CHAPTER IV : DEPARTMENT OF ATOMIC ENERGY

4.1 Establishment of Medical Cyclotron Facility

Variable Energy Cyclotron Centre, Kolkata (VECC) did not prepare the site in time for installation of equipment for the proposed Medical Cyclotron facility due to which equipment costing ₹ 82.12 crore remained idle for more than eight years and the project remained incomplete for more than 15 years since sanction and after incurring an expenditure of ₹ 219.50 crore.

Variable Energy Cyclotron Centre, Kolkata (VECC), a research and development unit under the Department of Atomic Energy (DAE), took possession (September 2002) of 5.19 acres of land received free of cost from the Government of West Bengal for establishment of Medical Cyclotron facility under a project titled 'DAE Medical Cyclotron Project'. The objective of the project was to set up 30MeV high beam current proton cyclotron which would be used for carrying out sophisticated material science experiments and to produce radioisotopes. The objective of such experiments was to develop materials that could be used in the nuclear power reactors. The large scale production of radioisotopes products would result in import substitution of some hitherto expensive vital radiopharmaceuticals and making them available at affordable price to the common people of India. The project was to be executed jointly by VECC and Board of Radiation and Isotope Technology, Mumbai (BRIT), another unit of DAE.VECC was to set up the Cyclotron System and its operation and use for research whereas BRIT was to handle the sales and distribution of radio-pharmaceuticals produced by the cyclotron machine.

DAE conveyed sanction (January 2004) of ₹ 78.01 crore[1] for the said project with the scheduled date of completion in January 2007.Some of the key milestones of the project included completion of engineering designs by July 2004, procurement of cyclotron to be commenced in July 2004 and completed by May 2006, completion of civil works by May 2006, installation of the cyclotron and beam lines by August 2006, commissioning of the cyclotron by November 2006 and commencement of its utilisation by December 2006.

VECC appointed (October 2005) a consultant for preparation of master plan, design report, detailed estimate, drawing and tender documents for the facility, to be done within a total time period of 52 weeks. In course of the project, VECC initiated (February 2005) introduction of a fifth beamline in addition to

[1] Includes setting up (A) 30 MeV Medical Cyclotron for ₹ 58.78 crore; and (B) Processing facility for radioisotopes and radiopharmaceuticals for ₹ 19.23 crore.

the four originally planned beam lines. This addition to the scope of work required inputs from the vendor, who was not finalised at that time.

VECC submitted (December 2005) a proposal to DAE for revision of the project cost and extension of time schedule citing increase in the scope of the construction of the building and services of Medical Cyclotron Facility as well as increase in the price of materials, services and equipment. Accordingly, DAE revised (May 2006) the project cost to ₹ 98.25 crore and extended the duration up to March 2008. During this first revision, the layout for the extra beam line was prepared based on gross input from the supplier and on the understanding of the users.

The consultant began to provide the drawings to VECC from March 2008. However, the consultant was unable to provide the complete set of drawings to VECC due to which the contract with the consultant was terminated (July 2014) and the Directorate of Construction Services and Estate Management, Mumbai (DCSEM)[2] was entrusted with the task of preparation of the remaining drawings. The drawings were provided to VECC in a sequential manner up to December 2014.

Meanwhile, after tendering process, VECC issued (July 2006) purchase order for supply, installation and commissioning of the complete equipment facility to a foreign firm[3] at a cost of Euro 13,302,500 to be delivered by May 2008.VECC then issued (February 2008) work order to a firm for civil works at a cost of ₹ 18.33 crore with scheduled date of completion by June 2009.However, owing to the changes made in the proposed facilities and consequent delay in releasing drawings, the construction work could not be completed within the stipulated time schedule. The construction firm informed (July 2009) VECC that it had completed almost 90 *per cent* of the works as per the drawings made available to them till June 2009 and submitted a revised quotation for the balance works. After negotiations, VECC amended (December 2010) the work order with the revised cost of ₹ 24.50 crore and extended the date of completion of the works to May 2012.

