

ENTRY No. 84

NAME OF MACHINE NEN Cyclotron 4 DATE 06 July 1981
INSTITUTION New England Nuclear Corporation
ADDRESS 601 Treble Cove Rd., N. Billerica, MA (USA)
TEL (617) 667-9531 TELEX 947126-NENNMTG
IN CHARGE J. L. Need REPORTED BY J. L. Need

HISTORY AND STATUS Designed & built by the
DESIGN, date Cyclotron Corp. Model tests
ENG DESIGN, date
CONSTRUCTION, date Dec. 79
FIRST BEAM, date (or goal) July 80
MAJOR ALTERATIONS Center Region,
Ion Source Drive; Beam Probe & Drive
COST, ACCELERATOR
COST, FACILITY, total
FUNDED BY New England Nuclear Corporation

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT
SCIENTISTS 1 ENGINEERS 1
TECHNICIANS 1 CRAFTS 1
GRAD STUDENTS involved during year None
OPERATED BY Research staff or Operators
OPERATION 90 hr/wk, On target 85 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) 96.52cm, R extraction 41.9cm
R injection cm
GAP, min 5.08 cm, Field 22.5 kG }
max 10.16 cm, Field 14.4 kG } at .26 x .106
AVERAGE FIELD at R ext 17.5 kG } Ampere turns
B max/ 1.28

NUMBER OF SECTORS { compact 3 } Spiral, max deg
separated

SECTOR ANGLE (SSC) deg
TRIMMING COILS Inner and outer harmonic coils, one
per sector
CONDUCTOR, material and type Hollow copper
STORED ENERGY (cryogenic) MJ
POWER: main coils 51 max, kW ; current stability
trimming coils 1.2 max, kW ; current stability
WEIGHT: Fe 22.5 tons ; coils 2 tons
COOLING system Deionized water
ION ENERGY (bending limit) E/A = q²/a² MeV/amu
(focusing limit) E/A = .26 q /a MeV/amu

ACCELERATION SYSTEM
DEES, number 2 ; angle 81 deg
BEAM APERTURE 1.9 cm ; DC Bias 2.5 kV
TUNED by, coarse shorting bar, fine capacitor
RF 26.943 to MHz, stable ±
Orb F 26.943 to MHz
HARMONICS, RF/Orb F, used 1st
DEE - Gnd, max 34 kV, min gap 1 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
Pigs. cold cathode, radial

INJECTION SYSTEM

EXTRACTION SYSTEM

None
FACILITIES FOR RESEARCH None
SHIELDED AREA, fixed m² ; movable m²
TARGET STATIONS in rooms
STATIONS served at same time, max
MAG SPECTROGRAPH, type
COMPUTER model
OTHER FACILITIES

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (μA)	
	Goal	Achieved	Internal	External
p	26.1	26.1	600	

SECONDARY (part/s)

BEAM PROPERTIES

MEASURED CONDITIONS
PULSE WIDTH RF deg μA of MeV ions
PHASE EXC, max RF deg μA of MeV ions
EXTRACT eff % μA of MeV ions
RESOL ΔE/E % μA of MeV ions
EMITTANCE

(π mm. mrad) { axial } μA of MeV ions
rad

OPERATING PROGRAMS, time distribution
BASIC NUCLEAR PHYSICS .. SOLID STATES PHYSICS ..
BIOMEDICAL APPLICAT. .. ISOTOPE PRODUCTIONS 90
MACHINE DEVELOPMENT .. 10

REFERENCES/NOTES

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS