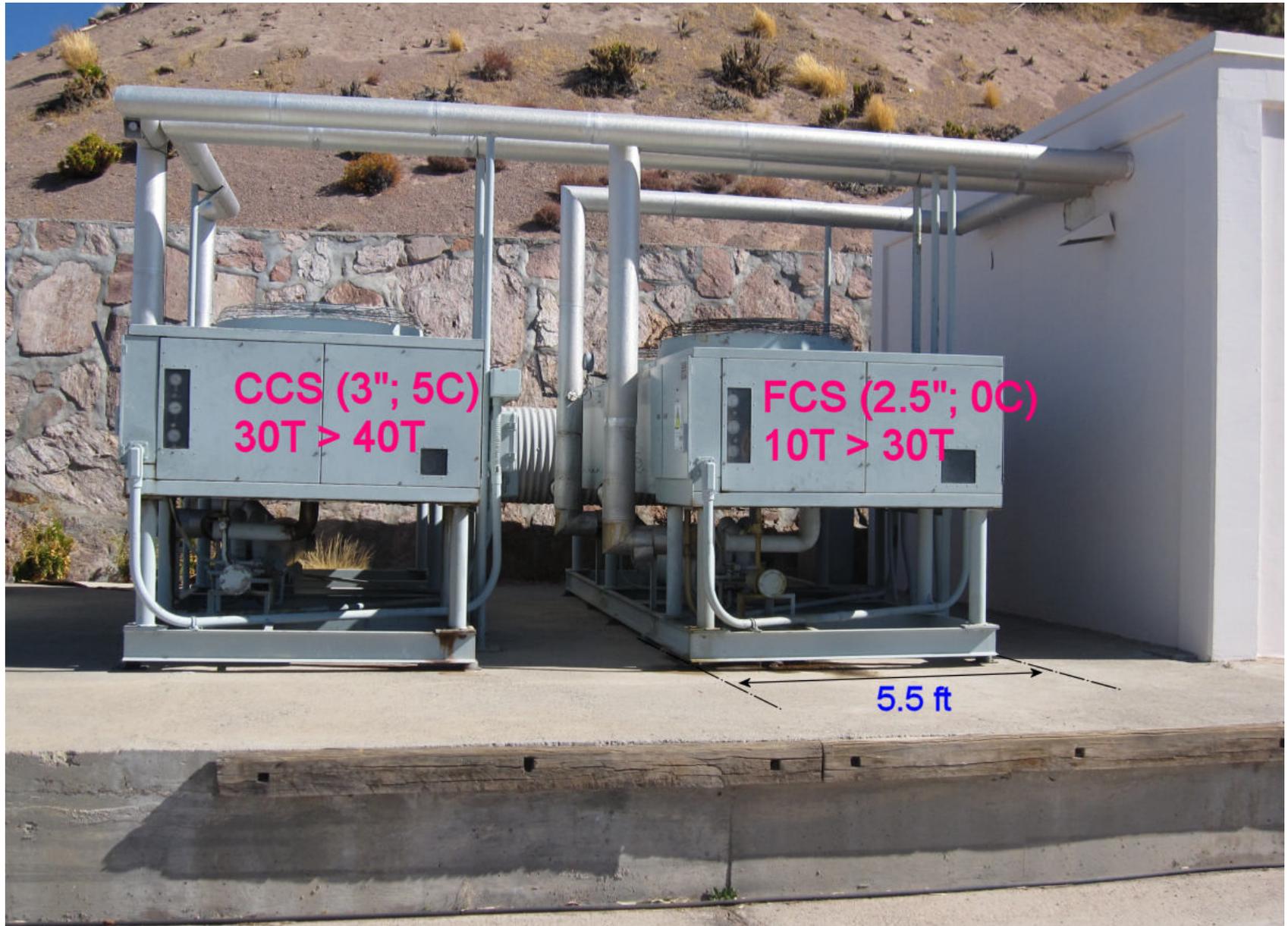


Blanco Glycol System, utilities

Brooke Gregory

DECam I&I meeting, 11-14 April 2011

Glycol System Upgrade

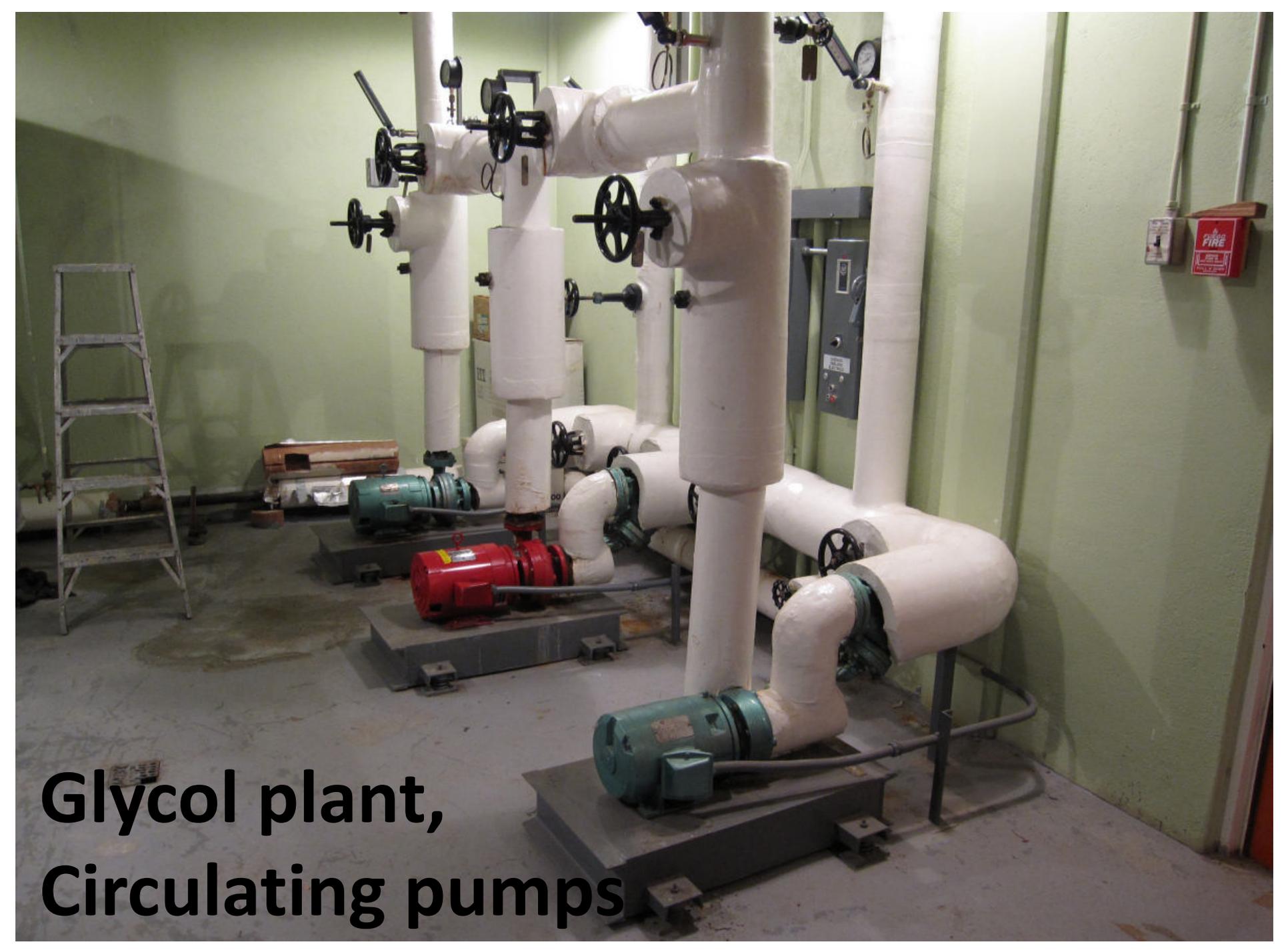


New 40 T Trane chiller



The image shows a row of industrial glycol chillers in a desert environment. The chillers are large, rectangular metal cabinets mounted on a metal frame. They are connected to a network of large, silver-colored pipes that run across the top of the area. In the background, there is a stone wall and a hillside under a clear blue sky. The ground is sandy and sparsely vegetated. The text "Glycol chillers, now" is overlaid in the bottom left corner.

