

**August 13, 1964**

**India Department of Atomic Energy, Minutes of a Meeting Held August 1, 1964 Regarding the Fourth Five Year Plan Requirements**

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**Summary:**

Minutes from a meeting headed by Homi Bhabha regarding research and development requirements for atomic energy for the department's Fourth Five Year Plan. Includes the budget and research topics for various divisions of nuclear research.

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GOVERNMENT OF INDIA  
DEPARTMENT OF ATOMIC ENERGY

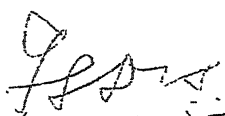
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Apollo Pier Road,  
Bombay-1.

No. 31/4/63-Budget

August 13, 1964.

A copy of the minutes of the meeting held on Saturday, August 1, 1964, at 10 A.M. under the Chairmanship of Dr H.J. Bhabha, Secretary, Department of Atomic Energy to discuss the Fourth Five Year Plan requirements for research and development of atomic energy is forwarded herewith for information and necessary action.

  
(Y. S. Das)  
Deputy Secretary

To

Prof. H.J. Bhabha,  
Dy. Director, (Physics)  
Tata Institute of Fundamental Research,  
Bombay-5.

YSD:lks:13.8.64

M I N U T E S

A meeting was held on Saturday, August 1, 1964, at 10 A.M. under the Chairmanship of Dr H.J. Bhabha, Secretary, Department of Atomic Energy to discuss the Fourth Five Year Plan requirements for research and development of atomic energy. The Directors of Groups, Heads of Divisions of the Atomic Energy Establishment Trombay, officers of Tarapur Atomic Power Project/ Rajasthan Atomic Power Project and Secretariat Officers were present. Prof. M.G.K. Menon was present by invitation.

2. The papers submitted by the various Divisions of the Atomic Energy Establishment Trombay, indicating their programme of work during the Fourth Five Year Plan and their estimated requirements of funds, were discussed. It was decided that funds should be provided as follows to cover the programme of work proposed to be undertaken by various Divisions of the Atomic Energy Establishment Trombay during the Fourth Plan period:-

PHYSICS GROUPI. Nuclear Physics Division

Provision for:

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|--|---|
| 1. Fundamental research in nuclear solid state and fission physics | - Rs.6.00 lakhs (for establishment)                 |
| 2. Liquid Helium Plant   | - Rs.0.50 lakhs (all in foreign exchange)           |
| 3. Seismology Centre   | - Rs.2.20 lakhs (foreign exchange<br>Rs.1.25 lakhs) |

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It was decided that provision for the medium energy accelerator should be made under Inter-University Centres in the Fourth Plan and the array of Seismometers should be purchased during the Third Plan itself, funds being available.

## II. Technical Physics Division

Provision for development work on special purpose high vacuum tubes, - Rs.25.00 lakhs  
to cover the cost of equipment (Rs.10.00 lakhs)  
and recurring costs (Rs.15.00 lakhs)

### ELECTRONICS GROUP

#### I. Electronics Division

Provision for production of electronic instruments (servo motors, D.C. Recorders, logic modules, telemetry systems, resistors and capacitors, nuclear electronic systems, etc.) - Rs.405.00 lakhs  
(foreign exchange Rs.100.00 lakhs)

This will not include a sum of Rs.17.00 lakhs representing the cost of fabricating equipment for TAPP/RAPP debitible to these Power Projects. With regard to the provision of Rs.40.00 lakhs required by the Electronics Division for fabricating photo-multipliers and Cathode ray tubes, it was considered that this would be a part of the programme undertaken by "Trombay Electronics" and for this no provision need be made under Electronics Division. Director, Electronics Group mentioned that a U.K. firm had offered complete equipment for the manufacture of Cathode ray tubes and photo-multipliers at a cost of £ 30,000 (Rs.5.00 lakhs). Chairman desired that we should provide the requisite foreign exchange to

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the Electronics Division now itself. Chairman also desired that a study of the guidance system should be started and a separate Group should be set up.

#### II. Electronics Production Division

It was decided that an ad hoc provision of Rs.3 crores should be made to cover the estimated expenditure during the Fourth Plan. The estimated foreign exchange component may be taken as Rs.1 crore.

#### III. Health Physics Division

It was held that most of the activities of this Division should be deemed to have been committed in the Third Plan itself and only a provision of Rs.20.00 lakhs should be made to cover the cost of staff employed in connection with environmental radio-activity studies near nuclear installations, marine radioactivity and physical oceanographic studies along the coastline of India, etc.

#### IV. Directorate of Radiation Protection

The activities of this Directorate should be considered to have been committed during the Third Plan and, therefore, no provision during the Fourth Plan was required to be made. As, however, the normal projections of Non-Plan expenditure will not take care of the provision of Rs.2.42 crores (Rs.1.52 crores for services and equipment and Rs.0.90 crores for salary etc.) required by the Directorate, it was felt that this amount (Rs.2.42 crores) should be specifically mentioned as Non-Plan (Revenue) requirement.

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CHEMICAL GROUPI. Spectroscopy Division

Provision for development of sensitive photo-multipliers techniques, X-ray fluorescence methods and fabrication of equipment for molecular spectra and molecular structure studies - Rs.10.00 lakhs (foreign exchange Rs. 4.00 lakhs)

Chairman felt that the question of recruiting scientists on a five year contract basis, with a view to training them and later sending them to the Universities, should be considered.

