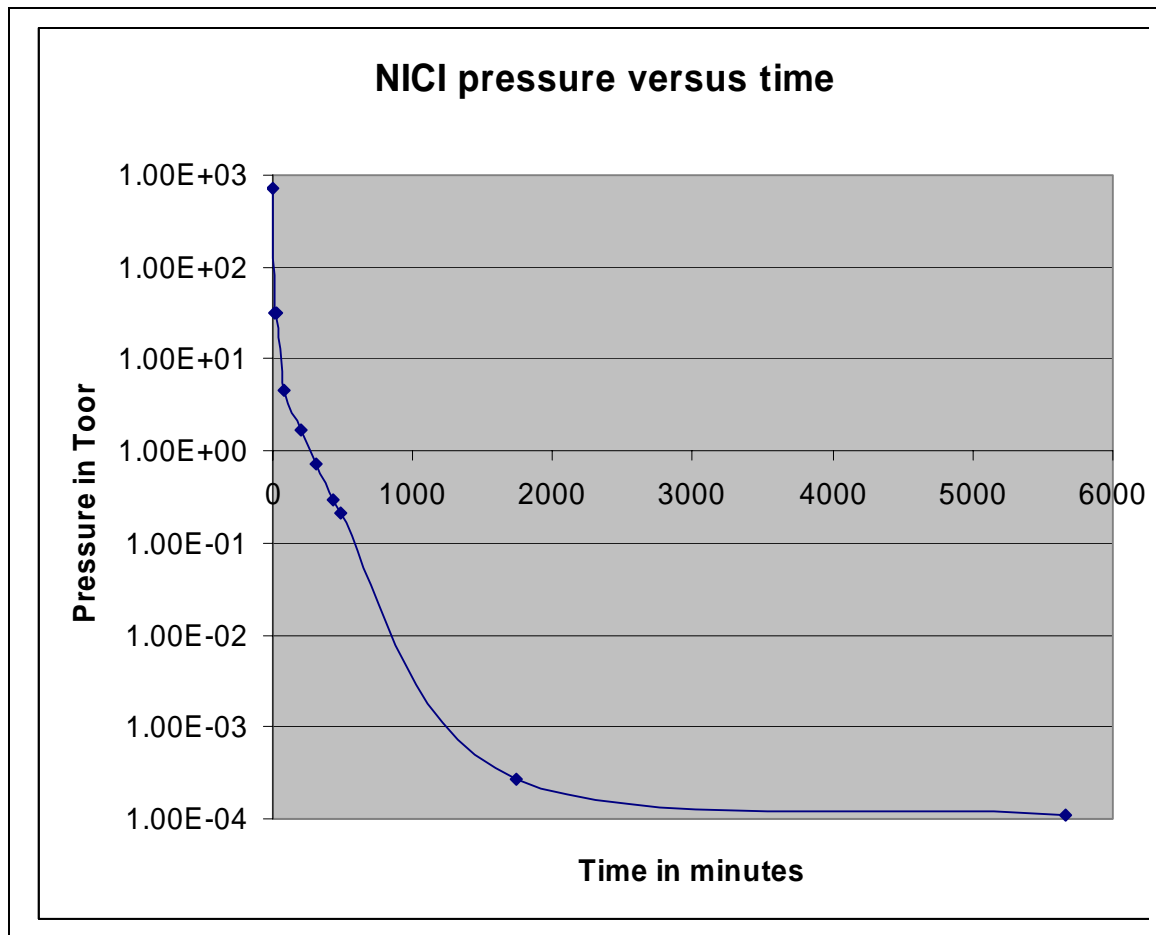


NICI Pumpdown and Cooldown Procedure



Shown on the cover page is the NICI engineering pump down vacuum setup. This is used only during engineering since the gauges are not robust enough for normal handling and not trusted for very long term use. NICI will be shipped with the valve mounted directly on the cryostat. If gauges are desired a T or X fitting can be added outside the valve, between the valve and the pump. The data presented here are for NICI being pumped with a Varian Turbo V70-LP turbo pump. This is a fairly small pump but since it was mounted directly on the cryostat valve thus avoiding the line impedance it worked quite well.

The graph below shows an early pump down of NICI. Subsequent pump downs will vary from this curve no doubt but this is meant to give a typical curve. As NICI matures the cleanliness of the vacuum environment will improve and the pump down should be quicker.



Pump Down Data

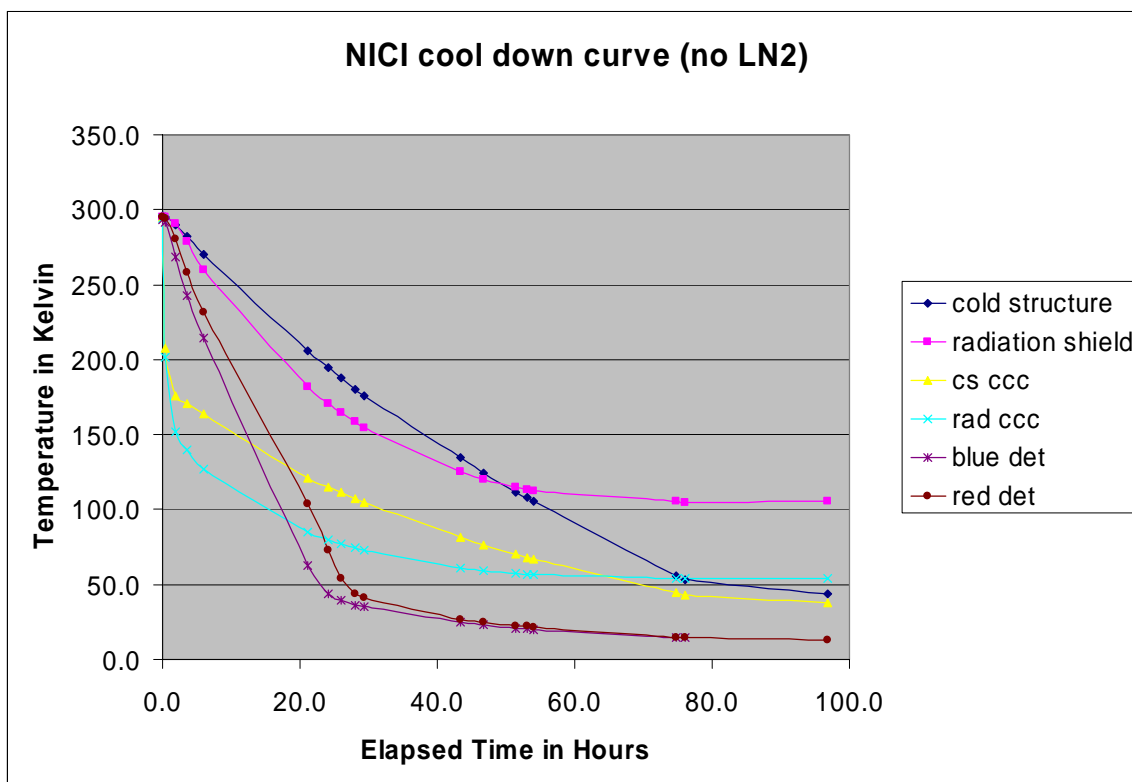
day	hours	minutes		minutes	pressure
1	11	32		0	7.20E+02
1	11	52		20	3.20E+01
1	11	53	Start Turbo on Low Speed	21	3.20E+01
1	12	56		84	4.50E+00
1	15	0		208	1.70E+00
1	16	45		313	7.10E-01
1	18	41		429	2.90E-01
1	19	40		488	2.10E-01
2	16	33	Turbo on High speed	1741	2.70E-04
5	10	0		5668	1.10E-04

NICI Cool Down Data

The graph below shows an early cooldown curve for NICI using no liquid nitrogen through the precharge can. This is a very convenient way to cooldown and represents a long cooldown curve. Cooldown can be substantially accelerated by using the precharge can. Two days with the precharge can is a reasonable minimum cooldown time.

Using this method the detectors will be operational at about 2 days but the backgrounds will be elevated since the cold structure is still at about 130K. After about three days the cold structure is down to 56K and the mechanisms should all have equilibrated so testing can begin. Temperatures are nearly steady state by three days.

Note that once the closed cycle coolers are turned on the pressure drops rapidly to 10^{-7} Torr and bottoms out at about 10^{-8} Torr.



day	elapsed time			cold	radiation		blue		pressure	
hours	hours	minutes	Hrs	structure	shield	cs ccc	rad ccc	det	red det	Torr
0	12	37	0.0	295.6	295.2	294.7	294.5	293.3	294.8	
0	12	57	0.3	295.5	295.2	207.8	201.2	291.9	294.6	
0	14	29	1.9	289.8	290.7	176.2	152.0	268.9	280.7	
0	16	10	3.6	281.9	278.5	171.1	139.9	243.1	257.9	5.00E-07
0	18	36	6.0	270.4	260.0	163.5	127.2	214.5	231.7	
24	9	43	21.1	205.7	181.6	121.3	84.8	62.6	103.4	
24	12	45	24.1	194.4	170.8	115.0	79.9	44.0	72.7	2.80E-07
24	14	41	26.1	187.5	164.4	111.2	77.1	39.7	53.7	2.40E-07
24	16	40	28.1	180.5	158.3	107.2	74.4	36.4	43.6	2.00E-07
24	18	0	29.4	176.1	154.5	104.6	72.8	34.8	40.8	1.70E-07
48	7	55	43.3	134.4	125.2	81.3	61.1	24.6	27.0	5.80E-08
48	11	23	46.8	124.4	120.1	76.3	59.3	22.8	24.9	5.80E-08
48	16	5	51.5	111.9	115.0	70.1	57.5	20.9	22.7	
48	17	43	53.1	107.8	113.5	68.1	57.0	20.3	22.0	5.80E-08
48	18	38	54.0	105.5	112.8	67.0	56.7	20.0	21.6	
72	15	23	74.8	55.9	105.1	44.3	54.0	14.8	15.0	
72	16	46	76.2	53.5	105.0	43.1	54.0	14.5	14.6	
96	13	27	96.8	43.7	105.5	37.9	54.1	13.4	13.2	

NICI Cooldown Data