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IMPLEMENTATION OF THE DECLARATION ON THE DENUCLEARIZATION OF AFRICA

South Africa's nuclear capability

Note by the Secretary-General

1. By paragraph 7 of its resolution 38/181 A of 20 December 1983, the General Assembly requested the United Nations Institute for Disarmament Research, in co-operation with the Department for Disarmament Affairs and in consultation with the Organization of African Unity, to provide data on the continued development of South Africa's nuclear capability.

2. The report which has been prepared is submitted herewith.

* A/39/150.

ANNEX

Report of the United Nations Institute for Disarmament Research

CONTENTS

CONTENTS (continued)

I. INTRODUCTION

1. By resolution 38/181 A of 20 December 1983, the General Assembly requested the United Nations Institute for Disarmament Research, in co-operation with the Department for Disarmament Affairs and in consultation with the Organization of African Unity, to provide data on the continued development of South Africa's nuclear capability. The present report is submitted by the Institute to the General Assembly pursuant to that resolution.

2. In implementing the mandate entrusted to it by the General Assembly, the Institute took into account duly, the fact that the request was made in the context of consideration of the agenda item entitled "Implementation of the Declaration on the Denuclearization of Africa". The Institute further took into account the views of the sponsors of that resolution A/C.1/38/PV.33, pp. 24-25, as embodied in the statement introducing the draft of the resolution in the First Committee:

> "This request represents a modest and indispensable minimum effort to move the consideration of this question forward.
>
> "The report requested is not a full-fledged study with analyses, conclusions and recommendations. What we are asking for is a report containing data and other relevant information relating to South Africa's continued nuclear activities and the implementation of the Declaration on the Denuclearization of Africa."

3. In fulfilling the mandate, the Institute worked in close co-operation with the Department for Disarmament Affairs of the Secretariat, and held extensive consultations with the Organization of African Unity and the International Atomic Energy Agency. UNIDIR is most grateful for the expert assistance and advice it received from the representatives of these organizations.

4. It is in the general framework of South Africa's policies, both internal and external, as well as in considering the whole international environment that South Africa's nuclear capability would be more thoroughly understood. As indicated above, the Institute's mandate, however, was more limited and an effort has been made to stay within its limits. Information of a more general nature has been provided only to facilitate a broader understanding of certain aspects of South Africa's nuclear capability.

5. References to Namibia in this report reflect the fact that South Africa continues its illegal occupation and exploitation of that country and its resources, and does not imply acceptance of the existing status of Namibia.

6. Publicly available information emanating mainly from governmental sources or international organizations has been used in this report. It is to be noted in this respect that a great part of South Africa's nuclear activities is shrouded in secrecy as reflected, inter alia, in the strict limitations imposed by the Nuclear Energy Act No. 92 of 1982 on the disclosure of information in this field.

7. A report of the Secretary-General entitled "South Africa's Plan and Capability in the Nuclear Field" was submitted to the General Assembly in 1980 (A/35/402 and Corr.1). That was a comprehensive report containing factual information, analyses and conclusions.

8. The present report provides in a concise and factual manner, data and information on the continued development of South Africa's nuclear capability. It focuses on the following aspects that are indicative of South Africa's nuclear capability: uranium resources and production; uranium enrichment; nuclear energy research; nuclear power facilities and the nuclear policy framework. Recent developments relating to safeguards in South Africa are also presented.

II. SUMMARY

9. The present report provides information on the continued development of South Africa's nuclear capability. It covers the period since the preparation of the report of the Secretary-General on South Africa's plan and capability in the nuclear field (ibid.).

10. In that report, South Africa's nuclear capability was dealt with in the context of:

(a) Uranium resources and mining;

(b) The development of a uranium enrichment technology and facilities;

(c) Build-up of a nuclear power programme;

(d) Availability of technical skills and expertise.

11. The presentation of information on the further evolution of South Africa's nuclear capability is being done in the present report by statistical and descriptive material of the main elements of this capability.

12. The following broad findings have become apparent:

(a) Uranium production in South Africa and Namibia has increased by about 50 per cent since the figures in the Secretary-General's report to the General Assembly mentioned above (from 1978 to 1982);

(b) A pilot enrichment plant has been in operation for 8 to 10 years providing highly enriched uranium for the SAFARI-I reactor and for other purposes that are not known. Operating experience is obtained which is of importance for developing the enrichment technology further and for preparing the operational phase of a semi-commercial enrichment plant, which is approaching the completion stage;

(c) The first reactor - Koeberg-I - of the Koeberg nuclear power plant started operations in March 1984 and a second reactor, Koeberg-II is expected to be completed in 1984;

(d) Research and development on fuel technology to enable South Africa to manufacture its own nuclear fuel is in progress. A hot-cell laboratory is under construction at Pelindaba;

(e) A decision has been taken to establish a new Nuclear Research Centre. No programme for this centre has been published;

(f) A new legislation was enacted and institutional restructuring took place aimed at strengthening the control and management of South Africa's nuclear programme;

(g) South Africa has stated its readiness to resume discussions with the International Atomic Energy Agency secretariat on safeguards in respect of its semi-commercial enrichment plant, but not its pilot enrichment plant. It has also announced its nuclear export policy;

(h) South Africa continues to have a technical capability to manufacture nuclear weapons.

III. URANIUM RESOURCES AND PRODUCTION 1/

A. South Africa's uranium resources

13. The possession by South Africa of large uranium resources is an important component of its nuclear capability. It has large deposits of uranium on its territory and through its continued illegal occupation and exploitation of Namibia and its resources, South Africa exercises control over even larger uranium resources. The aggregate share of uranium resources controlled by South Africa is more than 20 per cent of "Reasonably Assured Resources" of the world outside the centrally-planned economies area (WOCA).

1. Deposits in South Africa

14. South Africa has about 13 per cent of WOCA's "Reasonably Assured Resources" of uranium at a cost level of less than $80/kg U (kilogrammes of uranium).

Table 1. Uranium resources - as at 1 January 1983 2/

PRINCIPAL DEPOSITS OR DISTRICTS	TONNES U			
	REASONABLY ASSURED RESOURCES Recoverable at		ESTIMATED ADDITIONAL RESOURCES - Category I Recoverable at	
	<$80/kg U	$80-130/kg U	<$80/kg U	$80-130/kg U
Witwatersrand Basin Conglomerates	163 000	50 000	98 000	43 000
Witwatersrand Basin Tailings	22 000	21 000	---	---
Palabora	2 000	---	---	---
Karoo Sequence	4 000	50 000	1 000	5 000
Surficial	---	1 000	---	---
TOTAL	191 000	122 000	99 000	48 000

2. Deposits in Namibia

15. Namibia accounts for 8 per cent of the world's "Reasonably Assured Resources" of uranium at a cost level of less than $80/kg U.

16. The known uranium deposits in Namibia are primarily concentrated in the Rossing area.

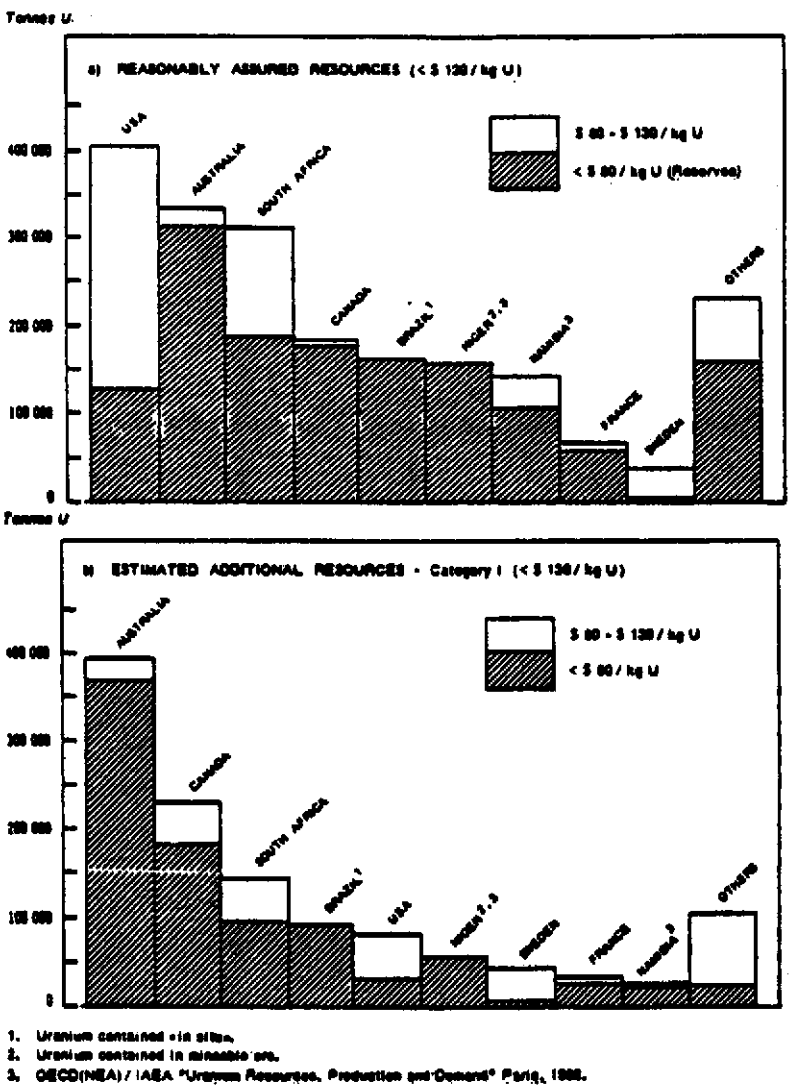
Table 2. Uranium resources recoverable at less than $130/kg U in tonnes U as at 1 January 1981 2/

