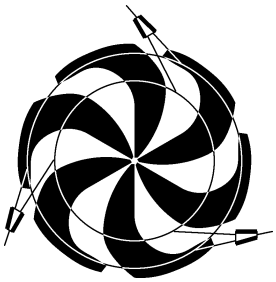
TRIUMF



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CANADA'S NATIONAL LABORATORY FOR PARTICLE AND NUCLEAR PHYSICS

OPERATED AS A JOINT VENTURE

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UNDER A CONTRIBUTION FROM THE
NATIONAL RESEARCH COUNCIL OF CANADA

DECEMBER 2006

The contributions on individual experiments in this report are outlines intended to demonstrate the extent of scientific activity at TRIUMF during the past year. The outlines are not publications and often contain preliminary results not intended, or not yet ready, for publication. Material from these reports should not be reproduced or quoted without permission from the authors.

TECHNOLOGY TRANSFER DIVISION

INTRODUCTION

The Technology Transfer Division at TRIUMF is responsible for the laboratory's commercial interactions. It comprises a small, dedicated group whose efforts are directed at realizing and managing the commercial opportunities arising from TRIUMF's research programs.

The Division also includes the Applied Technology group, which is responsible for the operation of the commercial cyclotrons for MDS Nordion. These cyclotrons are dedicated toward the production of medical radioisotopes for sale worldwide, as per TRIUMF's contractual partnership with MDS Nordion.

TECHNOLOGY TRANSFER

The Division's mandate towards pursuing all financially and technically viable opportunities for technology commercialization is intended to complement and support the preeminent fundamental research conducted at TRIUMF. The objective is to maximize TRIUMF's impact on the Canadian economy and, where possible, provide additional capital towards TRIUMF's operations. Efforts toward this objective are conditioned to minimize any compromising interference with, or influence upon, scientific programs. The current NRC-TRIUMF Contribution Agreement specifies, as part of the "Description of Project", a requirement for TRIUMF to "pursue activities designed to maximize the economic benefits to Canadian companies through the vigorous pursuit of technology transfer activities, contracts and procurement policies". A measure of performance for the Division is thus the stimulus and economic dividends provided to Canadian industry, through technology transfer activities ranging from intellectual property protection and out-licensing, to collaboration and contract work.

APPLIED TECHNOLOGY GROUP

500 MeV Isotope Production Facility

During this year, the 500 MeV irradiation facility received 247 mAh. Thirty targets were irradiated to produce ^{82}Sr/^{82}Rb, twenty-six targets were delivered to MDS Nordion.

CP42 Facility

The total beam delivery for 2005 was 227 mAh. The weekly beam delivery graph is shown in Fig. 335, the quarterly time evolution of the beam delivery is shown in Fig. 336. The downtime and maintenance statistics are analyzed in Fig. 337 and compared with the TR30-1 and TR30-2.

