ENTRY NO. 95

NAME OF MACHINE: NEN Cyclotron 4 — DATE: 30 April 1984
INSTITUTION: E. I. DuPont
ADDRESS: 331 Treble Cove Road, N. Billerica, MA (USA)
TEL: (617) 667-9531 — TELEX: 947126-NENNMTC
IN CHARGE: R. Garniewicz — REPORTED BY: F. Buck

HISTORY AND STATUS

Designed and Built by the Cyclotron Corp.

DESIGN, date ... Model tests ...
ENG DESIGN, date ...
CONSTRUCTION, date ... December 79 ...
FIRST BEAM, date (or goal) ... Jult 80 ...
MAJOR ALTERATIONS ... None ...
COST, ACCELERATOR ...
COST, FACILITY, total ...
FUNDED BY ... E. I. DuPont ...

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS ... ENGINEERS ...
TECHNICIANS ... CRAFTS ...
GRAD STUDENTS involved during year ... None ...
OPERATED BY ... Research staff or ... X ... Operators
OPERATION ... 100 ... hr/wk. On target ... hr/wk
TIME DISTR. in house ... 100 ... %, outside ... %
BUDGET, op & dev ...
FUNDED BY ... E.I. DuPont ...

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) 96.52 ... cm, R-extraction 41.9 ... cm
R injection ... cm
GAP, min 5.08 cm, Field 22.5 ... kG
max 10.16 m, Field 14.4 ... kG } at ... 26×10^6 ... Ampere turns
AVERAGE FIELD at R ext ... 17.5 ... kG
B max/<B> ... 1.28 ...
NUMBER OF SECTORS { compact 3 / separated ... } Spiral, max ... deg
SECTOR ANGLE (SSC) ... deg
TRIMMING COILS ... Inner and outer harmonic coils, one per secotr ...
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 = ... q^2/A^2 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 ... 26.9 ... to ... MHz, stable ± ...
Orb F ... 26.9 ... 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 Micro ... Torr or mbar
PUMPS, No, Type, Size ... 1-10" oil diffusion ...

ION SOURCES

... Pig, cold cathode, radial ...

INJECTION SYSTEM

EXTRACTION SYSTEM

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 ...

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	ENERGY (MeV) Achieved	CURRENT (pμA) Internal	CURRENT (pμA) External
p	26	26	200	
SECONDARY			(part/s)	

BEAM PROPERTIES

MEASURED		CONDITIONS			
PULSE WIDTH	RF deg	pμA of	MeV	ions	
PHASE EXC. max	RF deg	pμA of	MeV	ions	
EXTRACT eff	%	pμA of	MeV	ions	
RESOL ΔE/E	%	pμA of	MeV	ions	
EMITTANCE					
(π mm-mrad)	axial	pμA of	MeV		
	rad				

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS ... SOLID STATES PHYSICS ...
BIOMEDICAL APPLICAT. ... ISOTOPE PRODUCTIONS ... 100 ...

REFERENCES/NOTES

1)
2)

PLAN VIEW OF FACILITY, COMMENTS, ETC.