ENTRY NO. 49

NAME OF MACHINE NAC Light-ion Injector DATE 24/7/78

INSTITUTION National Accelerator Centre

ADDRESS P O Box 320, Stellenbosch 7600, South Africa

IN CHARGE G Heymann REPORTED by A H Botha

HISTORY AND STATUS

DESIGN, date 1978 MODEL tests

ENG. DESIGN, date 1978 - 1982

CONSTRUCTION, date 1980 - 1983

FIRST BEAM date (or goal) Goal - Jan. 1984

MAJOR ALTERATIONS

OPERATION, hr/wk; On Target hr/wk

TIME DIST., in house %, outside %

USERS' SCHEDULING CYCLE weeks

COST, ACCELERATOR

COST, FACILITY, total

FUNDED BY CSIR

ACCELERATOR STAFF, OPERATION and DEVELOPMENT

SCIENTISTS 2 ENGINEERS 2

TECHNICIANS CRAFTS

GRAD STUDENTS involved during year

OPERATED BY Res staff or Operators

BUDGET, op & dev

FUNDED BY

RESEARCH STAFF, not included above

USERS, in house outside

GRAD STUDENTS involved during year

RES. BUDGET, in house

FUNDED BY

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed m^2

movable m^2

TARGET STATIONS in rooms

STATIONS served at same time, max

MAG SPECTROGRAPH, type

COMPUTER, model

OTHER FACILITIES

REFERENCES/NOTES

MAGNET

POLE FACE diameter 112 cm; R extraction 47,6 cm

GAP, min 15 cm; Field 10,4 kG
max 25 cm; Field 6,24 kG
} at 0,128 x 10^6 ampere turns

AVERAGE FIELD at R ext 8,6 kG

CURRENT STABILITY 100 parts/10^6; $B_{max}/\langle B \rangle$ 1,21

NUMBER OF SECTORS 4 ; SPIRAL, max 0 deg

POLE FACE COIL PAIRS: AVF 0 /sec;
Harmonic correction 4

Rad grad /sec or Circ coils 1

WEIGHT: Fe 32 tons; Coils 1,97 tons

CONDUCTOR, Material and type Copper

STORED ENERGY 0,06 MJ

COOLING SYSTEM Demineralized water

POWER: Main coils 17,4 max, kW
Trimming coils max, kW

YOKE/POLE AREA 90 %

SECTOR ANGLE (Sep Sec) - deg

ION ENERGY (Bending limit) E/A = 8 q^2/A^2 MeV
(Focusing limit) E/A = 8 q/A MeV

ACCELERATION SYSTEM

DEES, number 2 angle 90 deg

BEAM APERTURE 4 cm; DC BIAS 0 kV

TUNED by, coarse Short.Pl. fine Trim. Cap.

RF 7.5 to 26 mHz, stable ± 10 /10^6

Orb F 1.25 to 13 mHz; GAIN, max 280 kV/turn

HARMONICS, RF/Orb F, used 2,6

DEE-Gnd, max 70 kV, min gap cm

STABILITY, (pk-pk noise)/(pk RF volt)

RF PHASE stable to ± deg

RF POWER input, max 40 kW

RF PROTECT circuit, speed μsec
Type

FREQUENCY MODULATION, rate 0 /sec
MODULATOR, type -
BEAM PULSE, width -

VACUUM SYSTEM

PUMPS, No., Type, Size

OPERATING PRESSURE μTorr,

PUMPDOWN TIME hrs

ION SOURCES/INJECTION SYSTEM

EXTRACTION SYSTEM

CONTROL SYSTEM

ENTRY NO. 49 (cont.)

CHARACTERISTIC BEAMS

	Particle	Goal (MeV)	Achieved (MeV)
ENERGY	p	0,8-8	
	d	0,4-4	
	α	0,8-8	
	N^{3+}	1-5	
CURRENT		(μA)	(μA)
Internal			
External	p	100	
	d	100	
	$^{3}He, ^{4}He$	50	
		(part/s)	(part/s)
Secondary	-	-	-

BEAM PROPERTIES

	Measured	Conditions
Pulse Width	____ RF deg	____μA of ____ MeV ____
Phase Exc, max	____ RF deg	____μA of ____ MeV ____
Extract Eff	____ %	____μA of ____ MeV ____
Res, ΔE/E	____ %	____μA of ____ MeV ____

Emittance

(mm-mrad) { ____ axial / ____ radial } ____ μA of ____ MeV ____

OPERATING PROGRAMS, time dist

Basic Nuclear Physics ____ %
Solid State Physics ____ %
Bio-Medical Applications ____ %
Isotope Production ____ %
Development ____ %
____ %
____ %

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, OPERATION SUMMARY, ADDITIONAL REFERENCES

Will be used as an injector for 200 MeV separated-sector cyclotron of the South African National Accelerator Centre.