М.	Marinich, A.M.
Марков, В.К.	Markov, V.K.
Марков, Ю.В.	Markov, Yu.V.
Матвеев, В.В.	Matveev, V.V.
Матвеева, М.Д.	Matveeva, M.D.
Мельникова, М.К.	Mel'nikova, M.K.
Меньшикова, Т.С.	Men'shikova, T.S.
Мехов, Н.В.	Mekhov, N.V.
Мешков, А.Г.	Meshkov, A.G.
Минакова, Е.И.	Minakova, E.I.
Минашин, М.Е.	Minashin, M.E.
Митенков, Ф.М.	Mitenkov, F.M.
Митяев, Ю.И.	Mityaev, Yu.I.
Михан, В.И.	Mikhant, V.I.
Мовшевич, З.М.	Movshevich, Z.M.
Моисеев, Л.И.	Moiseev, L.I.
Моисейцев, П.И.	Moisejtshev, P.I.
Морохов, И.Д.	Morokhov, I.D.
Мухин, В.С.	Mukhin, V.S.
Мясоедов, Б.Ф.	Myasoedov, B.F.

## H

Наумов, В.А.	Naumov, V.A.
Нахутин, И.Е.	Nakhutin, I.E.
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Невский, Б.В.	Nevskij, B.V.
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Нелепо, Б.А.	Nelepo, B.A.
Несмеянов, А.Н.	Nesmeyanov, A.N.
Несмеянова, Г.М.	Nesmeyanova, G.M.
Нестеренко, В.Б.	Nesterenko, V.B.
Неуманн, Я.	Neumann, J.
Никипелов, Б.В.	Nikipelov, B.V.
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Николаев, В.А.	Nikolaev, V.A.
Николаев, В.М.	Nikolaev, V.M.
Никулина, А.В.	Nikulina, A.V.
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Новоселов, Г.П.	Novoselov, G.P.

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 Онуфриев, В.Д.  
 Орлов, В.В.  
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Obukhov, N.V.  
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 Пименов, М.К.  
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 Поляков, Ю.А.  
 Пономаренко, В.Б.  
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 Пристер, Б.С.  
 Прохоров, В.И.  
 Прохоров, В.М.  
 Прошкин, А.А.  
 Прусаков, В.Н.  
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 Пупко, В.Я.  
 Путилова, И.Н.

Pavlov, A.S.  
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 Pasechnik, A.M.  
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 Pismannik, K.D.  
 Platonov, P.A.  
 Poddubnyj, I.Ya.  
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 Ponomarenko, V.B.  
 Popov, A.K.  
 Prister, B.S.  
 Prokhorov, V.I.  
 Prokhorov, V.M.  
 Proshkin, A.A.  
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 Pugachev, A.V.  
 Pupko, V.Ya.  
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 Renard, Eh.V.  
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 Rivkin, E.Yu.  
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Родин, В.М.	Rodin, V.M.
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Романов, Г.Н.	Romanov, G.N.
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Сычев, Р.С.	Sychev, R.S.

