ENTRY NO. FM-9
NAME OF MACHINE . BEVALAC Synchrotron
INSTITUTION . Lawrence Berkeley Laboratory
ADDRESS . 1 Cyclotron Road, Berkeley, CA 94720
TEL . (415) 486-5185 . TELEX
IN CHARGE J. Alonso . REPORTED BY F. Lothrop

HISTORY AND STATUS
DESIGN, date 1949 . Model tests 1949-51
ENG DESIGN, date
CONSTRUCTION, date 1949-54
FIRST BEAM, date (or goal) Feb. 1954
MAJOR ALTERATIONS 1961-62 Proton Intensity Upgrade
1981-82 Uranium Capability Upgrade
COST, ACCELERATOR $10M (1950)
COST, FACILITY, total
FUNDED BY U.S. Department of Energy

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT
SCIENTISTS . ENGINEERS } 154
TECHNICIANS . CRAFTS }
GRAD STUDENTS involved during year 0
OPERATED BY . Research staff or x Operators
OPERATION 168 hr/wk. On target 100 hr/wk
TIME DISTR. in house 50 %, outside 50 %
BUDGET, op & dev $17M
FUNDED BY U.S. Department of Energy

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

CONDUCTOR, material and type
STORED ENERGY (cryogenic) MJ
POWER: main coils . max kW; current stability
trimming coils . max kW; current stability
WEIGHT, Fe tons; coils tons
COOLING system
ION ENERGY (Bending limit) E/A = q^2/A^2 MeV/amu
(Focusing limit) E/A = q/A MeV/amu

ACCELERATION SYSTEM
DEES, number 1 angle 10 deg
BEAM APERTURE cm; DC Bias kV
TUNED by, coarse fine
RF 0.25 to 2.4 MHz, stable ± 40 Hz
Orb F 0.25 to 2.4 MHz
HARMONICS, RF/Orb F, used
DEE-Gnd, max kV, min gap cm
STABILITY, (pk-pk noise)/(pk RF volt)
ENERGY GAIN, max 1.5 kV/turn
RF PHASE, stable to ± deg
RF POWER input, max. 150 kW kW
FREQUENCY MODULATION, rate - /s
modulator, type -
beam pulse, width 40 nb

VACUUM SYSTEM
OPERATING PRESSURE 1×10^{-10} Torr or mbar
PUMPS, No, Type, Size cold-bore cryopumping

ION SOURCES
PIG

INJECTION SYSTEM
PIB source - linac

EXTRACTION SYSTEM
Slow resonant system

FACILITIES FOR RESEARCH
SHIELDED AREA, fixed m^2; movable m^2
TARGET STATIONS 12 in 10 rooms
STATIONS served at same time, max 1
MAG SPECTROGRAPH, type
COMPUTER model mostly DEC 11-series
OTHER FACILITIES

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pμA) Internal	External
Neon		2000-42000		1.6 nA/pulse
to				
Uranium		2×10^5		2 pA/pulse
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. 60 %		pμA of	MeV	ions
RESOL ΔI/I 0.1 %		pμA of	MeV	ions
EMITTANCE				
(π mm mrad)	25 axial 25 rad	pμA of	MeV	

OPERATING PROGRAMS, time distribution
BASIC NUCLEAR PHYSICS 67 SOLID STATES PHYSICS
BIOMEDICAL APPLICAT. 33 ISOTOPE PRODUCTIONS

REFERENCES/NOTES
1)
2)

PLAN VIEW OF FACILITY, COMMENTS, ETC.

Bevalac is a relativistic heavy-ion synchrotron. Ions available range from helium to uranium. Intensity depends on ion but will be on the order of 10^6-10^9 ions/pulse. Each pulse is about 800 milliseconds long at a rate of 10-15 pulses per minute. Minimum energy ≈ 50 MeV/n; maximum energy ≈ 2100 MeV/n (q/A = 1/2), ≈ 900 MeV/n (q/A = .286)