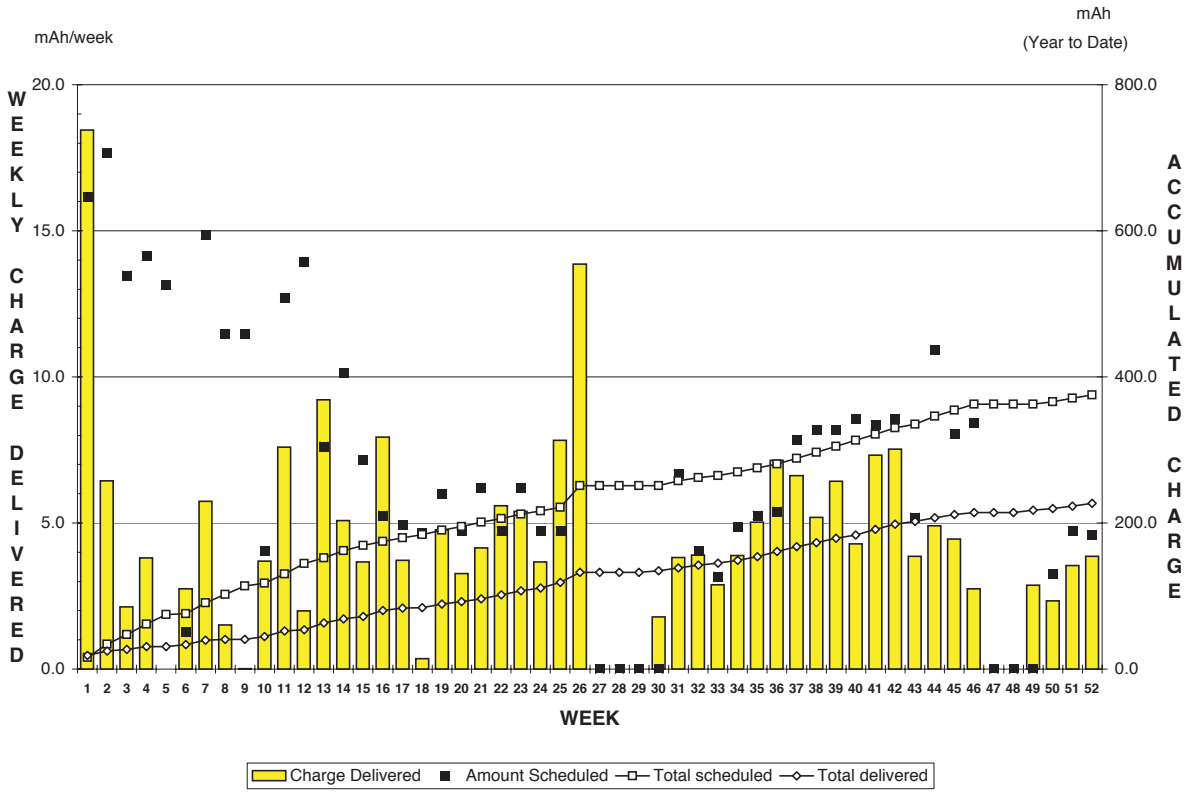

Fig. 335. Weekly beam delivery for the CP42.

