ENTRY NO. 67

NAME OF MACHINE: AMERSHAM INTERNATIONAL SECOND CYCLOTRON

INSTITUTION: AMERSHAM INTERNATIONAL

ADDRESS: WHITE LION ROAD, AMERSHAM, BUCKS, ENGLAND

TEL: (02404) 4444 TELEX: ACTIVA G

IN CHARGE: DEWI M LEWIS REPORTED BY: DEWI M LEWIS

HISTORY AND STATUS

DESIGN, date: 1977 Model tests: -

ENG DESIGN, date: -

CONSTRUCTION, date: 1979-1981

FIRST BEAM, date (or goal): September 1981

MAJOR ALTERATIONS: Control system
Extraction system 1982/83

COST, ACCELERATOR: approx US$2m

COST, FACILITY, total: -

FUNDED BY: Amersham International

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS: 3 ENGINEERS: 5

TECHNICIANS: 6 CRAFTS: -

GRAD STUDENTS involved during year: -

OPERATED BY: - Research staff or: - Operators

OPERATION: - hr/wk. On target: - hr./wk

TIME DISTR. in house: - % Outside: - %

BUDGET, op & dev: -

FUNDED BY: Amersham International Medical Products Division

RESEARCH STAFF, not included above

USERS, in house: - outside: -

GRAD STUDENTS involved during year: -

RESEARCH BUDGET, in house: -

FUNDED BY: -

MAGNET

POLE FACE, diameter (compact) 120 cm, R extraction 53 cm

R injection - cm

GAP, min 5 cm, Field 24 kG
min 12 cm, Field 16 kG } at 92,400 Ampere turns

AVERAGE FIELD at R ext kG

B max/ < B > 1.3

NUMBER OF SECTORS { compact 3 / separated - } Spiral, max 64 deg

SECTOR ANGLE (SSC) deg

TRIMMING COILS 2 x 3 sets

CONDUCTOR, material and type: Cu Hollow Copper

STORED ENERGY (cryogenic): - MJ

POWER: main coils 100 max, kW; current stability 10^{-5}
trimming coils - max, kW; current stability -

WEIGHT: Fe 35 tons; coils 3 tons

COOLING system: Closed loop demineralised water

ION ENERGY (bending limit) E/A = 42 q^2/a^2 MEV/amu
(focusing limit) E/A = q/a MeV/amu

ACCELERATION SYSTEM

DEES, number 2 angle 90° deg

BEAM APERTURE 1.8 cm; DC Bias 1.5 kV

TUNED by, coarse mechanical plate fine capacitors

RF to 26.7 mHz, stable ± 1 KHz

Orb F to 26.7 mHz

HARMONICS, RF/Orb F, used 1

DEE—Gnd, max 39 kV, min gap 10^{-4} 0.5 cm

STABILITY, (pk-pk noise)/(pk RF volt) 10

ENERGY GAIN, max approx. 100 kV/turn

RF PHASE, stable to ± - deg

RF POWEP input, max 100 kW

FREQUENCY MODULATION, rate - /s

modulator, type -

beam pulse, width -

VACUUM SYSTEM

OPERATING PRESSURE 5×10^{-6} (H_2) Torr or mbar

PUMPS, No, Type, Size
4 x 10 inch diff pump + cryo panels

ION SOURCES

PIG for H^-

INJECTION SYSTEM

EXTRACTION SYSTEM

Charge Exchange Carbon foil, fixed and variable energy.

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed - m²; movable - m²

TARGET STATIONS - in -

STATIONS served at same time, max -

MAG SPECTROGRAPH, type -

COMPUTER model PDP11/03, 11/23 + multi micro controllers

OTHER FACILITIES Industrial Radioisotope Production System.

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pμA) Internal	External
H^-	11-42	23-42	320	250
SECONDARY		(part/s)		
	-			

BEAM PROPERTIES

MEASURED		CONDITIONS		
PULSE WIDTH	40 RF deg	200 pμ A of	42 MeV	H^- ions
PHASE EXC. max	RF deg	pμ A of	MeV	ions
EXTRACT eff	99 %	pμ A of	MeV	ions
RESOL ΔE/E	~1 %	pμ A of	MeV	ions
EMITTANCE (π mm. mrad)	~15 axial / ~10 rad	pμ A of	MeV	

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS: SOLID STATES PHYSICS:

BIOMEDICAL APPLICAT: ISOTOPE PRODUCTIONS 90%

Machine Development 10%

REFERENCES/NOTES

1)

2) -

PLAN VIEW OF FACILITY, COMMENTS, ETC.

ISOTOPE PRODUCTION MACHINE with heavy commitment to machine development and improvement.

- Remote controlled target system
- Full computer control using 16 bit and 8 bit computers in a STAR network of serial links.
- No operator attendance 1984 onwards.