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Трофимов, Д.И.	Trofimov, D.I.
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P/495	2.6	4	403	E	P/080	2.10	10	321	E
P/496	2.7	9	119	E	P/081	3.1	11	125	E
P/497	2.9	2	511	E	P/082	3.1	11	3	E
P/498	2.10	10	39	E	P/085	3.3	11	575	E
P/499	2.10	10	109	E	P/086	3.3	11	631	E
P/500	2.10	10	167	E	P/087	3.3	11	559	E
P/501	2.10	10	141	E	P/089	3.4	3	423	E
P/502	2.11	10	549	E	P/091	4.3	13	127	E
P/503	2.11	10	399	E	P/092	4.3	13	13	E
P/504	2.11	10	415	E	P/093	4.4	13	361	E
P/505	3.1	11	67	E	P/098	5.1	9	323	E
P/506	4.1	12	215	E	P/101	5.2	9	511	E
P/507	4.3	13	85	E	P/102	5.5	1	585	E
P/508	4.3	13	137	E	P/103	6.3	12	481	E
P/509	4.5	14	469	E	P/677	4.4	13	487	E
P/511	5.5	1	653	E	P/723	3.3	11	529	E
P/512	3.2	11	415	E	P/833	1.7	5	345	E
P/764	2.9	2	589	E	P/836	1.14	7	445	E
					P/837	2.6	4	433	E
					P/838	2.10	10	123	E
					P/839	3.2	11	427	E
<b>UNITED STATES OF AMERICA</b>					P/840	4.5	14	29	E
P/033	1.1	1	171	E	P/841	4.6	7	487	E
P/034	1.3	2	21	E	P/842	5.2	9	413	E
P/036	1.3	2	3	E	<b>URUGUAY</b>				
P/037	1.4	2	427	E	P/108	5.4	1	551	S
P/038	1.5	3	95	E	<b>YUGOSLAVIA</b>				
P/039	1.5	3	37	E	P/347	1.2	1	353	F
P/040	1.5	3	201	E	P/348	1.10	6	315	E
P/041	1.5	3	65	E	P/349	2.1	8	73	E
P/042	1.6	4	103	E	P/350	2.6	4	491	E
P/043	3.4	3	437	E	P/351	2.7	9	181	E
P/044	1.7	5	185	E	P/352	3.1	11	53	E
P/045	1.7	5	169	E	P/354	4.1	12	201	E
P/047	1.7	5	143	E	P/355	4.2	12	373	E
P/048	1.7	5	225	E	P/358	4.4	13	459	E
P/049	1.7	5	3	E	<b>COUNCIL FOR MUTUAL ECONOMIC ASSISTANCE (CMEA)</b>				
P/050	1.9	6	99	E	P/683	5.5	1	695	R
P/051	1.9	6	229	E	<b>EUROPEAN ECONOMIC COMMUNITY (EEC)</b>				
P/052	1.11	7	167	E	<b>EURATOM</b>				
P/053	1.11	7	19	E	P/724	5.5	1	707	F
P/056	1.13	7	249	E	P/725	5.1	9	367	F
P/059	2.1	8	23	E	<b>INTER-AMERICAN NUCLEAR ENERGY COMMISSION OF THE ORGANIZATION OF AMERICAN STATES (IANEC)</b>				
P/060	2.2	4	255	E	P/755	6.3	12	417	F
P/061	2.9	2	575	E	P/756	4.1	12	33	S
P/062	2.3	8	201	E	P/757	1.1	1	185	S
P/063	2.3	8	311	E					
P/064	2.4	8	395	E					
P/065	2.4	8	445	E					
P/066	2.5	9	31	E					
P/067	2.11	10	459	E					
P/069	2.6	4	325	E					
P/071	2.7	9	131	E					
P/072	1.4	2	475	E					
P/074	2.9	2	601	E					
P/075	2.9	2	497	E					
P/077	2.10	10	53	E					

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P/206	5.5	1	683	E	P/797	4.5	14	161	E
P/760	1.8	6	57	E	<b>ORGANIZATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD)</b>				
P/762	1.12	7	211	E	<b>EUROPEAN NUCLEAR ENERGY AGENCY (ENEA)</b>				
P/770	5.1	9	385	E	P/678	2.1	8	3	E
P/772	4.1	12	49	E	P/737	5.5	1	721	E
P/773	5.2	9	487	E	P/738	1.7	5	317	E
<b>INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT (IBRD)</b>					P/767	3.4	3	389	F
P/761	6.1	6	425	E	<b>UNITED NATIONS</b>				
<b>INTERNATIONAL LABOUR ORGANISATION (ILO)</b>					P/420	1.1	1	303	E
P/851	3.1	11	181	E	P/421	6.1	6	469	F
<b>JOINT INSTITUTE FOR NUCLEAR RESEARCH (JINR)</b>					<b>UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION (UNESCO)</b>				
P/447	4.6	7	471	R	P/769	4.5	14	411	E
P/695	1.11	7	159	R	P/652	3.3	11	725	E
					P/653	4.3	13	3	E
					<b>WORLD HEALTH ORGANIZATION (WHO)</b>				

