STUDY TOUR REPORT NO. 8

C.P.U.NO. 830

COMMITTEE ON PUBLIC UNDERTAKINGS

(2001-2002)

(THIRTEENTH LOK SABHA)

STUDY TOUR REPORT

ON

NUCLEAR POWER CORPORATION OF INDIA LIMITED

Laid in the Lok Sabha on 31.07.2001

Laid in the Rajya Sabha on 31.07.2001

LOK SABHA SECRETARIAT

NEW DELHI

July, 2001/ Sravna 1923(S)

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COMPOSITION OF COMMITTEE ON PUBLIC UNDERTAKINGS (2001-2002)

CHAIRMAN

Prof. Vijay Kumar Malhotra

MEMBERS

LOK SABHA

2. Shri Prasanna Acharya
3. Shri Mani Shankar Aiyar
4. Prof. S P.Singh Baghel
5. Shri Sudip Bandyopadhyay
6. Shri Ram Tahal Chaudhary
7. Shri Ajay Singh Chautala
8. Shri Shiv Raj Singh Chauhan
9. Shrimati Sangeeta Kumari Singh Deo
10. Shri C K. Jaffer Sharief
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13. Shri Rajiv Pratap Rudy
14. Shri Tarit Baran Topdar
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RAJYA SABHA

16. Shri Suresh Kalmadi
17. Shri K. Kalavenkata Rao
18. Shri Jiban Roy
19. Shri B.P.Singhal
20. Smt. Ambika Soni
21. Shri C.P.Thirunavukkarasu
22. Shri Ranjan Prasad Yadav

SECRETARIAT

1	Shri. N. Rajagopalan Nair.	Joint Secretary
2.	Shri S. Ba Shekar	Director
3.	Shri Raj Kumar	Under Secretary

INTRODUCTION

In pursuance of the procedure adopted under Rule 281 of the Rules of Procedure and Conduct of Business for laying the Study Tour Reports on the Tables of both the Houses of Parliament, I, Chairman, Committee on Public Undertakings have been authorised by the Committee to lay the Study Tour Report on their behalf, lay the Study Tour Report of the Committee on their discussions with the officials of Nuclear Power Corporation of India Ltd.

2. The Committee held discussions with the officials at Chennai on 17.1.2001. A copy of the tour programme is annexed (Annexure-I).

3. The Committee considered and approved the Report at their sitting held on 15th May, 2001.

4. The Committee wish to express their thanks to Nuclear Power Corporation of India Ltd for providing facilities during the visit of the Committee and for supplying necessary material and information required in connection with the Study Tour.

5. They would also like to place on record their sense of appreciation for the invaluable assistance rendered to them by the officials of the Lok Sabha Secretariat attached to the Committee.

New Delhi
29 MAY, 2001
8 JYAISTHA, 1923(S)

PROF. VIJAY KUMAR MALHOTRA
CHAIRMAN
COMMITTEE ON PUBLIC UNDERTAKINGS

"STUDY TOUR NOTES" OF THE COMMITTEE ON PUBLIC UNDERTAKINGS

Discussion with the representatives of Nuclear Power Corporation of India Limited at Chennai on 17th January, 2001.

At the outset, the Chairman, Committee on Public Undertakings informed the Members that the Chairman, Nuclear Power Corporation of India Ltd. (NPCIL) had sought exemption from being present during the Committee's discussions with the representatives of the Corporation and that he had agreed to the request.

2. In the absence of Chairman, the Sr. Executive Director of NPCIL represented the Corporation during the discussions with the Committee.

3. After the opening remarks of the Chairman, COPU, the Sr. Executive Director of NPCIL was requested to introduced himself and his colleagues to the Committee and also to give a brief account on the working of the corporation.

4 Following the introduction of officers, the Sr. Executive Director, NPCIL informed the Committee that the Nuclear Power Corporation of India Ltd., a public sector enterprise under the Department of Atomic Energy, was set up on 17th September, 1987 with the objective of operating the atomic power stations and implementing the atomic power projects for generation of electricity in pursuance of the schemes and programmes of the Government of India under the Atomic Energy Act, 1962. The Corporation has 14 Atomic Power reactors in

operation with a total capacity of 2720 MWe– two reactors each at Tarapur, Kalpakkam, Narora, Kakrapar and Kaiga and four reactors at Rawatbhata. Of these, Unit-1 of Rajasthan Atomic Power Station at Rawatbhata is operated by the Corporation on behalf of the Government of India. The details of these nuclear power stations presently under operation are given in the table below:-

