PARLIAMENT OF INDIA
RAJYA SABHA

DEPARTMENT-RELATED PARLIAMENTARY STANDING COMMITTEE ON SCIENCE AND TECHNOLOGY, ENVIRONMENT AND FORESTS
TWO HUNDRED THIRTY SECOND REPORT
ON

(PRESENTED TO THE RAJYA SABHA ON THE 20TH DECEMBER, 2012)
(LAIRED ON THE TABLE OF THE LOK SABHA ON THE 20TH DECEMBER, 2012)

RAJYA SABHA SECRETARIAT
NEW DELHI
DECEMBER, 2012/ AGRAHAYANA, 1934 (SAKA)

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## MEMBERS OF THE DEPARTMENT-RELATED PARLIAMENTARY STANDING COMMITTEE ON SCIENCE & TECHNOLOGY, ENVIRONMENT & FORESTS (2012-13)

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Shri V.S.P. Singh, Joint Director
Shri Girija Shankar Prasad, Deputy Director
Shri Deepak Kalra, Committee Officer
Shri Ranajit Chakraborty, Committee Officer

# Shri Ninong Ering and Shri Kodikkunnil Suresh ceased to be a member of the Committee consequent upon their induction in the Union Council of Ministers w.e.f. 28th October, 2012.

@ Shri Bansa Gopal Chowdhury ceased to be a Member of the Committee w.e.f. 14th December, 2012 on his resignation from the Membership of the Committee.
PREFACE

I, the Chairman of the Department-related Parliamentary Standing Committee on Science & Technology, Environment & Forests, having been authorised by the Committee to present the Report on its behalf, present this Two Hundred thirty second Report on the Action Taken by the Department of Atomic Energy on the recommendations contained in Two Hundred twenty second Report of the Committee on Demands for Grants (2012-2013) of the Department of Atomic Energy.


3. There were Twenty three recommendations contained in the Two Hundred twenty second Report of the Committee. Action Taken Notes on the recommendations of the Committee were received from the Department on 6th August, 2012.

4. In the meeting held on 17th December, 2012, the Committee considered the Draft Action Taken Report and adopted the same.

NEW DELHI;
December, 2012

DR. T. SUBBARAMI REDDY
Chairman
Department-related Parliamentary Standing Committee on Science & Technology, Environment & Forests

ACRONYMS

AEC : Atomic Energy Commission
AERB : Atomic Energy Regulatory Board
AHWR : Advanced Heavy Water Reactor
AMD : Atomic Minerals Directorate
APSC : AHWR Plant Sitting Committee
ATTF : AHWR Thermal hydraulic Test Facility
BRIT : Board of Radiation and Isotope Technology
CFE : Consent for Establishment
CHTR : Compact High Temperature Reactor
CONSIST : Containment System Integral Simulation Test
CSR : Corporate Social Responsibility
DAE : Department of Atomic Energy
DBSKKV : Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth
EB : Electron beam
EC : Environmental Clearance
ESR : Electron Spin Resonance
FLD : Front Line Demonstrations
FMTF : Fuelling Machine Test Facility
FRFCF : Fast Reactor Fuel Cycle Facility
HTSE : High Temperature Steam Electrolyser
REPORT

The Report of the Committee deals with the Action Taken by the Department of Atomic Energy on the recommendations contained in the Two Hundred and Twenty Second Report of the Department-related Parliamentary Standing Committee on Science & Technology, Environment & Forests on the Demands for Grants (2012-13) of the Department of Atomic Energy, which was presented to both the Houses of Parliament on 18th May, 2012. There were twenty-three recommendations in the Two Hundred and Twenty Second Report of the Committee. Action Taken notes on the recommendations of the Committee were received from the Department on 6th August, 2012.

The Committee's recommendations, action taken thereon and comments of the Committee on the Action Taken by the Department of Atomic Energy are set out in the subsequent paragraphs:

Recommendation (Para 4.9)

The Committee, therefore, recommends that Financial Year 2012-13, being the first Financial Year of the XII Five Year Plan, the Department must ensure that the allocation made to the Department is fully utilized not only during the current year but also throughout the entire Plan period.

Action Taken by Government

The existing monitoring system developed by the Department to monitor and review the progress of expenditure will eliminate possibility of underutilization/non-utilisation of allocated funds. The recommendations of the Committee have been brought to the notice of all the Heads of Constituent Units/Aided Institutions/Public Sector Undertakings of the Department. All efforts will be made for full utilisation of the budget allocation.
Comments

The Committee notes that a similar plea was taken by the Department while submitting the Action Taken Report on the recommendations contained in the 207th Report of the Committee on the Demands for Grants 2010-11. However, in spite of categorical assurance given by the Department to the Committee that its monitoring mechanism is potent enough to eliminate possibility of under-utilisation/non-utilization of allocated funds, the fact remains that the Department was not able to fully utilise its funds in the year 2011-12. As such, pursuant to present recommendations of the Committee, the Department ought to have taken further steps to plug the loopholes, if any, in its monitoring mechanism so as to preclude any possibility of under-utilisation/non-utilisation of allocated funds in the year 2012-13. The Committee views with serious concern, the inaction of the Department in this regard. The Committee reiterates its recommendation and would like the Department to make a critical review of various factors that led to under-utilisation/non-utilisation of funds by the Department year after year and take necessary remedial measures to put an end to this practice.

Recommendation (Para 4.10)

The Committee was, however, informed that reduced allocation of Non-Plan expenditure in Demand No. 4 to the extent of Rs. 984.67 Crores, if not restored would affect the production of Heavy Water and Nuclear Fuel besides affecting O&M of various R&D units of the Department. Similarly, the shortfall of Rs. 377.94 Crores in Demand No. 5, if not restored will affect the import of nuclear fuel. The Committee takes note of adverse consequences arising from drastic cut in the Non-Plan allocation under Demand No. 4 & 5 and recommends that Non-Plan allocation be suitably enhanced at R.E. stage to avoid adverse impact arising from reduction of Non-Plan allocation.

Action Taken by Government

Secretary, DAE has already taken up the matter with Secretary Expenditure, Ministry of Finance for restoration or Non-plan fund suitably at RE stage. The Ministry of Finance assured that Department's requirements will be considered favourably at RE stage. The recommendation of the Committee is again being brought to the notice of the Ministry of Finance for consideration at RE stage.

Comments

The Committee is happy to note that the Ministry of Finance has assured to consider favourably provision of additional funds to the Department at RE stage.

Recommendation (Para 4.14)

The Committee observes that the Apex Committees were constituted in December, 2010 and despite their existence there had been no significant progress in the improved utilisation of allocated funds, particularly, under Plan Heads during the Financial Years 2011-12. The Committee, therefore, feels that the existing monitoring system is not able to ensure full utilisation of funds and, therefore, recommends that the monitoring mechanism needs to be so strengthened and revamped as to preclude any possibility of underutilization/ non-utilisation of allocated funds on almost similar grounds year after year.

Action Taken by Government

The existing monitoring system developed by the Department to monitor and review the progress of ongoing schemes/projects before formulating/ finalizing proposals for budgetary support are being effectively used to eliminate the scope of shortage or
surrenders of funds at a later stage. The Department has strengthened the monitoring mechanism again vide office order 03/2011/2887 dated 16.03.11.

Comments

The Committee notes that the Department has not indicated as to how it has strengthened its existing mechanism vide its order dated 16.03.2011. The Committee would like the Department to make a critical review of the factors that led to under-utilisation/non-utilisation of allocated funds year after year and take suitable remedial measures so that more efficient allocation of the public money could be made. The Committee further hopes that in the financial year 2012-13, the Department would be able to ensure the optimum utilisation of allocated funds.

Recommendation (Para 4.16)

The Committee finds that silence on the issue of preparation of Result Framework Document shows reluctance on the part of the Department to prepare the same. The Committee fails to understand the reasons for its reluctance when other scientific Departments like the Department of Scientific and Industrial Research and Department of Biotechnology have been preparing the Result Framework Document since its inception in 2009-10. The Committee, therefore, recommends that the Department should also strive to prepare the Result Framework Document to objectively assess its performance index.