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P/006	4.5	14	197	E	P/061	2.9	2	575	E
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P/008	1.6	4	73	E	P/063	2.3	8	311	E
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P/011	1.11	7	101	E	P/065	2.4	8	445	E
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P/019	4.5	14	493	E	P/072	1.4	2	475	E
P/020	2.8	9	271	E	P/074	2.9	2	601	E
P/021	1.6	4	89	E	P/075	2.9	2	497	E
P/023	1.7	5	433	E	P/077	2 10	10	53	E
P/026	2.3	8	263	E	P/080	2.10	10	321	E
P/027	1.5	3	79	E	P/081	3.1	11	125	E
P/028	2.4	8	349	E	P/082	3.1	11	3	E
P/029	4.2	12	299	E	P/085	3.3	11	575	E
P/030	4.4	13	465	E	P/086	3.3	11	631	E
P/033	1.1	1	171	E	P/087	3.3	11	559	E
P/034	1.3	2	21	E	P/089	3.4	3	423	E
P/036	1.3	2	3	E	P/091	4.3	13	127	E
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P/040	1.5	3	201	E	P/101	5.2	9	511	E
P/041	1.5	3	65	E	P/102	5.5	1	585	E
P/042	1.6	4	103	E	P/103	6.3	12	481	E
P/043	3.4	3	437	E	P/106	6.3	12	429	E
P/044	1.7	5	185	E	P/107	4.5	14	19	F
P/045	1.7	5	169	E	P/108	5.4	1	551	S
P/047	1.7	5	143	E	P/110	4.5	14	293	E
P/048	1.7	5	225	E	P/113	4.5	14	447	E
P/049	1.7	5	3	E	P/115	4 2	12	337	E
P/050	1.9	6	99	E	P/116	1.7	5	409	E
P/051	1.9	6	229	E	P/119	2.6	4	391	E
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P/136	4.2	12	361	E	P/256	4.2	12	325	E
P/137	1.1	1	241	E	P/257	4.4	13	423	E
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P/142	3.1	11	243	E	P/265	5.2	9	523	E
P/144	1.12	7	233	E	P/266	5.5	1	731	E
P/146	2.6	4	475	E	P/270	1.6	4	35	E
P/147	4.3	13	325	E	P/272	1.5	3	23	F
P/148	1.3	2	289	E	P/274	2.3	8	295	F
P/149	1.4	2	443	E	P/275	2.6	4	363	E
P/150	1.5	3	173	E	P/277	2.7	9	149	E
P/151	1.7	5	239	E	P/278	2.9	2	611	F
P/152	1.10	6	277	E	P/280	2.10	10	89	E
P/154	2.1	8	37	E	P/285	1.8	6	19	F
P/155	2.2	4	293	E	P/286	5.2	9	449	F
P/156	2.3	8	185	E	P/287	1.11	7	191	E
P/157	2.8	9	239	E	P/288	2.10	10	179	E
P/158	2.10	10	239	E	P/290	1.5	3	359	E
P/159	2.11	10	513	E	P/291	2.3	8	327	E
P/160	3.3	11	475	E	P/293	2.9	2	645	E
P/161	4.3	13	285	E	P/294	1.3	2	337	E
P/162	4.1	12	67	E	P/295	2.10	10	257	E
P/163	4.4	13	407	E	P/296	2.11	10	443	E
P/164	4.5	14	213	E	P/298	1.2	1	383	E
P/166	5.4	1	493	E	P/299	1.9	6	185	E
P/169	5.4	1	541	E	P/300	1.1	1	289	E
P/171	1.3	2	205	E	P/301	1.3	2	321	E
P/172	1.3	2	165	E	P/302	1.3	2	75	E
P/173	1.5	3	3	E	P/303	1.3	2	93	E
P/175	1.7	5	115	E	P/304	1.5	3	129	E
P/176	1.7	5	269	E	P/305	1.5	3	241	E
P/177	1.8	6	79	E	P/306	1.6	4	3	E
P/178	1.13	7	303	E	P/307	1.3	2	393	E
P/181	2.3	8	225	E	P/310	1.11	7	53	E
P/182	2.4	8	375	E	P/311	1.13	7	361	E
P/185	2.7	9	105	E	P/312	2.9	2	633	E
P/186	2.8	9	255	E	P/314	2.10	10	273	E
P/188	2.10	10	307	E	P/315	2.10	10	289	E
P/189	2.11	10	563	E	P/318	4.5	14	481	E
P/191	3.1	11	91	E	P/320	4.4	13	435	S
P/192	4.1	12	153	E	P/322	1.6	4	195	E
P/197	2.6	4	379	E	P/323	4.1	12	85	E
P/200	withdrawn				P/324	4.3	13	253	E
P/203	4.3	13	243	E	P/325	4.5	14	45	E
P/204	5.1	9	397	E	P/326	5.4	1	529	R
P/206	5.5	1	683	E	P/329	4.1	12	127	E
P/211	2.4	8	459	E	P/330	5.5	1	601	E
P/212	1.6	4	157	E	P/332	4.3	13	189	E
P/213	4.4	13	373	E	P/333	6.3	12	441	E
P/225	1.5	3	279	E	P/334	4.5	14	123	E
P/226	1.5	3	297	E	P/338	1.1	1	263	E
P/232	1.7	5	283	E	P/339	2.10	10	337	E
P/236	1.13	7	271	E	P/340	4.5	14	111	E

