

ENTRY NO. 74

NAME OF MACHINE NEN Cyclotron 4 DATE 30 Jan 1979
INSTITUTION New England Nuclear Corporation
ADDRESS 601 Treble Cove Rd., N. Billerica, MA

IN CHARGE J. L. Need REPORTED by J. L. Need

HISTORY AND STATUS Designed & built by The Cyclotron Corp.
DESIGN, date _____ MODEL tests _____
ENG. DESIGN, date _____
CONSTRUCTION, date Dec. 79
FIRST BEAM date (or goal) Feb. 80
MAJOR ALTERATIONS None

OPERATION, 90 hr/wk; On Target 85 hr/wk
TIME DIST., in house 100 %, outside _____ %
USERS' SCHEDULING CYCLE 1 weeks
COST, ACCELERATOR _____
COST, FACILITY, total _____
FUNDED BY New England Nuclear Corp.

ACCELERATOR STAFF, OPERATION and DEVELOPMENT

SCIENTISTS 1 ENGINEERS 1
TECHNICIANS 2 CRAFTS 2
GRAD STUDENTS involved during year None
OPERATED BY _____ Res staff or Operators
BUDGET, op & dev _____
FUNDED BY _____

RESEARCH STAFF, not included above None

USERS, in house _____ outside _____
GRAD STUDENTS involved during year _____
RES. BUDGET, in house _____
FUNDED BY _____

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 _____

REFERENCES/NOTES

MAGNET

POLE FACE diameter 96.52 cm; R extraction 41.9 cm
GAP, min 5.08 cm; Field 22.5 kG } at .26 x 10⁶
max 10.16 cm; Field 14.4 kG } ampere turns
AVERAGE FIELD at R ext 17.5 kG
CURRENT STABILITY 10 parts/10⁶; B_{max}/(B) 1.28
NUMBER OF SECTORS 3; SPIRAL, max _____ deg
POLE FACE COIL PAIRS: AVF None /sec;
Harmonic correction 2/sector - inner & outer
Rad grad None /sec or Circ coils None
WEIGHT: Fe 22.5 tons; Coils 2 tons
CONDUCTOR, Material and type Hollow copper
STORED ENERGY _____ MJ
COOLING SYSTEM Deionized water
POWER: Main coils 51 max, kW
Trimming coils 1.2 max, kW
YOKE/POLE AREA 111 %
SECTOR ANGLE (Sep Sec) -- deg
ION ENERGY (Bending limit) E/A = _____ q²/A² MeV
(Focusing limit) E/A = 26 q/A MeV

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 ± -- /10⁶
Orb F " to -- mHz; GAIN, max 25 kV/turn
HARMONICS, RF/Orb F, used 1st
DEE-Gnd, max 34 kV, min gap 1 cm
STABILITY, (pk-pk noise)/(pk RF volt) --
RF PHASE stable to ± -- deg
RF POWER input, max 55 kW
RF PROTECT circuit, speed 5 μsec
Type Clamps pass tube grid
FREQUENCY MODULATION, rate None /sec
MODULATOR, type _____
BEAM PULSE, width _____

VACUUM SYSTEM

PUMPS, No., Type, Size 1-10" oil diffusion
OPERATING PRESSURE 10-20 μTorr,
PUMPDOWN TIME 1 hrs

ION SOURCES/INJECTION SYSTEM

Pig, cold cathode, radial

EXTRACTION SYSTEM

None

CONTROL SYSTEM

Manual

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CHARACTERISTIC BEAMS

	Particle	Goal (MeV)	Achieved (MeV)
ENERGY	<u>p</u>	<u>26.1</u>	<u>26.1</u>
	_____	_____	_____
	_____	_____	_____
CURRENT		(μ A)	(μ A)
Internal	<u>p</u>	<u>100</u>	<u>450</u>
	_____	_____	_____
	_____	_____	_____
External	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
Secondary	_____	(part/s)	(part/s)
	_____	_____	_____
	_____	_____	_____

BEAM PROPERTIES

	Measured	Conditions
Pulse Width	_____ RF deg	_____ μ A of _____ MeV
Phase Exc, max	_____ RF deg	_____ μ A of _____ MeV
Extract Eff	_____ %	_____ μ A of _____ MeV
Res, $\Delta E/E$	_____ %	_____ μ A of _____ MeV
Emittance		
	(mm-mrad) { _____ axial }	_____ μ A of _____ MeV
	{ _____ radial }	

OPERATING PROGRAMS, time dist

Basic Nuclear Physics	_____ %
Solid State Physics	_____ %
Bio-Medical Applications	_____ %
Isotope Production	<u>90</u> %
Development	<u>10</u> %
_____	_____ %
_____	_____ %

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