Action Taken by Government

Preparation of Result Framework Document (RFD) by the Government Departments was introduced by the Cabinet Secretariat in the context of Performance Monitoring and Evaluation System (PMES) approved by the Prime Minister of India in 2009. While RFD was intended to provide a summary of the targets/results of Department in that financial year, it was also designed to provide a fair basis to evaluate the annual performance of the Department.

Department of Atomic Energy (DAE) was established by the Government of India to facilitate self-reliance in every aspect of nuclear technology including strategic as well as other applications such as nuclear power, nuclear agriculture, etc. Owing to the specialized nature of nuclear technology, DAE is under the direct charge of the Prime Minister of India. Atomic Energy Commission (AEC) was constituted by the Government of India vide resolution dated March 01, 1958. The Commission has full powers of the Government of India, both administrative and financial (within the limits of the approved budget) and has the responsibility to ensure implementation of the Government's policy in all matters concerning Atomic Energy. DAE is responsible for the execution of policies laid down by the AEC from time to time. Performance and new proposals of the various units of the Department are reviewed in every meeting of the AEC. It may be mentioned that the composition of AEC include Minister of State-PMO, Principal Secretary, PMO, National Security Adviser, Cabinet Secretary, Secretary for Expenditure, Member for Finance and some eminent scientists from the field of Atomic Energy and/or Science & Technology. Some of these members are also members of the committee constituted by the Government to review the performance of the Department as stated in PMES.

Subsequent to the decision of Government of India to grant Performance Related Incentive Scheme (PRIS) to Department of Atomic Energy, an evaluation methodology was formulated by the Department which was approved after discussion in Atomic Energy Commission. It may be noted that the existing PRIS structure in Department of Atomic Energy is particularly evolved for 'mission-mode' R&D organization. PRIS in
Department of Atomic Energy consists of three components namely PRIS-O, PRIS-G and PRIS-I. Performance of the Individual scientists, those of the Group and Organization are independently reviewed by three different committees and the methodology/metric adopted is also different in the three cases. This serves to encourage individual excellence, team work and organizational performance.

Considering that the Result Framework Document system is a methodology primarily for performance monitoring and evaluation, and that these documents are made available in public domain, the Department prefers not to adopt Result Framework Document system. The achievements in Research & Development, Power Generation and other societal benefits-related research are available in the outcome budget document and the performance in total are reported to Prime Minister's Office on monthly basis and to Atomic Energy Commission in every meeting. Suitability of following Result Framework Document system in place of the existing monitoring mechanism in DAE was discussed and considered at various levels and found that the existing system in the Department would be appropriate to continue. Hence it is considered appropriate for Department of Atomic Energy to continue with the current practice of Atomic Energy Commission monitored system.

Comments

The Committee is not convinced with the reasoning, i.e., "considering that the Result Framework Document system is a methodology primarily for performance monitoring and evaluation, and that these documents are made available in public domain, the Department prefers not to adopt Result Framework Document system" given by the Department. The Committee notes with concern why Result Framework Document cannot be prepared when the Department has multilevel and multifaceted, strict performance monitoring mechanism and its achievements in Research & Development, Power Generation and other Societal benefits related research are made available in the Outcome Budget document and the performance in total also reported to PMO on monthly basis.

The Committee fails to understand as to why at least in areas where its achievements are already being reported in the Outcome Budget document, RFD cannot be introduced.

The Department has also not clarified that in case there were genuine difficulties in preparing RFD in other areas, why it has not sought exemption from the Cabinet Secretariat for it. The Committee, therefore, expresses its dissatisfaction with the casual reply given by the Department and reiterates its recommendation.

Recommendation (Para 4.20.2 & 4.20.3)

4.20.2 The Committee feels that it is a matter of concern that as against the B.E. allocation of Rs. 1190.00 Crores under Plan Head, BARC could utilize only Rs. 1015.00 crores, thus, leaving a gap of Rs. 175.00 Crores. The Committee, therefore, recommends that these sort of loopholes which lead to under-utilization of funds should be plugged in future.

4.20.3 The Committee was informed that the increase in provision for the year 2012-13 is mainly for the development of facilities at BARC, Visakhapatnam and for setting up of integrated nuclear projects at Tarapur. The Committee is happy to note that allocation for BARC, a prestigious research & development institution, has been increased notwithstanding its poor performance in terms of financial achievements. It however,
recommends all out efforts be made to fully utilize the outlay and that no excuse whatsoever should be allowed to come in its way.

**Action Taken By Government**

The recommendations of the Committee on the underutilization of funds have been brought to the notice of all concerned and the monitoring mechanism has been further strengthened for effective implementation and to minimize surrender of funds. This consists of review of projects at Group Board level and then in Trombay Council periodically. In addition, the review takes place in specially convened meetings by Director, BARC and Internal Financial Adviser. The projects under the Research & Development Sector are also reviewed by specially constituted Specialist Groups (SGs) and Internal Working Group (IWG) in the Department.

**Comments**

The Committee takes note of the action taken and hopes that its monitoring/review mechanisms have been sufficiently strengthened to ensure optimum utilisation of funds in future.

**Recommendation (Para 4.20.4)**

The Committee, therefore, recommends that the Department should intensify its efforts in developing more and more high yielding disease resistant crop varieties not only of pulses, groundnuts, etc., but also of cereals like wheat and rice.

**Action Taken By Government**

The Committee’s appreciation of BARC’s crop improvement programme using radiation induced mutation is gratefully acknowledged. BARC has a programme in nuclear agriculture which focuses on the continuous development of new crop varieties with desirable characteristics to meet the challenges of biotic and abiotic stresses emerging in Indian agriculture. Biotic stress is due to microbe-mediated diseases and insect pests. Abiotic stresses include salinity, drought and increased temperature, the latter two may also be associated with climate change. Thus 40 crop varieties have been released and notified to date for commercial cultivation in different states by Ministry of Agriculture, Government of India and are popular among farmers throughout the country. Oil seeds and pulses, which continue to be in short supply in our country, form a major (38 out of 40) share of this development. The pulse requirement in the country to ensure self-sufficiency is projected at 32 million tonnes by the year 2030. Seventeen pulse varieties have been notified for commercial cultivation from BARC and are popularised through number of front line demonstrations and mini kit trials in different states of India and sufficient quantities of quality seeds were produced and supplied to farmers through different seed corporations and Universities.

Estimated share of BARC developed varieties in the national production could well be around 20 to 30% for groundnut, around 20 to 30% for black gram and around 10 to15% for mungbean. On an average 3 new BARC varieties have been released annually over last 5 years. This trend is expected to continue; extending to other crop varieties as well.

As recommended by the Committee, BARC is already intensifying its efforts in this direction. Programmes have also been taken up for nutritional and processing quality improvement. To increase the area and production of pulse crops particularly in mungbean (greengram), urdbean (blackgram)and groundnut, the rice fallow areas have been targeted, where residual soil moisture after rice crop is used to raise subsequent pulse crops. It is a known practice among farmers but the number of high yielding varieties are limited. Three Trombay mungbean varieties TARM-1, TM-96-2 and TM-
2000-2 (pairy mung) were released for rice fallow cultivation. These varieties have resistance to a major disease called powdery mildew and have synchronous maturity. The present research is focused on development of powdery mildew and yellow mosaic virus disease resistant and drought tolerant varieties for rice fallow cultivation and high temperature tolerant varieties for summer season in mungbean, urdbean and cowpea crops.

Further, with the help of State Agricultural Universities and ICAR Institutes, BARC is evaluating newer breeding lines under various agro-climatic conditions, multiplying in large scale, quality seeds (breeder seed) of most of the popular and recent crop varieties and supplying them to National and State Seeds Corporation, Seed Agencies and farmers.

The Committee’s recommendation to develop more and more high yielding disease resistant varieties in cereals like wheat and rice is in tune with our present R&D programmes. In rice, salinity tolerance and tolerance to diseases like rice blast and blight and improvement of basmati type rice for earliness, plant height and yield are the objectives. Some of the improved lines of rice are currently in station trial on the field of Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra (DBSKKV) under a MOU between BARC and the University.