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P/346	2.7	9	167	E	P/448	2.4	8	499	R
P/347	1.2	1	353	F	P/449	1.11	7	183	R
P/348	1.10	6	315	E	P/451	3.3	11	641	R
P/349	2.1	8	73	E	P/452	2.11	10	383	R
P/350	2.6	4	491	E	P/453	2.10	10	3	R
P/351	2.7	9	181	E	P/454	2.10	10	217	R
P/352	3.1	11	53	E	P/455	2.1	8	147	R
P/354	4.1	12	201	E	P/457	3.3	11	609	R
P/355	4.2	12	373	E	P/459	2.1	8	165	R
P/358	4.4	13	459	E	P/460	2.10	10	69	R
P/359	1.2	1	445	E	P/462	4.3	13	299	R
P/364	1.5	3	111	E	P/464	4.5	14	183	R
P/365	1.5	3	51	E	P/465	4.5	14	227	R
P/366	1.7	5	63	E	P/466	4.5	14	301	R
P/369	1.7	5	87	E	P/467	1.2	1	331	E
P/370	1.7	5	367	E	P/468	1.3	2	233	E
P/371	1.8	6	37	E	P/469	1.3	2	247	E
P/376	1.13	7	285	E	P/470	1.3	2	261	E
P/377	1.14	7	423	E	P/471	1.3	2	307	E
P/378	2.2	4	267	E	P/472	1.7	5	157	E
P/379	2.3	8	281	E	P/473	1.4	2	465	E
P/381	2.4	8	483	E	P/474	1.5	3	139	E
P/382	2.5	9	63	E	P/475	1.5	3	151	E
P/383	2.5	9	3	E	P/476	1.5	3	227	E
P/385	2.6	4	415	E	P/477	1.5	3	187	E
P/389	2.8	9	287	E	P/478	1.6	4	13	E
P/390	2.9	2	523	E	P/479	1.6	4	49	E
P/392	2.10	10	21	E	P/480	1.7	5	385	E
P/393	2.11	10	479	E	P/481	1.7	5	53	E
P/395	3.1	11	141	E	P/482	1.7	5	201	E
P/396	3.2	11	355	E	P/483	1.7	5	255	E
P/399	3.3	11	591	E	P/484	1.9	6	243	E
P/400	3.4	3	451	E	P/485	6.3	12	469	E
P/401	3.4	3	465	E	P/486	1.11	7	115	E
P/404	4.2	12	391	E	P/487	1.13	7	323	E
P/407	4.3	13	61	E	P/488	1.14	7	431	E
P/415	5.2	9	469	E	P/489	2.1	8	59	E
P/417	5.4	1	515	E	P/490	2.3	8	215	E
P/418	6.1	6	417	E	P/491	2.4	8	367	E
P/420	1.1	1	303	E	P/492	2.4	8	525	E
P/421	6.1	6	469	F	P/493	2.5	9	53	E
P/425	2.9	2	539	E	P/494	2.6	4	449	E
P/426	3.2	11	369	R	P/495	2.6	4	403	E
P/427	3.2	11	387	R	P/496	2.7	9	119	E
P/428	2.11	10	537	R	P/497	2.9	2	511	E
P/429	3.1	11	113	R	P/498	2.10	10	39	E
P/431	1.7	5	397	R	P/499	2.10	10	109	E
P/434	4.1	12	111	R	P/500	2.10	10	167	E
P/435	2.4	8	411	R	P/501	2.10	10	141	E
P/436	1.11	7	63	R	P/502	2.11	10	549	E
P/437	4.3	13	117	R	P/503	2.11	10	399	E
P/439	3.1	11	225	R	P/504	2.11	10	415	E
P/441	1.14	7	405	R	P/505	3.1	11	67	E
P/442	4.5	14	321	R	P/506	4.1	12	215	E

