

**Written Direct Testimony of Robert McLaren**  
Decommissioning of Telescopes and Limits on Future Development

My name is Robert McLaren. I am the Associate Director at the Institute for Astronomy at the University of Hawai'i ("UH"). Since joining the Institute in 1990, I have been closely involved in the development of astronomy facilities on Maunakea. Prior to that, I was on the staff of the Canada-France-Hawaii Telescope from 1982-1990. My curriculum vitae was submitted as Exhibit A-119.

The *Decommissioning Plan for the Mauna Kea Observatories* ("DP") (Exhibit A-13) is a subplan of the *Mauna Kea Comprehensive Management Plan* ("CMP") (Exhibit A-9). It was approved by both the UH Board of Regents and the Board of Land and Natural Resources ("BLNR") in 2009. The DP provides a framework for both existing and future observatories on Maunakea to ensure that the Department of Land and Natural Resources ("DLNR") as landowner and lessor, UH as lessee, and the observatories as sublessees have clear expectations of the observatory decommissioning process. To that end, the plan calls for an extensive program of advance planning, consultation and approvals that must begin several years before the actual physical removal starts. The attached Figure 1 from the DP (Exhibit A-38) illustrates the broad scope of the decommissioning process. It begins with the submission of a Notice of Intent ("NOI") followed by review and comment at several stages by the Office of Mauna Kea Management ("OMKM"), the Kahu Kū Mauna Council and the Mauna Kea Management Board ("MKMB"), and ultimately approval by the UH President and Board of Regents. The MKMB reviews in particular provide an opportunity for local community input and comment. In parallel, there are the required environmental assessments and any required Conservation District permitting actions.

While the main focus of the DP is on the requirements and process for telescope decommissioning, Chapter 5 of the document addresses UH's goal of maintaining a world-leading observatory complex while limiting future growth. At the time that the DP was adopted, there were 13 telescopes operating on Maunakea. Two were owned and operated exclusively by UH: the UH 2.2-meter Telescope and Hokuke'a, the UH Hilo instructional telescope. The other 11 were owned by non-UH organizations and situated on subleased sites: CFHT, UKIRT, IRTF, CSO, JCMT, VLBA, Kecks I & II, Subaru, Gemini and SMA. In May 2009, Caltech announced its intention to decommission the CSO and remove it from the mountain during the period 2016-2018. In September 2015, CSO ended scientific operations. Caltech submitted its NOI to decommission CSO in November 2015.

When the DP was adopted in 2009, it was assumed, for planning purposes, that the other 10 non-UH telescopes would continue to operate through the term of their subleases, *i.e.*, through 2033. This assumption was based on the fact that, with relatively inexpensive upgrades to their instrumentation, all of them could maintain their high level of scientific productivity for at least that period and even longer. In some cases, the upgrades might be more extensive, amounting to renovations or replacements that would have about the same overall footprint. On the other hand, it was also understood that policy changes within sponsor organizations could lead to earlier termination of operations and subsequent decommissioning, but no such changes were foreseen at that time. With regard to the UH-owned telescopes, the intention was to retain Hokuke'a indefinitely and to replace the UH 2.2-meter Telescope with the Pan-STARRS wide-field survey telescope. The latter did not happen, and instead Pan-STARRS was developed on Haleakala. The other basic assumption in the DP was that the Thirty Meter Telescope ("TMT") would be developed at its designated site, known as "13 North."

Based on the above assumptions, and in line with the goal of limiting future growth while maintaining scientific and educational excellence, Chapter 5 of the DP concludes with a projection that 10 facilities would continue beyond the year 2033, assuming that the master lease is extended. These are: UH 2.2-m, Hokuke'a, CFHT, IRTF, Kecks I & II, Subaru, Gemini, TMT, and one or other of JCMT and SMA. Conversely, the current projection is that four will not extend beyond 2033: CSO, VLBA, UKIRT, and one or other of JCMT and SMA. Thus, starting with the 13 telescopes in operation at the time the DP was adopted, one would be added (TMT) and four would be removed by 2033, leaving 10 in operation. Two points are important to keep in mind. The first is that none of the four telescopes projected for decommissioning by 2033 was selected because it would be obsolete by that time. On the contrary, and as explained above, all of them could remain very productive given adequate sponsor support. Rather, they were selected either because of announced sponsor policy decisions (CSO) or on the basis of a value judgment by UH between future scientific potential and the goal of limiting overall physical presence on the mountain. The second point is that judgments like this are by necessity based on the current prevailing situation and assumptions. Both of these can change with time, and with them, the resulting priorities and projections.

In May 2015, UH responded to two directives from Governor Ige that bear on this topic. The first of these was a confirmation that the TMT site is the last new area on the mountain where a telescope project will be contemplated or sought; any other future development will be at existing sites. This limitation, which was already implicit in the DP, was reaffirmed explicitly in a November 17, 2015 letter from UH President Lassner to BLNR Chairperson Suzanne Case. A copy of the letter is attached as Exhibit A-39. In the same letter, UH responded to the second directive by committing to decommission three telescopes by the time that TMT is operational.

One of these is the CSO, for which the decommissioning process is already underway, as mentioned above. Another is UKIRT, whose decommissioning by the time TMT is operational amounts to an acceleration of the time scale already foreseen in the DP. UH has proposed that Hokuke'a be the third, which proposal is currently under review by OMKM and MKMB.

*[Remainder of page intentionally left blank. Signature page follows.]*

DATED: Honolulu, Hawai'i, October 11, 2016.

A handwritten signature in black ink, appearing to read 'R. McLaren', written over a horizontal line.

Robert McLaren  
Associate Director, Institute for  
Astronomy