Unit Location	Reactor Type	Present Capacity (MWe)	Year of Commercial Operation
TAPS-1,Tarapur,Maharashtra	LWR	160	28.10.1969
TAPS-2,Tarapur,Maharashtra	PHWR	160	28.10.1969
RAPS-1,Rawatbhata,Rajasthan	PHWR	100	16.12.1973
RAPS-2,Rawatbhata,Rajasthan	PHWR	200	01.04.1981
MAPS-1,Kalpakkam,Tamilnadu	PHWR	170	27.01.1984
MAPS-2,Kalpakkam,Tamilnadu	PHWR	170	21.03.1986
NAPS-1,Narora,Uttar Pradesh	PHWR	220	01.01.1991
NAPS-2,Narora,Uttar Pradesh	PHWR	220	01.07.1992
KAPS-1,Kakrapar,Gujarat	PHWR	220	06.05.1993
KAPS-2,Kakrapar,Gujarat	PHWR	220	01.09.1995
KAIGA-1,KaigaKarnataka	PHWR	220	16.11.2000
KAIGA-2,KaigaKarnataka	PHWR	220	16.03.2000
RAPS-3,Rawatbhata,Rajasthan	PHWR	220	01.06.2000
RAPS-4,Rawatbhata,Rajasthan	PHWR	220	January,2001
TOTAL		**2720**	

5. It was also informed to the Committee that the total generation of electricity from the Nuclear Power Plants (NPPs) of NPCIL during the financial years 1995-96, 1996-97, 1997-98, 1998-99 and 1999-2000 were 7983 MUs, 9068 MUs, 9618 MUs, 11174 MUs and 12460 MUs. The average capacity factors of NPPs of NPCIL were 60%, 67%, 71% 75% and 80% during 1995-96, 1996-97, 1997-98, 1998-99 and 1999-2000 respectively. During the past 14 months, four units each of 220 MWe amounting to a total capacity of 880 MWe have been commissioned and connected to the Grid meeting the target set for the Ninth Plan.

6. About the financial performance of the Corporation, the Committee were informed that the Corporation earned a profit (before tax) of Rs. 153 crore, Rs. 252 crore, Rs. 265 crore Rs. 402 crore and Rs 223 crore during 1995-96, 1996-97, 1997-98, 1998-99 and 1999-2000 respectively.

7. It was pointed out that the Nuclear Power Corporation of India Ltd. (NPCIL) was established in 1987 primarily to carry forward the "Nuclear Power Profile" prepared in 1984 by the Department of Atomic Energy, which envisaged a 10,000 MWe pressurised heavy water capacity by 2000AD by addition of twelve 220 MWe and ten 500 MWe units. The present nuclear power capacity stands only at 2720 MWe which is far below the capacity originally planned to be achieved.

Asked to state the reasons for the slow growth of nuclear power generation in India, it was informed that the nuclear power development so far has been technology driven. The frontier technology of this nature had to be implemented in a developing country like ours. Therefore it involved significant amount of R&D in technology and manufacturing development work. It required time. The process of learning had to be gone through. Therefore, the growth was limited by the above factors.

8. Asked about the schemes planned to be implemented during the Ninth Plan period (1997-98 to 2001-2002) along with the outlays proposed by NPCIL and actually approved by the government for implementing the schemes, the Committee have been informed that the schemes planned to be

implementedduring Ninth Plan Period along with the outlays proposed by NPCIL and approved by the Government are given below.

Rs. In Crores

	PROPOSED	APPROVED	EXPECTED UTILISATI ON
ON-GOING PROJECTS:			
Kaiga-1&2	837.18	837.18	1002.85
RAPP-3&4	843.57	843.57	1013.77
RAPP-3&4	2269.24	1973.15	1510.74
TOTAL FOR ON-GOING PROJECTS	**3949.99**	**3653.90**	**3527.36**
NEW PROJECTS			
Kaiga-3&4	600.90	300.00	164.08
KK PROJECT	1517.36	405.05	685.66
TOTAL FOR NEW PROJECTS	**2118.26**	**705.05**	**849.74**
ANCILLARY SCHEMES:			
OPERATING STATIONS	246.88	246.88	136.38
COOLANT CHANNEL INSPECTION	35.37	35.37	8.36
RAPS-2 CCR & UPGRADATION	111.71	111.71	116.73
DEVELOPMENT WORKS-500 MWe	30.06	30.06	2.47
DEVELOPMENT WORKS-220 MWe	21.31	21.31	0.98
NAPS-1REHABILITATION	34.00	34.00	31.48
ENVIRONMENT & PUBLIC AWARENESS	3.15	3.15	1.75
MAPS-1&2 CCR & UPGRADATION	258.46	258.46	43.96
INTERNATIONAL RELATIONS FOR TRANSFER OF TECHNOLOGY	5.06	5.06	0.10
INTEGRATED INFORMATION SYSTEM			
NPC OFFICE BUILDING & QUARTERS	67.43	67.43	67.32
TOTAL FOR ANCIALLARY SCHEMES	**828.48**	**828.42**	**420.28**
TOTAL FOR NPCIL	**6296.83**	**5187.43**	**4797.48**

