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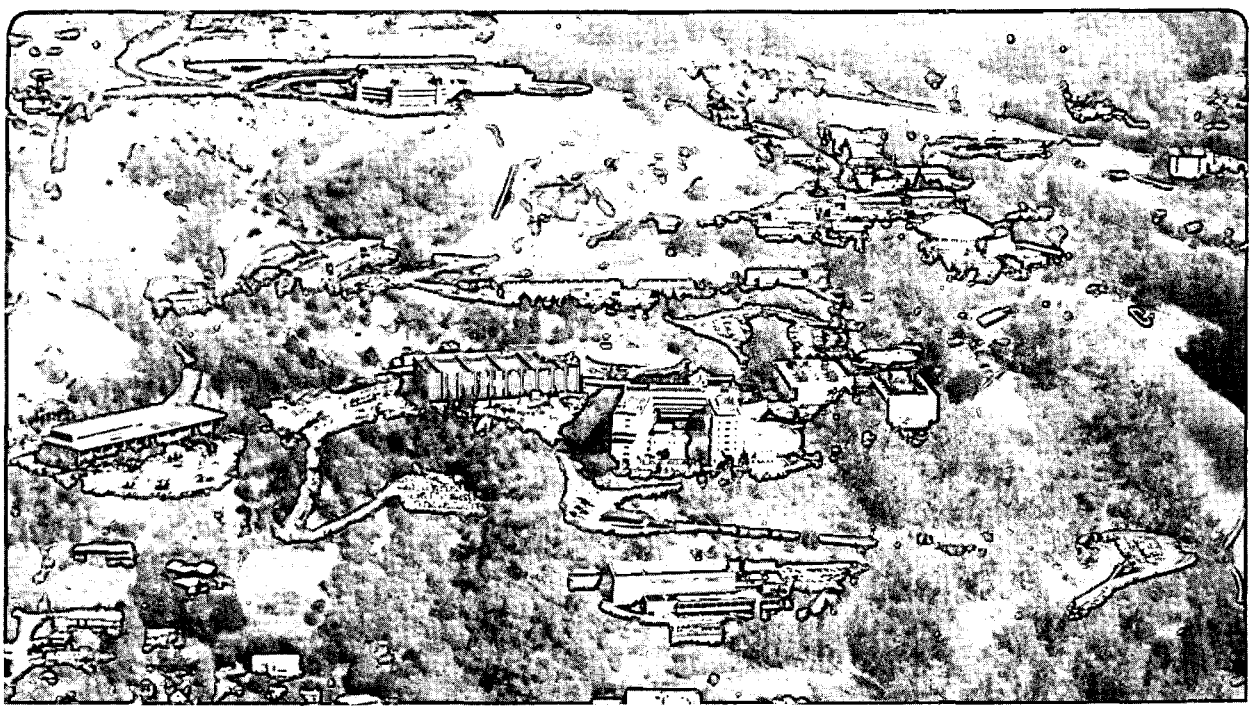