	REASONABLY ASSURED RESOURCES			ESTIMATED ADDITIONAL RESOURCES			
	Recoverable at $<80/kg U	Recoverable at $80-$130/kg U	Total RAR $<130/kg U	Recoverable at $<80/kg U	Recoverable at $80-$130/kg U	Total EAR $<130/kg U	Total RAR + EAR
Granitic Rocks	93 000	9 000	102 000	15 000	21 000	36 000	138 000
Karoo strata and younger surficial sediments	26 000	7 000	33 000	15 000	2 000	17 000	50 000
Total	119 000	16 000	135 000	30 000	23 000	53 000	188 000

B. World distribution of uranium

17. Figure 1 shows the latest OECD/IAEA estimates of the world's "Reasonably Assured Resources" and "Estimated Additional Resources" at a cost of production of less than $130 per kg U. 2/

Figure 1. Geographical distribution of uranium resources



1. Uranium contained in sites.
2. Uranium contained in mineable ore.
3. OECD(NEA) / IAEA "Uranium Resources, Production and Demand" Paris, 1988.

C. Uranium production

18. Production of uranium in South Africa peaked in 1980 when 6,146 tonnes of uranium were produced. During the period from 1980, small decreases in production have been reported by South Africa and Namibia. 3/ Uranium mined in South Africa is processed into a purified high concentrate of 80 per cent of U_3O_8 called yellowcake. Tables 3 and 4 indicate the evolution of uranium production in South Africa and Namibia. 4/

Table 3. Uranium production (South Africa)

YEAR	TONNES U (in concentrate)
Pre-1977	75 322
1977	3 360
1978	3 961
1979	4 797
1980	6 146
1981	6 131
1982	5 816
1983*	5 800
TOTAL	111 333

* Planned.

Table 4. Planned uranium production capability (Namibia)

YEAR	TONNES U (in concentrate)
Pre-1977	594
1977	2 340
1978	2 697
1979	3 840
1980	4 042
1981	3 971
1982	3 776
1983*	3 800
TOTAL	25 060

* Secretariat estimate.

19. World uranium production grew from a level of 20,000 tonnes per annum in 1975 to a peak of 44,000 tonnes in 1980 and remained at that level through 1981. Production then declined in 1982 to around 41,000 tonnes and continued to fall in 1983 to around 38,000 tonnes. Table 5 presents the evolution of uranium production worldwide. 4/

Table 5. Uranium production in the WOCA*

(Tonnes U)

Country	Pre-1977	1977	1978	1979	1980	1981	1982	1983 a/
Argentina	339	98	109	134	187	123	155	200
Australia	8 159	356	516	705	1 561	2 860	4 453	3 700
Belgium b/	0	0	0	0	20	40	40	40
Brazil	0	0	0	0	0	4	290	300
Canada	112 080 c/	5 790	6 800	6 820	7 150	7 720	8 080	7 500
Finland	30	0	0	0	0	0	0	0
France	23 133	2 097	2 183	2 362	2 634	2 553	2 859	3 200
Gabon	8 464	907	1 022	1 100	1 033	1 022	970	1 042
Germany, Federal Republic of	151 d/	15	35	25	34	36	34	40
Japan	38	3	2	2	5	3	5	7
Namibia	594	2 340	2 697	3 840	4 042	3 971	3 776	3 800 e/
Niger	6 108	1 609	2 060	3 620	4 100	4 360 f/	4 259 f/	n.a.
Portugal	1 932	95	98	114	82	102	113	100
South Africa	75 332	3 360	3 961	4 797	6 146	6 131	5 816	5 800
Spain	476	177	191	190	190	178	150	150
Sweden	200	0	0	0	0	0	0	0
United States of America	209 800	11 500	14 200	14 408	16 804	14 793	10 331	7 900 g/
Zaire	25 600 c/	0	0	0	0	0	0	0
TOTAL	472 436	28 347	33 874	38 117	43 988	43 892	41 331	38 000

a/ Estimated.