In wheat, the objectives are improvement of resistance to rust disease and heat stress tolerance. Radiation induced early maturing mutants of wheat variety C306 are being tested for their field performance in collaboration with IARI, Indore. Other wheat selections derived from intervarietal cross are also being tested for field performance on the fields of Agharkar Research Institute, Pune. BARC is participating in an international programme supported by International Atomic Energy Agency to develop mutants for resistance to wheat rust Ug99 which may be a potential threat to wheat crop in India. These efforts will be further intensified during the XII plan period.

Comments

The Committee appreciates the effort made and success achieved by the Department in developing high yielding disease resistant crop varieties of pulses, groundnuts and extending it to wheat and rice. The Committee hopes that the Department would further intensify its public awareness programmes to popularise crop varieties developed at BARC.

Recommendation (Para 4.20.5)

The Committee is also of the view that there is need for popularizing new high yielding varieties developed at BARC, so that benefit of research done at BARC reaches all nooks and corners of the country and does not remain restricted only to farmers of Maharashtra. The Committee recommends that Department chalk out a popularization cum awareness campaign to make people throughout the country aware of various varieties developed at BARC and for popularizing them.

Action Taken By Government

The benefit of BARC’s research in crop improvement is not restricted to the state of Maharashtra. Groundnut varieties developed by BARC in association with the agriculture universities are popular in all groundnut growing states like Andhra Pradesh, Karnataka, Gujarat, Maharashtra, Rajasthan, Tamil Nadu and West Bengal. Trombay mungbean varieties are popular in Madhya Pradesh, Andhra Pradesh, Orissa, Chhattisgarh, Bihar and Maharashtra. Trombay blackgram varieties are very popular in Maharashtra, Orissa, Chhattisgarh and Karnataka while Trombay Tur is popular in Maharashtra and Madhya Pradesh. Considering the large size of the country, there is a
need to further popularize the cultivation of these varieties through extensive public awareness programmes.

BARC is conducting various awareness programmes like exhibitions, field demonstration to popularize the new and popular crop varieties. MOUs are being finalized with State agriculture universities and other agencies for this purpose. We are also taking help of the Ministry of Agriculture, Government of India which conducts a large number of minikits/Front Line Demonstrations (FLD) of Trombay new crop varieties in different states. Support of several progressive farmers in different states will also be enlisted to intensify the efforts at popularization of our varieties. In XII Plan, the outlay for nuclear agriculture is being enhanced for more collaborative research with Agriculture Universities and to support progressive farmers for popularizing our varieties.

Comments

The Committee is happy to learn that benefits of BARC's research in crop improvement are being made available in a number of States and hopes that Department shall take proactive steps to further popularise crop varieties developed by BARC so that entire country gets benefited from the research of BARC in crop improvement.

Recommendation (Para 4.20.7)

The Committee, therefore, recommends that the Department should create a separate agency of its own instead of depending on other agencies for popularizing and marketing of socially beneficial technologies like Nisargruna Biogas Plant for handling biodegradable wastes; Sludge Hygienization Research Irradiation (SHRI) for treatment of municipal sewage, etc. including its technology on food preservation, nuclear medicine and healthcare, so that, the benefit ultimately could reach the society at large.

Action Taken By Government

An independent unit of Department of Atomic Energy called Board of Radiation and Isotope Technology (BRIT) has already been created in 1989 for popularizing and marketing of socially beneficial technologies under nuclear medicine and healthcare etc. Further, Department is actively engaged in development of various technologies for societal benefits such a Nisargruna Biogas Technology, Food Preservation, Nuclear Medicine etc. which is briefed below:

**NISARGRUNA Biogas Technology**

Nisargruna biogas technology has been developed for processing biodegradable waste resources. Initially the technology was developed for waste resources generated in kitchen. The technology has matured in last 10 years. More than 140 Nisargruna plants have been installed in 9 states of the country. The concept of using Nisargruna technology is becoming popular amongst Urban Local Bodies. In Maharashtra about 40 Municipal Councils and Municipal Corporations are using this technology. Kerala is another State which is using this technology for processing biodegradable waste. The scope and capacity of these plants has now increased. In Nasik and Baramati two plants of 10MT/day capacity are functioning using cattle dung. Biogas is compressed and used for running a vehicle at Nasik. At Baramati, it is exclusively used for generating electricity. Government of Delhi has offered 33% subsidy for installation of this plant. Karnataka Lokayukta has passed an order for installing several such decentralized Nisargruna units in Bangalore and other parts of Karnataka. Ministry of New and Renewable Energy has supported this technology financially at several places by giving a subsidy. BARC has transferred the technology to more than 90 entrepreneurs so far.
Food Preservation

The project 'R&D in radiation technology for food preservation and hygienization' was undertaken in X Plan. The thrust area for the project was development of technology for packaged food products with improved shelf life and stability. Several shelf stable products such as ready to cook (RTC) Indian vegetables, fruit products and chicken and mutton products were developed. A dip treatment using food grade chemicals and low temperature (40C) storage was found to extend shelf life of packed litchi fruit by more than a month with acceptable sensory quality allowing market access in India and for export. In the area of identification and development of suitable packaging materials for irradiation processed food, functional clay filled LLDPE nano-composite films with improved barrier properties and radiation resistance was developed. Active films were prepared from biopolymers containing natural additives. In the area of development of dosimetry protocols for accelerator based sources, a standard phenyl-β-D-glucopyranoside based color dosimeter was developed and tested at plant level. Electron Spin Resonance (ESR) and thermoluminisence (TL) based detection methods were developed for several irradiated food stuffs. During the XII plan, efforts will be made towards standardization of process parameters for different Electron beam (EB)/ X-ray sources, development of new products and processing protocols, and improved quality control techniques. Efforts towards increasing public awareness and entrepreneur development for wider deployment of the technology will continue.

Nuclear Medicine

The Radiation Medicine Centre (RMC) of BARC, established in 1963 is a premier national centre carrying out R&D in nuclear medicine, teaching/training and providing nuclear medicine services for a large number of patients at a very affordable cost and, at times, free of cost for needy patients. RMC is also the major Centre in India for nuclear medicine education for doctors and technologists since 1973 and, staff trained at RMC are present in almost all the 170 nuclear medicine facilities in various hospitals in India. RMC is also the first Centre in India to install a Medical Cyclotron and PET (Positron Emission Tomography)-scanner and, over the last 10 years of its continuous operation, has shown that the production of short-lived PET-radioisotopes and its use in patients for cancer and cardiology is commercially viable. This initiative resulted in 12 medical cyclotrons and over 50 PET-scanners being installed in government and private sectors in various parts of India. RMC is also well known for nuclear medicine services for thyroid diseases.

In 2011-12, 17500 patients had registered for various nuclear medicine investigations viz., [F-18]FDG-PET scans (done free of cost), SPECT studies with [Tc-99m]-radiopharmaceuticals, therapy with I-131 for thyroid cancer and hyperthyroidism, therapy with [I-131]MIBI for neural crest tumours and [177-Lu]DOTATATE therapy for neuro-endocrine tumours. The latter three are important patient services rendered at RMC and about 600 patients were treated last year, of whom ~30% are from West Bengal and the North East region. This makes RMC the largest centre in South East Asia for radionuclide therapy.

New [F-18]-radiopharmaceuticals e.g. FLT for PET-imaging of rapidly growing tumours, and F-MISO for hypoxia in tumours, have been produced by RMC and BRIT for the first time using indigenous methods and with the approval of the DAE-Radiopharmaceutical Committee are being supplied to users. Other [F-18]-radiopharmaceuticals for estrogen positive breast cancers and prostrate tumours are in the process of development and clearance by the Radiopharmaceutical Committee. [Ga-
DOTATE for imaging neuro-endocrine tumours is also in the process of approval and will be available for patients soon.

A DAE committee has been specially constituted for the formulation and implementation of additional socially important programmes during XII plan to reach the benefits of the technologies developed by the Department to the public at large.