In the meantime, the cyclotron and other equipment were prepared for delivery (January 2008) and inspected by VECC (February 2008). However, due to delay in preparation of site, VECC requested the supplier to delay delivery of the same. Accordingly, between October 2008 and August 2009, VECC received 36

---

2 A DAE organisation responsible for civil works and estate management of DAE establishments.

3 M/s New Merchants International L.L.C., Dubai, U.A.E.

items of equipment valuing ₹ 82.12 crore[4] against the purchase order. Pending availability of site for installation, the equipment received were kept in VECC in a packed condition.

VECC submitted (November 2011) a proposal to DAE seeking a second revision of the project cost along with extension of time schedule, again on the ground of increase in the scope of works and price escalation. Based on the proposal of VECC, DAE sanctioned (November 2013) revised project cost of ₹ 241.34 crore and extended the project duration up to March 2017. Thus, due to the two revisions, the total sanctioned cost of the project increased by ₹ 163.33 crore[5].

The civil works were completed and the site was taken over by VECC in June 2016.Due to delay in completion of the works, the supplier refused to carry out the installation at the original quoted cost. As the revised cost quoted by them was too high, the purchase order was short closed and installation was carried out by VECC from November 2017 onwards using its internal resources. As of May 2019, commissioning of medical cyclotron and beam lines was completed but operational clearance from Atomic Energy Regulatory Board (AERB)[6] for utilisation of the facility was awaited. VECC had incurred a total expenditure of ₹ 219.50 crore on the project as of May 2019.

Audit observed deficient planning and coordination by VECC in the procurement of equipment, finalisation of the proposed facilities, execution of civil works and adherence to the targeted schedule, which resulted in delay in completion of the project and cost overrun. VECC took up the work of appointing a consultant for the project only in March 2005, after more than one year of sanction of the project. VECC was also unable to finalise the drawings for the civil works prior to issue of work order due to changes proposed mid-way, which led to delay in execution of the civil works. Consequently, the site for installation of the equipment could not be prepared in time to match the schedule for delivery of the equipment due to which equipment valuing ₹ 82.12 crore remained idle for more than eight years since receipt. The delay in civil works led to demand for increase in cost of installation of equipment by the supplier and resulted in change of plan whereby equipment was ultimately installed by VECC themselves. As a result, the future financial and operational

---

4 Euro 1,27,02,000 x 64.65 = ₹ 82.12 crore (at the rate of conversion of one Euro = ₹ 64.65).

5 Of which ₹ 106.92 crore was towards increase in scope of work, ₹ 44.08 crore was on account of price escalation, ₹ 12 crore was due to exchange variation and ₹ 33 lakh was towards expenditure on salaries.

6 AERB was constituted in November 1983 to carry out the regulatory and safety functions under the Atomic Energy Act, 1962 and the Environment (Protection) Act, 1986.

liabilities arising from the equipment (maintenance, defects, damage, etc.) have to be borne by VECC independently.

The delay of over 10 years in execution of the project led to price escalation of ₹ 44.08 crore.

DAE accepted (October 2018) the delay in the project citing addition of the fifth beam line during the second revision of the project in November 2013 but stated that these were beyond the control of VECC due to the unique nature of the facility that required many interactions with suppliers, statutory authorities, changes due to compliance with AERB regulations, etc. DAE added that the medical cyclotron facility was commissioned by VECC in September 2018. VECC however, stated (May 2019) that the facility would be utilised for the purpose envisaged after obtaining operational clearance from Atomic Energy Regulatory Board

The reply of DAE is viewed in the light of the deficient planning and coordination for establishment of the facility. Although the fifth beam line was planned during February 2005, the proposal for sanction for the same was made in November 2011 with a completion period of March 2015, which was revised to March 2017 in the sanction received in November 2013. The fact remains that though installed, the Medical Cyclotron facility was still not operational as it is awaiting clearance of AERB. The stated objectives of developing materials for nuclear power reactors and import substitution of vital radiopharmaceuticals for making them available at affordable price to the common people of India remain unachieved.

4.2 Commissioning of Ion Trap System

An Ion Trap System procured by Directorate of Purchase and Stores, Mumbai for Bhabha Atomic Research Centre, Mumbai after incurring expenditure of ₹ 2.13 crore, could not be commissioned even after more than seven years due to defective parts. The organisations did not obtain adequate financial safeguards for ensuring the security of the procurement.