**Glycol chillers,
now**

A photograph of a glycol plant in a utility room. The system consists of several large, white, vertical pipes connected by horizontal pipes. Three green electric motors are mounted on the pipes, each driving a pump. A red motor is also visible. The room has light green walls, a concrete floor, and a metal ladder on the left. A fire alarm pull station is mounted on the wall to the right.

**Glycol plant,
Circulating pumps**

Compressors are major heat load



DECam demands on glycol system

Subsystem	Heat to be removed
Two DECcam compressors	2 x 7.5 kW
NESLAB cooler for monsoon crates	2.4 kW
Total DECcam	17.4 kW
Two NEWFIRM compressors	2 x 8 kW
Grand Total	33.4 kW

Demands on and capacity of upgraded Blanco Glycol Chiller system

version of 4Apr2011

Floor	Height above ground	FCS - Floor loop (2.5 inch) [0 C]	Heat kW	CCS - Building loop (3 inch) [5 C]	Heat kW
Main		[Dome air (future)]	20	[Dome air (future)]	20
		Floor	36	Coude (cleanroom and all compressors)	47.3
				Coude (NEWFIRM compressors only)	16
				Coude (2 NEWFIRM + 2 DECam comp.)	32
Pump		Oil cooler	10		
Pump		Mirror air	10	TCS , screen room etc.	3
				Computer (new)	30
				Computer (old)	10
Ground				Console	5