Comments

The Committee is happy to learn that Department has not only developed a number of technologies for societal benefits but has also taken steps for popularizing and marketing of such technologies. The Committee, however, would like the Department to further enhance its efforts towards increasing public awareness and entrepreneurship development so as to ensure its reach on a much wider scale.

Recommendation (Para 4.21.3)

The Committee understands that receipt/grant of approval for the project is purely an internal matter of the Department which could have been sorted out well in time. The Committee does not find it to be a convincing cause for spill over of a project from one financial year to the other and hence expresses its serious concern over such lame excuses. The Committee, therefore, recommends that the process of receipt/grant approval for projects for which allocation has been earmarked must be completed in the same financial year, so that, the allocated outlay are fully utilized in that year itself. The Committee also expresses its serious concern over such sort of delay in crucial project like Fast Reactor Fuel Cycle Facility which is badly required for the second stage nuclear power programme and recommends that such procedural delays should not be allowed to come in the way of such an important programme in future.

Action Taken By Government

The proposal for the project Fast Reactor Fuel Cycle Facility (FRFCF) was presented to the Atomic Energy Commission (AEC) after completion of all internal processing in the Department of Atomic Energy, AEC had approved the proposal in October 2010 and thereafter, a cabinet note was prepared and circulated to different ministries as a part of obtaining approval of Union Cabinet for the project. Approval of Cabinet for the project is awaited.

In parallel, the design work on the project has been continued and completed. Prior environmental clearance for the project has been obtained from MoEF. In anticipation of the financial approval for the project, action for performance qualification of prospective bidders has been initiated. Tender documents and drawings for issue of tenders for construction work are being scrutinized to enable issue of tenders on receipt of sanction. Necessary infrastructure at the construction site has been developed to enable speedy commencement of construction work. These activities carried out during the period of waiting for approval for the project which will enable minimizing time for start of construction and procurement work for the project.

Comments

The Committee is perturbed to learn that such a crucial project (Fast Reactor Fuel Cycle Facility) has been pending for want of approval of Cabinet for over the last two years. If such important projects are kept pending for such long, it escalates the cost of the projects and burdens the exchequer unnecessarily. In this backdrop, the Committee desires that the Department must pursue the matter seriously to obtain the cabinet approval.

Recommendation (Para 4.22.2)

The total budgetary outlay at B.E. stage for Raja Rammana Centre for Advanced Technology last year was Rs. 248.15 Crores which was enhanced to Rs. 275.81 Crores at R.E. stage making the Centre an additional amount of Rs. 27.66 Crores available over the budgetary allocation. Budgetary allocation for 2012-13 is Rs. 268.00 Crores which is less by Rs. 7.81 Crores of R.E. allocation made last year. When the Committee enquired about the reduction in budgetary allocation for this Centre despite its outstanding performance in utilisation of funds last year, the Department explained that the reduction is mainly on account of keeping minimum requirement for the new projects of XII Plan pending approval of the new projects. While the Committee tends to agree with the explanation given by the Department, it recommends that requirement of further funds, if any, of the Centre should be favourably considered at the R.E. level.

Action Taken By Government

The Department is also thankful to the Committee for its recommendation that “requirement of further funds, if any, of the Centre should be favourably considered at the R.E. level”. The Centre will continue to put in its best efforts towards utilizing the budget provided.

Comments

The Committee notes the reply.

Recommendation (Para 4.23.2)

VECC is also running a Regional Radiation Medicine Centre in Eastern part of the country which caters to the nuclear imaging requirements of the patients from low income group at an affordable cost. The Committee feels that this is a very noble act on the part of an organisation of Department of Atomic Energy which would go a long way in winning the trust of the people through such philanthropic acts. The Committee, therefore, recommends that such activities aimed at helping the poor and the needy needs to be further expanded in other states of the country.

Action Taken By Government

It is a point of pleasure that the Parliamentary Standing Committee has appreciated in its recommendations, the activities of the Regional Radiation Medicine Centre, Variable Energy Cyclotron Centre for its philanthropic activities relating to catering to the nuclear imaging requirements of the patients, especially of the low income group, at an affordable cost. Based on the spirit of the recommendations, RRMC shall go ahead in helping the poor and needy class of people, particularly in the expensive areas like treatment of thyrodism and cancer. This centre uses low energy Isotopes for immuno assay, Gamma Scanner and Linear Accelerator for detection of carcinogenic conditions and malignancy. This Centre has also a target in the near future for installation and use of more sophisticated and high yielding monitors, scanners and accelerators to provide most accurate diagnostic information. For upgradation of this Centre a fresh project proposal has been submitted.

Comments

The Committee finds that the Department has not responded to the recommendation of expanding the activities of Variable Energy Cyclotron Centre in other states of the country and as such reiterates its recommendation.

Recommendation (Para 4.23.3)

The Committee is happy to note that the allocation for Variable Energy Cyclotron Centre has been increased by Rs. 65.28 Crores in comparison to the B.E. allocation of the last year which will help the Centre effectively pursue its programmes for societal
benefits. The Committee is, however, constrained to observe that the allocations for the Centre were reduced to Rs. 136.68 Crores at the R.E. stage as against the budgetary allocation of Rs. 155.69 Crores last year and the major portion of reduction amounting to Rs. 20.00 Crores was under Plan Head. Apparently allocations were reduced at R.E. stage as the Centre was not able to utilize the amount allocated to it. The Committee, therefore, recommends that the Centre should not only try to utilize the allocated resources this year but also accomplish the task of development of software for hearing impaired and medical cyclotron project within the stipulated targeted period.

**Action Taken By Government**

In regard to the observation of the Committee for reduction of Budget allocation at RE stage of 2011-12, the fact is stated that the reduction had resulted due to some unavoidable factors like non-materialisation of purchase orders, delay in delivery, etc., which were actually beyond the control of the project authorities. However, suitable planning and programming are being made for utilization of the Budget allocation to the maximum extent during the current financial year. As regards the development of software for hearing impaired, the target as envisaged in the XIth Plan has been satisfactorily achieved. The software for sign to text is in an advanced stage and its completion is likely by the end of the financial year 2012-13.

As regards Medical Cyclotron Project, procurement of all essential components of the facility has been completed and they are waiting for installation till the completion of the building construction by March 2014.

**Comments**

The Committee feels that the reasons advanced by the VECC for the delay are routine lame excuses and could be avoided with the application of due diligence and discretion.

**Recommendation (Para 4.23.4)**

The Committee, therefore, recommends that accomplishment of third stage nuclear power programme using thorium as fuel for power generation on commercial basis, research on Compact High Temperature Reactor (CHTR) and on Hydrogen energy needs to be intensified and results achieved in a time bound manner.

**Action Taken By Government**

Department of Atomic Energy appreciates the view of the Committee that in the highly competitive age what counts is time within which technology is developed and put in commercial domain. BARC has been working for the third stage of Indian nuclear power programme and would like to submit the accomplishments, present activities and future plans.

1. Third stage nuclear power programme using thorium as fuel for power generation

1.1 Accomplishments

Thorium plays a pivotal role in Indian Nuclear power programme. Right from the inception of Indian nuclear power programme, work has been carried on various aspects of thorium utilisation-mining and extraction of thorium, fuel fabrication, irradiation in reactors, reprocessing and refabrication.

- Thorium fuel fabrication through powder pellet route has been well established. Few tons of fuel have been made for CIRUS and Dhruga, PHWR and for blanket assemblies for FBTR. Few pins have been fabricated using mixed oxides of (Th-Pu) for irradiation in research reactors.
Thoria bundles are used in the initial cores of PHWR. The irradiation experience of thoria fuel in the research reactors CIRUS and Dhruva and PHWRs is satisfactory.

The thoria pins of CIRUS have been reprocessed to obtain U233. The recovered U233 has been fabricated as fuel for KAMINI reactor at Kalpakkam. The Post Irradiation Examination of one of the thoria bundle irradiated in PHWR has also been carried out for validation of theoretical analyses.

Studies have been carried out regarding use of thorium in different types of reactors with respect to fuel management, reactor control and fuel utilisation.