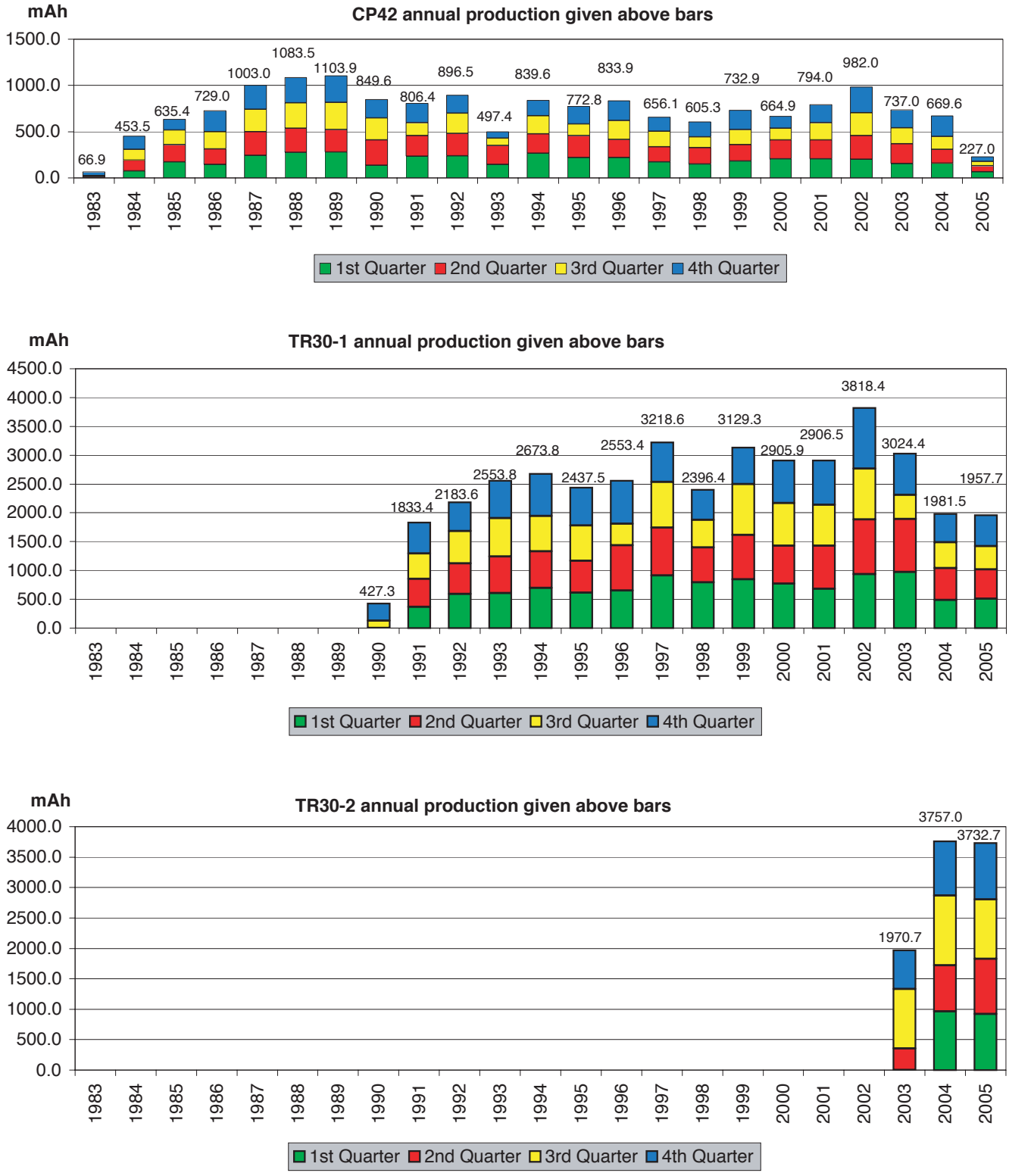

Fig. 336. Quarterly time evolution of the beam delivery for the CP42 (top), TR30-1 (middle) and TR30-2 (bottom).

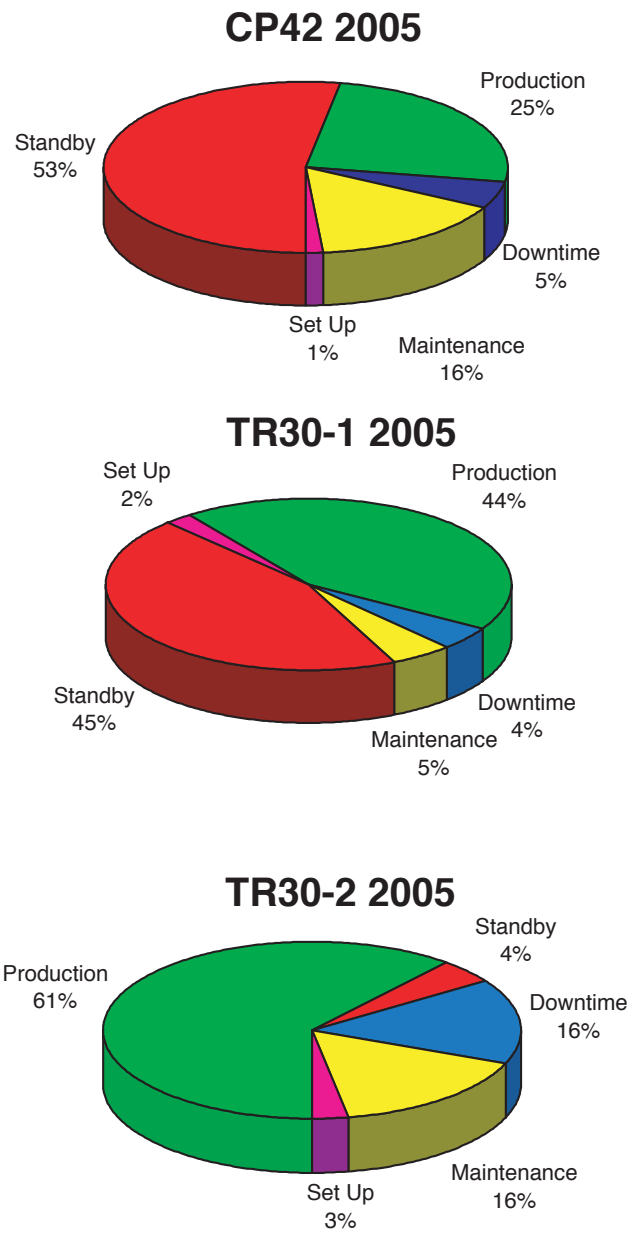

Fig. 337. Breakdown of downtime and maintenance for the CP42 (top), TR30-1 (middle) and the TR30-2 (bottom) during operational hours.