According to the Purchase Manual of Department of Atomic Energy (DAE), Bank Guarantees (BG) are required as a performance bond as guarantee for discharge of warranty obligations and towards re-export of defective instruments/equipment to the manufacturer within the warranty period for arranging repair/replacement. Rule 158 of the General Financial Rules, 2005 (GFR) stipulates that Performance Security is to be obtained from the bidder for an amount of five to 10 *per cent* of the value of the contract with a validity of sixty days beyond the date of completion of all contractual obligations of the supplier including warranty obligations.

Bhabha Atomic Research Centre, Mumbai (BARC), a unit of DAE raised (March 2009) an indent for procurement of 'LC (ESI) (Ion Trap system) MS/MS' under an XI plan project 'Radiation Effects in Biology Systems'. The equipment was to be installed in the Modular Laboratories building of BARC and was to be used for conducting biological research.

Directorate of Purchase and Stores, Mumbai[7] (DPS) placed (November 2010) a purchase order after tendering, on Bruker Daltonik GMBH, Germany for the Ion Trap System at a cost of USD 398,427. The scope of the order included manufacture, supply, installation, commissioning of the system and also covered training and warranty. As per payment terms, 90 *per cent* of the total cost was to be paid by irrevocable Letter of Credit (LC) and the remaining 10 *per cent* within 30 days after satisfactory installation and commissioning of the equipment. The system was to be delivered within 24 weeks from the date of receipt of LC.

In terms of the purchase order, the items being purchased were guaranteed for satisfactory performance against manufacturing defects and faulty workmanship for a period of 24 months from the date of installation or 26 months from the date of shipment, whichever was earlier. If the item became defective during this period, the contractor shall be responsible for making arrangement for repair/replacement at his own cost. Further, the supplier's Indian agent was required to furnish a Performance Bond in the form of a Bank Guarantee (PBG) for 10 *per cent* of the total value of the equipment and valid till the guarantee period.

The system was received in BARC in May 2012[8] but due to a fault in two of the parts integrated to the machine, it was installed only in May 2013. Even after installation, the system did not operate smoothly and continued to develop problems from time to time due to defective parts. The supplier observed that the problems were occurring because the temperature maintained in the laboratory was not as required and requested (October 2014) BARC to take action to improve the ambient temperature and dust conditions. However, following a scheduled safety scrutiny, the Modular Laboratories building was declared unsafe for running of AC units. In the meantime, the guarantee period of the equipment had expired in May 2014. Expenditure of ₹ 2.13 crore[9] had been incurred on the equipment.

The system was ultimately moved (July 2016) to a new facility provided with the recommended temperature but this time the instrument calibration was lost.

---

7 The centralised procurement organisation of DAE.

8 LC was opened in March 2012.

9 Including 90 *per cent* of the cost of the system, Freight, customs duty and clearance charges.

The supplier offered to repair the instrument at their factory in Germany but declined to furnish the bank guarantee for the same. After prolonged correspondence, the supplier finally agreed (September 2018) to replace the faulty equipment with a new one. However, as of August 2019, the replacement had not taken place as the export permit from the German Government was awaited.

Audit observed that BARC was unable to provide the site conditions required for the system, which caused its malfunction in the first instance. There was a delay of nearly three years in providing the site with the required temperature and ambient air conditions. Audit also observed that DPS failed to obtain a PBG from the Indian agent of the supplier towards satisfactory performance of the system, as stipulated in the purchase order. The purchase order also did not contain provisions for monetary guarantees that would safeguard BARC against the risk of non-replacement of defective items/equipment.

BARC stated (December 2016) that work to be undertaken using this machine was managed by using similar infrastructure in other institutes and that the Ion Trap system in BARC would be used in the XII Plan projects. DAE stated (August 2019) that the delay in getting the equipment commissioned was due to change of installation site and considerable time taken by the supplier to obtain export permit. DAE justified not obtaining PBG stating that it was to be submitted by the supplier only after successful installation and commissioning of the system.