b/ Uranium from imported phosphates.

c/ Pre-1938 data not available.

d/ Plus 120 tonnes uranium of foreign origin.

e/ Secretariat estimate.

f/ CEA - Rapport Annuel (1981, 1982).

g/ Production in the United States in 1983 is expected to fall between 7,500 and 8,300 tonnes.

* See footnote 1/.

D. Uranium demand forecast

20. A more comprehensive understanding of uranium production would have to take into account, inter alia, the demand for uranium. South Africa's expected annual requirements of uranium, including deliveries to the Koeberg nuclear power plants, are shown in the following table: 4/

Table 6. Annual expected requirements of uranium, 1984-2000

YEAR	REQUIRED URANIUM Tonnes U in UF_6 (Natural)
1983	145
1984-2000	289 per annum

21. Worldwide, the annual production of uranium since 1970 has been in excess of consumption, so much so that in some years it has exceeded 50 per cent. The main reason for this is attributed to the persistent tendency towards overestimation in forecast of demand for nuclear power. The overproduction has been reduced, but the world uranium production still exceeds reactor requirements. The large stockpiles that have resulted are estimated to be the equivalent of 4 to 5 years worth of normal consumption.

22. The short-term projection worldwide from the present to 1995 shows that the total production capability of existing and already committed production centres would increase slowly to a level of around 50,000 tonnes per annum in the late 1980s and remain around this level for the remainder of the period. At the same time the longer-term projection (1995-2025) shows that, under favourable market conditions, production capability supported by currently known resources could rise rapidly to a level of around 70,000 tonnes per annum by the early 1990s.

23. South African uranium production is committed to long-term contracts, with only a relatively small percentage of it being sold on the spot market.

IV. URANIUM ENRICHMENT

24. Uranium enrichment - the process of increasing the concentration of the fissile isotope U-235 to the level needed for utilization in light-water reactors - is central to South Africa's nuclear capability. Uranium enrichment is carried out at the pilot plant in Valindaba near the National Research Center at Pelindaba. A semi-commercial enrichment plant is under construction also at Valindaba.

A. Pilot enrichment plant

25. The pilot enrichment plant - construction of which was completed in 1977 - has continued to operate in the period under review. It has been assumed in the Secretary-General's report (A/35/402 and Corr.1) to have a capacity of 10 tonnes separative work units (SWU) per year.

26. An example of the results obtained from the pilot plant was reflected in the announcement by South Africa in 1981 that SAFARI-I would henceforth be fuelled with 45 per cent enriched uranium of South African origin. 5/ SAFARI-I is the experimental 20 MW (thermal) "Oak Ridge type" research reactor obtained from the United States, and which went into operation in 1965.

B. Semi-commercial enrichment plant

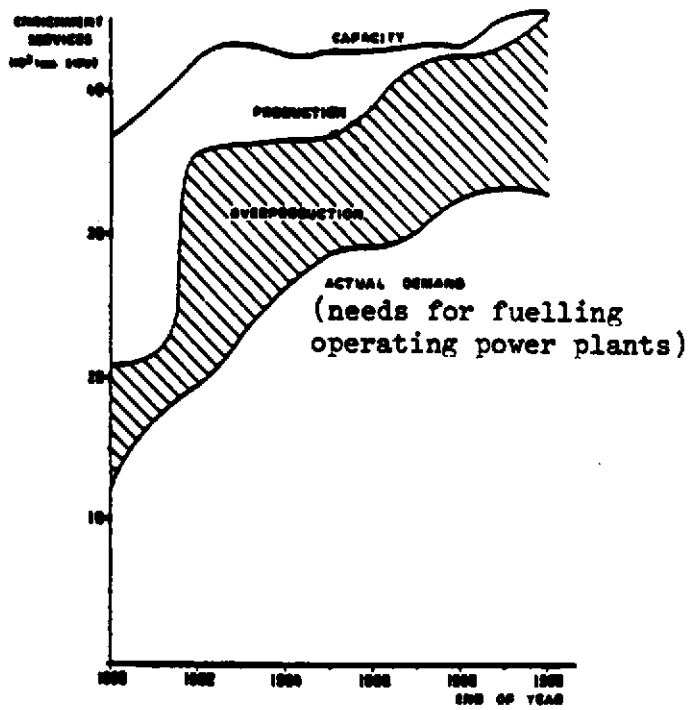
27. A semi-commercial enrichment plant which is still under construction at Valindaba will have an estimated capacity of 300 tonnes SWU/year. This is expected to be in operation by 1986/87.