TR30-1 Facility

The total beam delivery for 2005 was 1957 mAh. The weekly beam delivery graph is shown in Fig. 338, the quarterly time evolution of the beam delivery is displayed in Fig. 336. The downtime and maintenance statistics are analyzed in Fig. 337 and compared with the CP42 and TR30-2.

TR30-2 Facility

In 2005, the TR30-2 had the highest beam production of the three ATG cyclotrons. The total beam delivery was 3733 mAh, which was only 24 mAh less than in 2004. The weekly beam delivery graph is shown in Fig. 339, the quarterly time evolution of the beam delivery is displayed in Fig. 336. The downtime and maintenance statistics are analyzed in Fig. 337 and compared with the CP42 and TR30-1.

ATG Projects

The upgrade of the CP42 controls has been completed. The CP42 safety system has been redesigned and converted to a PLC based system.

ATG has completed the consolidation of the cyclotron controls into one control room in the RCA-3 building.

Modifications to the existing collimators in solid target stations are in progress. The new design uses collimator heads manufactured from a specific high strength tantalum-tungsten alloy.

Several solid target stations have been equipped with a new style manipulator head which uses a snap-on connector to hold the solid target assembly in position. The new design has proved very reliable and has greatly reduced the downtime due to failures of the locking mechanism.

Collaborations are ongoing with the Université de Sherbrooke, Quebec, and the University of Washington Medical Center in Seattle.

RADIOISOTOPE PROCESSING (MDS NORDION)

During the year 2005, MDS Nordion shipped large quantities of short-lived medical radioisotopes produced using the two TR30 cyclotrons and the CP42 cyclotron. The main radioisotopes produced and shipped were iodine-123 used for thyroid imaging and research, palladium-103 used in prostate brachytherapy, and indium-111 used for monoclonal antibody imaging.