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P/508	4.3	13	137	E	P/607	2.5	9	69	F
P/509	4.5	14	469	E	P/608	2.6	4	459	F
P/511	5.5	1	653	E	P/609	2.6	4	343	F
P/512	3.2	11	415	E	P/610	2.7	9	197	F
P/516	6.1	6	455	E	P/611	2.9	2	553	F
P/519	1.6	4	113	E	P/613	2.11	10	579	F
P/522	2.2	4	233	E	P/614	2.11	10	429	F
P/523	3.1	11	195	F	P/617	3.1	11	161	F
P/526	1.3	2	45	E	P/621	3.2	11	325	F
P/527	1.4	2	459	E	P/624	3.4	3	409	F
P/528	1.6	4	143	E	P/626	4.1	12	241	F
P/529	1.9	6	131	E	P/628	4.2	12	347	F
P/531	2.1	8	99	E	P/629	4.3	13	223	F
P/532	2.2	4	243	E	P/631	4.3	13	35	F
P/535	3.1	11	31	E	P/633	4.4	13	447	F
P/536	3.3	11	689	E	P/634	4.5	14	425	F
P/537	4.1	12	97	E	P/636	4.5	14	393	F
P/538	4.4	13	393	E	P/637	4.5	14	237	F
P/539	4.5	14	3	E	P/638	5.4	1	567	F
P/540	6.3	12	499	E	P/639	4.3	13	317	E
P/541	1.2	1	419	R	P/640	2.2	4	281	E
P/542	1.3	2	353	R	P/642	4.3	13	161	E
P/543	1.5	3	339	E	P/646	4.5	14	455	E
P/546	2.4	8	535	E	P/647	4.5	14	355	E
P/548	1.5	3	265	R	P/650	2.4	8	559	E
P/550	3.3	11	711	E	P/652	3.3	11	725	E
P/552	1.9	6	171	E	P/653	4.3	13	3	E
P/554	4.4	13	381	E	P/654	4.3	13	337	E
P/556	4.5	14	257	E	P/655	1.10	6	347	E
P/558	5.1	9	355	R	P/659	3.1	11	13	E
P/559	1.10	6	291	S	P/660	1.2	1	463	E
P/560	2.1	8	81	S	P/668	4.5	14	369	E
P/561	2.3	8	245	S	P/669	4.1	12	137	E
P/563	4.3	13	203	S	P/670	2.2	4	221	E
P/567	5.5	1	661	S	P/671	3.3	11	487	E
P/568	6.3	12	511	S	P/672	1.5	3	309	E
P/569	1.2	1	343	F	P/673	1.3	2	117	E
P/571	1.3	2	371	F	P/675	1.6	4	129	E
P/575	1.3	2	191	F	P/676	3.3	11	503	F
P/576	1.5	3	249	F	P/677	4.4	13	487	E
P/579	1.5	3	163	F	P/678	2.1	8	3	E
P/580	1.5	3	325	F	P/681	3.3	11	519	F
P/582	1.6	4	165	F	P/683	5.5	1	695	R
P/583	1.7	5	21	F	P/684	3.3	11	703	R
P/584	1.7	5	127	F	P/685	3.3	11	675	R
P/585	1.7	5	331	F	P/686	3.3	11	663	R
P/589	1.9	6	257	F	P/687	3.1	11	79	R
P/590	1.9	6	213	F	P/688	4.5	14	275	R
P/591	6.3	12	453	F	P/689	4.6	7	529	R
P/592	1.11	7	73	F	P/690	4.4	13	481	R
P/593	1.11	7	141	F	P/693	1.3	2	101	R
P/594	1.11	7	3	F	P/694	4.1	12	227	R
P/601	2.4	8	547	F	P/695	1.11	7	159	R
P/603	2.4	8	429	F	P/696	4.2	12	309	R
P/605	2.5	9	15	F	P/699	4.5	14	331	R

