**ENTRY NO.** 6

NAME OF MACHINE Chalk River Superconducting Cyclotron

INSTITUTION Atomic Energy of Canada Limited

ADDRESS Chalk River, Ontario, Canada

TEL 613-584-3311 TELEX 053-34555

IN CHARGE J.H. Ormrod REPORTED BY J.H. Ormrod

**HISTORY AND STATUS**

DESIGN, date 1973 Model tests 1974-1978

ENG DESIGN, date 1974-1982

CONSTRUCTION, date 1978 (Magnet and Rf Structure)

FIRST BEAM, date (or goal) 1984

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 ENGINEERS

TECHNICIANS CRAFTS

GRAD STUDENTS involved during year

OPERATED BY Research staff or Operators

OPERATION hr/wk. On target hr./wk

TIME DISTR. in house % Outside %

BUDGET, op & dev

FUNDED BY

**RESEARCH STAFF,** not included above

USERS, in house outside

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 14.5-22 cm

GAP, min 3.7 cm, Field 60 kG

max ~~xxx~~ 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 Spiral, max 50 deg

separated

SECTOR ANGLE (SSC) deg

TRIMMING COILS 13 trim rods per 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 3.2 cm; DC Bias 0 kV

TUNED by, coarse sliding short fine variable capacitor

RF 31 to 62 mHz, stable ± 1/$10^6$

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 25,000 kV/turn

RF PHASE, stable to ± deg

RF POWEP input, max 100 kW

FREQUENCY MODULATION, rate /s

modulator, type

beam pulse, width

**VACUUM SYSTEM**

OPERATING PRESSURE 5 x $10^{-7}$ Torr or mbar

PUMPS, No, Type, Size 2 cryopanels @ 1500 L/s each

**ION SOURCES**

13 MV tandem Van de Graaff

**INJECTION SYSTEM**

Carbon stripper after radial injection

**EXTRACTION SYSTEM** Orbit perturbation, electrostatic deflector, magnetic channel

**FACILITIES FOR RESEARCH**

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

TARGET STATIONS in

STATIONS served at same time, max

MAG SPECTROGRAPH, type

COMPUTER model

OTHER FACILITIES

**CHARACTERISTIC BEAMS**

| PARTICLE | ENERGY (MeV) Goal | Achieved | CURRENT (pμA) Internal | External |
|---|---|---|---|---|
| $C^{12}$ | 600 | | | 0.200 |
| $U^{238}$ | 2380 | | | 0.004 |
| | | | | |
| SECONDARY | | (part/s) | | |

**BEAM PROPERTIES**

| MEASURED | CONDITIONS |
|---|---|
| PULSE WIDTH .....RF deg | ..... pμ A of ..... MeV ..... ions |
| PHASE EXC. max .....RF deg | ..... pμ A of ..... MeV ..... ions |
| EXTRACT eff .....% | ..... pμ A of ..... MeV ..... ions |
| RESOL ΔE/E .....% | ..... pμ A of ..... MeV ..... ions |
| EMITTANCE ($\pi$ mm. mrad) .....axial | ..... pμ A of ..... MeV ..... |
| .....rad | |

**OPERATING PROGRAMS,** time distribution

BASIC NUCLEAR PHYSICS ..... SOLID STATES PHYSICS.....

BIOMEDICAL APPLICAT..... ISOTOPE PRODUCTIONS.....

**REFERENCES/NOTES**

1) J.H. Ormrod et al. (these proceedings)

2)

**PLAN VIEW OF FACILITY, COMMENTS, ETC.**