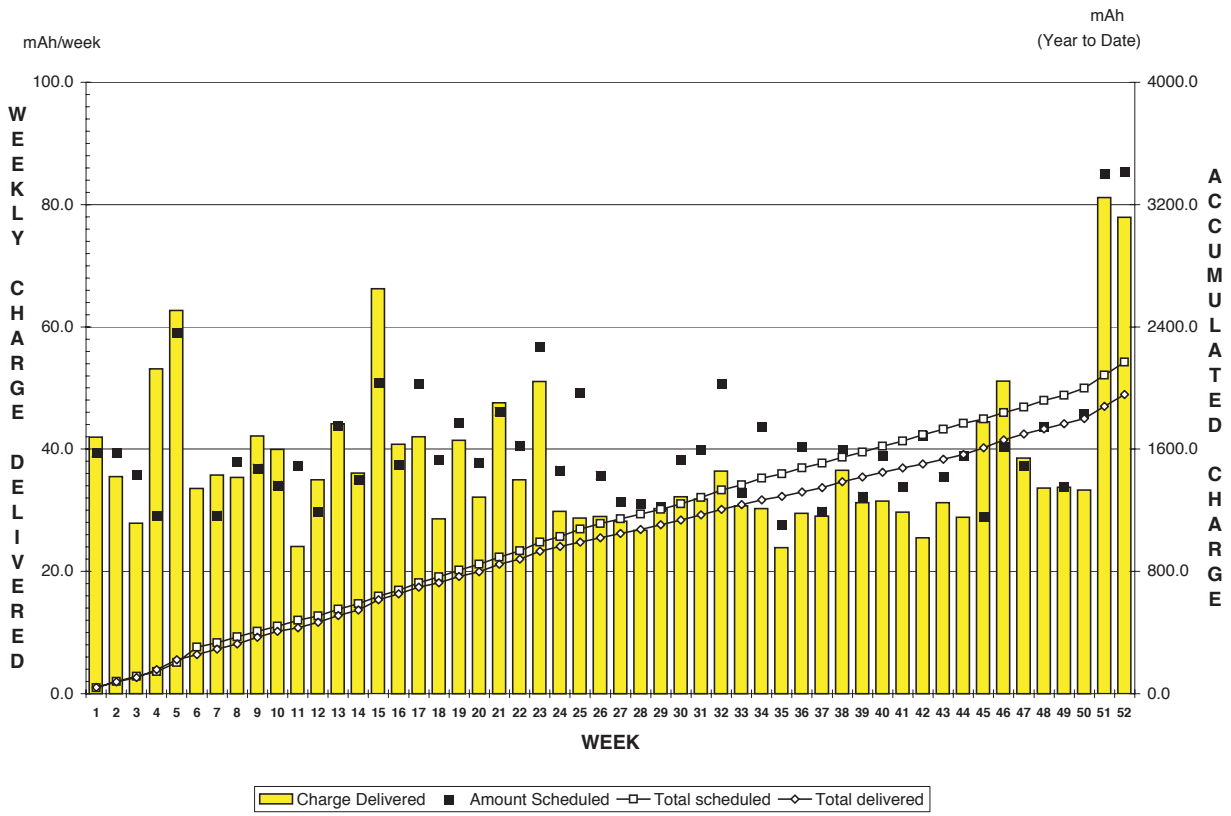

Fig. 338. Weekly beam delivery for the TR30-1.

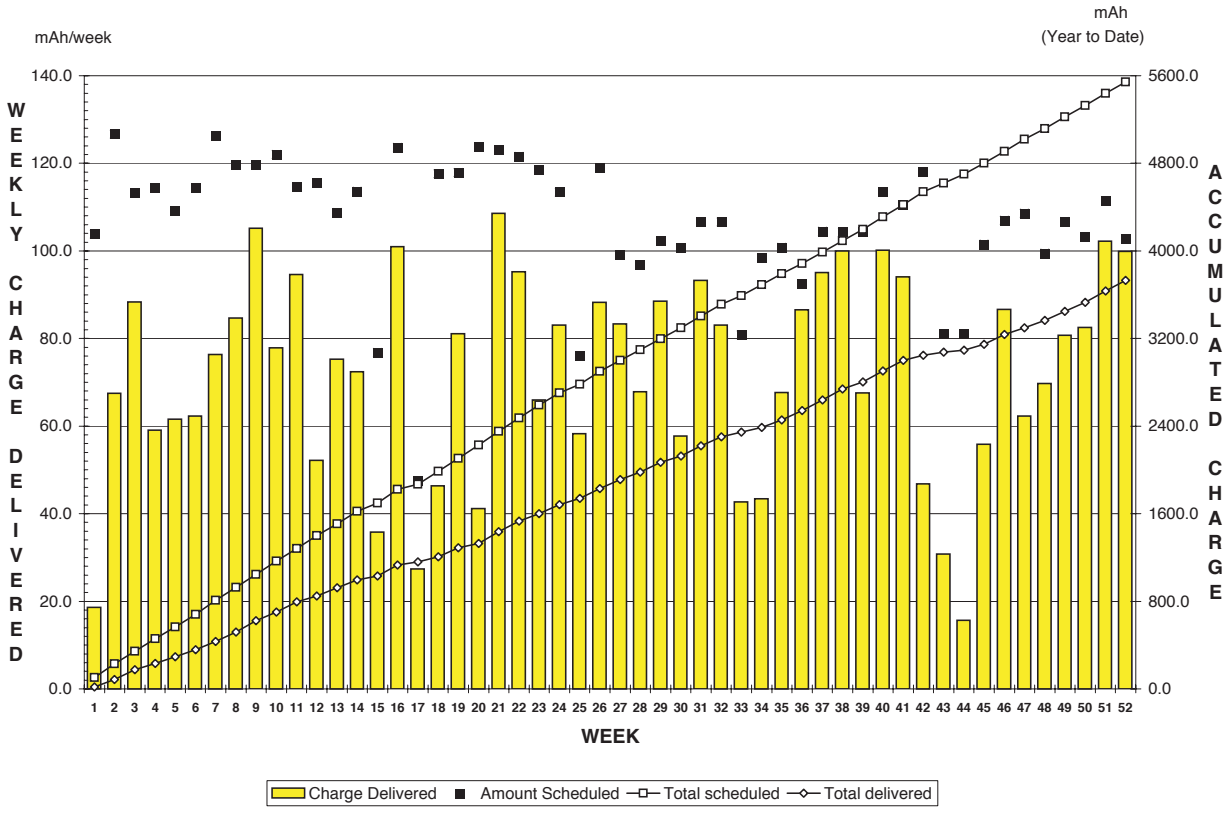

Fig. 339. Weekly beam delivery for the TR30-2.