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P/728	4.1	12	163	S	P/804	4.5	14	345	E
P/729	1.1	1	273	S	P/806	1.3	2	59	E
P/730	2.1	8	121	S	P/809	5.2	9	435	E
P/732	1.10	6	309	S	P/811	1.3	2	273	F
P/733	1.9	6	199	S	P/812	1.7	5	213	F
P/734	1.5	3	217	S	P/813	1.14	7	389	F
P/735	1.3	2	139	S	P/818	1.2	1	431	E
P/737	5.5	1	721	E	P/819	1.7	5	101	E
P/738	1.7	5	317	E	P/820	1.11	7	85	E
P/739	4.3	13	99	E	P/821	2.6	4	309	E
P/740	4.2	12	265	E	P/822	2.7	9	215	E
P/742	6.1	6	375	E	P/823	2.10	10	153	E
P/743	5.5	1	667	R	P/824	3.1	11	259	E
P/748	4.1	12	179	E	P/827	4.5	14	73	E
P/749	withdrawn				P/828	5.1	9	335	E
P/750	1.7	5	37	R	P/829	4.5	14	383	E
P/752	4.3	13	147	R	P/831	4.5	14	91	E
P/755	6.3	12	417	F	P/833	1.7	5	345	E
P/756	4.1	12	33	S	P/836	1.14	7	445	E
P/757	1.1	1	185	S	P/837	2.6	4	433	E
P/760	1.8	6	57	E	P/838	2.10	10	123	E
P/761	6.1	6	425	E	P/839	3.2	11	427	E
P/762	1.12	7	211	E	P/840	4.5	14	29	E
P/763	1.14	7	379	R	P/841	4.6	7	487	E
P/764	2.9	2	589	E	P/842	5.2	9	413	E
P/766	3.2	11	445	F	P/844	4.1	12	189	R
P/767	3.4	3	389	F	P/848	3.1	11	207	F
P/768	4.1	12	3	E	P/849	1.3	2	151	E
P/769	4.5	14	411	E	P/850	3.2	11	285	E
P/770	5.1	9	385	E	P/851	3.1	11	181	E
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**TOPICAL AGENDA AND  
PROGRAMME**

## TOPICAL AGENDA

### NUCLEAR POWER AND SPECIAL APPLICATIONS

Agenda Item*	Session <sup>*</sup>	Volume
<b><u>Energy resources and requirements</u></b>		
1. 1 Survey of world energy demand and resources up to the year 2000	B. 1	1
1. 2 Projected role of nuclear energy in meeting future energy needs	G. 3	1
<b><u>Current status of nuclear power plants in operation</u></b>		
1. 3 Performance of nuclear power plants	A. 1, A. 2, A. 3	2
1. 4 Techniques for costing nuclear power plants and recent cost trends	A. 10	2
1. 5 Review of safety aspects of nuclear power plants	A. 4, A. 5, A. 6	3
<b><u>Current and future developments in power reactors</u></b>		
1. 6 Optimum integration of nuclear power plants in electrical networks as a means of lowering the cost of delivered power; current experience and future developments	B. 12	4
1. 7 Developments in breeder and advanced converter reactors including long-term development prospects for fission reactor systems	A. 7, A. 8, A. 9	5

\* Throughout the published Proceedings, the papers are grouped by Agenda Item and not by Session. The Agenda Item numbers give an indication of the way the six main subject headings were divided up. The cross-reference provided here to the Session numbers is included only to complete the record of the Conference.

Agenda Item	Session	Volume
1.8 Prospects of small- and medium-power reactors	A. 11	6
1.9 Nuclear energy for desalination and agro-industrial complexes	B. 14	6

Advanced and special applications

1.10 Utilization of research reactors and their role in stimulating nuclear technology in developing countries	A. 13	6
1.11 Advanced research uses of reactors and accelerators, and applications in energy conversion	A. 17	7
1.12 Applications of nuclear explosions for civil engineering and mineral resources development	G. 4a	7
1.13 Special applications of nuclear energy	A. 16	7
1.14 Status and prospects of controlled thermonuclear reactions	G. 4	7

## NUCLEAR FUELS, CYCLES AND MATERIALS

Fuels, materials and services

2.1 Uranium and thorium resources, supply, demand and costs	B. 5, B. 6	8
2.2 Integrated planning of nuclear industry, anticipated demand for and supply of enriched uranium, plutonium and heavy water, as well as reprocessing services	B. 9	4
2.3 Review of fuel fabrication processes and costs	B. 7	8
2.4 Experience with fuel reprocessing plants; improved techniques for reprocessing	B. 3, B. 4	8
2.5 Developments in isotope enrichment techniques and trends in costs for enrichment services	B. 2	9
2.6 Review of developments in fuel materials technology	B. 13	4

