

Full Cold SHUT DOWN Checklist

Mount Lemmon 60”

ver. 4.0 - Last Updated 09/01/2019

This is for a NORMAL Shutdown to a Lightning Safe Condition.

Note that CSS cables that MUST be disconnected for shutdown are marked with RED tape. Cables that should NOT be disconnected are marked with WHITE tape. KEEP AN EYE OPEN FOR ANY CABLES MARKED WITH WHITE TAPE THAT HAVE BEEN DISCONNECTED! Reconnect them if you can identify where the connections should be made.

Call for assistance if you cannot identify ANY cables!

NOTE: THIS CHECKLIST DESCRIBES THE CORRECT PROCESS, **IN THE PROPER ORDER**, TO BRING THE TELESCOPE OUT OF A FULL COLD SHUT DOWN. THESE INSTRUCTIONS WILL SHOW YOU A PHOTO OF THE LOCATION FOR THE NEXT STEP IN THE PROCESS AND THEN PROVIDE THE INSTRUCTIONS ON WHAT TO DO IN THAT PHOTO.

1. When the telescopes are going to be put into lightning shutdown, the observer at the 1.5-m (60”) telescope has the final responsible for the majority of the tasks required to put the 1-m (40”) telescope into shutdown too. Some of these tasks can be completed by the remote observer, but the division of labor should always be coordinated with the observer at the Lemmon site to ensure that the telescope is completely shut down and ready for the physical disconnection of cabling. If the remote observer is performing these tasks, you can go to the next main section to shutdown the telescope. **If there is no remote observer when it is time to perform full shutdown, do these tasks first, then continue with the 1.5-m (60”) shutdown!**

Initial 1-meter Lightning Shutdown

1. It is often easier for the remote observer to complete these tasks at the end of the night before shutdown, or at whichever time it is agreed that a full lightning shutdown should occur. Regardless of who does the actual remote shutdown of the equipment at the telescope, the observer on Mt. Lemmon should confirm that the equipment has been powered off before performing the shut down of the 1.5-m telescope.
2. When it is time to put the telescopes into shutdown, the remote observer should perform their nominal end of night tasks, i.e., send the telescope and dome back to their stow positions if they are not already there, turn off the fans, close the mirror covers, close the slit.

3. Once these tasks have been completed, turn off the power to the TCS UPS (including the interior light if it was turned on for any reason)
4. Turn off the power to the camera controller on “UPS40”.
5. SSH into Atacama and issue a shutdown command.
6. SSH into Gobi and issue a shutdown command.
7. Wait a few minutes so these two computers can completely shut themselves off.
8. While the shutdown of these computers (Gobi in the computer rack and Agincourt in the SO closet) -should- be an indication to the observer at the Lemmon site that the 1-m (40”) telescope is powered off and ready for shutdown, an email or telephone call to the on site observer confirming that fact would be helpful.

At this point the 1.5-m (60”) observer can then go over to the 1-m (40”) dome and proceed to put the telescope into a physical lightning shut down.

Initial Shut Down Steps

2. Location: **“Observer's Position”**

1. When it has been determined you will be going into lightning shutdown, COMPLETE any end of night tasks that need to be finished by the CSS Control software, if you have not yet already done so.
2. Using the TCS-NG GUI, send the telescope and dome to their appropriate positions to close the lower dome shutter (ALT 85 / AZM 225 works well for this). Leave this interface running & connected.
3. In the Acquisition Window in Control, CLICK “Stop Cooling” and then “Stop Camera”
Click on “Stop Telemetry”.
4. When Control has finished all of it's processes, “Clean Up”, and “Quit” Control as usual. (The “Xfer” process can take some time. You can shut down before this process finishes, though it will need to be restarted once the system is brought back up.)
5. Quit and Close all remaining software that is still running. Leave a terminal windows open so you can shut down the computers in a later step.

2. Location: **“The Dome”**

1. Turn **“OFF”** any **fans** that are still running.
2. **CLOSE** the telescope's **dust covers**.
3. **CLOSE** the **lower dome shutter**.
4. Once the telescope's dust covers are closed, **CLOSE** the **upper dome shutter**.

“Securing” the Computers

3. Location: **“Observer's Position”**

1. Using the **TCS-NG GUI**, send the **telescope & dome** to their **STOW** positions.
2. Once both the telescope and dome have reached their stow positions, and all indications of movement have stopped, you can now **disconnect the TCS-NG GUI** from the TCS-NG computer and shut the program down.
3. Confirm that the 1-m (40”) computers **Atacama, Gobi & Agincourt** have all been shutdown. If not, log in as Super User and issue the **POWEROFF** command to each one in turn.
4. Log into each of the **remaining CSS computers** and as Super User, **POWEROFF** each one in turn.
5. **Shut Down the Control Computer**



6. When all of the computers have shut themselves off, **UNPLUG** the **Computer Rack** from the wall outlet.
7. In the **SO Closet**, **UNPLUG** the computer “**Agincourt**”, which is the labeled “**Camera 40**” from the wall outlet. Do nothing else in this closet.