28. The separative elements for this plant are manufactured in South Africa by the Uranium Enrichment Corporation of South Africa Limited (UCOR) at Valindaba. Other components are also reportedly manufactured in South Africa by domestic firms or by the South African subsidiaries of overseas firms. 6/

C. Demand for enrichment services

29. A more comprehensive understanding of uranium enrichment would have to take into account the demand for it. It has been estimated that there is at present in the world an oversupply of enrichment services. The following graph produced by an independent researcher 7/ shows the projections for the uranium enrichment market in the current decade.

Figure 2. Projected Enrichment Market 1980-1990



30. Table 7 compiled by the Research Unit of the United States Library of Congress summarizes the existing enrichment plant capacity and the planned capacity of Western supplies in 1990 and 1995. The table shows maximum projected capacity of each supplier. Actual production might be significantly lower.

Table 7. Worldwide* uranium enrichment capacity: existing and planned (in millions of SWU/year)

Supplier	Process	Existing Capacity 1984	Planned Capacity 1990	Planned Capacity 1995
United States				
Oak Ridge, Tenn.	diffusion	7.9	7.9	7.9
Paducah, Kentucky	diffusion	11.4	11.4	11.4
Portsmouth, Ohio	diffusion	8.0	8.0	8.0
Portsmouth, Ohio	centrifuge	--	2.2	13.2
Subtotal U.S.		27.3	29.5	40.5
Eurodif	diffusion	10.8	10.8	10.8
Urenco	centrifuge	1-1.2	2	2*
Soviet Union (for export)	diffusion	3	2-3	2-3
Japan	centrifuge	0.05	0.2	1-2
South Africa	helicon	0.03	0.3	0.3
Brazil	jet-nozzle	--	0.1	0.3
Australia	centrifuge	--	--	1
Pakistan	centrifuge	?	small**	small*
Argentina	diffusion	small**	0.05	0.05
Total		42*	45-46	58*

* An additional 30 million SWU are currently held in private stockpiles. Much of that could be available for sale over the next few years on the secondary market, depending upon price and other market factors.

** Less than 30 thousand SWU/year.

V. NUCLEAR ENERGY RESEARCH

31. The National Nuclear Research Centre at Pelindaba is the main governmental nuclear research organization. It undertakes research on mineral prospecting and mining, mineral exploitation, reactor and reactor fuel development, radiation and health physics, metallurgy, reactor safety and operations, applications of radioisotopes in medicine, agriculture and industry, and nuclear physics. Pelindaba's centre-piece is the SAFARI-I reactor. A hot-cell complex is being constructed at the Centre, primarily for the purpose of post-irradiation examination of fuel and materials irradiated in the SAFARI-I reactor and in the reactors at the nuclear power plant at Koeberg.

32. In 1975, the United States ceased to supply fuel for the SAFARI-I reactor. 8/ In 1980, the reactor was operating at a power level of 5 Megawatts (against usually 20 MW) for three days per week every third week. 9/ In April 1981, the Minister for Mineral and Energy Affairs announced that SAFARI-I was fuelled with indigenously supplied 45 per cent enriched uranium. 10/ It is expected that such indigenous supply of fuel would help restore SAFARI-I's performance.

33. The SAFARI-I reactor performs irradiation testing of fuel samples and construction materials used in power reactors. SAFARI-I contains irradiation loops where the samples can be irradiated under controlled conditions. The reactor therefore plays an important part in South Africa's nuclear programme.

34. South Africa's programmes for the development of resources of nuclear material are co-ordinated by the Nuclear Development Corporation of South Africa Limited (NUCOR). NUCOR is expanding its research and development programme in fuel technology. The aim is to develop manufacturing techniques for SAFARI-I fuel as well as having in mind a possible future manufacturing of fuel for the Koeberg nuclear power plant. 11/ The main supporting facilities in this programme are the SAFARI-I reactor and the Metallurgical Hot-Cell Complex presently under construction at Pelindaba.

