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OPERATED AS A JOINT VENTURE

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UNDER A CONTRIBUTION FROM THE
NATIONAL RESEARCH COUNCIL OF CANADA

DECEMBER 2004

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 commercial interactions for the laboratory. It is composed of a small group dedicated to optimizing the commercialization technologies emanating from TRIUMF research, plus the Applied Technology group that is responsible for the operations of the on-site commercial cyclotrons on behalf of MDS Nordion.

TECHNOLOGY TRANSFER

The mandate of the Division is the pursuit of all financially and technically viable opportunities for commercializing technologies emanating from the research at TRIUMF. This mandate must recognize the preeminence of the scientific research at the laboratory, and proceed in a manner that optimizes the impact on TRIUMF and the Canadian economy while minimizing the impact on scientific activities at the facility.

The current Contribution Agreement between National Research Council (NRC) and TRIUMF includes the requirement for TRIUMF to enhance its impact on the Canadian economy. This impact is measured through the benefits provided to Canadian industry, both through the transfer of TRIUMF's technical knowledge and through its purchasing practices.

APPLIED TECHNOLOGY GROUP

500 MeV Isotope Production Facility

During this year, the 500 MeV irradiation facility received 326.46 mAh. Eight targets were irradiated, six targets delivered to produce ^{82}Sr/^{82} Rb for MDS Nordion.

CP42 Facility

The total beam delivery for 2003 was 737 mAh. The weekly beam delivery graph is shown in Fig. 313 and the quarterly time evolution of the beam delivery is shown in Fig. 314. The downtime and maintenance statistics are analyzed in Fig. 315 and compared with the TR30-1 and TR30-2.

Work is still proceeding on the CP42 control system upgrade.

TR30-1 Facility

The total beam delivery for 2003 was 3024.5 mAh. The weekly beam delivery graph is shown in Fig. 316 and the quarterly time evolution of the beam delivery is displayed in Fig. 314. The downtime and maintenance statistics are analyzed in Fig. 315.

ATG replaced the north high current target station for palladium production (1B) with the new radiation hard type.