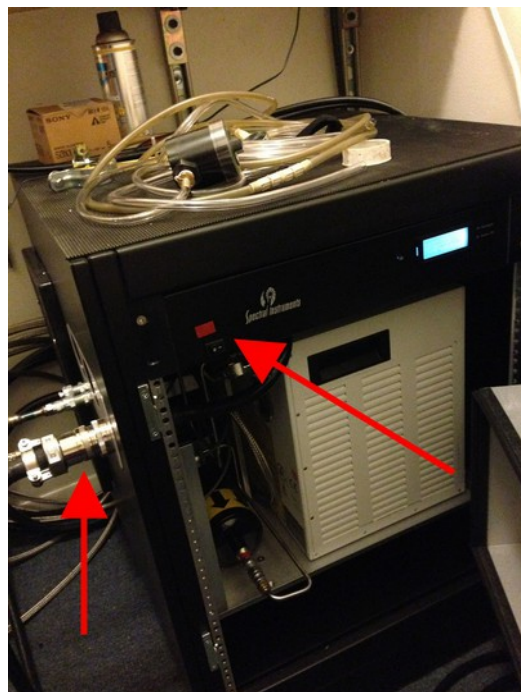
Securing the Telescope & Instrument

4. Location: “Tiger Cage and South Wall”

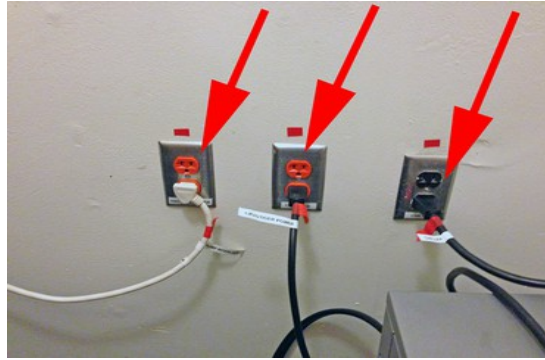
1. Press the Power Button to power down the Chiller.



2. **OPEN** the door on the right-hand side of the Cryotiger+power supply “Service Module” (CSM) and turn the rocker switch to the OFF position! Close the door.



3. **UNPLUG** the cable on the side of the **CSM**.
4. Then, **UNPLUG** the “Vacuum Pump and Interlock Valve power strip” (**VPIV**), the Cryotiger+power supply “Service Module” (**CSM**), and the Chiller from their respective wall outlets.



5. **CONFIRM** that the air compressor wall switch is in the **ON** and the air dryer is **plugged IN**. We now run the compressor and air dryer during lightning shutdowns. Air flow should be 0.5 CFM.

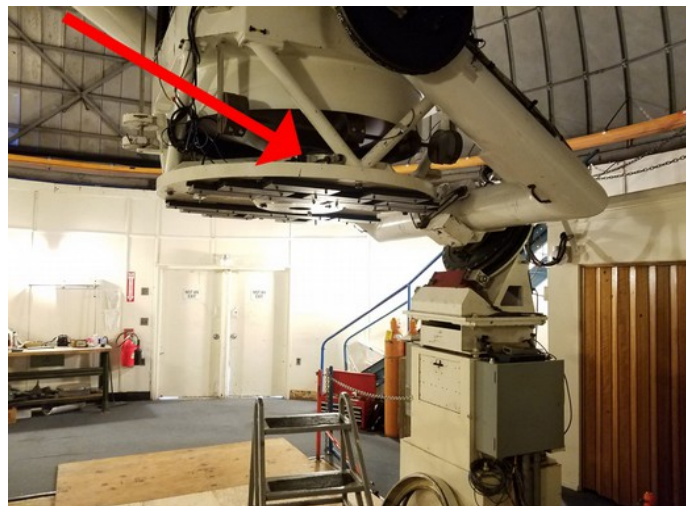


6. Inside the **South Closet**, switch “**OFF**” the wall type switch on the lower right of the box.
7. **Unplug** the two (2) “**Dome Power**” cable pigtails together.
8. Outside the closet, on the south dome wall, **disconnect** the pig-tail cable labeled “**Dome**

Controller” from its socket on the bottom of the controller box below the label “Dome Controller”.

