

ENTRY NO. 104

NAME OF MACHINE W.U. Med. School Cyclotron I  
INSTITUTION Washington University Medical School, Barnard Hospital  
ADDRESS St. Louis, Missouri, 63110 U.S.A.  
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IN CHARGE J. T. Hood, Director. REPORTED BY John T. Hood

M. M. Ter-Pogossian, Professor of Radiation Sciences

#### HISTORY AND STATUS

DESIGN, date 1962 Model tests  
ENG DESIGN, date 1963  
CONSTRUCTION, date 1963-64 Allis-Chalmers  
FIRST BEAM, date (or goal) 1964  
MAJOR ALTERATIONS

COST, ACCELERATOR \$120,000  
COST, FACILITY, total \$190,000  
FUNDED BY NTH

#### ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS 2 ENGINEERS 1  
TECHNICIANS 2 CRAFTS 2  
GRAD STUDENTS involved during year  
OPERATED BY Research staff or x Operators  
OPERATION hr/wk. On target hr/wk  
TIME DISTR. in house % Outside %  
BUDGET, op & dev  
FUNDED BY NTH

#### RESEARCH STAFF, not included above

USERS, in house 6 outside  
GRAD STUDENTS involved during year 2  
RESEARCH BUDGET, in house  
FUNDED BY NTH

#### MAGNET

Classical  
POLE FACE, diameter (compact) .81 cm, R extraction .33 cm  
R injection cm  
GAP, min cm, Field kG }  
min cm, Field kG } at  
AVERAGE FIELD at R ext 15 kG } Ampere turns  
B max/ < B >  
NUMBER OF SECTORS { compact } Spiral, max deg  
{ separated }  
SECTOR ANGLE (SSC) deg  
TRIMMING COILS

CONDUCTOR, material and type Copper, Hollow Conductor  
STORED ENERGY (cryogenic) MJ  
POWER: main coils 40 max, kW; current stability  
trimming coils max, kW; current stability  
WEIGHT: Fe tons; coils tons  
COOLING system water  
ION ENERGY (bending limit) E/A = q<sup>2</sup>/a<sup>2</sup> MEV/amu  
(focusing limit) E/A = q/a MeV/amu

#### ACCELERATION SYSTEM

DEES, number 1 180 deg  
BEAM APERTURE 2.5 cm; DC Bias 0 kV  
TUNED by, coarse fine  
RF 11.4 to MHz, stable ±  
Orb F to MHz  
HARMONICS, RF/Orb F, used  
DEE-Gnd, max kV, min gap cm  
STABILITY, (pk-pk noise)/(pk RF volt)  
ENERGY GAIN, max kV/turn  
RF PHASE, stable to ± deg  
RF POWER input, max 2.5 kW  
FREQUENCY MODULATION, rate /s  
modulator, type  
beam pulse, width

#### VACUUM SYSTEM

OPERATING PRESSURE 20 μ Torr or mbar  
PUMPS, No, Type, Size 2-oil diffusion  
Seven inch

#### ION SOURCES

Hot Filament

#### INJECTION SYSTEM

#### EXTRACTION SYSTEM

Electrostatic and Magnetic Channel

#### FACILITIES FOR RESEARCH

SHIELDED AREA, fixed m<sup>2</sup>; movable m<sup>2</sup>  
TARGET STATIONS 1 in 1  
STATIONS served at same time, max  
MAG SPECTROGRAPH, type  
COMPUTER model  
OTHER FACILITIES

#### CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (pμA)	
	Goal	Achieved	Internal	External
d		6.8		80
SECONDARY (part/s)				

#### BEAM PROPERTIES

MEASURED	CONDITIONS	
	RF deg	MeV ions
PULSE WIDTH	pμ A of	MeV ions
PHASE EXC. max	pμ A of	MeV ions
EXTRACT eff	pμ A of	MeV ions
RESOL ΔE/E	pμ A of	MeV ions
EMITTANCE (π mm. mrad) { axial } { rad }	pμ A of	MeV ions

#### OPERATING PROGRAMS, time distribution

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

#### REFERENCES/NOTES

- 1)
- 2)

#### PLAN VIEW OF FACILITY, COMMENTS, ETC.