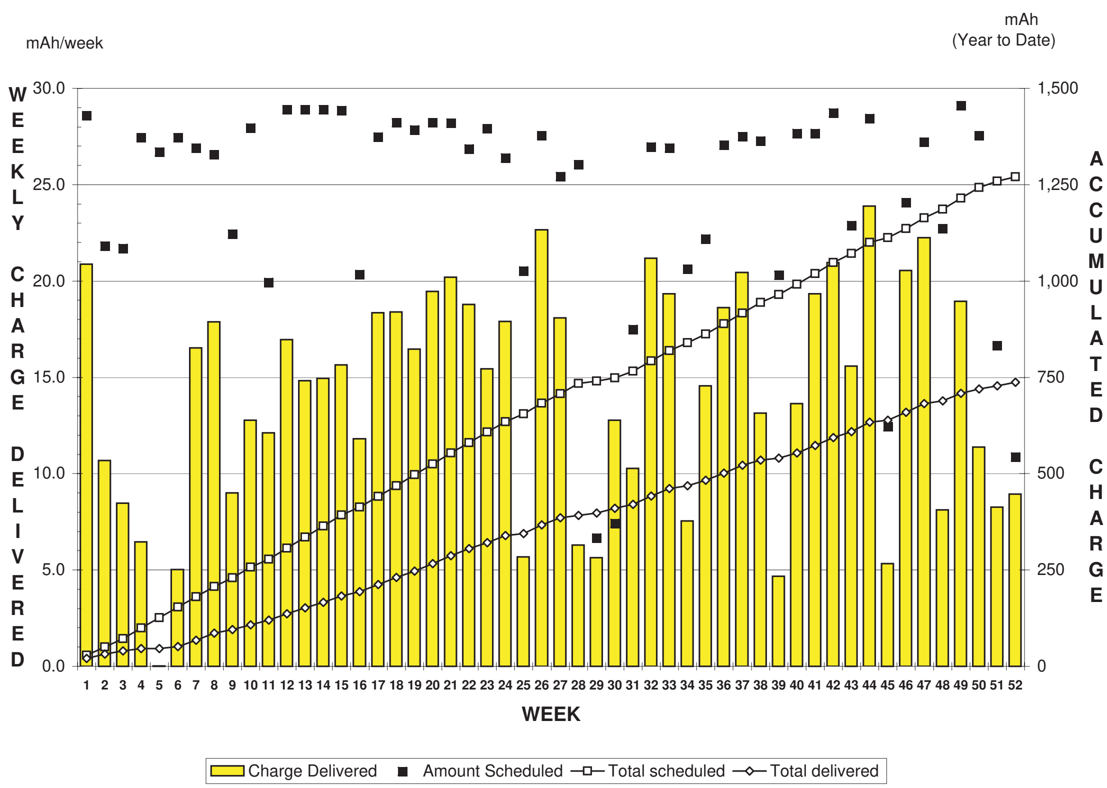

Fig. 313. Weekly beam delivery for the CP42.

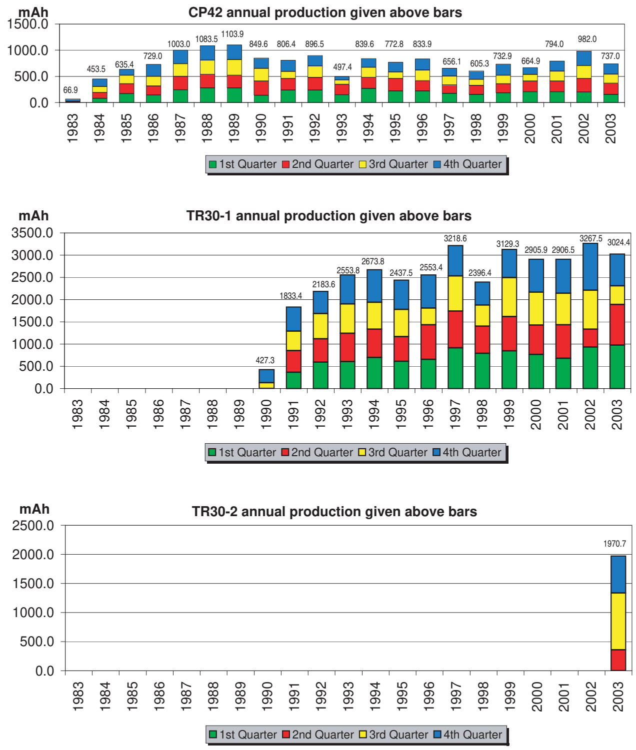

Fig. 314. Quarterly time evolution of the beam delivery for the CP42 (top), TR30-1 (middle) and TR30-2 (bottom).

TR30-2 Facility

A new TR30 industrial cyclotron was installed and commissioned. High beam current irradiations started in June. Two solid target stations and one gas target system are available for medical radioisotope production. Currently, the TR30-2 produces mostly ^{103}Pd at beam currents of up to 500 μA.

The total beam delivery for 2003 was 1970.8 mAh. The weekly beam delivery graph is shown in Fig. 317 and the quarterly time evolution of the beam delivery is displayed in Fig. 314. The downtime and maintenance statistics are analyzed in Fig. 315 and compared with the CP42 and TR30-1.

ATG Development Projects

ATG is working towards a consolidation of the cyclotron control rooms. The CP42 and TR30-1 controls are scheduled to be moved into the TR30-2 control room by the end of 2004.

Improvements 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.