II. Analytical Division

Provision for development of analytical techniques to cover the cost of equipment (Rs.15.00 lakhs) and establishment (Rs.9.00 lakhs) - Rs.24.00 lakhs (foreign exchange Rs.10.00 lakhs)

It was considered that item (b) of the last para of the Paper submitted by the Analytical Division, namely, X-ray Fluorescence equipment should be deleted from the items of equipment proposed to be purchased.

III. Chemistry Division

The requirement of this Division being primarily for maintenance and replacement purposes, no provision in the Fourth Plan need be made. The activities of this Division will be treated as having been committed during the Third Plan.

IV. Chemical Engineering Division

Provision for:  
1. Pilot Plant studies on reprocessing of reactor fuel subjected to higher burn up. - Rs.21.50 lakhs (foreign exchange Rs.5.00 lakhs)

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| 2. Development of new methods of producing heavy water   | - Rs. 4.00 lakhs   |
| 3. Separation of $\text{Li}^6$ , $\text{O}^{18}$ and development of methods for production of metallic $\text{B}^{10}$ | - Rs.10.00 lakhs<br>(foreign exchange<br>Rs. 4.00 lakhs) |

As regards the provision of Rs.1 lakh required by this Division for the work connected with the development of a process for the manufacture of Ammonium perchlorate, it was felt that the work could be undertaken during the Third Plan itself and that in any case provision for this should be made under "Space Research".

V. Radiochemistry & Isotope Division (Isotope Section)

In the Paper submitted by this Division a requirement of Rs.67.00 lakhs for the following items was indicated:-

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|--|----------------|
| (i) Equipment and production Plants in Radiological Laboratory | Rs.25.00 lakhs |
| (ii) Irradiation Units programme                               | Rs.25.00 lakhs |
| (iii) Consumables  | Rs.15.00 lakhs |
| (iv) Contingencies   | Rs. 2.00 lakhs |

It was considered that no provision was required for item (i) above as provision for this has been included in the estimate for Radiological Laboratories. No provision was also necessary for items (iii) and (iv) which can be treated as having been committed during the Third Plan. As regards item (ii) - Irradiation Units programme - it was felt that an ad hoc provision

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of Rs.50.00 lakhs (foreign exchange Rs.10.00 lakhs) may be made for an Irradiation Facility to cover this item as also the following items for which provision had been asked for in the Paper submitted by Superintendent, Central Workshop:-

- (i) Commercial sterilization, food preservation set ups.
- (ii) Teletherapy Units and industrial units.

#### VI. Fuel Reprocessing Facility

It was agreed that provision of Rs.60.00 lakhs may be made for the expansion of the present Plutonium Plant for reprocessing zircalloy clad fuels. Director, Chemical Group indicated that the foreign exchange component would be of the order of Rs.20.00 lakhs, which may not be required in full if stainless steel to the extent of Rs.7.00 lakhs is not required to be imported. It was felt that this provision should be made under "Development of Atomic Minerals etc." and not under "Research and Development of Atomic Energy".

#### VII. Waste Treatment Division

Provision for high level waste management	- Rs.35.00 lakhs
studies, research and development work on	(foreign exchange
low and intermediate level waste	Rs.11.00 lakhs)

### METALLURGY GROUP

#### I. Central Workshops

It was decided that a provision of Rs.1 crore should be made in the Fourth Plan for the development of new techniques

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and new types of equipment in the Central Workshop. A sum of Rs.1.5 crores which would be required for the operation of the Workshops during the Fourth Plan should be treated as committed and, therefore, treated as Non-Plan (Revenue) expenditure.

## II. Reactor Engineering Division

The provision of Rs.15.15 crores indicated in the Paper submitted by Head, Reactor Engineering Division was approved. This would cover:

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|---|----------------|
| (a) Development work on test reactor, future coolants for heavy water moderated reactors and on fast reactors | Rs.1.65 crores |
| (b) NUHMOC  | Rs.7.50 crores |
| (c) Work on Fast Reactor  | Rs.6.00 crores |

It was also felt that a provision of Rs.1 crore to cover the operational expenses of NUHMOC during the Fourth Plan should be made.

## III. Metallurgy Division

Following provisions were approved:-

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|---|----------------|
| (i) For special projects                      | Rs.10.00 lakhs |
| (ii) Development work on Uranium carbide fuel | Rs. 5.00 lakhs |

## IV. Atomic Fuels Division

It was decided that the provisions required for the various Plants/Facilities by this Division under (a), (b), (c) and (d) below should be classified under "Development of Atomic

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Minerals" and not under "Research and Development of Atomic Energy". It was decided that provision may be made as follows:-

(a) Zirconium Plant (Capacity 50 tonne/annum)

The total cost of this Plant is estimated at Rs.3 crores from which a sum of Rs.1 crore will be spent during the Third Plan. It was decided that a provision of Rs.2 crores should be made in the Fourth Plan and in addition Rs.2 crores should be provided for the operation of this Plant. Thus the total provision required would be Rs.4 crores.

(b) Ceramic Fuel Fabrication Facility

It was decided that a provision of Rs.1 crore should be made for this Facility, the amount which will spill over into the Fourth Plan. In addition a provision of Rs.1.30 crores should be made to cover the operational costs in the Fourth Plan.

(c) Enriched Fuel Fabrication Facility  
(Capacity 25 tonne/annum)

A sum of Rs.60.00 lakhs should be provided. In addition, Rs.30.00 lakhs should be provided to cover the operational costs.

(d) Storage Facilities for Plutonium

A provision of Rs.30.00 lakhs would be required out of which Rs.10.00 lakhs will be spent in the Third Plan.

BIOLOGY GROUP

The requirements of the Biology and Medical Divisions were discussed in considerable detail and it was decided that