9. Asked about the gross power generation in respect of each of the operating units in the last five years as compared to the targets set alongwith

the reasons for shortfall, if any, in achieving the targeted generation, the Committee have been informed about the operating performance of the nuclear power stations from 1995-96 to 1999-2000 as given in table below:-

Year Units	1995-96		1996-97		1997-98		1998-99		1999-2000	
	Target Gen.	Actual Gen.	Target Gen.	Actual Gen.	Target Gen	Actual Gen	Target Gen	Actual Gen	Target Gen	Actual Gen
TAPS-1	960	1108	865	424	950	1180	960	1298	850	941
TAPS-2	680	445	975	648	780	955	780	998	1020	1214
RAPS-2	0	0	0	0	0	0	875	990	1158	1405
MAPS-1	905	1136	500	752	905	729	1090	1123	943	1042
MAPS-2	995	274	810	1233	905	1164	810	1065	1037	1189
NAPS-1	1222	1295	1209	1377	1260	1735	1320	1316	1353	1602
NAPS-2	1226	1457	1218	1449	1260	1716	1320	1492	1353	1529
KAPS-1	1226	1115	1201	1590	1240	933	1320	1388	1353	1646
KAPS-2	737	1152	992	1594	1205	1208	1320	1506	1353	1750
KAIGA-2									401	128
KAIGA-1										
RAPS-3									188	15
RAPS-4										
NPCIL's TOTAL	7960	7983	7570	9086	8515	9618	9795	11174	10979	12460

The broad reasons for the units which have not met the targets are given below (1995-96 to 1999-2000)

19995-96

TAPS-2 had an extended refueling shutdown on account of regulatory inspection of core shroud which was based on information on detection of cracks in core shroud in some Boiling Water Reactors in USA. This needed a relatively longer outage for the period from Sept.95 to May 96 due to special work on core shroud inspection.

MAPS-2 The annual maintenance shutdown of MAPS-2 which commenced from 1st April 1995 was extended up to January 1996 for chemical decontamination of primary heat transport system, in service inspection and subsequent removal of three coolant channels for radio metallurgical examination, removal of leaky tube of a steam generator and replacement of Low Pressure (LP) Turbine rotor with the rotor having modified blade design.

These are safety related Regulatory requirements.

1996-97

TAPS-1 which was shutdown in June 1996 had to take an extended outage and the unit came back in January 1997 due to extended refuelling outage on account of regulatory inspection of core shroud. TAPS-2 had also to take a relatively longer outage from June 1996 to August 1996 due to the problem of generator rotor which was replaced. Also the Unit-2 generation was

at reduced power level (120 Mwe) from Oct.96 to May 97 due to failure of a recirculation pump.

RAPS-2 was under capital maintenance outage since August 1994 for enmasse coolant channels replacement and systems upgradation and commissioned back after successfully completing the task in June 1998, thus excluded from the targets.

1997-98

MAPS-1 had to take an outage for in service inspection of coolant channels from April 1996 to August 1997.

At KAPS-1, LP turbine failure was revealed during annual maintenance shutdown (ASD) taken from March 26, 1997. The unit was synchronized on July 8, 1997 after repair of the turbine.

1999-2000

Targets for Kaiga-2 and RAPS-4 were set from November, 1999 and February 2000 respectively but units were synchronized to the grid for the first time on 2nd December, 1999 and 10th March, 2000 respectively.

It may be mentioned that during all the years mentioned above, NPCIL's overall targets were met.

