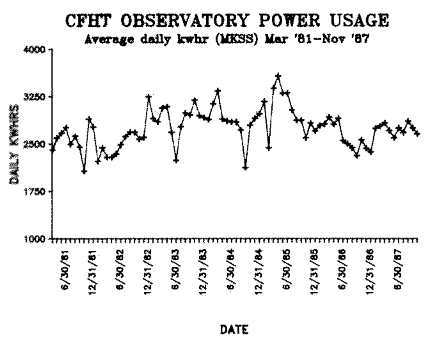
- rewiring staff elevator motors to reduce starting currents.
- installing a new motor/generator set for filtering and conditioning incoming power to the computers and instruments.

Figure 11b shows CFHT Observatory Power Costs, reflecting our lower consumption. The returns on our efforts have clearly been very worthwhile, with monetary savings far outweighing capital and operating investments. Power usage appears to have levelled off now; one can expect less dramatic improvements in the future. Further gains in image quality may actually require more energy consumption.

For example, our latest step towards seeing improvement has been to cool the telescope hydraulics fluid using energy from the chiller system. Considering the various inefficiencies along the way, one would expect overall energy usage to have gone up. This has not been observed during the past 6 months since the telescope hydraulics cooling system came into steady operation. The countervailing measures for better chiller control and more efficient operation have apparently compensated for the overall increased cooling.

Similar detailed plans are underway to monitor, analyze, and improve the operation of other major energy users in the building: i.e. dome hydraulics system; lighting; air compressors; heating and ventilation. This will enable us to further control our dome environment and guide us to yet other gains in seeing and image quality improvements.

*J. Sovka*



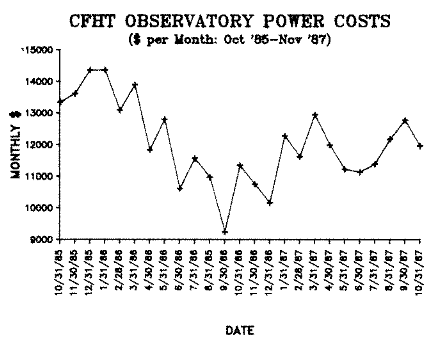




*Figure 11a and 11b.*

# CCD Lab Development

Since 1981 the number of nights per year that a CCD has been used on the telescope has increased dramatically. This rise in popularity has necessitated the creation of a support facility at CFHT to provide installation and setup of the detectors on the telescope, as well as a development lab to test and characterize these devices. The support of the instrument at the telescope is complete; development of the lab continues.

In the spring of 1987 a computer system was brought up and running in the CCD lab to enable testing of detectors. The computer is based on the Multibus architecture with a 68010 central processing unit and supports a version of the UNIX operating system. This system is now capable of controlling several peripherals such as external image memory, a tape drive, and of course, a CCD. With a 140 Mb hard disk, 8 Mb of RAM and a relatively fast floating point processor, the system is capable of sophisticated image processing. This includes such things as basic image subtractions and additions to more elaborate procedures requiring row or column averaging or search and detection routines (filters).

In its current state of development the CCD lab is capable of performing many different tests in CCD characterization. These include finding proper preflash levels, generating linearity and light transfer function curves, investigating charge transfer efficiency, and determining noise and gain values. Plotting and analysis routines have been written to help interpret the data generated from these tests.

Over the past year the CCD lab capabilities have increased greatly as the test facility has been expanded and developed. Because of this, the support at the telescope has been aided as the detectors are better understood. There is little doubt that CCDs will be in heavy demand for sometime to come and with this in mind development of the CCD lab will continue.

*C. Clark*

# 3.6 Meter Primary Mirror Washing

In an attempt to prolong the useful lifetime of the mirror's aluminum coating a new washing procedure was used on 13 August 1987. This procedure is an adaptation of techniques used successfully for many years at the Mt. Wilson and Palomar Observatories in California. The CFHT mirror was successfully washed in its mirror cell while on the telescope. Safety is one of the most obvious advantages of this method as there is always a very small but finite risk to the mirror whenever it is removed from the telescope although every effort is made to minimize this risk. Another advantage to washing in place is time, as only about 7 hours are required to completely clean the mirror surface. This also means there is no time lost due to re-collimation of the telescope as the mirror position is left unchanged.

Effectively, the mirror could be washed 3 or 4 times at six month intervals before re-aluminizing would be necessary due to normal environmental deterioration of the coating. Besides the advantages of prolonging the useful lifetime of the aluminum coating, the overall quality of the optical surface should be significantly improved.

*T. Gregory*

*Figure 12.*