ENTRY NO. 7

NAME OF MACHINE: TASCC (Tandem Accelerator SuperConducting Cyclotron)

INSTITUTION: Atomic Energy of Canada Limited

ADDRESS: Chalk River Nuclear Laboratories, Chalk River, Ontario, Canada K0J 1J0

TEL: 613-584-3311 TELEX: 053-34555

IN CHARGE: J.C. Hardy REPORTED BY: J.A. Hulbert

HISTORY AND STATUS

DESIGN, date: 1973 Model tests: 1974-1978

ENG DESIGN, date: 1974-1982

CONSTRUCTION, date: 1978-1984

FIRST BEAM, date (or goal): September 1985

MAJOR ALTERATIONS:

COST, ACCELERATOR: $2.4 M Canadian

COST, FACILITY, total: $12 M Canadian

FUNDED BY: Atomic Energy of Canada Limited

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS: 3 ENGINEERS: 8

TECHNICIANS: 8 CRAFTS/OPS: 15

GRAD STUDENTS involved during year:

OPERATED BY: Research staff or Operators

OPERATION: 80 hr/wk. On target: 50-75 hr/wk

TIME DISTR. in house: %, outside: %

BUDGET, op & dev:

FUNDED BY:

RESEARCH STAFF, not included above

USERS, in house: 14 outside: 6-16 at a time

GRAD STUDENTS involved during year:

RESEARCH BUDGET, in house:

FUNDED BY:

MAGNET

POLE FACE, diameter (compact): 138.6 cm, R-extraction: 65 cm

R injection: 14.5 cm - 22 cm

GAP, min: 3.7 cm, Field: 60 kG
max: 64 cm, Field: 43 kG } at 5.4 x 10^6 Ampere turns

AVERAGE FIELD at R ext: 50 kG

B max/<B>: 1.2 - 1.7

NUMBER OF SECTORS: compact: 4, separated: Spiral, max: 50 deg

SECTOR ANGLE (SSC): deg

TRIMMING COILS: 13 saturated iron trim rods in each flutter pole

CONDUCTOR, material and type: Nb-Ti

STORED ENERGY (cryogenic): 22 MJ

POWER: main coils: max kW: current stability
trimming coils: max kW: current stability

WEIGHT: Fe: 170 tons: coils: 10 tons

COOLING system: Liquid helium bath

ION ENERGY (Bending limit) E/A = 520 q^2/A^2 MeV/amu
(Focusing limit) E/A = 100 q/A MeV/amu

ACCELERATION SYSTEM

DEES, number: 4 angle: ~40 deg

BEAM APERTURE: 2 cm; DC Bias: 0 kV

TUNED by, coarse: sliding short fine: variable capacitors

RF: 31 to 62 MHz, stable ±: 1 in 10^6

Orb F: 5.9 to 23.4 MHz

HARMONICS, RF/Orb F, used: 2, 4, 6

DEE–Gnd, max: 100 kV, min gap: 3 cm

STABILITY, (pk-pk noise)/(pk RF volt): $1/10^4$

ENERGY GAIN, max: 800 q keV ~~xxx~~/turn

RF PHASE, stable to ±: deg

RF POWER input, max.: 100 kW

FREQUENCY MODULATION, rate: /s

modulator, type:

beam pulse, width:

VACUUM SYSTEM

OPERATING PRESSURE: Torr or mbar

PUMPS, No, Type, Size: Two cryopanels 1500 L/s each

ION SOURCES

13 MeV Van de Graaff

INJECTION SYSTEM

Carbon stripper after radial injection

EXTRACTION SYSTEM Orbit perturbation, electrostatic deflector, superconducting magnetic channel

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed: m^2; movable: m^2

TARGET STATIONS: 4 in 1 rooms

STATIONS served at same time, max: 1

MAG SPECTROGRAPH, type: Q3D (accessible after Phase II construction)

COMPUTER model: Perkin Elmer

OTHER FACILITIES: 8π spectrometer

Research facilities funded for Phase II upgrade

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pμA) Internal	External
C^{12}	600			
U^{238}	2370			
I^{127}		1270	3.5 pnA	2 pnA
I^{127}		710	5 pnA	3.5 pnA
SECONDARY			(part/s)	

BEAM PROPERTIES

MEASURED		CONDITIONS			
PULSE WIDTH: RF deg		pμA of: MeV			ions
PHASE EXC. max: RF deg		pμA of: MeV			ions
EXTRACT eff: 58 %	0.0035	pμA of 1270 MeV	^{127}I		ions
RESOL ΔE/E: 0.05 %	0.002	pμA of 710 MeV	^{127}I		ions
EMITTANCE					
(π mm-mrad) 0.7 axial, 0.6 rad	0.003	pμA of 1270 MeV	^{127}I		

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS: SOLID STATES PHYSICS:

BIOMEDICAL APPLICAT.: ISOTOPE PRODUCTIONS:

REFERENCES/NOTES

1) J.A. Hulbert, et al., These proceedings.
2)

PLAN VIEW OF FACILITY, COMMENTS, ETC.