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

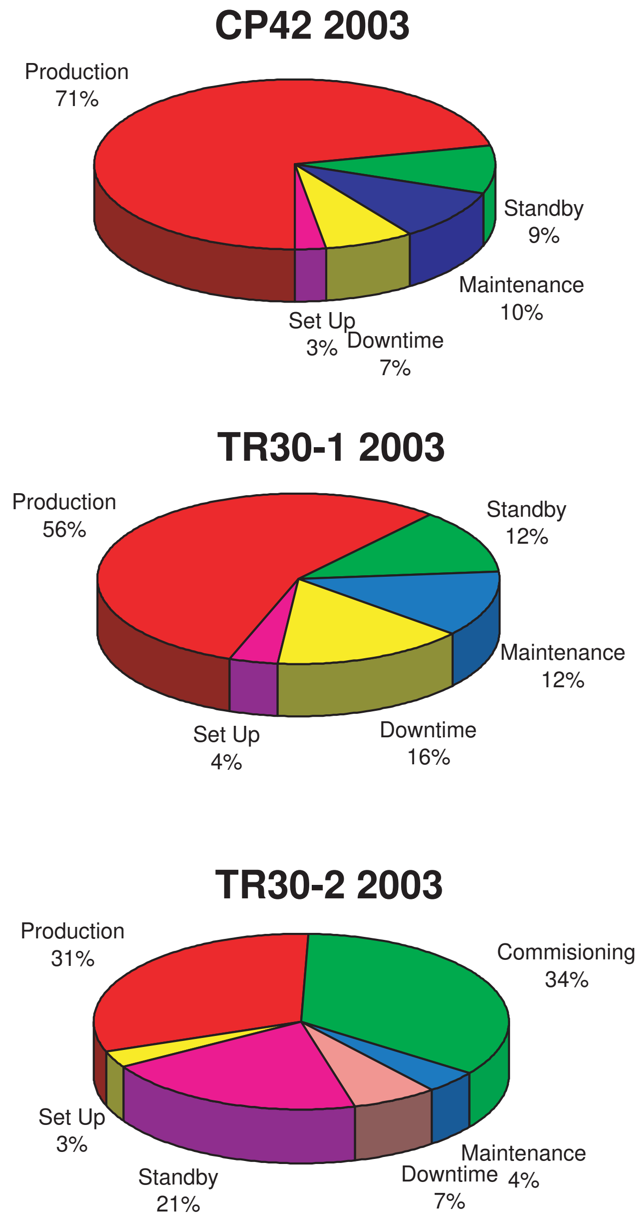

Fig. 315. Breakdown of downtime and maintenance for the CP42 (top), TR30-1 (middle) and the TR30-2 (bottom) during operational hours.

RADIOISOTOPE PROCESSING (MDS NORDION)

During the year 2003, MDS Nordion commissioned a new 30 MeV cyclotron and commenced production operations using it. MDS Nordion now has 3 operating cyclotrons on-site dedicated to isotope production.

The main isotopes produced and shipped in 2003 were iodine-123 used for thyroid imaging and research, palladium-103 used in prostate brachytherapy, and indium-111 used for monoclonal antibody imaging.

