ENTRY NO. FM-1	1	
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		s Laboratory (SREL) DATE July 1	<u>1</u> , 1978				
	College of William and Mary Newport News, Virginia						
ADDRESS	Newport News, Virginia		_				
in charge <u>Robe</u>	rt T. Siegel	REPORTED by Robert T. Siegel	_				
HISTORY AND STATUS		MAGNET					
DESIGN, date 1960-62 M	ODEL tests	POLE FACE diameter 500 cm; R extraction	cm				
THE DESIGN 3-4- 1962	-63	GAP, min 36 cm; Field 19.5 kg) 1 7	6				
CONSTRUCTION, date	July, 1963	GAP, min 36 cm; Field 19.5 kG at 1.3 cm; Field 18.2 kG	_X 10°				
FIRST BEAM date (or goal)	January, 1965	AVERAGE FIELD at R ext 18.2 kg	turns				
MAJOR ALTERATIONS	1972	CURRENT STABILITY 50 parts/10 ⁶ ; B _{max} /⟨B⟩					
		NUMBER OF SECTORS; SPIRAL, max	deg				
OPERATION,136 hr.	/wk; On Target 128 hr/wk						
TIME DIST., in house	%, outside <u>100</u> %	Harmonic correction					
USERS' SCHEDULING CYC	LE16weeks	Rad grad/sec or Circ coils					
COST, ACCELERATOR \$5	,963,000 (incl. orig.	WEIGHT: Fe 2700 tons; Coils 60	tons				
COST, FACILITY, total \$1	6,900,000 beam	CONDUCTOR, Material and type					
FUNDED BY NASA	transport)		MJ				
		COOLING SYSTEM					
ACCELERATOR STAFF, OF	PERATION and DEVELOPMENT	POWER: Main coils 950 m					
SCIENTISTS 2	ENGINEERS 4	Trimming coilsm					
TECHNICIANS 12	CRAFTS 1	YOKE/POLE AREA					
GRAD STUDENTS involved of		SECTOR ANGLE (Sep Sec)	deg				
	Res staff or X Operators	ION ENERGY (Bending limit) E/A =q ² /A					
BUDGET, op & dev \$75		(Focusing limit) E/A =q/	A MeV				
FUNDED BY NSF and	State of Virginia	ACCELERATION SYSTEM					
DECEADOU CTACE	undered advance	DEES, number 1 angle 180					
RESEARCH STAFF, not incl		BEAM APERTURE 12 cm; DC BIAS -1.4	kV				
	outside 45	TUNED by, coarse fine fine					
	during year60						
		Orb F to mHz; GAIN, max					
FUNDED BY		HARMONICS, RF/Orb F, used					
F4.011 15150 F05 5505 4505		DEE-Gnd, max 35 kV, min gap 2 78					
FACILITIES FOR RESEARC		STABILITY, (pk-pk noise)/(pk RF volt) 2-35	-				
SHIELDED AREA, fixed	350 m ²	RF PHASE stable to ±					
movable	600 m ²	RF POWER input, max 60					
	in 4 rooms	RF PROTECT circuit, speed					
STATIONS served at same tim	ne, max3	Type					
		FREQUENCY MODULATION, rate 55					
	360/44	MODULATOR, type Tuning Fork					
OTHER FACILITIES	4-44	BEAM PULSE, width 50,000 10 msec, external, in	ternal meso				
		VACUUM SYSTEM					
		PUMPS, No., Type, Size					
DEEDENOES/NOTES		OPERATING PRESSURE	μTorr,				
REFERENCES/NOTES		PUMPDOWN TIME	hrs				
	conference on Cyclotron	ION COLIDOES/INJECTION SVOTEM					
	ge of William and Mary	' Cold cathode					
	. M. Brobeck, R. M.						
Nissen, J. R. Mula	idy.	EXTRACTION SYSTEM					
		Regenerator-Magnetic Channel					
		CONTROL SYSTEM					

ENTRY NO. FM-II (cont.)

CHARACTERISTIC BEAMS

BEAM PROPERTIES

		Goal	Achieved	Meas	ured C	onditions
	Particle	(MeV)	(Me∨)	Pulse WidthR	F degμA o	f MeV
ENERGY	ρ	600	590	Phase Exc, maxR	F deg μA ο	f MeV
	α.	710	_710	Extract Eff5 %	<u>0.1</u> μA ο	f_ρMeV_ <u>590</u>
				Res, ΔE/E%	μΑ ο	f MeV
				Emittance		
CURRENT		(μ <u>Α</u>)	(μ <u>Α</u>)	(a)	kial)	
Internal	ρ		2.5	(mm-mrad) {ra	$\min \left\{ \mu A o \right\}$	f MeV
	<u> </u>	1	0.5	OPERATING PROGRAM	IS, time dist	
External	ρ	1011	4×10^{11}	Basic Nuclear Physics	85	
	a	<u> 10¹⁰</u>	$> 10^{10}$	Solid State Physics	10	%
				Bio-Medical Applicatio	ns 5	%
				Isotope Production		%
		(part/s)	(part/s)	Development		%
Secondary	<u> </u>	107	107			%
	<u> </u>	$2x10^{5}$	$\frac{6x10^{5}}{}$			%

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

- 1. Two extraction systems for use at 600 MeV and 300 MeV Entire extraction systems with internal targets are removable on "platters," with turnover time of \sim 8 hours.
- 2. The full external proton beam can be delivered to either of two alternate target areas.
- 3. Muon Channel (Quadrupole type) used to deliver stopping Π^{\pm} and μ^{\pm} beams. Other movable bending and quadrupole magnets available for specialized transport.
- 4. Electronic equipment pool available for users.
- 5. IBM 360-44 Data Acquisition System available for users.

SREL operations will be terminated July 31, 1978. Complete phaseout is scheduled for December 31, 1978.