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LAWRENCE RADIATION LABORATORY - UNIVERSITY OF CALIFORNIA

ENGINEERING NOTE

CODE	SERIAL	PAGE
BW2007	M4549	7 Pages

AUTHOR	DEPARTMENT	LOCATION	DATE
Rod Byrns	MECHANICAL ENGINEERING	BERK.	10-11-72

PROGRAM — PROJECT — JOB

BEVATRON VACUUM PUMPING SYSTEM

CRYOGENIC PUMPING

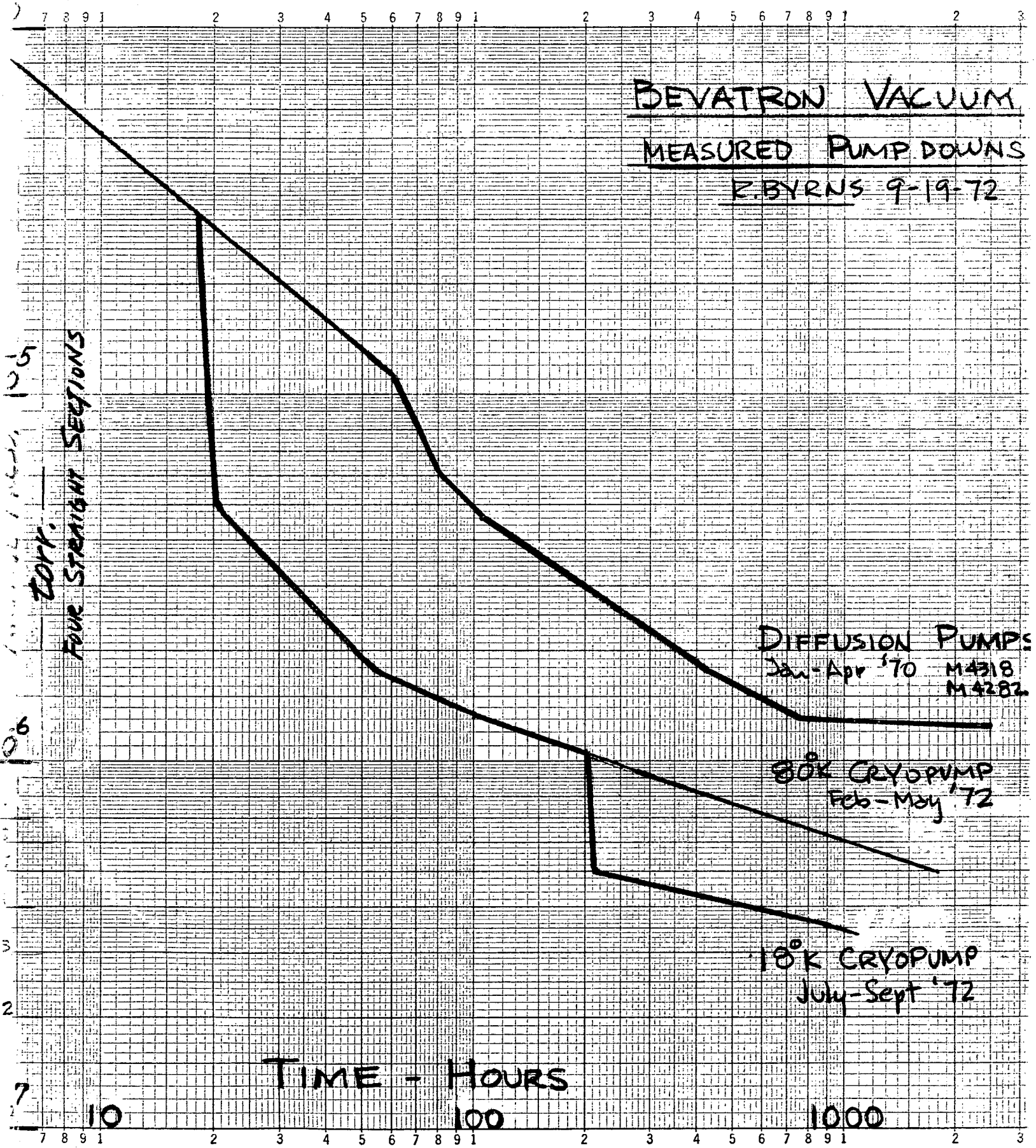
TITLE

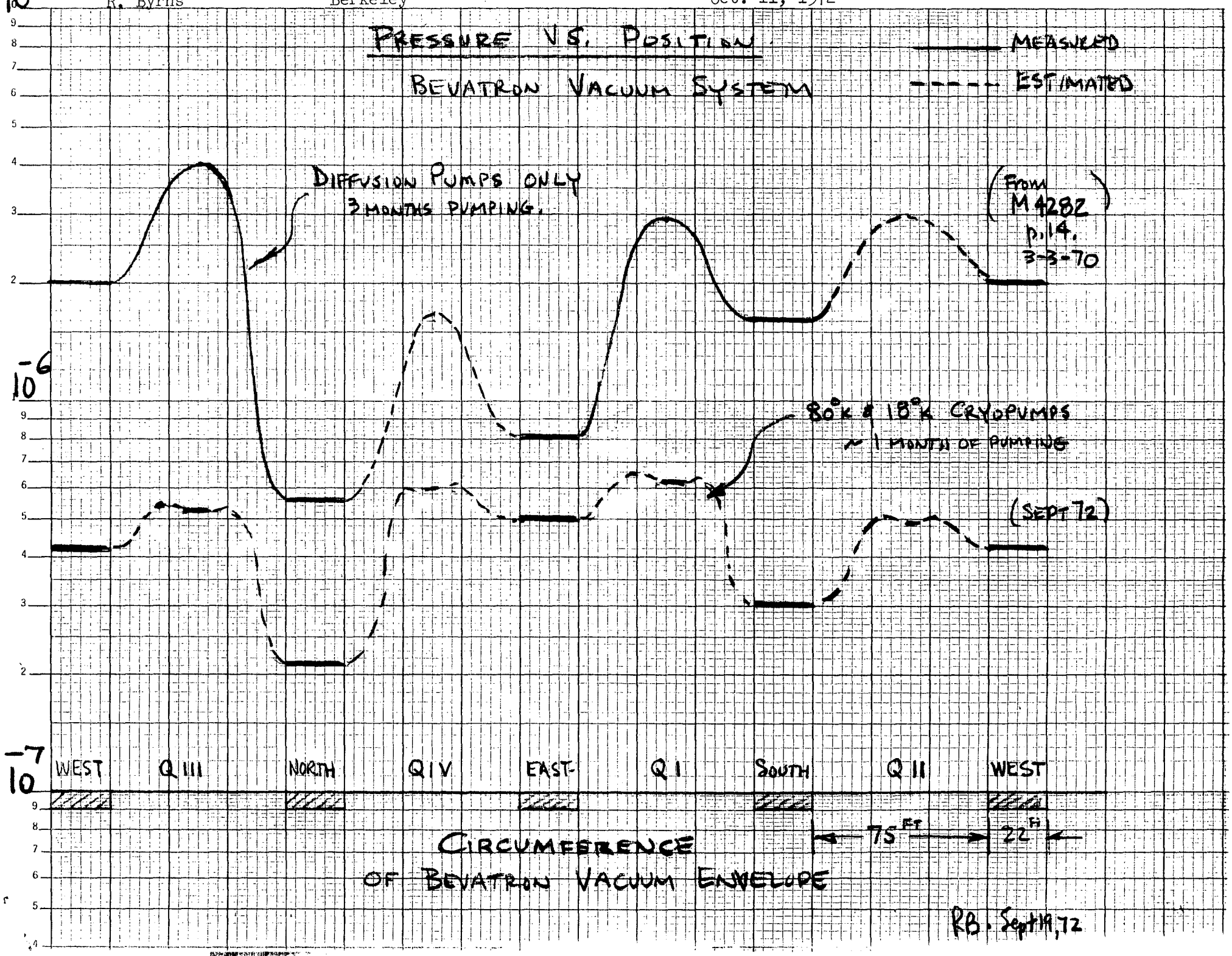
PRESSURE HISTORY

BEVATRON VACUUM

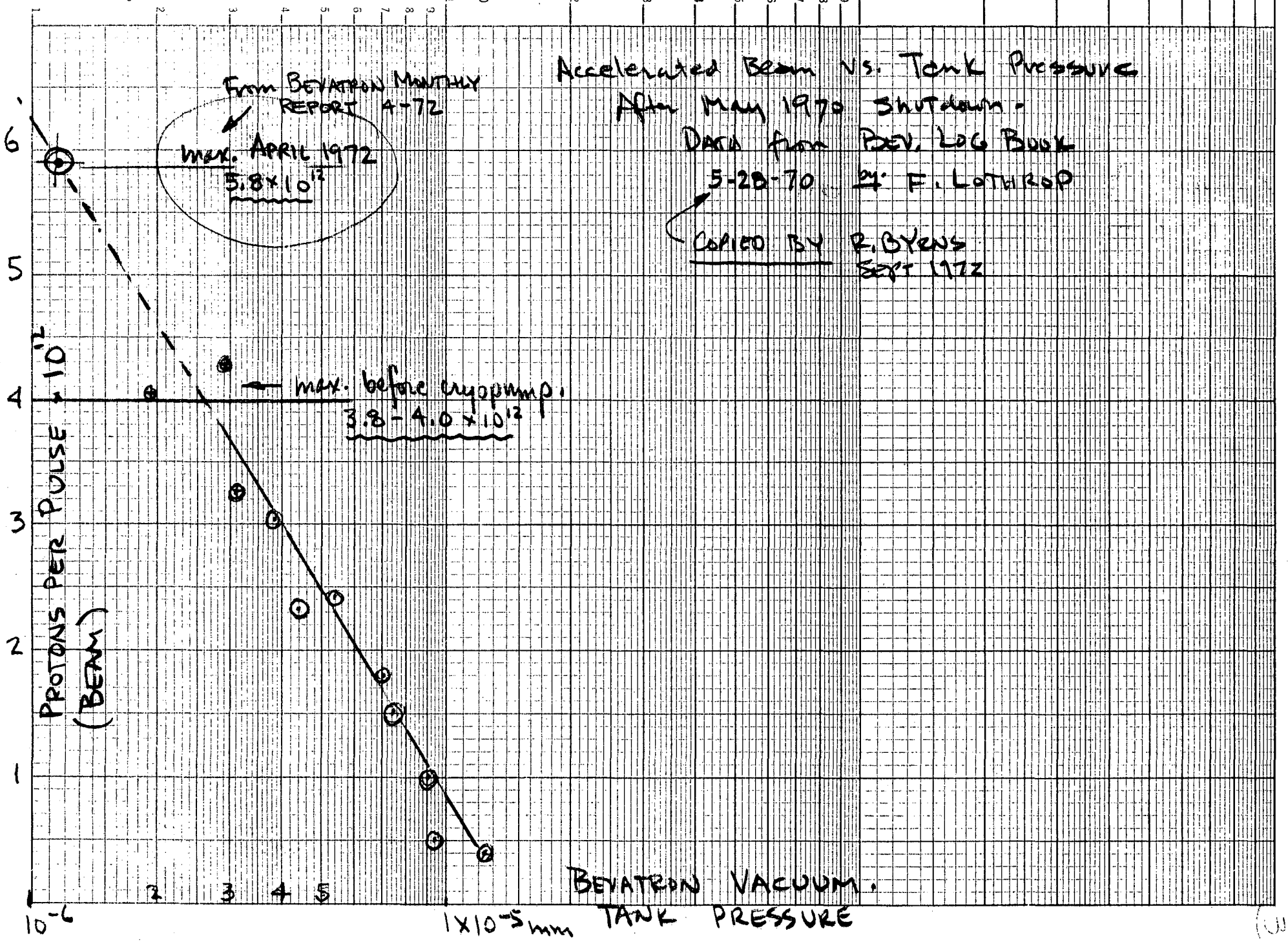
MEASURED PUMP DOWNS

R. BYRNS 9-19-72


BEVATRON VACUUM
MEASURED PUMP DOWNS
R. BYRNS 9-19-72
TORR.
FOUR STRAIGHT SECTIONS
DIFFUSION PUMPS
Jan-Apr '70 M4318
M4282
80°K CRYOPUMP
Feb-May '72
18°K CRYOPUMP
July-Sept '72
TIME - HOURS
10
100
1000