35. The Hot-Cell Complex is intended primarily for the purpose of post-irradiation examination of fuel materials irradiated in the Koeberg and SAFARI reactors. When completed the facility would be equipped to examine and test fuel elements from the Koeberg reactor in which defects might arise. Post-irradiation testing of samples from NUCOR's materials testing programme and of surveillance samples from the Koeberg reactor would also be carried out there. 11/ The availability of comprehensive post-irradiation examination and testing facilities is a necessary adjunct to South Africa's nuclear power programme and to NUCOR's irradiation testing programme. NUCOR participates also in the US-sponsored International Reduced Enrichment Research and Test Reactor Programe (RERTR) which has the purpose of developing low-enriched uranium fuels for use in research and test reactors. 11/

36. In February 1983, the Minister for Mineral and Energy Affairs announced that 10,000 hectares of land in the Namaqualand District would be taken over by NUCOR on behalf of the State for development and operation as the national depository for medium and low-activity radioactive waste. 11/

37. In June 1983, it was announced that a second nuclear research centre would be established. 12/ The new centre would be built in the Cape province at a distance of some 45 kilometres from Mossel Bay. This location is at about the same distance from the Koeberg reactors as from the site of a possible future nuclear power plant, Cape Saint Francis, south of Port-Elisabeth. The new centre would have a staff of about 300 professionals. No cost figures or time schedules have been published.

38. The following is a summary of total expenditure under research and administration funds in rands for the period 1 April 1959 to 31 March 1981, of the Atomic Energy Board which has been re-established as NUCOR. 10/

Table 8. Total expenditures for the Atomic Energy Board 1959-81

SUMMARY OF TOTAL EXPENDITURE UNDER THE RESEARCH AND ADMINISTRATIVE FUNDS FOR THE PERIOD 1 APRIL 1959 TO 31 MARCH 1981

NATURE OF EXPENDITURE	1959-04-01 to 1964-03-31	1964-04-01 to 1969-03-31	1969-04-01 to 1974-03-31	1974-04-01 to 1979-03-31	1979-04-01 to 1981-03-31	1980-04-01 to 1981-03-31	TOTAL EXPENDITURE	TOTAL EXPENDITURE
Capital works	5 135 945	5 733 442	7 714 983	12 004 388	2 896 672	24 552 626	58 038 056	17 76
Equipment	681 311	4 692 882	5 197 322	9 468 731	14 328 363	22 004 370	56 372 979	17 25
Running expenses	443 190	2 711 196	9 590 265	21 966 156	5 164 414	8 240 966	48 116 187	14 73
Salaries and administration	1 934 680	9 661 518	27 859 836	68 753 085	20 281 015	24 407 218	152 897 352	46 79
Subsidized research	595 053	1 279 252	2 364 413	1 762 807	448 633	433 326	6 883 484	2 11
Training costs	502 394	325 708	281 488	107 024	59 724	43 939	1 320 277	0 40
Bursaries	228 054	193 896	243 261	282 720	89 500	136 500	1 173 931	0 36
Library	49 391	150 678	349 083	873 927	255 127	279 117	1 957 323	0 60
	9 570 018	24 748 572	53 600 651	115 218 838	43 523 448	80 098 062	326 759 589	100 00

VI. NUCLEAR POWER FACILITIES

39. South Africa has a nuclear power plant at Koeberg on the coast north of Cape Town, comprising two 922 MWe electric pressurized-water reactors supplied by France.

40. One of the reactors, Koeberg-I, started operation on 14 March 1984 and is scheduled to be connected to the power grid in July 1984. Koeberg-II is scheduled for fuel loading in September 1984 13/.

41. A maintenance contract for the Koeberg plant was awarded in December 1983 to Framatome/Fluor Corporation. The contracting period is 10 years and the cumulative contracting sum is estimated at $US 50 million.

VII. NUCLEAR POLICY FRAMEWORK

42. South Africa's nuclear activities began after the Second World War with the discovery and exploitation of the country's uranium deposits. Over the years responsibility for these activities was exercised by several governmental agencies under the overall co-ordination of the Prime Minister and were governed by a number of specific national laws, the first major one being the Atomic Energy Act of 1948.

A. The Nuclear Energy Act of 1982

43. In 1982, a new nuclear energy act (Nuclear Energy Act No. 92 of 1982) was enacted by South Africa, with effect from 1 July of that year. It replaced the previous legislation in this field. The act provides for the establishment of the Atomic Energy Corporation of South Africa, Limited (AEC) and of a Council for Nuclear Safety, and defines the powers and functions of the said Corporation and Council.