Agenda Item	Session	Volume
<u>Fuel cycles</u>		
2.7 Uranium-plutonium fuel cycle for thermal and fast reactors	B. 10	<b>9</b>
2.8 Developments in the thorium fuel cycle	B. 11	<b>9</b>
2.9 Practical aspects of nuclear fuel management for electric power utilities	B. 8	<b>2</b>
<u>Radiation effects</u>		
2.10 Effects of radiation on reactor fuels, fuel materials and assemblies	B. 16, B. 17	<b>10</b>
2.11 Radiation damage to the internals and structural materials of reactors other than fuel assemblies	B. 18	<b>10</b>

**HEALTH, SAFETY AND LEGAL ASPECTS  
OF NUCLEAR ENERGY**

3.1 Health physics and radiation protection	C. 1, C. 2	<b>11</b>
3.2 Review of developments in radioactive waste management	C. 4	<b>11</b>
3.3 Environmental effects and public acceptance	G. 6, C. 7	<b>11</b>
3.4 Legislative, insurance and regulatory aspects	C. 3	<b>3</b>

**APPLICATIONS OF ISOTOPES AND RADIATION**

Applications in food and agriculture

4.1 Nuclear methods of increasing food production	A. 12, G. 7	<b>12</b>
4.2 Nuclear methods of reducing food losses	B. 15	<b>12</b>

Applications in the life sciences

4.3 Medical applications: techniques and use in diagnosis, therapy and research, including dosimetric aspects	C. 9, C. 10	<b>13</b>
4.4 Radiation biology: studies of cell function, radiation microbiology and biosphere resources	B. 19	<b>13</b>

Agenda Item	Session	Volume
<u>Use in applied sciences and technology</u>		
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4.6 Production and application of transuranium and super-heavy isotopes	C.6	7

INTERNATIONAL AND ADMINISTRATIVE ASPECTS  
OF NUCLEAR ENERGY

Safeguards

5.1 Safeguards systems analysis and safeguards objectives	G.5	9
5.2 Safeguards techniques and instrumentation	C.5	9
<u>Organizational and co-operative aspects</u>		
5.4 Organization of national atomic energy commissions and their relationship with other bodies and institutions	A.15	1
5.5 International co-operation in nuclear projects and exchange of information	G.8, A.14	1

ASPECTS OF NUCLEAR TECHNOLOGY  
OF PARTICULAR INTEREST FOR DEVELOPING COUNTRIES

6.1 Impact of nuclear technology in developing countries	G.9	6
6.3 Education and training of scientists and technicians; public information	C.13	12

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	p.m.	G. 2	Special talks		
Tuesday 7th Sep.	a.m.	G. 3	Projected role of nuclear energy in meeting future energy needs (1.2)	A. 1	Performance of nuclear power plants (1.3)
	p.m.			A. 2	continuation (1.3)
Wednesday 8th Sep.	a.m.	G. 4	Status and prospects of controlled thermonuclear reactions (1.14) Applications of nuclear explosions for civil engineering and mineral resources development (1.12)	A. 3	continuation (1.3)
				A. 4	Review of safety aspects of nuclear power plants (1.5)
	p.m.			A. 5	continuation (1.5)
Thursday 9th Sep.	a.m.	G. 5	Safeguards systems analysis and safeguards objectives (5.1)	A. 6	continuation (1.5)
	p.m.			A. 7	Developments in breeder and advanced converter reactors including long-term development prospects for fission reactor systems (1.7)
Friday 10th Sep.	a.m.	G. 6	Environment effects and public acceptance (3.3)	A. 8	continuation (1.7)
	p.m.			A. 9	continuation (1.7)
Monday 13th Sep.	a.m.	G. 7	Nuclear methods of increasing food production (4.1)	A. 10	Techniques for costing nuclear power plants and recent cost trends (1.4)
				A. 11	Prospects of small- and medium-power reactors (1.8)
Tuesday 14th Sep.	a.m.	G. 8	International cooperation in nuclear projects and exchange of information (5.5)	A. 12	continuation (4.1)
	p.m.			A. 13	Utilization of research reactors and their role in stimulating nuclear technology in developing countries (1.10)
Wednesday 15th Sep.	a.m.	G. 9	Impact of nuclear technology in developing countries (6.1)	A. 14	continuation (5.5)
	p.m.			A. 15	Organization of national atomic energy commissions and their relationship with other bodies and institutions (5.4)
Thursday 16th Sep.	a.m.			A. 16	Special applications of nuclear energy (1.13)
	p.m.	G. 10	Summing up and closing	A. 17	Advanced research uses of reactors and accelerators, and applications in energy conversion (1.11)

NOTE: Numbers in brackets indicate the Agenda Items.

