ENTRY NO. 82

NAME OF MACHINE Biomedical Cyclotron DATE 7-10-78

INSTITUTION University of California - Center for the Health Sciences

ADDRESS ~~Los Angeles, CA 90024~~

IN CHARGE N.S. MacDonald, Ph.D. REPORTED by N.S. MacDonald, Ph.D.

HISTORY AND STATUS

DESIGN, date Comercial (Cyclotron Corp;CS-22) MODEL tests --

ENG. DESIGN, date 1970

CONSTRUCTION, date --

FIRST BEAM date (or goal) --

MAJOR ALTERATIONS 3-15-71

None

OPERATION, 50 hr/wk; On Target 24 hr/wk

TIME DIST., in house 100 %, outside 0 %

USERS' SCHEDULING CYCLE -- weeks

COST, ACCELERATOR --

COST, FACILITY, total &700,000

FUNDED BY AEC, University

ACCELERATOR STAFF, OPERATION and DEVELOPMENT

SCIENTISTS 1 ENGINEERS 2

TECHNICIANS 2 CRAFTS --

GRAD STUDENTS involved during year 1

OPERATED BY X Res staff or Operators

BUDGET, op & dev --

FUNDED BY DOE

RESEARCH STAFF, not included above

USERS, in house 3 outside 2

GRAD STUDENTS involved during year 1

RES. BUDGET, in house --

FUNDED BY DOE

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed -- m^2

movable none m^2

TARGET STATIONS 1 in 1 rooms

STATIONS served at same time, max 1

MAG SPECTROGRAPH, type --

COMPUTER, model --

OTHER FACILITIES

isotope production yes

irradiaton,solid state yes

Biological no

tim e-of-flight no

REFERENCES/NOTES

MAGNET

POLE FACE diameter 97 cm; R extraction 81 cm

GAP, min 5 cm; Field 20 kG } at 0.2 X 10^6 ampere turns

max 10 cm; Field 12 kG }

AVERAGE FIELD at R ext 16 kG }

CURRENT STABILITY ±30 parts/10^6; $B_{max}/\langle B \rangle$ 1.25

NUMBER OF SECTORS 3 ; SPIRAL, max 60 deg

POLE FACE COIL PAIRS: AVF 3 -- /sec;

Harmonic correction --

Rad grad --/sec or Circ coils

WEIGHT: Fe 24 tons; Coils tons

CONDUCTOR, Material and type

STORED ENERGY MJ

COOLING SYSTEM

POWER: Main coils 30KW max, kW

Trimming coils max, kW

YOKE/POLE AREA 100 %

SECTOR ANGLE (Sep Sec) deg

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

(Focusing limit) E/A = q/A MeV

Penning Cold Cathode

ACCELERATION SYSTEM

DEES, number 2 angle 180 deg

BEAM APERTURE 4 cm; DC BIAS 2.5 kV

TUNED by, coarse straps fine vc auto

RF 12 to 25 mHz, stable ± 10 /10^6

Orb F -- to -- mHz; GAIN, max -- kV/turn

HARMONICS, RF/Orb F, used --

DEE-Gnd, max 25 kV, min gap 1 cm

STABILITY, (pk-pk noise)/(pk RF volt) 17./12kv

RF PHASE stable to ± -- deg

RF POWER input, max 150 kW

RF PROTECT circuit, speed -- μsec

Type ign. crowbar

FREQUENCY MODULATION, rate /sec

MODULATOR, type

BEAM PULSE, width

VACUUM SYSTEM

PUMPS, No., Type, Size

OPERATING PRESSURE μTorr,

PUMPDOWN TIME hrs

ION SOURCES/INJECTION SYSTEM

Penning Cold Cathode

EXTRACTION SYSTEM

dc electrostatic, mag. channel

CONTROL SYSTEM

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CHARACTERISTIC BEAMS

	Particle	Goal (MeV)	Achieved (MeV)
ENERGY	p	22.1	22.1
	d	12.2	12.2
	^{3}He	31.6	31.6
CURRENT		24.6 (μA)	24.6 (μA)
Internal	p	200	100
	d	200	750
	^{3}He	100	90
External	α	100	95
	p		52
	d		75
	^{3}He		50
	α	(part/s)	(part/s) 55
Secondary			

BEAM PROPERTIES

	Measured	Conditions
Pulse Width	____ RF deg	____ μA of ____ MeV ____
Phase Exc, max	____ RF deg	____ μA of ____ MeV ____
Extract Eff	60-70 %	100 μA of 22 MeV H^+
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 100 %
Development ____ %
____ %
____ %

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

Principal Use: Preparing radionuclides for the nuclear medicine clinic of the hospital, and for research in biology and medicine

Quantitative analyses of Oxygen-18 in small water samples of biological origin by proton activation to Fluorine-18 are routine.