10. The Kaiga Atomic Power Project (1 & 2) of 220 MWe each and Rajasthan Atomic Power Project (3 & 4) of 220 MWe each commenced commercial

operation with effect from 16th November, 2000, 16th March, 2000, and 1st June, 2000 and December, 2000 respectively The Original sanctioned cost, completion time as originally scheduled subsequent revisions in this respect, and the actual completion cost and time taken in implementing each of the four projects are given below:-

KAIGA 1 & 2

(Rs. in crores

Sanction	Sanctioned Cost			Approved Criticality	
	Base	IDC	Total	Kaiga –1	Kaiga-2
Original (June 87)	730.73	Nil	730.73	June-95	Dec-95
Revision-1(Oct. 96)	1590.00	685.00	2275.00	June-96	Dec-96
Revision-2 (June 2000)	1816.00	1080.00	2896.00	Sept. 2000	Sept. 99

Actual completion dates of major milestones are given below:

Milestone	Kaiga-2	Kaiga-1
Criticality	24.9.1999	26.9.2000
Synchronisation	2.12.1999	12.10.2000
Commercial	16.3.2000	16.11.2000

RAPP-3&4

(Rs. In Crores)

Sanction	Sanctioned Cost			Approved Criticality	
	Base	IDC	Total	Kaiga –1	Kaiga-2
Original (Nov.86)	711.56	Nil	711.56	May-95	Nov-95
Revision-1(Aug. 95)	1460.00	657.00	2107.00	Nov.-96	May-98
Revision-2 (June 2000)	1711.00	800.00	2511.00	Dec. 99	Nov. 2000

Actual completion dates of major milestones are given below:

Milestone	Kaiga-2	Kaiga-1
Criticality	24.12.1989	3.11.2000
Synchronisation	10.3.2000	17.11.2000
Commercial	1.6.2000	23.12.2000

Asked to state the reasons for the time and cost overruns in these projects , the Company informed the following reasons:-

KAGA 1 & 2

Major reasons for time overrun:

Though the excavation was completed in time, there has been an initial delay of about 1 year in commencement of raft concreting due to extensive analysis carried out as per the directives of AERB. Further activities were carried out as per the schedule till May 1994. Consequent to delamination of under surface of inner containment dome of RB-I, there has been delay of about 44 months (May 1994 to December 1997) in case of Kaiga-2 and 59 months (May 1994 to April 1999) in case of Kaiga-1. This has been mainly due to subsequent analysis, detailed reengineering, submissions and obtaining approvals from AERB. However, a significant portion of this delay has been absorbed by parallel working, crashing of downstream activities.

Reasons for cost over run:

Reasons for increase in Base Cost:

Sr. No	Factor	Increase in cost from original to Rev.-1	Increase in cost from Rev.-1 to Rev. -2
1.	Changes in scope of work	144.91	41.67
2.	Escalation	430.70	78.54
3.	Taxes and duties	95.96	7.88
4.	F.E. rate variation	51.98	1.42
5.	Other reasons	136.10 *	96.31 **
	Total	859.27	226.00

* Mainly due to effect of devaluation in June-98 and provision for working capital margin

** Mainly due to additional overhead expenditure at site and Headquarters on account of delay.

Reasons for Increase in IDC

No provisions was made for IDC in the initial estimates because it was envisaged that project will be constructed by full budgetary support from Government. Hence additional provision of Rs. 885 Crores in IDC is made in Revision - 1 of cost estimate. The increase of Rs. 385 Crores in IDC for Revision -2 over Revision -1 is on account of longer duration of construction

RAPP 3& 4
Reasons for time over run

- Till April. 94, project activities were proceeding as per schedule.
- Consequent to delamination of IC dome of Kaiga –1 "Hold" was put on construction of Containment structure of Reactor building in May 94.
- Final AERB clearance for construction of Reengineered IC Dome could be obtained on 13 May, 1998.
- 48 months have been lost due to delamination incident.
- But a significant portion of delay was absorbed by parallel working and crashing down stream activities by employing more resources.

Reason for cost run:

(Rs. in crores)

Sr. No	Factor	Increase in cost from original to Rev.-1	Increase in cost from Rev.-1 to Rev. –2
1.	Changes in scope of work	137.37	14.60
2.	Escalation	386.75	127.61
3.	Taxes and duties	77.16	16.80
4.	F.E. rate variation	62.04	1.42
5.	Other reasons	85.10 *	101.77 **
	Total	738.44	261.00

* Mainly due to effect of devaluation in June-98 and provision for working capital margin
** Mainly due to additional overhead expenditure at site and Headquarters on account of delay.

Reason for increase in IDC

No provision was made for IDC because it was envisaged that project will be constructed by full budgetary support from Government. Hence additional provision of Rs. 657 Crores in IDC is made in revised cost estimate (Rev-I). The increase of Rs. 143 Crores in IDC (Rev-2) over (Rev-1) is on account of longer duration of construction.