*Technical sessions – B**Technical sessions – C*

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B. 5	Uranium and thorium resources, supply, demand and costs (2.1)	
B. 6	continuation (2.1)	
B. 7	Review of fuel fabrication processes and costs (2.3)	
B. 8	Practical aspects of nuclear fuel management for electric power utilities (2.9)	C. 5 Safeguards techniques and instrumentation (5.2)
B. 9	Integrated planning of nuclear industry; anticipated demand for and supply of enriched uranium, plutonium and heavy water, as well as reprocessing services (2.2)	C. 6 Production and application of transuranium and super-heavy isotopes (4.6)
B. 10	Uranium-plutonium fuel cycle for thermal and fast-reactors (2.7)	
B. 11	Developments in the thorium fuel cycle (2.8)	
B. 12	Optimum integration of nuclear power plants in electrical networks as a means of lowering the cost of delivered power; current experience and future developments (1.6)	C. 7 continuation (3.3) C. 8 Panel on Ecological Aspects and Public Understanding of Nuclear Power
B. 13	Review of developments in fuel materials technology (2.6)	
B. 14	Nuclear energy for desalination and agro-industrial complexes (1.9)	C. 9 Medical applications: techniques and use in diagnosis, therapy and research, including dosimetric aspects (4.3)
B. 15	Nuclear methods of reducing food losses (4.2)	C. 10 continuation (4.3)
B. 16	Effects of radiation on reactor fuels, fuel materials and assemblies (2.10)	C. 11 Industry, study, investigation and development of resources (4.5)
B. 17	continuation (2.10)	C. 12 continuation (4.5)
B. 18	Radiation damage to the internals and structural materials of reactors other than fuel assemblies (2.11)	C. 13 Education and training of scientists and technicians; public information (6.3) C. 14 Panel on Introduction of Nuclear Power into Developing Countries
B. 19	Radiation biology; studies of cell function, radiation microbiology and biosphere resources (4.4)	C. 15 continuation (4.5)

## CORRIGENDA TO VOLUMES 1 TO 14

- VOL. 1** **Page 387**, Title of Table III:  
*For PROTECTION read PROJECTION*
- VOL. 2** **Pages 69 and 70**, figures:  
The figure above the Fig.5 caption should be *interchanged* with that above the Fig.6 caption.  
(The captions are correctly placed.)
- VOL. 4** **Page 215**, caption to Fig.C  
The caption should read as follows:  
FIG.C. Flowsheet of a PWR plant with integrated steam storage:  
1. reactor; 2. pressurizer; 3. steam generator, 4. main turbine; 5. moisture separator, 6. reheat, 7. main condenser; 8. feed water tank; 9. feed water heater, 10a, b, c. steam lines for heating main accumulators; 11. live steam line for loading superheat accumulator; 12a, b, c. main accumulators; 13. superheat accumulator; 14a, b, c. steam supply lines, 15a, b. superheaters; 16a, b, c. storage turbines, 17a, b, c. condensers of storage turbines; 18. condensate tank; 19. condensate return line; 20a, b, c. condensate lines; 21. live steam line to storage turbines when acting as spare for main turbine.
- VOL. 6** **Page 273**, 3rd paragraph, line 2, first word:  
*For areas read acres*
- VOL. 8** **Page 180**, last contribution and footnote.  
In both cases, BRINCK's initials should be J.W.  
**Page 362**, Figure 4, column 'STREAM 65':  
*For 3.7 read 37*
- VOL. 11** **Page 279**, 3rd line of contribution by P. BEAU:  
*For on page, read on page 103*
- VOL. 12** **Page 367**, 8th line from bottom.  
*For  $^{54}\text{M}$  read  $^{54}\text{Mn}$*
- VOL. 13** **Page 353**, first contribution by V. PECORINI.  
*For  $^{113}\text{I}$  read  $^{113}\text{In}$*
- VOL. 14** **Page 31**, 5th line from bottom.  
*For  $^{88}\text{Yb}$  read  $^{88}\text{Y}$*