A small research reactor KAMINI with 30 kWth capacity utilises nuclear fuel based on Uranium-233 derived from irradiation of thorium. It is in operation at Indira Gandhi Centre for Atomic Research (IGCAR), Kalpakkam and is the only reactor in the world to use U-233 as fuel.

The 300 MWe Advanced Heavy Water Reactor (AHWR) designed by BARC is specially meant for large scale commercial utilization of thorium, generating nearly 70% of its power from insitu burnup of thorium.

A Critical Facility for Advanced Heavy Water Reactor has been commissioned in 2008 and is being used for carrying out experiments to further validate the physics design features of Advanced Heavy Water Reactor.

1.2 Current Activities

Advanced Heavy Water Reactor (AHWR):

• Several major experimental facilities such as Integral Test Loop, High Pressure Natural Circulation Loop, Parallel Channel Loop, CHF and Instability Loop are being operated to establish feasibility of the basic design:
  • The design of major systems, structures and components as well as entire nuclear island have been carried out. The reactor physics design of core has been completed.
  • Peer Review of AHWR design was carried out by Nuclear Power Corporation of India Limited (NPCIL). Safety appraisal of AHWR has been carried out by Atomic Energy Regulatory Board (AERB) by Pre-Licensing Design Safety Committee for AHWR (PLDSC-AHWR).
  • In order to demonstrate the thermal design margin and fuelling operation of AHWR; construction of a full power AHWR Thermal hydraulic Test Facility (ATTF) and Fueling Machine Test Facility (FMTF) has been taken up at R&D Centre, Tarapur and is nearing completion.
  • The detailed engineering of major Structures/ Systems/ Components (SSCs) of AHWR is being carried out in consultancy mode which includes preparation of technical documents and specifications for design, 3D CAD modelling, 2D layout drawings, and stress and seismic analysis of Structures, Systems and Components.
  • The recent Fukushima incident has raised concern about the safety of reactors in case of a prolonged Station Black Out (SBO) continuing for several days. In view of this, a detailed study has been performed simulating such a low probable condition in AHWR. The results indicate that the decay heat can be removed safely by passive means using
Isolation Condensers which dissipate the heat into the large pool water called Gravity Driven Water Pool, which can absorb the decay heat for more than 50 days.

- Towards development of technologies for manufacture of Uranium-233 bearing fuel, setting up a Mock-up facility for U-233 fuel fabrication has been taken up.
- Conceptual design of fuel fabrication facility to be co-located with AHWR has been worked out.
- Towards development of technologies for reprocessing of Uranium-233 bearing fuel, a plant “Power Reactor Thoria Reprocessing Facility” to demonstrate the reprocessing technology of thorium fuel irradiated in PHWRs upto 8000MWD/Te is under construction. This reprocessing facility will address technology demonstration for establishing commercial reprocessing of uranium-233 bearing spent fuels. This plant is designed for a throughput of 1.5 Te of heavy metals per year.

1.3 Future Plans

- The XII Plan apex project Safety Assessment and Technology Development for Advanced Reactors aims at evaluation of design margins and thermal-hydraulic safety assessment of various FOAK features and passive systems of AHWR. In continuation of R&D infrastructure at R&D Centre, Tarapur (ATTF and FMTF), a test facility Containment System Integral Simulation Test (CONSIST) facility’ will be created and integrated with ATTF for design validation of containment and its associated systems. The project essentially aims at enhancing the passive features in AHWR in view of recent Fukushima incident and greater emphasis is placed on severe accident management that ensures minimal impact on public following such a scenario.

- AHWR Plant Siting Committee (APSC) is examining the issues associated with siting of AHWR at candidate sites. The design of the reactor, at present, has been carried out taking site independent input for a coastal area to facilitate sea water based cooling. In principle, however, it is possible to locate this reactor at any other site which meets the required siting criteria prescribed by AERB and other statutory bodies. It is expected that AHWR construction activities may commence as early as possible after completion of detailed engineering design by consultant and consequent timely appraisal from regulatory bodies. It requires about forty five months for getting all clearances and starting first pour of concrete (FPC). From FPC, it requires about five years for the construction and achieving first criticality. From here, another year is required to commence commercial operation.

- It is proposed to launch construction of AHWR towards the end of XII plan.
- This reactor is intended to serve as a technology demonstrator for a range of technologies for Thorium utilisation to provide long term energy security to our country as well as for several advanced safety features that have been incorporated in the design of this reactor.

2. Current status and future plans of Research on Compact High Temperature Reactor (CHTR) and on Hydrogen energy
Nuclear energy assisted hydrogen production has been identified as a long-term solution, and BARC is committed to this technology development and deployment. R&D work on high-temperature nuclear reactor and Iodine-Sulfur thermo-chemical processes constituted the main components of this development work. In addition, R&D on electrolysis-based production and development of hydrogen storage methods was also planned. These development works were included as “Hydrogen Energy” thematic PLAN Projects of BARC.

2.1 Indian High Temperature Reactor Programme:

- **Compact High Temperature Reactor:**
  - Under the programme, currently India is developing a Compact High Temperature Reactor (CHTR) as a technology demonstrator for associated technologies. This lead-bismuth eutectic (LBE) alloy cooled 100 kWth reactor, with core outlet temperature of 1000 °C, will use TRISO coated particle type fuel, and incorporate several advanced passive safety features. The reactor is modular in design and is being designed to be compact in weight and size for ease in its deployment in remote locations for its use as a compact power pack.
  - The technologies for the reactor would be demonstrated in stages. In the initial stage, all engineering systems with surrogate materials and electrical heating system would be demonstrated at 550 °C. Subsequent to the manufacture of fuel, materials and other systems, critical facility for CHTR would be set up.
  - Currently, many experimental facilities such as Liquid Metal Loop, Oxygen Probe Testing Facility, High Temperature Material Test Facility, Test Facility for Corrosion Studies in Fluoride Salts are in operation while the Molten Salt Test Facility is under construction to carry out various studies related to liquid metals, and heat removal systems.
  - Technological challenges overcome so far include:
    - The manufacturing capabilities for BeO, carbon components, and fuel micro-spheres have been demonstrated.
    - Trials for TRISO coatings have been successfully carried out on surrogate materials and characterised.
    - Thermal hydraulics for the LBE has been established through analytical and experimental studies. Various techniques for SiC coating on graphite have been developed.
    - Processes have been developed to produce high-density nuclear grade BeO components.
    - Nb-1%Zr-0.1%C alloy has been developed.
    - Passive heat removal systems such as high temperature heat pipes and a gas gap filling based heat removal systems are also under various stages of development.

- **Innovative high temperature reactor (IHTR):**
  - For the purpose of large-scale hydrogen generation using high temperature thermo-chemical processes (>850 °C), design for a larger power reactor (600 MWth), called Innovative high temperature reactor (IHTR) is also being worked out. Studies carried out have resulted in selection of pebble bed reactor core with molten salt-based coolant. Detailed design is underway for this reactor. It is expected that this reactor would be able to
produce 80,000 Nm³/hr of hydrogen when coupled to a high efficiency (50%) hydrogen production process. It is contemplated that reject heat after producing hydrogen, could be utilised to produce electricity and potable water by desalination. Currently studies related to reactor physics, thermal hydraulics, and pebble based fuel handling systems are underway and other studies are planned in the current plan period.

2.2 Hydrogen production

Hydrogen production by both thermo chemical process and electrolysis process is under development

i. Hydrogen production by thermo chemical process

Iodine-Sulfur process

- R&D on nuclear heat based Iodine Sulfur thermo-chemical process for water splitting has been identified for initial research in view of highest thermodynamic efficiency reported. Theoretical and experimental investigation of all three sections of IS process viz. Bunsen, Hydrogen Iodide and sulphuric acid section, has been carried out. Catalyst for sulphuric acid decomposition (Fe1.8Cr0.2O3) and for HI decomposition (Pt on activated carbon) have been developed. Glass close loop system operating at atmospheric pressure has been erected & commissioned successfully to investigate feasibility of operation.
- Metallic closed loop system is planned to obtain engineering data pertaining to techno-economics, component/system service life etc. All three sections of Metallic plant will be operated together to demonstrate the closing of loop at prototypical conditions to generate data for design of pilot plant. The bench scale metallic plant will be demonstrated at the end of XII plan project.

