

ENTRY NO. **C3** Date **October 1995**
 Name of Machine **TASCC (Tandem Accelerator Superconducting Cyclotron)**
 Institution **AECL**
 Address **Chalk River Laboratories, Chalk River, Ontario, Canada, K0J 1J0**
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 In Charge: **J.C. Hardy** Reported by: **H. Schmeing**

HISTORY
MILESTONE DATES:
 Design 1973 Model Tests 1974-78
 Construction 1978-84 First Beam Sep. 1985
 DESIGN/CONSTRUCTION BY: Commissioned Oct. 1991
 in house other
 COST: Accelerator Facility
 FUNDED BY: AECL

STATUS
STAFF: Machine
 Scientists and Engineers 10
 Technicians 14 Operators: 14
 Research (in house/external)
 Scientists 16 / 92 Engineers - / -
 Technicians 15 / - Students 5 / 24
BUDGET: Machine Funded by AECL
Research Funded by AECL

TIME DISTRIBUTION:
 Basic Research (in house/external) 56 % / %
 Applied Program (in house/external) 14 % / %
 Maintenance 20 % Development 10 %
 Facility operates 8400 hour/year

MAGNET
POLE PARAMETERS:
 Diameter 138.6 cm $R_{extract}$ 65.2 cm R_{inject} 14.5-28.5 cm
HILL PARAMETERS: Gap (min) 3.7 cm B_{max} 6.0 T
 (@ AT) Gap (max) cm B_{min} T
VALLEY PARAMETERS: Gap (min) cm B_{max} T
 (@ AT) Gap (max) 64 cm B_{min} 4.3 T
 AVERAGE FIELD: $\langle B \rangle_{min}$ 2.3 T $\langle B \rangle_{max}$ 5.1 T
 NUMBER OF SECTORS: compact/separated 4 /
 sector angle deg. spiral (max) 50 deg.
FIELD TRIMMING: Trim Coils 13 saturated rods in
 Harmonic Coils each flutter pole
 Other
CURRENT: Main Coils 2200 Amps Stability ± 20 mA
 Trim Coils Amps Stability
 Stored Energy (cryogenic) 22 MJ
WEIGHT: Iron 170 tonnes Conductor NbTi
ION ENERGY: Bending Limit E/A = 520 q^2/A^2 MeV/u
 Focusing Limit E/A = 100 q/A MeV/u

ACCELERATION SYSTEM
FUNDAMENTAL ACCELERATION:
 Description: 2 dee pairs on 2 resonators
 No. of Gaps/turn $dE/dn(max)$ 0.8 MeV/q
 Voltage (max) 0.1 MV Harmonic f_H/f_{ion} 2, 4, 6
 Freq 31-62 MHz Power in(max) 0.1 MW
 Stability: Phase $\pm 1^\circ$ Voltage 0.02%
OTHER CAVITIES (Flattopping or otherwise):
 Description:
 Region of Influence: R_{min} cm R_{max} cm
 No. of Gaps/turn $dE/dn(max)$ MeV/q
 Voltage (max) MV Harmonic f_H/f_{ion}
 Freq MHz Power in(max) MW
 Stability: Phase Voltage

VACUUM SYSTEM
OPERATING PRESSURE: 310⁻⁷ torr
PUMPS: (No. and type) two cryopanel
 1500 l/s. each

ION SOURCE(S)
 Type Intensity @ $\epsilon_n = \beta\gamma\epsilon$ Ion Species
 (mA) (π mm mrad)
 (a)
 (b) Beam injected from MP Tandem - 16 MV
 (c)
 (d)

INJECTION SYSTEM
 Carbon stripper after radial injection Efficiency %
EXTRACTION SYSTEM
 Electrostatic deflector, superconducting magnet channel Efficiency 30-100 %
CHARACTERISTIC BEAMS

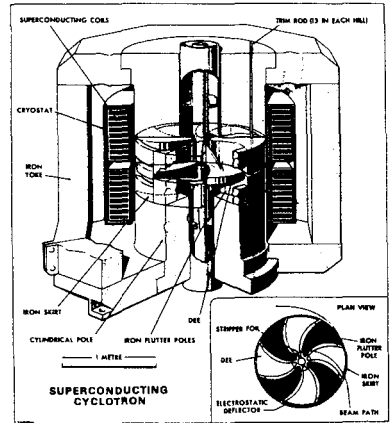
	Accelerated Ions	E/A (MeV/u)	Current (part μ A)	
			Internal	External
(a)	³ He	50		$7. \times 10^{-3}$
(b)	⁶ Li	50		$4.7. \times 10^{-3}$
(c)	¹² C	50		$23. \times 10^{-3}$
(d)	¹²⁷ I	19		$1.5. \times 10^{-3}$
Secondary Beams				
(e)	¹⁹⁷ Au	14		$0.2. \times 10^{-3}$
(f)	²³⁸ U	3.3		$0.2. \times 10^{-3}$

EXTRACTED BEAM PROPERTIES:
 For 0.1 μ A of 127 MeV/u I ions
 $\Delta E/E$ 0.3 % $\Delta \phi$ 3
 $\epsilon_n = \beta\gamma\epsilon \times 0.7 \pi$ mm mrad z 0.6 π mm mrad

FACILITIES FOR RESEARCH
 SHIELDED AREA: Fixed: m² Moveable m²
 Target Stations: 9 No. Served At Same Time: 1
MAGNETIC SPECTROMETERS: Q3D
OTHER FACILITIES: 8- π high spin spectrometer
 ISOL on-line isotope separator
 Atomic physics particle physics, scattering chambers,
 AMS, SEE, Penning trap

REFERENCES/NOTES
 (a) H. Schmeing, et al., Proc. 12th Int. Conf. on
 (b) Cyclotrons and Their Applications, Berlin, 1989

PLAN VIEW OF FACILITY, COMMENTS



"The TASCC accelerator facility was shut down 1997/03/31, for lack of funds, and subsequently dismantled"