

Annual Report 2013 - 2014
Board of Radiation and Isotope Technology

Executive Summary

Radiation Technologies & Applications

Board of Radiation & Isotope Technology (BRIT) supplies a vast array of high quality radioisotope products for medical and industrial use. BRIT supplies therapeutic and diagnostic radiopharmaceuticals, labelled compounds and nucleotides, radiochemicals, sealed radiation sources and radiation technology equipments including gamma chambers, blood irradiators and radiography exposure devices.

BRIT also offers radiation processing, Isotope applications in industry and radioanalytical services to a large number of customers. Besides BRIT signs MoUs for setting up of radiation processing plants in private sector.

Indian Nuclear Society conferred Industrial excellence award upon BRIT recognizing contributions of BRIT for society. BRIT is celebrating its Silver Jubilee this year.



Chief Executive of BRIT Dr. A.K. Kohli receives the INS award from Shri Ratan Tata.

Healthcare

22000 consignments of ready to use radiopharmaceuticals of ^{131}I , ^{177}Lu , ^{32}P , and ^{153}Sm were supplied to Nuclear Medicine Centers. ^{131}I radiopharmaceuticals are most widely used.

BRIT has introduced supply of high dose ^{131}I - NaI therapeutic capsules of 25 - 125 mCi for thyroid cancer treatment. The price of ^{131}I NaI has also been reduced substantially.

The production and supply frequency of injectable product ^{131}I MIBG has been increased during the year. MIBG is an important therapeutic and diagnostic product for treatment of neuroendocrine cancers.



Hot cell for ^{131}I - NaI Capsule at Vashi

200 Ci of ^{99}Mo in the form of Sodium molybdate solution for solvent extraction generator and ^{99}Mo - $^{99\text{m}}\text{Tc}$ Gel Generator were supplied. Approximately 375 Ci of ^{99}Mo were also supplied as the new alumina column generator COLTECH.

More than 70000 Technetium cold kits for formulation of $^{99\text{m}}\text{Tc}$ radiopharmaceuticals were supplied. Four new $^{99\text{m}}\text{Tc}$ cold kits TRODAT, HYNICTOC, Tetrofosmin and HSA-NC are now being supplied on regular basis.

Medical cyclotron facility at Parel continued supplying PET radiopharmaceuticals such as ^{18}F - FDG, ^{18}F -FLT, ^{18}F -NaF and ^{18}F - FMISO to various hospitals in and around Mumbai.

QC analyses of high dose ^{131}I -NaI capsules was performed. Additional shielding Facility for handling and removal of waste during analysis were set up in QC lab. Analysis of imported Technetium cold kits were performed at behest of DCG(I) for regulating the foreign kits.

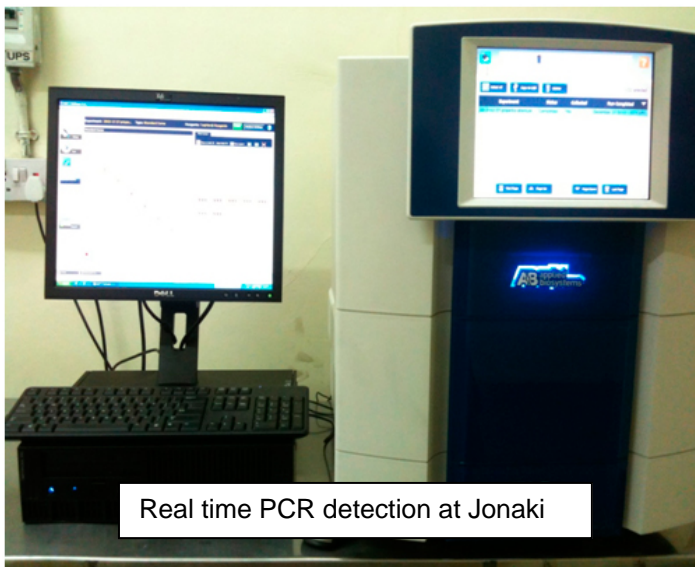
Regional Centre Bengaluru supplied more 72,000 mCi of ready-to-use $^{99\text{m}}\text{Tc}$ formulations to user retail outlet. Gamma Irradiation of 2580 blood bags was also done. Radioanalytical laboratory was inaugurated by Director, KMIO Hospital at regional



Radioanalytical Laboratory inaugurated at Bengaluru

Centre, Bengaluru for residual radionuclide determination and certification in domestic and export commodities. Regional Centre Delhi supplied ~40,000 mCi of ready to use $^{99\text{m}}\text{Tc}$ -radiopharmaceuticals for diagnostic nuclear medicine studies in Delhi & NCR Delhi. ~2000 cold kits for labeling radiopharmaceuticals were sold. The Regional Centre Dibrugarh rendered the RIA and IRMA diagnostic services for the benefit of patients of the entire

north-eastern region.



Real time PCR detection at Jonaki

At Regional Centre Kolkata civil work of DAE Medical Cyclotron is expected to be completed by March 2014 and installation will start by the end of 2014. ^{68}Ge - ^{68}Ga generator was evaluated by the optimized method of purification, the average yield of purified ^{68}Ga was around 75%. A new SnO_2 based generator is prepared using the isolated ^{68}Ge . Retail outlet sold cold kits to nuclear medicine centres in Kolkata.

At Regional Centre Hyderabad a project to develop Real time PCR based M tuberculosis

detection kit has been initiated. Real time PCR kits for determination of Hepatitis B and C, and HIV are also under development and detection systems for some cancer markers like EGFR, BCR-ABL are also planned. A new centralized radiopharmacy laboratory for supply of $^{99\text{m}}\text{Tc}$ as Sodium pertechnetate at Hyderabad has been set up. 1300 consignments of ^{32}P labelled nucleotides and ortho-phosphoric acid, ^{35}S amino acids, TAQ Polymerase and PCR Kits and cold kits (TCK products) were supplied.