44. Under the Act, the functions of the Atomic Energy Corporation are to undertake research in the field of nuclear or atomic energy and the production of nuclear or atomic energy, to enrich source material and special nuclear material, to process source material, special nuclear material and restricted material, to re-process source material and special nuclear material, and to exercise control over certain nuclear activities in South Africa, including the licensing thereof. The affairs of the Corporation are managed and controlled by an eight-member Board of Directors headed by a full-time executive chairman, who is appointed by the President of the Republic of South Africa.

45. The Act stipulates also that the right to produce nuclear or atomic energy shall be vested solely in the Atomic Energy Corporation on behalf of the State and that no person except the Corporation or a subsidiary company shall produce nuclear or atomic energy, except under a nuclear licence granted by the Atomic Energy Corporation.

46. The Council for Nuclear Safety, also established by the Nuclear Energy Act of 1982, replaced the Nuclear Safety Advisory Committee of the former Atomic Energy

Board. The Council, composed of 14 members who are independent of the Atomic Energy Corporation and of potential licencees and are appointed by the Minister for Mineral and Energy Affairs, is primarily responsible for exercising control over health and safety aspects of nuclear installations or of the production, use, storage, disposal or transport of nuclear-hazard materials.

B. Institutional restructuring

47. The Atomic Energy Corporation is the central co-ordinating body in the nuclear field in South Africa. The Nuclear Development Corporation of South Africa Limited (NUCOR) - replacing the former Atomic Energy Board - and the Uranium Enrichment Corporation of South Africa Limited (UCOR) were established in 1982 as full subsidiary companies of the Atomic Energy Corporation.

48. NUCOR concentrates on applied research or production aspects of South Africa's nuclear programmes. Programmes undertaken by the Government relating to the development of resources of nuclear materials are centred around or co-ordinated by NUCOR.

49. Mining and exploration companies are required to furnish NUCOR regularly with details of their exploration and mining activities on a strictly confidential basis.

50. As at 31 March 1983, 2,434 persons worked for NUCOR.

51. The Uranium Enrichment Corporation of South Africa Limited (UCOR) is principally responsible for the production of enriched uranium.

52. The Council for Mineral Technology (MINTEK) is the main organization in the field of research and development for the mining industry. MINTEK is mainly concerned with applied research in mineralogy, mineral and process chemistry, ore dressing, pyrometallurgical and hydrometallurgical research and the development and application of mineral processing operations.

53. The Extraction Metallurgy Division of the former Atomic Energy Board was in 1981, by Cabinet decision, transferred to MINTEK. MINTEK is now responsible for all research and development by the State in South Africa of the processing of uranium, thorium and zirconium ores.

54. South Africa's research and development effort in the processing of uranium, thorium and zirconium ores has been strengthened by combining the forces of the former Atomic Energy Board's Extraction Metallurgy Division and the previous National Institute for Metallurgy under MINTEK's supervision.

VIII. SAFEGUARDS IN SOUTH AFRICA

A. Safeguards related to the SAFARI-I Research Reactor

55. The International Atomic Energy Agency has been applying safeguards to the

SAFARI-I research reactor since 1967 under a Safeguards Agreement between IAEA, the United States of America and the Republic of South Africa (INFCIRC/98) 14/.

B. Safeguards related to the Koeberg Nuclear Power Plant

56. IAEA applies safeguards to the Koeberg nuclear power plant under a Safeguards Agreement of 5 January 1977 between IAEA, France and South Africa (INFCIRC/244) 15/.

57. According to the provisions of the Co-operation Agreement between France and South Africa, reprocessing of fuel irradiated in the Koeberg reactors and the storage of plutonium produced there shall take place outside South Africa in facilities acceptable to both countries, under IAEA safeguards.

C. Safeguards at the semi-commercial enrichment plant

58. The Executive Chairman of the Atomic Energy Corporation of South Africa Limited announced through a press release issued on 31 January 1984 the following:

> "Although South Africa is not a signatory to the Non-Proliferation Treaty, nor has it agreed to fullscope safeguards on all its nuclear facilities, South Africa is prepared to resume discussions with the International Atomic Energy Agency Secretariat on safeguards in respect of its semi-commercial enrichment plant, but not its pilot enrichment plant. South Africa cannot, of course, agree to IAEA safeguards before greater clarity has been obtained on what would be expected of South Africa."

D. Unsafeguarded facilities

59. The following facilities are not covered by IAEA safeguards:

(a) The Pilot Enrichment Plant;

(b) The Fuel Element Production Plant;

(c) The Metallurgical Hot-Cell Complex.