Copper-Chlorine process

- In addition R&D on medium temperature thermo chemical process eg. Copper-Chlorine process which can be integrated with Prototype Fast Breeder Reactor (PFBR), is initiated as part of XII Plan research.

ii. Hydrogen production by electrolysis process

Alkaline electrolyser

- Porous Nickel electrodes with high internal pore surface area has been developed in BARC which provide high current densities without increasing the cell voltage. Successful electrolyser plant operation has been demonstrated for 10 Nm³/hr high purity hydrogen production up to 4 kg/cm² pressure.
- Demonstration of 30 Nm³/hr hydrogen production plant at 15 kg/cm² discharge pressure is in progress. This relatively high discharge pressure is unique feature of the plant, which can be directly connected to many applications without the requirement of booster compressor.

High Temperature Steam Electrolyser / Solid Oxide Fuel Cell

- Based on the experience gained in materials development and fabrication of Solid Oxide Fuel Cell (SOFC), over the last few
years, BARC has started working on development and demonstration of High Temperature Steam Electrolyser (HTSE).

- Process has been developed for fabrication of single tubular cell of 14 ID/18 OD x 150 mm long. The process is primarily based on co-pressing and co-firing. Cells have been tested in SOFC mode and found to give maximum power density 62 mW.cm-2 at 900°C. Work is under progress to demonstrate higher performance (> 250 mW.cm-2) single cell through effective collection of current from cell electrodes.

Studies related to Intermediate Temperature Solid Oxide Fuel Cells (ITSOFCs)

- Studies on oxide ion conducting as well as proton ion conducting SOFCs have been carried out, which can operate at intermediate temperatures, i.e. 500-700°C, as compared to high temperature SOFCs with operating temperatures in the range of 800-1000°C. This lowering of operating temperature can overcome several problems encountered while operating SOFCs at higher temperatures.

2.3 Hydrogen storage

- A Sievert’s-type experimental apparatus for the study of hydrogen storage in metals forming the hydride phase is developed. The apparatus is realized with commercial components and allows the study of the hydrogen absorption and desorption kinetics as well as the determination of the pressure–composition (P–C) diagram of the material–hydrogen system.
- Transition metal based hydride having composition Ti_{0.85}VFe_{0.15} has the maximum storage capacity of 3.7 wt% among the various Ti–V–Fe compositions studied.
- Design and Synthesis of reversible high capacity lithium based metal hydrides are also planned. Erection of the demonstration plant is in progress and experimental trials will begin by this year end.

The above summary of work undertaken would have given the Committee some reassurance about the intense efforts being put in by the Department.

Comments

The Committee takes note of the efforts and progress made with regard to the third stage Nuclear Power Programme which are laudable. Still, the Committee feels that there must be a scientific approach—a well laid out time frame within which it should be targeted to be accomplished. Such an approach would prove to be more assuring for the Committee.

Recommendation (Para 4.25.2)

Supply and availability of Uranium forms a critical component of expansion of nuclear power programme of our country. Non-availability of fuel owing to shortage of Uranium continues to be a major constraint in enhancing nuclear energy production. Worse, operation of PHWRs fuelled with domestic Uranium is not able to attain full capacity factor. As per the Annual Report – 2011-12 of the Department, the reactors operating with domestic fuel supply registered capacity factor of about 67 per cent till December 31, 2011. However, the Committee is surprised to note that out of B.E. allocation of Rs. 154.00 Crores for the year 2011-12, of UCIL under Major Head 4861
and Rs. 487.00 Crores under Major Head 12861 was drastically reduced at R.E. stage to only Rs. 25.00 and Rs. 274.00 Crores respectively apparently due to non-utilisation or underutilization of funds by UCIL. When the Committee enquired about the reasons for gross under utilisation of funds by UCIL, it was informed that it was due to delay in sanctioning of the Tummalapalle Expansion Project and Uranium Project at Gogi. The Committee understands that sanctioning of the project is an internal matter of the Department, which could have been obtained in time as such a vital project on which expansion of nuclear power programme so heavily depends, cannot be made to suffer due to procedural reasons. The Committee expresses its serious displeasure over such a lackadaisical approach of the Department.

**Action Taken By Government**

Uranium Corporation of India Limited had planned for construction of Gogi uranium project in Karnataka and Expansion of Tummalapalle uranium project in Andhra Pradesh during 2011-12. Accordingly, pre-project activities like land site selection, base lines studies, obtaining statutory clearances were initiated.

In case of Gogi uranium project, after baseline studies and public hearing on 16th November 2010, application for environmental clearance was made to MoEF on 14th March 2011. It was expected that following the final Environmental Clearance (EC) and subsequent CCEA approval, site activities shall start during 2011-12. MOEF’s expert committee discussed Gogi project on 28th November 2011 and asked for some more clarifications which were submitted to MoEF on 14th May 2012. The matter has been pursued at different times with MoEF and as the final EC was taking time, the fund allocation to Gogi was accordingly reduced. The final EC is yet to be obtained and consequently, UCIL could not utilize the allocated funds for Gogi uranium project during 2011-12.

In case of Expansion of Tummalapalle uranium project, it was expected that the project approval shall be available to UCIL during October 2011. All reports and studies for environmental clearance of the project have been completed. Environmental Public Hearing will be conducted by State Pollution Control Board in consultation with District Administration taking local public opinion into consideration. Accordingly, the fund allocated in BE of 2011-12 and subsequently revised in RE of 2011-12 could not be utilized.

It may be noted that in spite of all efforts by UCIL, statutory clearances could not be obtained due the external reasons beyond the control of UCIL/DAE for which BE and RE allocation for two of the above mentioned projects could not be utilized.

**Comments**

The Committee reiterates its recommendations with the hope that the Department would sort out the procedural wrangles by taking up the matter at the highest level with the Ministry of Environment & Forests.

**Recommendation (Para 4.25.3)**

The allocation for Uranium Corporation India Ltd. for this year under Major Head 4861 has been increased from Rs. 154.00 Crores B.E. last year to Rs. 216.00 Crores this year, but under Major Head 12861, it has been slightly reduced from Rs. 487.00 Crores to Rs. 467.00 Crores. The Department has stated that the provision has been made in anticipation of sanction of the Tummalapalle Expansion Project and Uranium Project at Gogi and also the new projects envisaged under XII Plan. The Committee, therefore, recommends that the budgetary allocation made this year must be fully utilized and the Department should not come out with procedural excuses next year. The Committee also
recommends that the new potential heavy mineral zones identified by Atomic Minerals Directorate in new areas must also be exploited so as to extract as much Uranium ore as possible and for this purpose, the Department should prepare a time bound Action Plan.

**Action Taken By Government**

Uranium Corporation of India Limited shall make all efforts for pre-project activities towards timely availability of all statutory clearances of all the projects listed under XII\(^\text{th}\) Plan period which will ensure full utilisation of budgetary allocation as envisaged in XII\(^\text{th}\) Plan period.

New areas identified by Atomic Minerals Directorate for Exploration and Research (AMD) are being regularly evaluated by UCIL for their techno-economic viability for exploitation. The viable deposits shall be taken for development in a time bound manner in line with the requirement of nuclear fuel.

**Comments**

The Committee notes the reply of the Department.

**Recommendation (Para 4.25.4)**

The Committee also expresses its serious concern over the fact that the Lambapur Project, Nalgunda District, Andhra Pradesh and Kyllegg Pyndengsotiong Mawthabah (KPM), West Khalsi Hills District, Meghalaya, which are being pursued from 10th Five Year Plan onwards have not yet been set up owing to resistance by the local people. The Committee understands that large amount of money has already been spent on these Projects. The Committee fails to understand as to why for so long the Department has not been able to amicably sort out the problems with the local people. The Committee feels that the concern of the people about health hazard posed by Uranium mining needs to be allayed with extensive public awareness and outreach programmes instead of standing firm on the notion that Uranium mining does not pose any health hazards and a number of health surveys conducted confirm this fact. The fact that Uranium mining does not cause health hazard needs to be appropriately conveyed to the people so as to convince them and win their confidence. The Committee, therefore, recommends that the Department should pay due attention on the above observations of the Committee.