11. Asked to state the reasons for the sharp decline in the post-tax profit earned by NPCIL in 1999-2000 as compared to the profit earned during 1998-99, the Committee have been informed as under.

The comparative Profit & Loss Account are given below:

(Rs. In Crores)

		1999-2000	1998-99
I)	Profit for the Year	552.23	427.80
ii)	Prior Period Adjustments	(329.16)	(26.27)
III)	Profit before Tax	223.07	401.53
iv)	Provision for Taxation	138.00	40.00
v)	Profit after Tax	85.07	361.53

It will be seen that profit for the year 1999-2000 is Rs. 552.23 crores as compared to Rs. 427.80 crores in the year 1998-99 showing increase of Rs. 124.43 crores.

The net post tax profit during the year 1999-2000 is Rs. 85.07 crores as against Rs. 361.53 crores in 1998-99 because of the following reasons:

(i) During the year 1999-2000, Corporation has provided additional interest on Government loan amounting to Rs. 342.32 crores in terms of Department of Atomic Energy (DAE) Notification out of which, Rs. 286.66 crores has been charged to the prior period adjustments. Balance Rs. 55.66 crores was capitalised and depreciation on the same amounting to Rs. 22.01 crores was also provided under prior adjustment for the year 1999-2000.

(ii) In view of the carried forward unabsorbed depreciation, the tax liability was Rs. 40 crores only in the year 1998-99. However, during the year 1999-2000, there was no carried forward unabsorbed depreciation and therefore, Company was required to make provision of Rs. 138 crores for taxation.

12. On the question of Joint Venture participation and foreign direct investment in nuclear power generation, the Committee have been informed that Joint venture participation will require amendment of Atomic Energy Act as it presently enjoins upon the Central Government to fully own the nuclear power plants. DAE is taking necessary action in this regard. Joint venture participation can initially be considered for 220 MWe PHWR units as these are under operation for a long time. Based on the experience, it can later be extended to 500 MWe PHWR units. The approach in this regard will have to be gradual as

such in the 10th Plan, the programme will have to mainly depend upon budgetary support from Govt. for its equity apart from internal surplus. It is not certain at this stage as to whether partial equity from Joint Venture could materialise. A concrete picture in this regard will emerge in due course of time.

As regards foreign direct investment in this sector, it will have to be looked at on a case to case basis based on the conditions attached to it. As of now, there is no proposal in this regard. Drawing of foreign capital in this sector can be through Inter Governmental Agreement of the type entered into between India and Russian Federation for the proposed 2x1000 MWe project Kudankulam. Any private or foreign participation in this sector will have to take into account strategic aspects associated with this sector and policies of national security on which there can be no compromise.

13. When asked whether there is any scope for private participation in nuclear power generation, the Committee have been apprised that there is scope for private participation in the nuclear power sector. However, presently the statutory restrictions made it obligatory for the Central Govt. to fully own the nuclear power plants. DAE is taking action regarding amendment of Atomic Energy Act to enable private participation. Such participation in specific projects will be guided by the terms and conditions of such offer without any compromise on the national policies. In the near term, prospects of private participation will be limited and the programme will have to mainly rely on Government's budgetary support combined with internal surplus and borrowings. However, a

beginning is proposed to be made in specific projects for Joint Venture participation with public and private sector. It is proposed to gradually increase such participation over a period of time. A concrete picture will emerge in due course of time.

14. Asked about NPCIL's dependence on imports and how far sanctions imposed by some developed countries had an effect on it, the Committee have been informed that the direct import content in the indigenously developed Pressurised Heavy Water Reactors (PHWRs) is in the range of 10 to 15% Department of Atomic Energy (DAE)/Nuclear Power Corporation of India Ltd. (NPCIL) have been experiencing restrictive control regimes imposed by some developed countries since 1974 in one way or the other. In spite of such restrictions, nuclear power reactors have been in operation and during 1999-2000 an overall average capacity factor of 80% has been achieved. In respect of the minimal imports, where-ever there are difficulties, measures like alternate sourcing, development of indigenous substitute and modification to designs are adopted to tide over the difficulties.

15. When asked why the NPCIL is building 220 MWe and 500 MWe unit nuclear power projects and not going for larger power projects, it was informed that in the early stages of nuclear power programme, the unit size in the range of 200-220 MWe was adopted to be consistent with the unit sizes of conventional thermal power plants and from the considerations of stable and reliable operation of the units in the existing electrical grid system. With the

growth in the electricity power system, 500 MWe unit sizes are now in operation. To be consistent with the unit sizes in the national grid system, the designs of 500 MWe PHWR units have been developed and the first 2x500 MWe units are being set up at Tarapur, Maharashtra. In order to utilise the technology development efforts fully, 500 MWe unit size has been standardised for the indigenous PHWRs and now efforts are being made to increase unit ratings to still higher levels. Also 500 MWe unit size has been adopted for the PFBR and initial FBRs as well.

