ENTRY No. 81

NAME OF MACHINE NEN Cyclotron 1 DATE 06 July 1981
INSTITUTION New England Nuclear Corporation
ADDRESS 601 Treble Cove Road, N. Billerica, MA (USA)
TEL (617) 667-9531 TELEX 947126-NENNMTC
IN CHARGE J. L. Need REPORTED BY J. L. Need

HISTORY AND STATUS Built by the Cyclotron Corp.
DESIGN, date ..... Model tests .....
ENG DESIGN, date .....
CONSTRUCTION, date March 70
FIRST BEAM, date (or goal) July 70
MAJOR ALTERATIONS None
COST, ACCELERATOR .....
COST, FACILITY, total .....
FUNDED BY New England Nuclear Corporation

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT
SCIENTISTS 1 ENGINEERS 1
TECHNICIANS 2 CRAFTS 2
GRAD STUDENTS involved during year None
OPERATED BY ..... Research staff or X Operators
OPERATION 90 hr/wk, On target 87 hr/wk
TIME DISTR. in house 100 %, Outside ..... %
BUDGET, op & dev .....
FUNDED BY New England Nuclear Corporation

RESEARCH STAFF, not included above None
USERS, in house ..... outside .....
GRAD STUDENTS involved during year .....
RESEARCH BUDGET, in house .....
FUNDED BY .....

MAGNET
POLE FACE, diameter (compact) 96.6 cm, R extraction 43 cm
R injection ..... cm
GAP, min 5.1 cm, Field 21.0 kG
max 10.2 cm, Field 13.5 kG
} at 14 x 10^6 Ampere turns
AVERAGE FIELD at R ext 16.5 kG
B max/ <B> 1.22
NUMBER OF SECTORS { compact 3 / separated ..... } Spiral, max 5 deg
SECTOR ANGLE (SSC) ..... deg
TRIMMING COILS Outer harmonic only, one per sector
CONDUCTOR, material and type Strap copper
STORED ENERGY (cryogenic) - - - MJ
POWER : main coils 45 max, kW ; current stability .....
trimming coils 0.5 max, kW ; current stability .....
WEIGHT : Fe 19.5 tons ; coils 2.5 tons
COOLING system Deionized water
ION ENERGY (bending limit) E/A = - - - q^2/a^2 MeV/amu
(focusing limit) E/A = - - - q /a MeV/amu

ACCELERATION SYSTEM
DEES, number 2 ; angle 90 deg
BEAM APERTURE 2.5 cm ; DC Bias 2.5 kV
TUNED by, coarse Tap bars fine panels
RF 25.0 to 12.7 mHz, stable ± .....
Orb F 25.0 to 12.7 mHz
HARMONICS, RF/Orb F, used 1st
DEE - Gnd, max 30 kV, min gap 40 cm
STABILITY, (pk-pk noise)/(pk RF volt) - - -
ENERGY GAIN, max ..... kV/turn
RF PHASE, stable to ± - - - deg
RF POWER input, max 55 kW
FREQUENCY MODULATION, rate None /s
modulator, type .....
beam pulse, width .....

VACUUM SYSTEM
OPERATING PRESSURE 10-20 Torr or mbar
PUMPS, No, Type, Size 1, 10" oil diffusion

ION SOURCES
Cold cathode radial

INJECTION SYSTEM

EXTRACTION SYSTEM
Electrostatic deflector - Magnetic channel

FACILITIES FOR RESEARCH None
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 .....

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (μA) Internal	External
p	22	22	200	60
d	12.5	~12.5	200	100
3HE	30	33	200	90
α	25	25	200	100

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	75 %	50	pμ A of	22 MeV	p ions
RESOL ΔE/E	16 %	5	μ A of	22 MeV	p ions

EMITTANCE
(π mm. mrad) { axial / rad } pμA of MeV ions

OPERATING PROGRAMS, time distribution
BASIC NUCLEAR PHYSICS .. SOLID STATES PHYSICS ....
BIOMEDICAL APPLICAT. .... ISOTOPE PRODUCTIONS 95
MACHINE DEVELOPMENT 5

REFERENCES/NOTES

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS