

Efficient Preservation of Helium Resources at ILL

Institut Laue Langevin, 6 rue Jules Horowitz, 38042 Grenoble Cedex 9, France - http://www.ill.eu/sane

P. Mendes, S. Baudoin, N. Belkhier, E. Bourgeat-Lami, J.-P. Gonzales, Y. Memphis, E. Lelièvre-Berna, O. Losserand, X. Tonon, S. Turc



liquid helium station

ILL do not have its own helium liquefier. Liquid helium is shipped to ILL in 100L and 250L dewars for immediate consumption. The stock of helium is monitored all along its life at ILL.

Every day, the empty dewars are returned from the instruments and weighted before being sent for refill. Gasometers located on the instruments are used to monitor the individual losses.

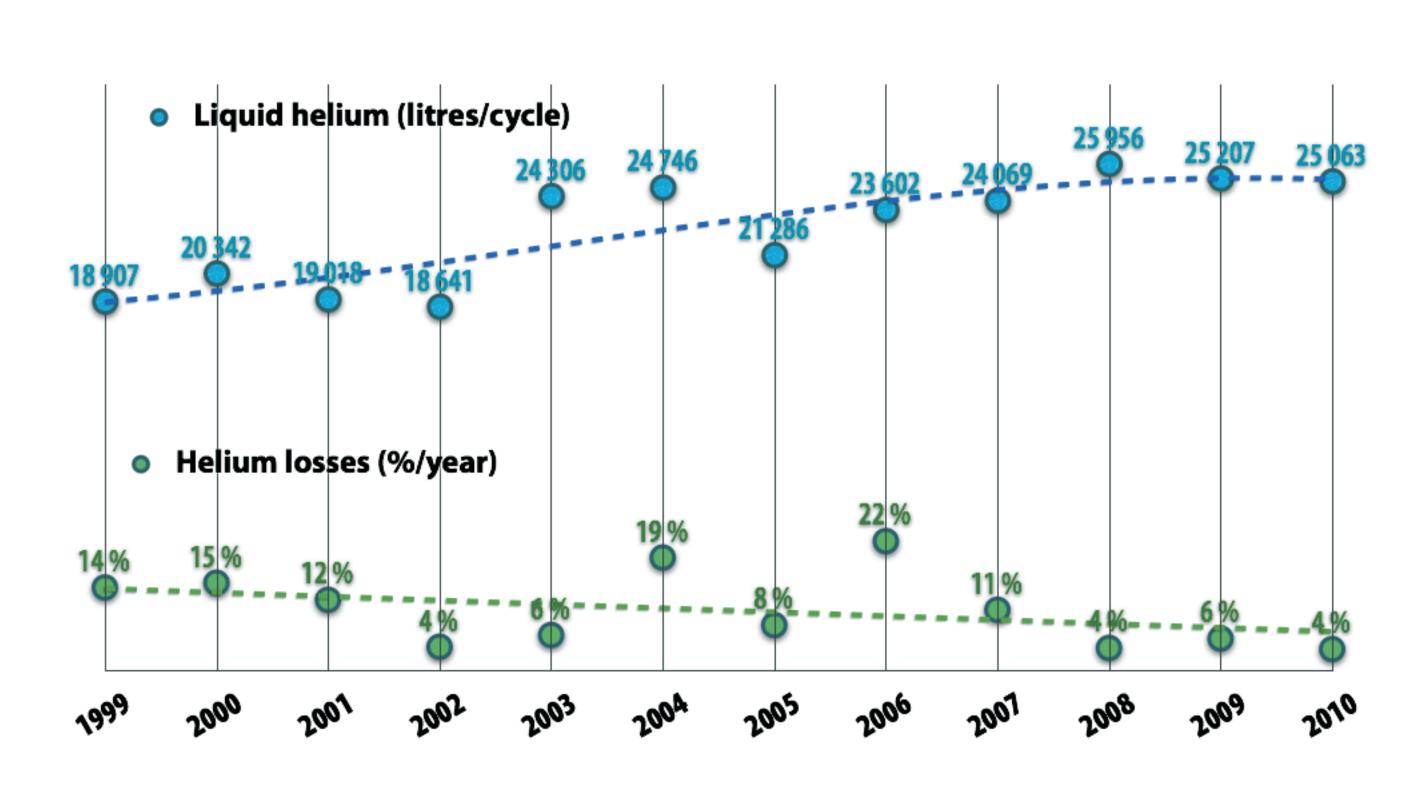
The dewars filled the preceding days are weighted to check the quantity that is delivered by the supplier (CEA or CNRS).



distribution to the instruments



ILL and ESRF counters



evolution of the consumption of liquid helium per cycle



helium compressors

The gas is collected in a 20 m³ balloon which ensures a relative stability of the pressure in the recovery line. The balloon is emptied by 2 compressors which fill racks of 200 bar bottles at a maximum rate of 300 m³/hour. When a rack of bottles is full, the gas is sent back to the liquefiers.



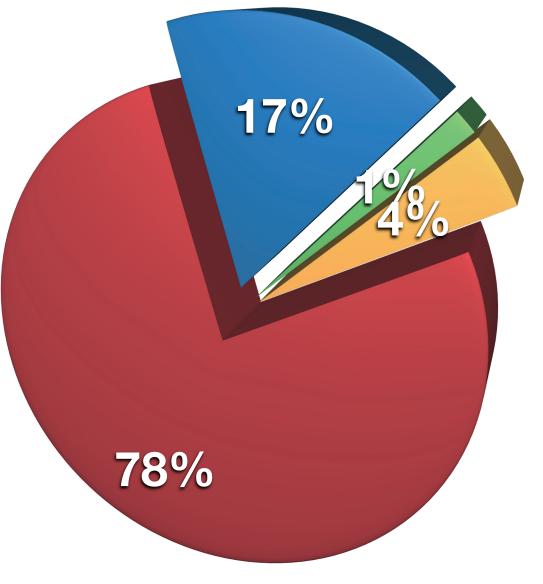
collect of the gas in a 20m³ balloon

9 💮 🔘					Liquid Helium	Managem	ent @ ILL				
Dewars moves	LHe supplied (2011)			He recovered (2011)							
Being filled	At gas sta	tion	On instrument			Delivered 1	Transp.	Recovered	Compressed	For instrum.	
	2		1 (IN8)		January:	000789 L	2	01468.29 m3	01417.43 m3	0110.06 m	Report
	3		4 (IN20)		February:	000736 L	2	01166.45 m3	01127.11 m3	0000.00 m	Report
	5		6 (D20)		March:	002648 L	6	01320.12 m3	01293.83 m3	0000.00 m	Report
	7		8 (Cryo. Lab.)		April:	008143 L	15	02876.34 m3	02707.55 m3	0052.64 m	Report
	9		10 (D2B)		May:	009781 L	22	06745.97 m3	06530.74 m3	0055.90 m	Report
	11		58 (D1B)		June:	006797 L	18	05293.60 m3	05093.47 m3	0067.35 m	Report
	12		59 (Vivaldi)		July:	001847 L	2	00000.00 m3	00000.00 m3	0000.00 m	Report
	54		60 (IN16)		August:	000000 L	0	00000.00 m3	00000.00 m3	0000.00 m	Report
	62		61 (D7)		September:	000000 L	0	00000.00 m3	00000.00 m3	0000.00 m	Report
	63		64 (SuperADA	М,	October:	000000 L	0	00000.00 m3	00000.00 m3	0000.00 m	Report
	66		65 (IN10)		November:	000000 L	0	00000.00 m3	00000.00 m3	0000.00 m	Report
	67	X	69 (IN22)	¥.	December:	000000 L	0	00000.00 m3	00000.00 m3	0000.00 m	Report
	68 204	¥	201 (D20) 202 (D10)	w		030741 L	69	82.95 %	96.29 %	01.52 %	Update)
Diffract			le structure	ion: O(Time of flight	04 DRAVES		e axis	Nuclear & pa		L
Cyclop.: 00168 L		11: 00412 L			0482 L 22.99				ryo-E.: 00000 L		3He La.: 0000
D10: 00276 L		16: 00000 L			0714 L 39.32			100.00 9	PF1B: 00139 L		Cryo: 0752
D15: 00000 L		17: 00225 L			0780 L 62.74			00.00 %	PF2: 00000 L		x-ray .: 00000
D19: 00000 L 0		22: 00453 L			00.00 L 00.00			04.76 %	PN1: 00000 L		
		21: 00000 L			0000 L 00.00			30.29 %	PN3: 00000 L		Mi Coro B : 0000
D1B: 00298 L 9		aro: 00000 L ADI: 00000 L			0061 L 100.00 1033 L 35.88			73.20 % 45.36 %	S18: 00000 L		LL5 D.: 0000
D20: 00972 L 7					0852 L 15.41			78.46 %			ILL5 D.: 0000
D28: 00624 L		A 00062 L			0782 L 34.39						ILL5 K.: 0000
D3: 01889 L					0858 L 39.89		00000 L	00.00 70			LL7 D.: 0000
D4: 00053 L				10. 00	35.05	70					LL7-2.: 0000
D9: 00000 L											LL1-2 0000
Orient.: 00000 L											
valence coolor 1	00.00 70										
Salsa: 00000 L	20.00.96										

status and reporting



200 bar helium storage



The distribution of liquid helium to \approx 40 instruments and the recovery of \approx 13 tons of gas per year require a rigorous day-to-day management. In order to ease this task, we use a mobile data terminal in a collaborative way.

This terminal allows us to record the quantity of liquid helium delivered to the institute and used on each instrument, the quantity of gas recovered on each instrument, the volumes sent to the liquefiers and presently stored in our racks, etc. The readings of the main gas counters are performed remotely by electronics connected to the Intranet.

The data are then uploaded to a server. An application downloads these data, calculates the losses and produces automatically the reports for CEA, CNRS, ESRF and ILL. Thanks to the efforts made by the staff and our visiting scientists, more than 95% of the gas is now recovered every year. In 2010, the savings amounted to 400 k€.