A beginning will be made with the introduction of 1000 MWe unit size of nuclear power plant with the proposal to construct, in co-operation with Russian Federation, 2x1000 MWe Russian VVERs at Kudankulam, Tamilnadu, which are Light Water Reactors of the PWR type.

16. Questioned about the outstanding amounts due to the Corporation, the Committee were informed that as on 31st December, 2000 a total amount of Rs.3250 crore was due from various State Electricity Boards (SEBs).

Specifying the steps taken to realise the dues, it was informed that in order to recover the oustanding dues from SEBs, NPCIL has been negotiating/entering into settlement packages with SEBs by giving some concessions on the delayed payment charges and payment in instalments etc. Moreover, NPCIL has been recovering a part of the dues by appropriations of the Central Plan Assistance (CPA) to the respective States. The matter of securitisation of dues from SEBs has been taken up with the Ministry of

Power/Ministry of Finance in similar line as is being considered in case of other Central PSUs.

17. To a query about economic age of the nuclear power plants and plans to decommission when they are due, it was informed that the economic age of the nuclear power plant is generally taken as 25 years. However, actual life based on plant life extension programme could be over 40 years. Soon after the operation of the nuclear power plant ceases, fuel containing most of the radioactivity is discharged for reprocessing. Also in a nuclear power plant, a large number of parts which do not become radioactive during operations and can be dismantled are removed by using conventional methods. No commercial nuclear power reactor in India is due for decommissioning in the near future. TAPS-1&2 which are the oldest units operating since 1969 have many more years of operation. In-service inspection and refurbishment activities are ongoing. The plants are as of now operating at high capacity factors. RAPS-2 has recently been refurbished. Such a programme is envisaged for RAPS-1 also. With the development of technology and the time available before the actual decommissioning operations start, it is technologically feasible to indigenously deal with the situation. A levy of 2 paise per KWH has been included in the tariff for decommissioning. Collections with accrued interest from this levy are meant for financing the decommissioning operations.

18. When asked how long the natural uranium reserves in the country will last and their plans to utilise thorium, the Committee have been informed that

the Uranium exploration is a continuing activity and efforts are in progress by Department of Atomic Energy (DAE) to identify uranium resources. The indigenous natural uranium resources are expected to support the first stage porgramme of Pressurised Heavy Water Reactors (PHWRs). However, India is endowed with one of the largest Thorium resources in the world. Thorium by conversion to Uranium in a nuclear reactor becomes a fissile material capable of generation of electricity. The DAE's plan is to use U^{233}-Thorium based reactors in the third stage of the nuclear power programme. Prior to this, the completion of the first stage of PHWRs is essential. Based on utilising the plutonium recovered from the spent fuel of PHWRs, Fast Breeder Reactors (FBRs) will be set up in the second stage. During this second stage, the recycling of uranium in the FBRs will be carried out for maximising the plutonium inventory for the electricity generation in the initial phases. Subsequently, during the second stage, thorium blanket material will be deployed in the FBRs for generating U^{233} inventory which will enable commencement of U^{233}–Thorium breeder reactors in the third stage. A beginning has been made in the technology development of thorium utilisation. Thorium has been irradiated in research reactors and also in PHWRs to produce U^{233}. The technology for separation of U^{233}, on a laboratory scale has also been established.

19. When asked about the present nuclear power generation capacity in the country in comparison to the international position, it was informed that the share of nuclear electricity in the world is about 16% of the total electricity

generated. In india, the share is about 3%. It may be mentioned that India, as a developing country, has developed comprehensive capability in the nuclear power and associated nuclear fuel cycle activities based on indigenous efforts in spite of restrictive control regimes prevalent in this field.