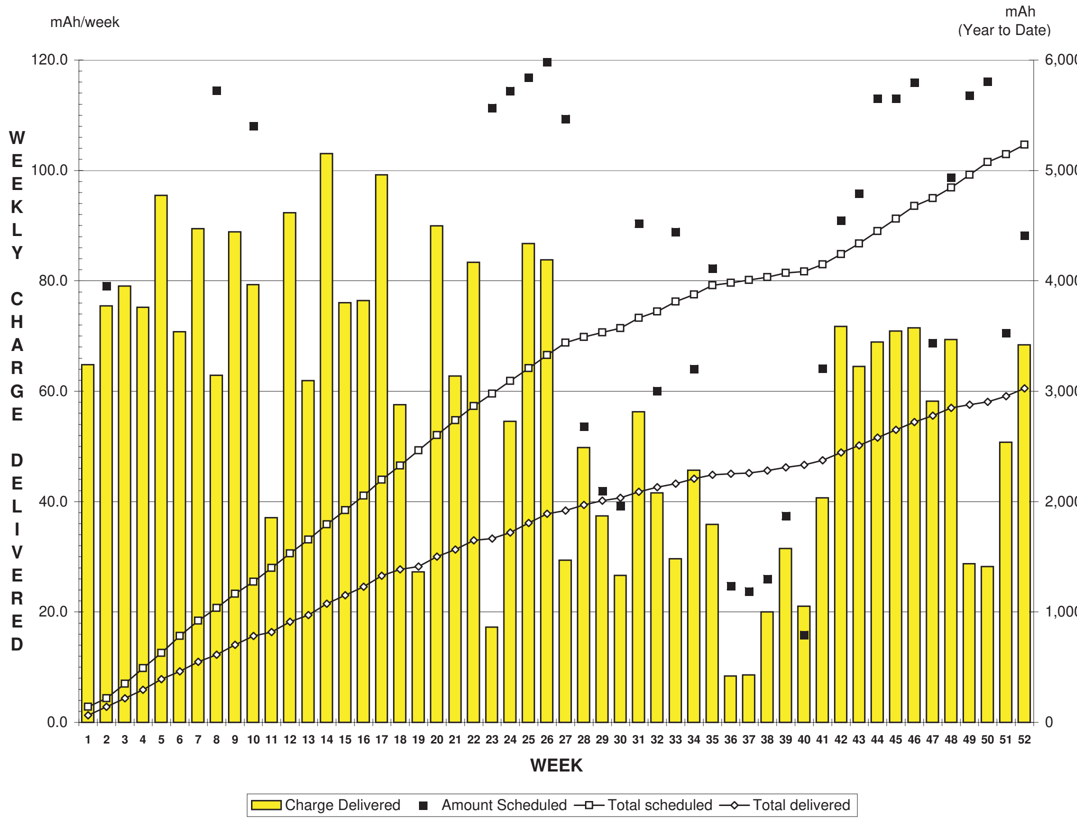

Fig. 316. Weekly beam delivery for the TR30-1.

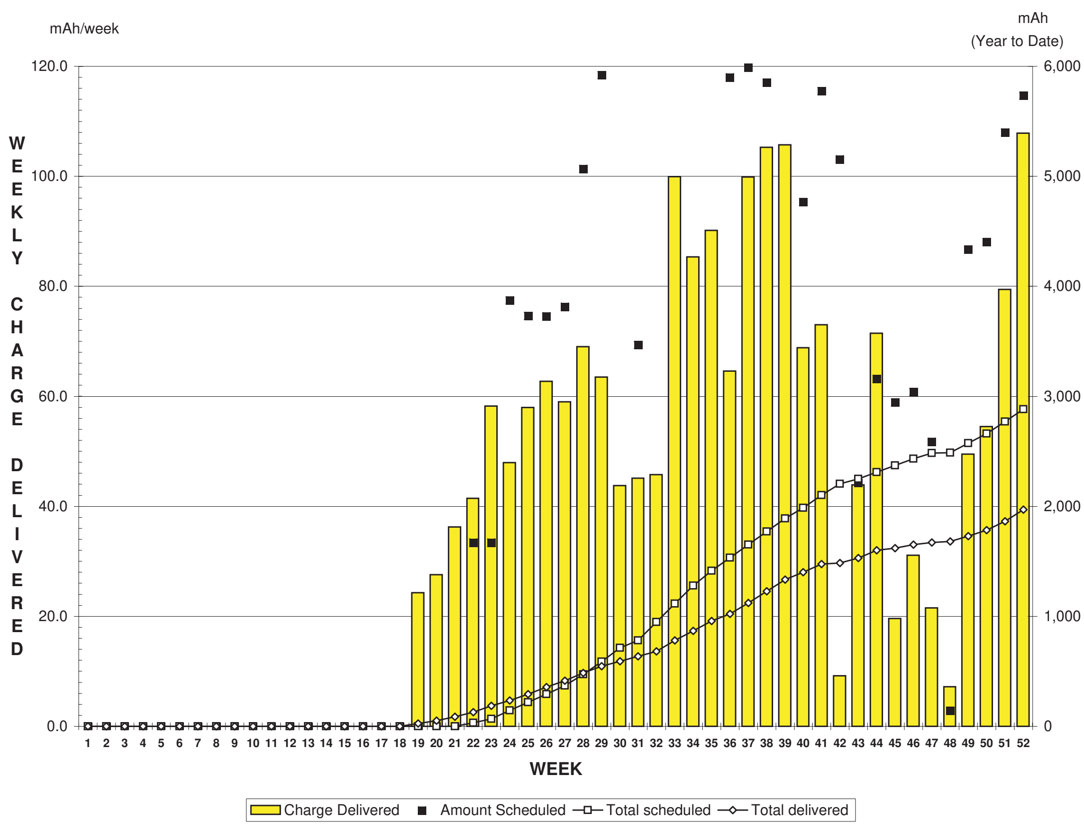

Fig. 317. Weekly beam delivery for the TR30-2.