**Action Taken By Government**

Lambapur Project in Nalgonda district, Andhra Pradesh and Kylleng-Pyndengsotiong, Mawthabah (KPM Project) in West Khalsi Hills District, Meghalaya State are being pursued by UCIL since X\(^\text{th}\) Plan. No headway has been made for taking up site construction activities at both the sites. However, UCIL continues to remain engaged with opinion makers of Meghalaya to create a favourable environment.

In case of Lambapur Uranium Project, mining lease application, Consent for Establishment (CFE) and land acquisition / transfer applications are pending since 2002. Part of the deposit, amenable to open pit mining is located adjacent to Nagarjunsagar reservoir which is the source of drinking water to large part of the State including Hyderabad. UCIL has made several studies and generated sufficient data to expel the fear of water pollution by dust generated from open pit mine. However, strong resentment against the project on the apprehension of drinking water pollution has been expressed on different platforms. In addition, part of the land required for project falls under Rajiv Gandhi Tiger Sanctuary.

In order to hasten the process of site construction, during 2010 the project activities were split into two stages; Stage I - Pre-project activities and Stage II - Mining & Milling activities. It was expected that all statutory clearances and the project approval from Govt. of India shall be available to UCIL. As the approval process was not
progressing, UCIL had made a token provision in BE 2011 - 12. This also could not be utilised in absence of statutory approvals.

Uranium Corporation of India Limited is cautiously moving towards mobilising public opinion in favour of uranium mining showcasing the benefit of Tummalapalle project in Andhra Pradesh. Under the circumstances, UCIL has made a token fund provision of Rs. 45.00 crore in XIIth plan period towards Lambapur uranium project.

In case of Kylleng-Pyndengsohiong, Mawthabah (KPM Project), application for mining lease is pending with State Govt. of Meghalaya since Jan. ‘07, Land lease agreement signed with local land owners is awaiting State Govt.’s approval since 2007. Construction of this project is being opposed by sections of population, people’s representatives and opinion makers on apprehension of potential health hazard, alienation of local population, influx of outsiders. These issues have been extensively addressed on various platforms and widely circulated. People residing in the neighbourhood of the proposed project site have been invited to see for themselves the workings, environmental management and corporate social responsibility initiatives at the existing operations of Uranium Corporation of India Limited. Uranium Corporation of India Limited continues to remain engaged with different sections of the population and opinion makers to create a favourable image of the company.

Comments

The Committee takes note of the reply.

Recommendation (Para 4.26.2)

The Committee, although satisfied with the explanation given by the Department for the shortfall in the allocation, feels that Atomic Minerals Directorate which is shouldering the responsibility of identifying mineral resources for the nuclear power programme should continue to intensify its survey and exploration activities, so that, the country could strive to attain, as far as possible, self-dependence in Uranium. The Committee, therefore, recommends that AMD should make efforts to cover those areas of the country to identify prospective mineral resources which have been left untouched so far.

Action Taken By Government

As desired by the Committee, the Atomic Mineral Directorate is putting every efforts to intensity its survey and exploration activities so that the country could strive to attain self dependence in uranium. The details of the activities carried out are given below :

(i) **Airborne survey during XI Plan:**

During XI Plan, AMD has carried out 2,09,678 line km heliborne survey, as detailed on the following page:

<table>
<thead>
<tr>
<th>BASIN/AREA</th>
<th>Achievement (Line km)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MNC</strong></td>
<td></td>
</tr>
<tr>
<td>Mohar, Madhaya Pradesh</td>
<td>6,500</td>
</tr>
<tr>
<td>Albitite Line, Rajasthan</td>
<td>9,945</td>
</tr>
<tr>
<td>Bhima NE Part &amp; Central Part, Karnataka</td>
<td>36,013</td>
</tr>
<tr>
<td>Kaladgi Basin, Karnataka</td>
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<tr>
<td>Sonrai Basin, Uttar Pradesh</td>
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<tr>
<td>Southern extension of Albitite Line, Rajasthan</td>
<td>30,131</td>
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<tr>
<td><strong>NGRI</strong></td>
<td></td>
</tr>
<tr>
<td>North Singhbhum, Jharkhand</td>
<td>13,545</td>
</tr>
</tbody>
</table>
(ii) **Survey and Exploration activities for XII Plan:**

During XII Plan (2012-17), exploration for uranium, thorium, zirconium, rare metal and rare earth elements aided by the existing and expected additional facilities to be created would be continued to support indigenous Nuclear Power Programme of the country. A total of 12 new projects are proposed for XII Plan besides nine XI Plan continuing projects. Major thrust will be on synergizing multi-disciplinary activities of AMD to achieve the goal of augmenting resources of uranium, rare metal and rare earth elements, monazite and zircon to facilitate scaling up of the indigenous Nuclear Power Programme.

During XII Plan, AMD envisaged to establish 75,000 t of *in situ* U₃O₈ to be identified through airborne, ground geophysical, geochemical, reconnaissance and detailed radiometric/geological surveys.

- **Airborne geophysical survey**: 3,75,000 line km (XI Plan continuing project: 1,95,000 line km and XII Plan new project: 1,80,000 line km),
- **ground geophysical survey**: 2,500 sq. km,
- **reconnaissance survey**: 25,000 sq. km,
- **detailed survey**: 1,000 sq. km,
- **geochemical survey**: 10,000 sq.km, and 8,15,000m of drilling [Departmental: 3,25,000 m and contract drilling: 4,90,000 m] is planned.

Augmentation of rare-metal and rare-earth resources with the addition of 18t columbite-tantalite (Nb-Ta) and 16t HREE mineral concentrate (xenotime) is also proposed. Augmentation of beach sand mineral resources through systematic survey and exploration to identify thorium and zirconium resources in unexplored areas in varied geological domains and at deeper levels along the coast-line is also proposed.

(iii) **Airborne Survey during XII Plan:**

As suggested by the Committee airborne survey including heliborne TDEM, magnetic and gamma-ray spectrometric over 2,25,000 line km and ZTEM, gravity gradiometry and hyper spectral survey (new technologies) over 1,50,000 line km will be taken up in new areas for identification of potential targets for further exploration and augmentation of uranium resources.

From the above it may kindly be seen that the efforts taken up by Atomic Mineral Directorate for survey and exploration of uranium is highly intensified.

**Comments**

The Committee notes the steps taken by the Department to intensify its surveys but wonders as to what extent, the surveys undertaken have been successful in identifying mineral resources for our Nuclear Power Programmes.

**Recommendation (Para 4.27.2)**

The Committee feels that Cancer is emerging as a major deadly disease in our country and adequate infrastructure facilities for its early detection, effective and economical treatment need to be created on priority basis. This assumes importance also because the poor cannot afford to get treatment, its cost being exorbitantly high. The Committee, therefore, feels that TMC can play a lead role in achieving the above
objectives and for this purpose it is imperative that it expands its network in other major cities and various States. During its visit to Tata Memorial Hospital, Mumbai, the Committee found that the Hospital was over crowded with patients mainly because of the lack of economical and effective treatment facilities elsewhere. The Committee, therefore, recommends that TMC should, in a time bound manner, try to establish its Centres in other parts of the country with high cancer case rates. Simultaneously, it should also makes sincere efforts to develop tertiary level cancer care facilities in each State/Region, so that, patients need not travel from remote and far flung areas all the way to Mumbai. The Committee also recommends that adequate financial allocation should be provided to the Centre, so that, it could not only undertake research in the field of cancer, but also expand its activities and reach in different parts of the country. The Committee expresses its displeasure over the reduction of allocation for the Centre in B.E. 2012-13 which is Rs. 248.15 Crores as against the B.E. of Rs. 289.78 Crores last year and recommends that adequate budgetary support needs to be provided to the Centre so that its is able to cater to the needs of the cancer patients, especially the poor through expansion and outreach programmes.