OBSERVATIONS OF THE COMMITTEE

Recommendation No 1

NUCLEAR POWER GENERATION

The Committee note that against the target of generating 10,000 MWe of nuclear power capacity by 2000 AD, the present nuclear power capacity stands at 2720 MWe which is far below the capacity originally planned to be achieved. The Committee further note that the Corporation now aims at setting up of 20,000 MWe of nuclear power generating capacity in the country by the year 2020. The Committee are unable to comprehend as to how this target could be achieved, considering the fact that if all the projects which the Corporation has planned to implement by 2009-10 start generation of power, the total nuclear power generating capacity would come to only 6680 MWe. Besides, the present operating base (2720 MWe) of nuclear power is not adequate to generate enough surpluses to support a large programme. Moreover, the Corporation is also plagued by the menace of heavy arrears of outstanding dues from the State Electricity Boards. The Committee urge upon the Corporation to frame a time-bound programme with a view to achieve the target of 20,000 MWe by the year 2020. To enable the Corporation to achieve the target, the Committee recommend that the Government should provide the necessary budgetary support consistently in the years to come hereafter. The Committee also desire that the issue of joint venture /private participation in the nuclear power sector should be decided expeditiously.

Recommendation No.2

DELAYS IN EXECUTION OF PROJECTS

Another aspect noted by the Committee is the inability of the Corporation to execute the projects as per the time schemes planned which had subsequently affected the cost of the projects. The Committee observe that there has been a delay of 4 to 5 years in commissioning of KAIGA 1&2 and RAPP-3&4 Nuclear Power Projects from the original commissioning schedules and the costs of these projects have increased 3 to 4 times. The Committee recommend that the Corporation should take corrective steps in future to ensure that the projects are commissioned as per the planned time and cost schedules and they should also review their planning process to identify the areas where delays could be avoided.

Recommendation No.3

SHORTFALL IN UTILISATION OF PLAN FUNDS

The Committee note that there has been under-utilisation of the approved Ninth Plan funds in respect of 500 Mwe Development works and for MAPs 1&2 upgradation schemes. Out of the approved plan outlay of Rs. 30.06 crores for development works on 500 Mwe plants, only Rs. 2.47 crores is expected to be utilised, while in the case of upgradation of the Madras Atomic Power Station 1&2, an expenditure of Rs. 43.98 crores only is expected to be made against an allocation of Rs. 258.4 crore during the Ninth Plan Period. Similarly, on Ancillary schemes, the total expenditure is expected to be around Rs. 420 crores out of an allocation of Rs. 828.42 crores. The Committee desire that an in-depth analysis about the reasons for the shortfall in expenditure should be made so that appropriate corrective measures could be taken during the forthcoming Tenth Five Year Plan in order to realise the goal set for nuclear power generation.

Recommendation No.4

NEED TO UNDERTAKE PROJECTS WITH LARGER CAPACITY ADDITIONS

The Committee note that a beginning will be made in the matter of construction of units with larger capacities with the introduction of 1000 MWe unit size plant at Kudaukulam with the assistance of Russian Federation. The Committee are of the view that the ambitious target of 20,000 MWe set for nuclear power production by 2020 AD can be realised only when units with larger capacities are set up in future. They, therefore, recommend that more such plants should be planned in future and the Union Government should allocate sufficient funds for undertaking these ventures, as nuclear power is a source of clean, pollution-free power.

Recommendation No.5

DUES OUTSTANDING FROM STATE ELECTRICITY BOARDS.

The Committee note that as on 31st December,2000 an amount of Rs. 3250 crore is due from various State Electricity Boards. The Committee have been informed that the corporation has been recovering some portion of the outstanding dues by appropriations of the Central Plan Assistance (CPA) to the respective States. Besides the Corporation has also been negotiating/entering into settlement packages with SEBs by giving some concessions on the delayed payment charges and agreeing to payment in instalments etc. Since the Corporation is facing financial constraints to carry on the nuclear power programme by it, the Committee feel that appropriation of Central Plan Assistance towards NPCIL dues should be enhanced so that the outstanding dues could be recovered in a very short period. Besides, all the SEBs should open Letter of Credit (LCs) for the full amount of billing to avoid building up of dues.The Committee recommend that the matter of securitisation of dues from the State Electricity Boards should be expeditiously decided and implemented in order to help NPCIL to generate sufficient resources for their power generation projects.