SEMI-LOGARITHMIC 359-72L
KEUFFEL & ESSER CO. MADE IN U.S.A.
3 CYCLES X 180 DIVISIONS


Accelerated Beam vs. Tank Pressure
After May 1970 Shutdown.
Data from Dev. Log Book
5-28-70 by F. Lothrop
Copied by R. Byrns
Sept 1972
From Bevatron Monthly
Report 4-72
max. April 1972
5.8×10^12
max. before cryopump.
3.8 - 4.0 × 10^12
Protons per Pulse × 10^12
(Beam)
Bevatron Vacuum.
Tank Pressure
10^-6
1×10^-5 mm

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ENGINEERING NOTE

CODE	SERIAL	PAGE
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AUTHOR	DEPARTMENT	LOCATION	DATE
R. BYRNS	Mechanical Engineering	BERK.	6 AUG. 72

PROGRAM — PROJECT — JOB

BEV. VAC. SYSTEM - CRYO PUMP

TITLE

PRESSURE HISTORY

(P in 10^{-6} mm.)

DATE - TIME	EAST	WEST	NORTH	SOUTH	QUAD I	QUAD II	
28 FEB 11⁰⁰	15.5	1.6	5.6	3.8	12.0	3.5	AFTER ~10 DAYS FEB. SHU LN CRYOPUMP & UP TO AIR
29 Feb 09⁰⁰	2.1	1.4	2.3	1.5	2.9	3.1	
1 MAR 08⁰⁰	8.0	2.2	8.0	2.0	6.0	4.8	LHe in QUAD II & III - 11⁰⁰
13³⁰	1.9	1.2	1.9	1.1	3.0	2.5	
6 MAR							WARM-UP LN
8 MAR 16¹⁵	1.9	0.7	1.5	0.9			
13 MAR 08³⁰	1.5	0.62	1.0	0.78	2.1	1.5	LHe in QII - 9³⁰ LHe in QIII - 10¹⁰
16⁰⁰	1.15	0.56	0.82	0.68	1.3	1.9	
13 APRIL	1.0	0.32	0.72	0.60			AFTER ~3 MOS. OF LN-ONLY — & UP TO AIRS.
24 APRIL 08⁰⁰	1.50	0.35	0.45	0.65	1.6	0.80	NOTE! P(QII) ≤ 0.5 x 10^{-6} mm
22 MAY 10⁴⁵	0.66	0.30	0.37	0.50	1.1	0.66	WITH ONLY LN.
19 JUNE THRU 1 JULY - SHUTDOWN FOR QII MAGNET INSTALL.							
5 JULY	PRESS ~ 1 x 10^{-5} MM						
6 JULY	" ~ 2 x 10^{-6}						
10 JULY	PRESS WAS ~ 1.8 - 3.5 x 10^{-6}						WARM-UP LN
11 JULY	2.20	1.80	1.4	1.6			
14 JULY 10³⁰	2.6	2.2	1.6	1.6	3.5	3.3	
17 JULY 0800	2.0	1.2	1.3	1.0	2.2	1.7	WELDING ON EAST. T.T. DIFF. PUMP. BOTTOM (N.G.)
20 JULY 10⁰⁰	1.3	0.8	0.65	0.9	2.0	1.3	DUXSEAL ADDED TO WEST PROBE #3 & FOREVAC LINE
21 JULY 11³⁰	1.5	0.75	0.65	0.85			
24 JULY							WARM-UP, LN
25 " 12⁰⁷	1.4	1.0	0.70	0.90			
26 " 11³⁰	1.4	0.8	0.70	0.90			
27 JULY 16³⁰	2.2	1.0	0.90	1.0			E. HOYER SEZ POWER ON QII MAGNET @ 10⁰⁰ AM IN SHORT PULSES.
28 JULY 12⁰⁰	1.4	0.9	0.90	0.75			

RL-3240 (Rev.8/63)