Labelled Compounds Laboratory at Vashi supplied 21000 tritium filled light sources for use in defence applications for illumination of various military gadgets and instruments. Custom synthesis of ^{14}C -radiolabelled Glycosate and ^3H -labelled Folic acid were undertaken.

Radioanalytical Laboratory, Vashi carried out more than 6000 tests on domestic commodities and 850 tests on water samples (for gross alpha, gross beta ^{228}Ra & ^{228}Ra). 1556 water samples were analysed from Punjab State for the certification of Uranium content alone.



Brachytherapy unit supplied to Tata Memorial Hospital

Seven HDR Brachytherapy units have already been received for which the development was completed earlier. One unit has been installed at Tata Memorial Hospital, Parel for trials.

Eight cobalt-60 teletherapy sources were supplied to different cancer hospitals in the country using high specific activity imported Co-60.



Civil construction for **Fission Molybdenum Project** – to meet large demand of the most crucial radioisotope ^{99}Mo (n, f) is under progress.

Industrial Applications



A 3 MCi multipurpose Irradiator has been set up at Colombo, Sri Lanka jointly with a private company and has been commissioned. BRIT had also carried out repatriation of 3 gamma chambers which were earlier exported to Sri Lanka from Colombo and Kandy on chargeable basis.

Irradiator sources of total of approximately 2000 kCi activity were fabricated and supplied to radiation processing plants in private sector.

More than 1000 Ir-192 Radiography Sources and ten Co-60 Radiography Sources were fabricated and supplied to various NDT users. Customized radiation sources of Co-60, Cs-137 for Nucleonic Gauges.

RAPPCOF Kota continued excellent work in processing, production and transportation of Cobalt-60. A record 99.59 PBq of Co-60 was processed at Kota in the calendar year 2013.

ISOMED, an ISO 9001:2008 and ISO 11137:2006 continued radiation sterilization of the medical products and processed 5300 cu.m. of product.

Radiation Processing Plant Vashi accredited with ISO-22000:2005 and surveillance audit for ISO-9001:2008 treated more than 3500 MT of spices and other products registering a growth of about 18.3%.



MoU signed with M/s Kumaka Industries of Gujarat

MoU was signed with M/s Kumaka Industries Ltd. for setting up a Radiation Processing plant for treatment of chilled meat, poultry products, sea food etc. at Sanand, Gujarat

A GC 5000 unit was supplied and installed at Bangladesh Institute of Nuclear Agriculture, Mymensingh, Bangladesh.

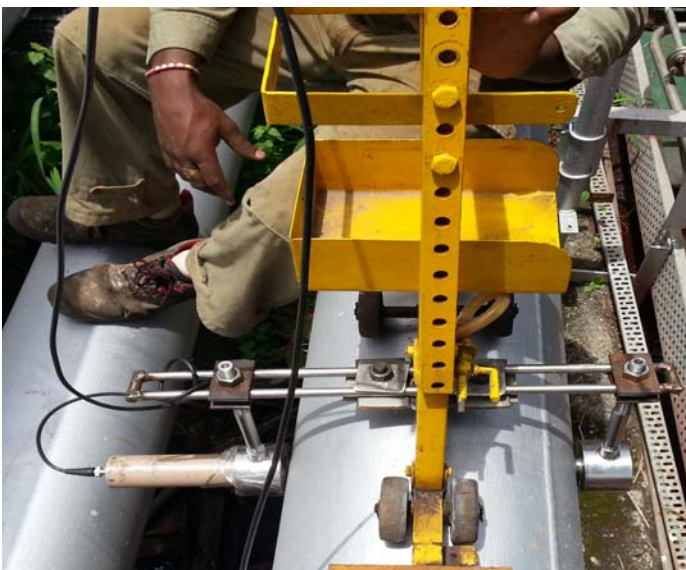
Two BI 2000 units were supplied and installed at JIPMER, Pondicherry & ISM & SUM hospital, Bhubaneswar.

More than 90 new indigenous radiography exposure devices were supplied and 590 were serviced. Around 1000 imported exposure devices were serviced & inspected.

A model for 100 kCi Co-60 based Medical Sterilizer for in-house sterilization of medical products in hospitals and an X-Ray based low dose Irradiator has been designed.

120 Ci Co-60 based Radiography Exposure Device has been designed and is under fabrication.

The cold commissioning of install & operate irradiator is completed. The cask has been loaded with 45 kCi of Co-60 at HIRUP Hot Cell.



Location of stuck pig in BPCL pipeline using Cs-137

Isotope Application Services Group of BRIT in collaboration with NIH could detect the locations of leak of water from the dam bed in a dam near Chandigarh by using a radioisotope of Gold (^{198}Au). BPCL pipeline was scanned using gamma pipe scanner containing 5 mCi of Cs-137 developed by BRIT to find the exact location of the stuck pig precisely. Gamma scanning of various process columns were carried out for a north India refinery using auto-column scanner that was scanned using collimated beam of gamma rays from Co-60 in the scanner.

The projects under XIth plan viz. Integrated Facility for Radiation Technology, Industrial Irradiator Development Project and GMP and GLP compliant labeled compounds laboratory have been completed.

BRIT website provided regular updates on various programs and activities related to developments in BRIT. Customer oriented reports were uploaded on website almost on daily basis enhancing co-ordination and communication with the customers.

BRIT is expected to achieve its sales turnover target of Rs.78 crores as against Rs.68 crores achieved last year.