ANNEXURE I

TOUR PROGRAMME OF THE COMMITTEE ON PUBLIC UNDERTAKINGS AS ACTUALLY PERFORMED TO CHENNAI, PORT BLAIR AND CALCUTTA FROM 17TH TO 22ND JANUARY, 2001

(MEMBERS ASSEMBLED AT CHENNAI)

DATE & DAY	TIME	VISIT & DISCUSSION
17.1.2001 (Wednesday)	1700 hrs	Informal discussion with the Officers of Nuclear Power Corporation of India Ltd.
		(NIGHT HALT AT CHENNAI)
18.1.2001 (Thursday)	1000 hrs	Informal discussion with the Officers of Central Warehousing Corporation
	1200 hrs	Informal discussion with the Officers of Oriental Insurance Co.Ltd.
		(NIGHT HALT AT CHENNAI)
19.1.2001 (Friday)	0600 hrs	Departure Chennai by CD-7549 for Port Blair
	0805 hrs	Arrival Port Blair
	1130 hrs	Informal discussion with the Officers of Airports Authority of India Ltd.
		(NIGHT HALT AT PORT BLAIR)
20.1.2001 (Saturday)	1700 hrs	Informal discussion with the Officers of Andaman & Nicobar Islands Forests & Plantation Development Corporation Ltd.
		(NIGHT HALT AT PORT BLAIR)
21.1.2001 (Sunday)	SUNDAY	
		(NIGHT HALT AT PORT BLAIR)
22.1.2001 (Monday)	0800 hrs	Departure Port Blair by CD-7286 for Calcutta
	1000 hrs	Arrival Calcutta
	1200 hrs	Informal Discussion with the Officers of National Insurance Company
		DISPERSAL

ANNEXURE-II

COMPOSITION OF THE COMMITTEE ON PUBLIC UNDERTAKINGS WHICH VISITED CHENNAI, PORT BLAIR AND CALCUTTA FROM 17TH TO 22ND JANUARY, 2001.

S.NO.		DATE/PLACE OF JOINING	DATE / PLACE OF LEAVING
CHAIRMAN			
	PROF VIJAY KUMAR MALHOTRA	16.1.01 CHENNAI	22.1.01 CALCUTTA
MEMBERS LOK SABHA			
2.	SHRI S. S. RARIWALA	16.1.01 CHENNAI	22.1.01 CALCUTTA
3.	SHRI DHARAM RAJ SINGH PATEL	16.1.01 CHENNAI	22.1.01 CALCUTTA
4.	SHRI A. E. KRISHNAMURTHY	17.1.01 CHENNAI	22.1.01 CALCUTTA
5.	SHRI RAM TAHAL CHOUDHARY	17.1.01 CHENNAI	22.1.01 CALCUTTA
6	SHRI SUDIP BANDYOPADHYAY	17.1.01 CHENNAI REJOINED ON 22.1.01 AT CALCUTTA	19.1.01 CHENNAI
7.	SHRI VILAS MUTTEMWAR	17.1.01 CHENNAI	22.1.01 CALCUTTA
8.	SHRI TARIT BARAN TOPDAR	17.1.01 CHENNAI REJOINED ON 22.1.01 AT CALCUTTA	21.1.01 PORT BLAIR
9.	SHRI D. P. YADAV	17.1.01 CHENNAI	22.1.01 CALCUTTA
10.	SHRI R. L. BHATIA	18.1.01 CHENNAI	21.1.01 PORT BLAIR
11.	SHRI R. P. RUDY	20.1.01 PORT BLAIR	22.1.01 CALCUTTA
MEMBERS RAJYA SABHA			
12.	SHRI JIBON ROY	17.1.01 CHENNAI	20.1.01 PORT BLAIR
13	SMT AMBIKA SONI	17.1.01 CHENNAI	22.1.01 CALCUTTA

14.	SHRI RANJAN PRASAD YADAV	17.1.01 CHENNAI	19.1.01 CHENNAI
15.	SHRI K. KALAVENKATA RAO	17.1.01 CHENNAI	22.1.01 CALCUTTA
16.	SHRI SATISH CHANDRA SITARAM PRADHAN	17.1.01 CHENNAI,	21.1.01 PORT BLAIR

SECRETARIAT

1. SHRI S. BAL SHEKAR, DIRECTOR
2. SHRI R.C. KAKKAR, UNDER SECRETARY
3. SHRI RAJ KUMAR, UNDER SECRETARY

ANNEXURE - II

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LIST OF OFFICIALS OF NUCLEAR POWER CORPORATION OF INDIA LTD. WHO WERE PRESENT DURING DISCUSSION WITH THE COMMINTTEE ON PUBLILC UNDERTAKINGS AT CHENNAI ON 17TH JANUARY, 2001.

1.	Sh. A. Sanat Kumar	Sr.ED
2.	Sh. S.Krishnan	ED
3.	Sh.K.J.Sebastian	Director
4.	Sh. Preman Dhinaraj	Director(Pers)
5.	Sh.S.S.Dhillon	Company Secretary
6.	Sh. A.K.Hariharan	Station Director
7.	Sh. M.A.Saleem	Sr.Manager(P&IR)