Action Taken By Government

Tata Memorial Centre has the responsibility to set standards of therapy for treatment modalities for cancer and a centre to train Doctors, Scientists an Para Medical staff in the field. TMC is expanding its activities and since of the significant ones are as stated below:-

- The Haematolymphoid services and Bone Marrow Transplant Unit have been moved to ACTREC in Navi Mumbai. This has already improved survival significantly.

- There is a strong effort to establish women and children cancer hospital in the vicinity of Tata Memorial Hospital (TMH) to take care of this niche area and simultaneously achieve decongestion.

- During XII Plan the Hospital has mooted a National Cancer Grid for seamless integration of service, research and education in cancer for India. Under the National Cancer grid it is proposed to establish Centres – one in Andhra Pradesh and one in Punjab, and also to support two additional Centres, Dr. B. Borooah Cancer Institute, Guwahati, Assam and Tata Medical Centre, Kolkata so that uniform state-of-art cancer care is offered in respective parts of India at an affordable cost. These Centres in turn will mentor regional facilities that will deliver care at patient’s door steps.

- A pro-active telemedicine activity covering almost all states is presently running at TMH to reduce patient influx from outside Mumbai.

- To bring state-of-art technology for treatment DAE is planning a Hadron Beam therapy unit in Mumbai.

Comments

The Committee takes note of the Action Taken.

Recommendation (Para 4.28.2, 4.28.3 & 4.28.4)

The Committee notes that out of the total B.E. allocation of Rs. 1204.63 Crores under this Head last year, an amount of Rs. 990.39 Crores has been utilized resulting in underutilization of Rs. 214.29 Crores. When the Committee asked about the reasons for the underutilization, it was explained that the amount of Rs. 109.00 Crores could not be utilized by Institute of Plasma Research as International organisation has not released the
design of the International Thermonuclear Experimental Reactors delaying payments for the same. Further, an amount of Rs. 18.00 Crores could not be used due to delay in sanction for the project – New Campus for Fusion Reactor Related Activities. Tata Institute of Fundamental Research failed to utilize an amount of Rs. 91.80 Crores due to delay in obtaining statutory permission for infrastructure facilities, TIFR New Campus Development, etc.

4.28.3 The Committee expresses its concern over underutilization of funds by these prominent institutions as it would adversely affect our preparations/advancement in the field of nuclear science.

4.28.4 The Committee is hopeful that the Department would give due consideration to the recommendations of the Committee and take all necessary measures to obviate the possibilities of underutilization of funds under various schemes.

**Action Taken By Government**

1. Rs. 91.00 crore was sanctioned for the 'In-wall Shields' (IWS) package under ITER-India Project. However, the designs of some ITER components were changed during the last year, which had impact on manufacturing schedules of IWS components by our contractors. The IWS design has now been finalized by ITER-IO and we have started receiving imported materials needed for manufacturing IWS components, and provisioned Rs. 91.00 crore for this package in the BE of year 2012-13.

2. Rs. 18.00 crore was earmarked for the project 'New Campus for Fusion Related Activities' at the BE stage. The project was not sanctioned because the discussion with the State Government on the project land/location could not be finalized in time. Therefore the earmarked money was surrendered at the RE stage. The project land/location has now been agreed upon between IPR and the Government of Gujarat is awaiting a proposal from DAE.

In both items, delays were caused due to involvement of outside agencies, namely ITER-IO and the Government of Gujarat. Action will be taken to prepare/present more realistic budgetary estimate in future, whenever outside agencies are involved.

Tata Institute of Fundamental Research failed to utilize an amount of Rs. 91.80 crore due to delay in obtaining statutory permission for infrastructure facilities. Out of the surrender of about Rs. 91.80 crore, Rs. 62.00 crore is towards non receipt of sanction for revised cost proposals such as Radio Astronomy-I, Inter Institutional III, Research Facilities, NCBS - I & II, and Rs. 30.00 crore towards delay in statutory permission coupled with non issue of sanctions being the last year of the plan period. The Department will take all necessary action to avoid under utilization of Plan funds.

**Comments**

The Committee notes the reply but would like the Department to seek allocation of funds for its various projects only to the extent it realistically hopes to spend during the relevant period.

**Recommendation (Para 4.30.5)**

The Committee feels that a department like Atomic Energy is expected to be more disciplined particularly in planning and execution of projects and hence slippage of target both physical and financial reflects adversely on the overall performance of the Department. The Committee also notes that setting up of Prototype Fast Breeder Reactor, the second stage of the Indian Nuclear Power Programme is crucial for the commencement of the third stage nuclear power programme for thorium utilisation. The Committee also notes that the target of achieving three stage nuclear power programme
leading ultimately to development of thorium fuel based reactors has already been
delayed considerably and to meet the ever increasing demand of energy, we need to
accelerate growth of installed capacity of nuclear power projects with indigenous
technology using domestic fuel. The Committee, therefore, recommends that the
Department should make all out efforts to make the prototype fast breeder reactor
operational by targeted date of completion, i.e., September, 2014 and start its commercial
operation by 2014-15 as scheduled.

**Action Taken By Government**

Prototype Fast Breeder Reactor (PFBR) has reached advance stage of
construction. With physical target of 86% achieved by end of Financial Year 2011-12,
the reactor is heading for mechanical completion of the reactor in FY 2012-13.

Indigenisation has been the prime need for this advance technology reactor.
Manufacturing of all critical reactor and sodium circuit equipment was taken up within
the country. Industries faced many challenges in meeting the never attempted in the past
specification for the critical reactor and sodium circuit equipments. The challenges have
been successfully accomplished. Equipment below the reactor top shield are already in
position and sodium circuit equipments are in advance stage of erection.

Commissioning of the water, gas electrical and instrumentation systems will
commence in FY 2012-13. This will be followed by integrated test before sodium is put
in the reactor. It is planned to put sodium in secondary system loop in first half of the FY
2013-14. Extensive trial run of the plant has been planned with sodium in Primary,
Secondary and Safety Grade Decay Heat Removal system loops to study and calibrate the
equipment and system before nuclear fuel is loaded in the reactor.

Current status of supply and erection of reactor and sodium circuit equipment
provides adequate confidence that the scheduled Criticality in September 2014 and
Commercial Operation in March 2015 is achievable target and will not slip. Further,
success in achieving stringent specification of manufacturing and erection of Prototype
Fast Breeder Reactor has paved way to move ahead with India's second stage of nuclear
programme with vigour.

**Comments**

The Committee takes note of the reply and hopes that the Department will
make the country proud by successfully achieving its target.

**Recommendation (Para 4.30.8)**

While the Committee appreciates the NPCIL motto of ‘Safety first and production
next’ and also the constraints the Department is facing both domestic and international, it
feels that the time has come when the Department must enhance its nuclear energy
capacity in a big way to help the country sustain its economic growth. The Committee,
therefore, recommends that the Department must not leave any stone unturned to ensure
that nuclear power generation capacity is given a big boost as the country cannot afford
any laxity on this front any more.

**Action Taken By Government**

All efforts are being made to ensure timely launch and completion of nuclear
power projects considering the domestic and international constraints. The main domestic
constraints are acquisition of land for new projects and gaining public acceptances for
nuclear power plants post Fukushima incident. Nuclear Power Corporation India Limited
has launched a massive public outreach campaign based on multi-pronged approach to
tackle the apprehensions of the people about nuclear power in a credible manner.
NPCIL has also enhanced its Corporate Social Responsibility (CSR) activities at its sites for inclusive growth of the neighbouring communities. The focus areas have been health, education and infrastructure. Upfront CSR activities have also been initiated at the new sites.

The nuclear power expansion programme is being pursued vigorously, with full regard to the safety, security and livelihood of the people.

Comments

The Committee appreciates the commitment of NPCIL towards Corporate Social Responsibility and its efforts in securing acceptability of the people for Nuclear Power Plants in their neighborhoods. The Committee hopes that NPCIL and its dedicated workforce will continue to strive towards generating more nuclear power to fill the critical gaps in energy needs of the country.