60. However, uranium enriched in the pilot plant at Valindaba and fuel fabricated for the SAFARI and Koeberg reactors would come under safeguards upon being introduced into the reactors and would remain under safeguards thereafter. That is to say, safeguards would continue to be applied to irradiated fuel from these reactors sent for post-irradiation examination at the hot-cell complex which is being constructed 15/.

F. South Africa's nuclear export policy

61. The Executive Chairman of the Atomic Energy Corporation of South Africa Limited announced through a press release issued on 31 January 1984 the following:

"Local development in the field of nuclear technology, such as the establishment of uranium enrichment and attendant facilities in the Republic of South Africa, has caused concern in the international nuclear community and has led to allegations that South Africa may become a supplier of nuclear technology materials and equipment outside the non-proliferation Treaty régime.

"During discussions on nuclear policy and safeguards with the United States of America, South Africa has become aware of the United States concern about its intentions, and the South African Government has given the assurance to the United States Government that South Africa will conduct and administer its nuclear affairs in a manner which is in line with the spirit, principles and goals of the Non-Proliferation Treaty (NPT) and the Nuclear Supplier Group Guidelines (INFCIRC/254). In practice this means that South Africa will transfer material, equipment and technology identified in the trigger list of INFCIRC/254 only in accordance with the provisions of that document. This would specifically include:

"I. South Africa will not sell uranium to non-nuclear weapon countries, without International Atomic Energy Agency or Euratom safeguards;

"II. South Africa will not make available sensitive technology to any other country, without Agency or Euratom safeguards;

"III. South Africa will not sell enriched uranium, or nuclear equipment, without Agency or Euratom safeguards.

"In the event of sales under I, II, or III above, the receiving country will have to guarantee that the technology, material, and equipment will not be used for nuclear explosives, but only for peaceful purposes."

IX. SOUTH AFRICA'S NUCLEAR EXPLOSIVE CAPABILITY

62. The Secretary-General's report (A/35/402 and Corr.1) has presented South Africa's plan and capability in the nuclear field and has established its capability to manufacture nuclear weapons.

63. The present report provides data and information on the continued development of South Africa's overall nuclear capability.

Notes

1/ The Nuclear Energy Agency (NEA) of the Organisation for Economic Co-operation and Development (OECD) in collaboration with the International Atomic Energy Agency (IAEA) issues regularly a comprehensive review of World Uranium Resources, Production and Demand, also referred to as the "Red Book". Data relates to the situation in the world outside the centrally planned economies area (WOCA).

Uranium that occurs in known mineral deposits of such size, grade and configuration that it could be recovered within the given production cost ranges,

Notes (continued)

with currently proven mining and processing technology, is referred to as "Reasonably Assured Resources" (RAR).

Uranium in addition to RAR that is expected to occur in extensions of well-explored deposits and in deposits in which geological continuity has been established but where specific data and measurements of the deposits and knowledge characteristics of the deposits are considered to be inadequate to classify the resources as RAR, is referred to as "Estimated Additional Resources" (EAR).

2/ OECD/IAEA, Uranium Resources, Production and Demand, 1983.

3/ Ibid. The decreases in production in South Africa were caused by some producers cutting back production during 1982, or phasing it out temporarily, as was the case with West Rand Consolidated Mines Limited and the No. 1 plant of Western Deep Levels Limited. Some of the production loss was offset by the commissioning of new uranium plants by Western Areas Gold Mining Company Limited and St. Helena Gold Mines Limited and some increases by existing producers. The decrease in production in Namibia resulted from reduced output from the Rossing mine.

4/ OECD/IAEA, Uranium Resources, Production and Demand, 1983.

5/ Atomic Energy Board, Annual Report, 1981.

6/ Nucleonics Week, April 8, 1982.

7/ A. Krass, P. Boskma, B. Elzen, A. Smit: Uranium Enrichment and Nuclear Weapon Proliferation, SIPRI 1983.

8/ Newby-Frazer, Chain Reaction, p. 55, "US Cancels Uranium Delivery contract with South Africa", Financial Times (London), 6 November 1976.

9/ Atomic Energy Board, Annual Report, 1980.

10/ Atomic Energy Board, Annual Report, 1981.

11/ NUCOR Review 1982-83.

12/ Press release, Atomic Energy Corporation, 22.6.83.

13/ Nuclear Engineering International, June 1984.

14/ International Atomic Energy Agency (IAEA) INFCIRC/98.

15/ IAEA INFCIRC/244.