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ENGINEERING NOTE

CODE	SERIAL	PAGE
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AUTHOR	DEPARTMENT	LOCATION	DATE
R. BYRNS	M.E.	BERK	6 AUG - 72

PROGRAM — PROJECT — JOB

BEV. VAC. SYSTEM. - CRYOPUMP

Cryogenic Pumping

TITLE

Pressure History $P \times 10^{-6}$ mm

DATE	Time	EAST	WEST	NORTH	SOUTH	QUAD I	QUAD II	
1 AUG	0800	1.6	0.85	0.60	0.90			← LN ONLY!
2 AUG	0800	1.9	0.70	0.50	0.90		He Refer	EAST HE REFER START. 09^{45}
	1200	1.5	0.82	0.50	0.80			CLOSE BYPASS @ 13^{15}
	1300	1.0	0.50	0.32	0.45			
	1430	0.85	0.65	0.32	0.45			
	16^{30}	0.85	0.60	0.32	0.45			
3 AUG	0800	1.0	0.70	0.35	0.50			EAST HE REFER CONTINUE WEST " " START 09^{40} WITH LN.
	12^{30}	0.72	0.51	0.35	0.40	0.80	0.55	BEV. MAGNET OFF ~ 10^{00}
	13^{55}	0.72	0.52	0.26	0.40	0.85	0.55	CLOSE HE REF. BYPASS @ 13^{00} EAST MOUSE REPAIR
	14^{30}	0.72	0.52	*0.26	0.40	0.80	0.55	*CLOSED NORTH D.P. HEAD GATES, Press → 1.0×10^{-6}
	17^{20}	0.80	0.47	0.28	0.40			BEV. MAGNET ON ~ 15^{00}
4 AUG	09^{20}	0.80	0.44	0.27	0.43			RICHTER SEZ CAN CLOSE EAST HEAD GATES - PRESSURE HOLDS ALL OTHERS - NO HOLD!
	16^{00}	0.80	0.46	0.28	0.42			
4 AUG	SWING	0.80	0.46	0.38	0.42			
5 AUG	OWL	1.0	0.35	0.28	0.35	←		NOTE: PRESS. AFTER LN + He + MI leaks
	DAY	1.0	0.68	0.40	0.56			
5 AUG	0600					PRESSURE		BURSTS EAST - MI OFF TRACK!
						START WARM-UP		
6 AUG	0600	UP TO AIR			→	TO	FIX	MI SEALS & ROLLERS
"	1800	ON VAC. PUMPS						
7 AUG	0300	~ 3-5 x 10^{-6}			AFTER	went ON	LN @	$P \simeq 3 \times 10^{-5}$ mm
8 AUG	14^{20}	2.2	1.85	1.40	1.60	3.50	2.60	7/4 1.05
9 AUG	13^{20}	2.0	1.45	1.20	1.60			
10 ✓	16^{08}	1.65	1.25	1.08	1.35			
11 ✓	15^{05}	1.60	1.30	1.02	1.20			

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ENGINEERING NOTE

CODE	SERIAL	PAGE
BW[redacted]2007	M4549	6 OF 7

AUTHOR	DEPARTMENT	LOCATION	DATE
R. BYRNS	M.E	B	Oct. 11, 1972

PROGRAM—PROJECT—JOB

BEVATRON VACUUM PUMPING SYSTEM

VACUUM PRESS. (10^{-6} TORR)