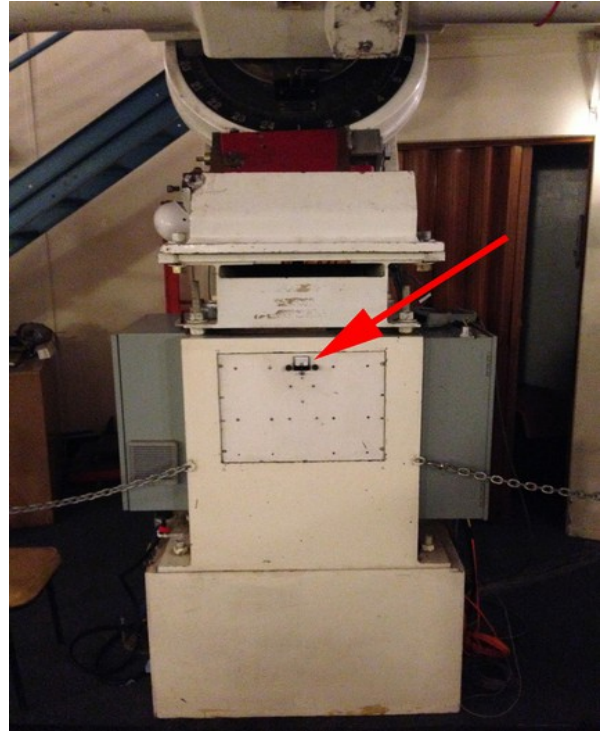


5. Location: **“The Dome”**



1. **UNPLUG** the **green power cord** for the **Shutter Box**, from under the Primary Cell, indicated by the lower arrow in the photo.
2. **Note: We no longer disconnect the 1-wire network cable. Do not disconnect any cable here other than the power cord.**
3. Note: The elevator is no longer in service.

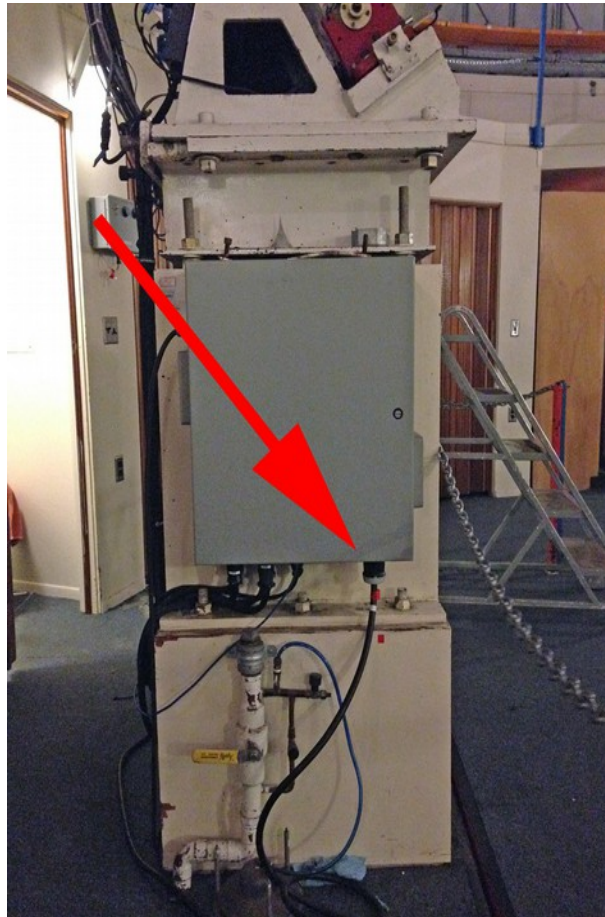
4. From the Console, **LOWER** the floor until it is all of the way down.



5. **PRESS** the **SQUARE RED** power button to **de-energize** the telescope drives and the TCS-NG computer
6. **Confirm** this by checking that the voltage is dropping on the meter on the south pier.
7. Press the large **ROUND RED** knob "**Main Power OFF**" to **de-energize** all of the remaining telescope & dome power.

Note that the Limit Override switch should be in the **CLOSED** position as shown in the image.

6. Location: “South Pier”



1. **UNPLUG** the “**Fat**” **Power cable** from the bottom of the TCS-NG box mounted on the east-side pier. The outlet is located on the bottom of the TCS-NG box. The power plug requires a slight turn to become unseated.
2. **Before leaving the dome:**
 1. **DISCONNECT** the dome encoder from the TCS-NG port inside the east entry door.
 2. **CONFIRM** that the fans are “**OFF**”.
 3. **CONFIRM** that there are no items left running.

4. **CONFIRM** that all of the lights are “**OFF**”.
Close and secure the entry way door.



7. Location: “**Foyer**”



1. On the front of the UPS, turn “**OFF**” the power using the key switch.
2. **Open** the front panel of the UPS and set the breaker to the “**OFF**” position. Close the front panel of the UPS.
3. On the east wall, set both breakers to the “**OFF**” position.
4. **Disconnect** the two (2) 220V cables from their outlets on the wall mounted box.

The telescope & associated systems are now in
FULL COLD Shutdown, a Lightning Safe Condition.