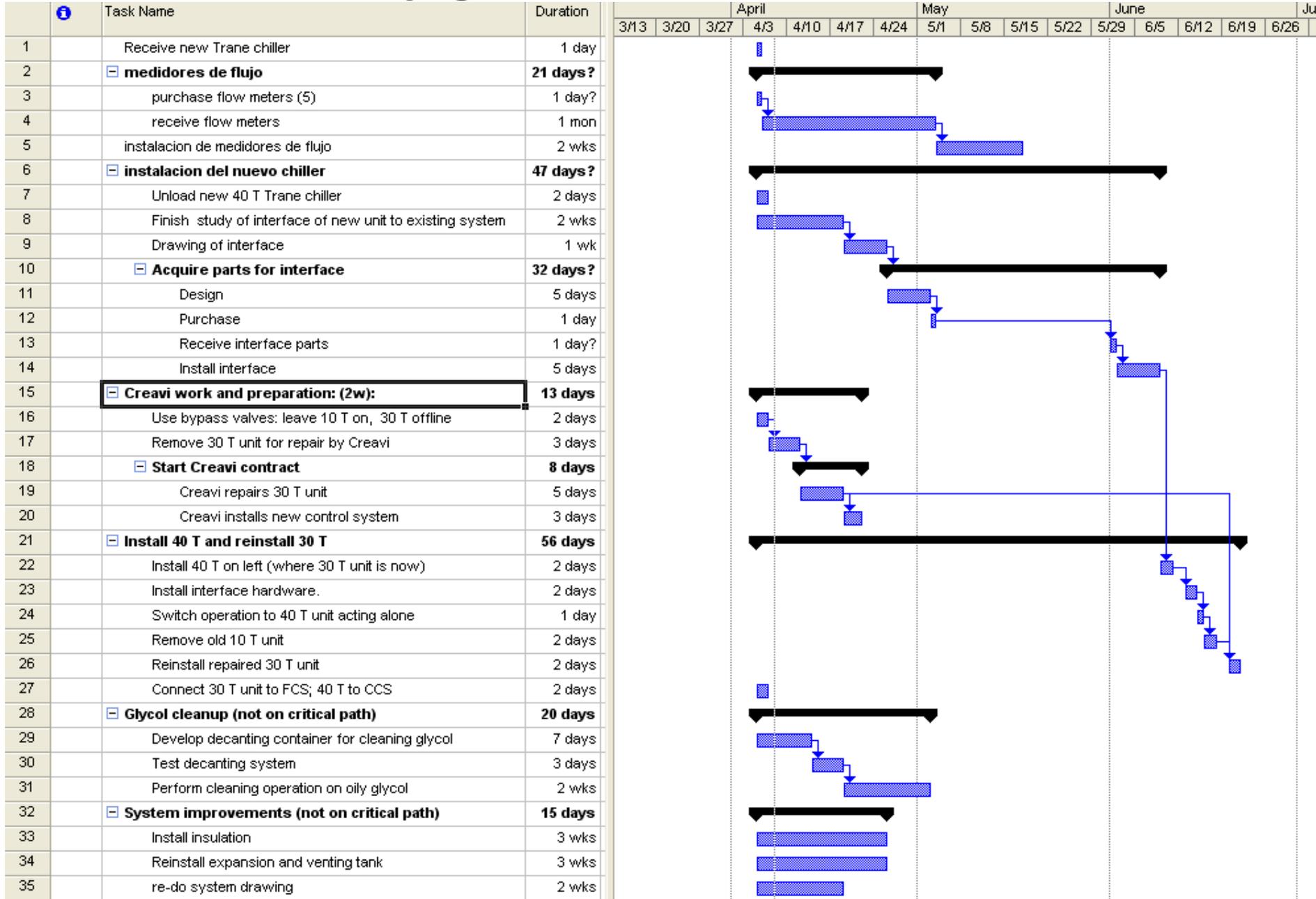
	FUTURE total demand		76 kW	FUTURE total demand		90 kW
Requirement:	Now	Future	22 TR			26 TR
Building Loop	34.0	105.3	kW	chiller capacity	30 TR	chiller capacity
Floor cooling loop	56.0	76.0	kW	overcapacity	139%	overcapacity
Total (kW)	90.0	181.3	kW			40 TR
Total (TR)	25.6	51.5	TR			156%

Capacity:	With new chiller		Capacity of chillers in watts			
Older chiller	30.0	TR	105.51 kW			
New chiller	40.0	TR	140.68 kW			
Total capacity	70	TR	246.19 kW			

	Now	Future			
Over-capacity	117%	136%			

1 TR = 3.517 kW

Chiller upgrade: Sketch of a Plan



Dry Air for purging optics

- Recent history: bottled N₂ or LN₂ boiloff vapor. Manpower intensive.
- A better way (pioneered by KPNO):
 - Use compressed air from existing compressors
 - Filter and dry the air

Requirements:

- DECam 3-4 scfm
- NEWFIRM 0.1 scfm

Compressed air supply: 2 x 9 scfm compressors = 18 scfm (currently operating at 90 psi). What is present unused capacity?

Photo of air compressors (P-floor)



Photo of
Hankison
dryer



Performance of dryer

Hankison DHW-20

Takes (up to) 16 SCFM ~ 100 psig air, water saturated at 100 F:

- Uses 5.5 SCFM to purge alternate cylinder, and
- Delivers (up to) 14.5 SCFM with a dewpoint of -73 C (at 100 psig pressure)

Equivalent of dewpoint of -85.6 C at atmospheric pressure

Compressed air for filter changing unit

- Another requirement for compressed air
- 1.7 – 1.9 scfm at a minimum pressure of 100 psi
- The flow requirement is within our present capacity
- We will boost the operating pressure of the compressed air system to 105 -110 psi