The reply is not acceptable as the equipment was yet to be commissioned and could not be used for the envisaged biological research even during the XII Plan period. The hold up of replacement of the defective parts due to non-receipt of export license which has been pending for one year constitutes an operational risk. It is also not correct that the PBG was to be obtained after installation and commissioning, as the purchase order stipulated that this be given prior to shipment. This is also contradictory to the GFR, which stipulates that the PBG should be obtained in advance with a validity of sixty days beyond the date of completion of all contractual obligations of the supplier. Further, the Purchase manual of DAE clearly provides for obtaining securities against performance and defects in the system. Hence, omitting this requirement from the purchase order was not in accordance with the Purchase manual. Failure to obtain adequate security for replacement of the faulty equipment has also exposed the procurement to a financial risk.

Thus, the equipment has been lying idle for seven years after incurring expenditure of ₹ 2.13 crore, due to non-replacement of the defective components. The inability of BARC to provide site conditions for the system led

to its malfunction and caused further delay in its installation. Further, there is risk of further delays in replacement of defective parts or of non-replacement, in the absence of adequate provisions in the purchase order to safeguard against delays and default in the replacement of defective parts.

4.3 Loss due to under coverage of medical stock

Tata Memorial Hospital, Mumbai did not carry out mid-term revision of the sum assured for its medical stock based on actual trend of inventory levels, which resulted in under coverage of stock and consequent loss of ₹ 1.64 crore from an insurance claim after a fire accident.

Tata Memorial Hospital, Mumbai (TMH), functions under the Tata Memorial Centre, Mumbai which is an autonomous institution of the Department of Atomic Energy (DAE). TMH took (April 2016) a Standard Fire & Special Perils Insurance policy for the period from 25 April 2016 to 24 April 2017 from New India Assurance Company Ltd. for its medical stock having a value of ₹ 18.62 crore (stock value as on 31 March 2016) at a premium of ₹ 9.82 lakh.

On 11 February 2017, a mishap occurred in TMH due to a fire in the Dispensary-Main Building. TMH raised (May 2017) an insurance claim for ₹ 6.02 crore for loss of medical stock in the said fire. The stock of medicine on the date of loss was valued at ₹ 25.60 crore. However, since the sum insured was for ₹ 18.62 crore, the insurance company proportionately deducted 27.28[10] *per cent* of value of stock from the claimed amount and admitted claim of ₹ 4.38 crore[11] only towards loss of stock. TMH received total claim amount of ₹ 4.20 crore after adjustment of the deductible amount[12] prescribed in the policy from the claim admitted. This resulted in under-recovery of the insurance claim of ₹ 1.64 crore[13] in respect of the un-insured stock held by TMH.

Audit observed that the General Rules and Regulations for fire insurance in respect of the insurance company contained a provision whereby mid-term increase or decrease in sum insured were allowed on pro-rata basis or on short-period scale respectively. Audit examined the monthly inventory levels maintained by TMH for medical stock for the period from April 2016 to January 2017 and observed that inventory levels were more than the sum insured

---

[10] Stock not insured as on date of loss: ₹ 25.59 crore - ₹ 18.62 crore = ₹ 6.98 crore i.e. 27.28 *per cent*.

[11] Amount claimed by TMH of ₹ 6.02 crore less ₹ 1.64 crore (being 27.28 *per cent* for uninsured stock valuing ₹ 6.98 crore) = ₹ 4.38 crore.

[12] The insurance policy contained a clause for compulsory deduction of five *per cent* of the claim amount subject to minimum of ₹ 25,000, which works out to ₹ 21.89 lakh.

[13] Claim made by TMH of ₹ 6.02 crore less claim admitted by the Insurance company of ₹ 4.38 crore = ₹ 1.64 crore.

for all the months from July 2016 to January 2017 by 7.79 to 34.88 *per cent*[14]. Though the stock levels continuously held were at levels higher than the sum insured, TMH did not exercise the option of mid-term revision of the sum insured. Hence, TMH had an inventory of 27.28 *per cent* that was not insured and did not qualify for the claim when the fire mishap occurred. In fact, scrutiny of monthly stock levels for the previous year revealed that TMH had taken an insurance policy for a stock value of ₹ 10 crore[15] but had held inventory ranging between ₹ 14.81 crore and ₹ 20.01 crore in all the months from April 2015 to March 2016 also. Thus, TMH had persistently under-insured the medical stock. The Insurance Consultant appointed by the hospital (TATA Motors Insurance broking & Advisory Services Ltd.) also did not point out this lapse on the part of the hospital.