	TITLE DATE	TIME	EAST	WEST	NORTH	SOUTH	QUAD I	QUAD II	
	8-14		LN WARMUP - OF CRYO PANELS						
	8-15	16³⁰	1.8	1.1	1.1	1.2			
	8-16	08⁰⁰	1.7	1.0	1.1	1.3			START He REFRIG ON BEV VAC.
		16³⁰	0.9	0.6	0.45	0.50			He REFRIG FULLY OPEN TO BEV 4³⁰
	8-18	16³⁰	1.0	0.45	.45	.47			BOTH REFER ON BEV
	8-21	16³⁰	1.1	0.55	0.48	0.55			
	8-24	16³⁰	0.8	0.40	0.45	0.45			
	8-25	12⁰⁰	0.6	0.40	0.46	0.44	0.83	0.50	BEV SHUT DOWN
	8-28	—	~0.70	0.40	0.50	0.40	0.80	0.50	↓ FOR HEAVY ION SOURCE △
	8-30	16¹⁵	0.50	.45	.35	0.40			PRESSURE UP IN AM. → 2×10⁻⁶ — COLD MAGNET
	8/31	16⁰⁰	0.60	0.40	0.35	0.40			
	9-1	~0900	0.60	0.50	0.35	0.50			HEAVY-ION RUN
	9-5	~ "	0.60	0.50	0.40	0.70			
	"	12³⁰	0.50	0.55	0.70	0.85			
	9-7	12⁰⁰	0.60	0.50	0.95	0.35			SOUTH GOT UP TO 1.0 CREW SEZ A BAD D.P.
FRI.	9-8	~0900	0.50	0.40	0.30	0.35	— READ (W)		NOW ONLY 2 PUMPS ON SOUTH MAGNET OFF
		~12⁰⁰	0.60	0.60	0.30	0.60			(DIFF. PUMPS E-4, W-3, N-2, S-2)
MON.	9-11	OWL	0.50	0.43	0.30	0.37		All	meters recalib. MONDAY MAINTENANCE
		~11⁰⁰	1.10	0.50	0.50	1.30	1.8	0.8	EAST He Refrig OFF BEV ~0900 MAGNET OFF 'TIL 1600
TUES.	9-12	10⁰⁰	0.90	0.45	0.40	0.85	EAST PRESSURE GOT UP TO 3.0		EAST He refrig still off.
WED.	9-13	11⁰⁰	0.80	0.45	0.35	0.80			" " " "
	9-14	09⁰⁰	0.80	0.50	0.35	0.70			EAST REFR ON BEV ~16³⁰ INCREASED BEAM (H.I.) FACTOR 4
FRI.	9-15	12⁰⁰	0.50	0.42	0.22	0.30	(P_{AN} = 0.36)		WORKING ON MOUSE MAGNET ON
MON	9-18	13³⁰	0.50	0.46	0.22	0.37	BEV ON HEAVY IONS		DIFF PUMPS - E-4, W3, N2, S2
WED	9-20	0000	0.50	0.45	0.26	0.30	(P_{AN} ≃ 0.36)		
		1600	0.50	1.70*	0.22	0.42		*	2-TRAVEL TARGET INTO WEST AIR LOCK ~15³⁰

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ENGINEERING NOTE

CODE	SERIAL	PAGE
BW 2007	M4549	7 OF 7

AUTHOR	DEPARTMENT	LOCATION	DATE
R. BYRNS	Mech Eng	B	9-21-72

PROGRAM — PROJECT — JOB

BEVATRON VACUUM PUMPING SYSTEM

CRYOGENIC PUMPING

TITLE

PRESSURE HISTORY

DATE	TIME	EAST	WEST	NORTH	SOUTH	QUAD I	QUAD II	
9-21	1600	0.50	0.31	0.22	0.32		$\bar{P}_{av}$ = 0.34	HEAVY ION - NEON MEDICAL - EYE FLASH
9-22	15^{00}	0.50	0.34	0.26	0.30		$\bar{P}_{av}$ = 0.35	He tank " " "
9-25	0930	0.80	0.30	0.26	0.38	0.85	0.36	Some weekend problems with WEST REFER
	10^{00}	START		WARM-UP			FOR UP TO AIR —	
				MAINTENANCE & GRIND MOUSE RAILS				
				THEN - BACK TO PROTONS FOR PHYSICS				
				1 OCT 72				

RL-3240 (Rev.8/63)

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