DAE accepted (August 2019) that the stock value was not reviewed periodically.

The failure to carry out a mid-term revision in the insurance amount for medical stock resulted in under coverage of stock and consequent loss of ₹ 1.64 crore towards insurance claim. The hospital needs to amend the procedures related to insurance of stock in its custody to provide for periodical appraisal of inventory levels and adjust for insurance accordingly.

4.4 Cost escalation in short term contracts

Indira Gandhi Centre for Atomic Research, Kalpakkam modified the provision for providing cost escalation in its works procedures without obtaining the approval of the competent authority which resulted in expenditure of ₹ 1.10 crore towards cost escalation in nine test checked contracts.

Section 33, Clause 10(CC) of Central Public Works Department (CPWD) Works Manual, 2012 provides for variation in contract amount due to variations in price of materials and/or wages of labour required for execution of work in contracts where the stipulated period for completion is more than 18 months. The period of 18 months was in effect since February 2003. Prior to this, the price variation clause was eligible for contracts having duration of more than six months. The CPWD Works Manual, 2012 was further amended in August 2013 and the price variation clause was made applicable in contracts where the stipulated period for completion is more than 12 months.

---

[14] July 2016: 7.79 *per cent*, August 2016: 20.06 *per cent*, September 2016: 8.26 *per cent*, October 2016: 28.48 *per cent*, November 2016: 34.66 *per cent*, December 2016: 32.31 *per cent* and January 2017: 34.88 *per cent.*

[15] TMH had taken insurance for medical stock for the first time for the period from 25 April 2015 to 24 April 2016 for an inventory value of ₹ 10 crore.

Department of Atomic Energy (DAE) issued (May 2006) instructions to all its constituent units to follow the provisions of CPWD Works Manual for execution of civil works. In terms of said instruction, changes to works procedures in accordance with amendments to the CPWD Works Manual were to be effected by the Department in consultation with/approval of the Member for Finance, Atomic Energy Commission (AEC).

The Civil Engineering Division (CED) of Indira Gandhi Centre for Atomic Research, Kalpakkam (IGCAR), a constituent unit of DAE, submitted (July 2007) a proposal to maintain the period of six months for operating clause 10(CC) on the ground that increase of the period from six to 18 months seemed very high. The proposal was approved (July 2007) by IGCAR after obtaining concurrence of the Nodal Officer, Directorate of Construction Services and Estate Management, Mumbai (DCSEM)[16] and Tender Committee[17] members.

Accordingly, IGCAR floated tenders with the provision of Clause 10(CC) in all works having stipulated completion period of more than six months. Test check of records showed that IGCAR had incurred expenditure of ₹ 1.10 crore towards cost escalation in nine contracts entered (March 2011 to April 2015) for execution of civil works having a total value of ₹ 21.80 crore for duration of eight to 15 months by allowing such cost escalation for the duration beyond six months. The details of these test checked contracts is given in **Annexe-4.1**.

As per extant instructions of DAE, IGCAR was required to obtain the approval of DAE/Member for Finance, AEC before reducing the period of eligibility for price escalation to six months. The lapse by IGCAR in following the procedure for changing stipulated works provisions resulted in expenditure of ₹ 1.10 crore towards cost escalation in nine test checked contracts, which was not otherwise due for payment.

DAE stated (November 2018) that having being given special exemption, the Department has framed their own works procedure and regulations for execution of works and hence have modified the conditions of contract suiting their requirements. DAE added that the concurrence of Director DCSEM, who is the nodal officer, was obtained for the proposal for sustaining the eligible contract period and was presumed as sufficient.

Director DCSEM was not the competent authority to concur with the changes proposed in the DAE works procedure. The Department may ensure that approval of the competent authority is obtained before carrying out changes to the works procedures of DAE.

---

[16] A service organisation under DAE responsible for construction and maintenance of DAE establishments.

[17] Associate Director, Engineering Services Group, Bhabha Atomic Research Centre, Mumbai and Joint Controller (Finance and Accounts) IGCAR.