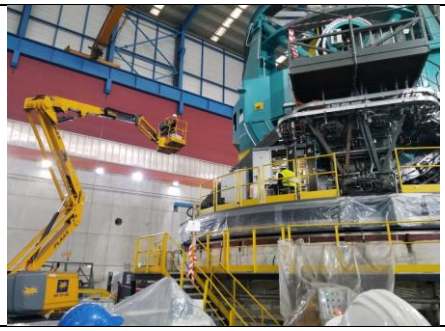

December 26, 2018

Victor Krabbendam
LSST Corporation
933 N. Cherry Avenue
Tucson, AZ 85721

Re: LSST Safety Council Review - 2018

Dear Victor:

The following is the LSST Safety Council summary of its observations during 2018 based on various reviews and forums in which the Council members have participated including the Joint Director's Review, June 24 – 29, 2018 and the All Hands Meeting the week of August 13-17, 2018.

Safety is given high priority on the LSST project and receives continued project senior management attention by way of regular field presence with demonstrated focus on safety and responsiveness to requests for safety support.

The project has well developed safety documentation identifying applicable safety standards, project requirements and defining personnel safety roles and responsibilities (LPM-18 and R2A2s). LSST also has in place a clearly defined Hazard Identification and Mitigation Process (LPM-49). The Hazard Index continues to be used and refined as a foundational document to drive mitigation at the design level.

Accident/ Injury response protocols in Chile have been clearly defined by the LSST. The effectiveness of the LSST safety program is reflected in its very low Total Recordable Incident Rate (TRIR), a measure of occurrence and recordable incidents reflecting the number of injuries per 100 workers over the span of one year. **LSST's TRIR of .37 is 1/11 of the US national average for construction** which is 4.0 and 1/4 of that of DOE construction projects of 1.3.

Initially the Safety Council was concerned, from a system safety perspective, whether appropriate hazard mitigations for the system and subsystems were being identified, described and mitigated during the AIV/Commissioning activities. Subsequent documentation from Chuck Gessner entitled, "Telescope Mount Assembly Hazard Mitigation Demonstrations" shows a Test Data framework for validating engineering design in systems and subsystems at a detailed level. The documentation provided, based on the JIRA information platform, clearly shows how the early project commitment to "Prevention (Of Hazards) Through Design (PtD)" is being used by the project. It is also anticipated that this process will also be used as a foundation for the project for operational aspects. The Council is impressed with the work the project

system and subsystem engineers to integrate work planning and work control management tools such as Magic Draw and JIRA, to verify subsystems functionality, performance, and interfaces into the AIV/Commissioning process prior to integration on Cerro Pachon. The LSST is using a systems chart provided by the Council as a template to verify that appropriate mitigations have been made. The Council approves of the significant involvement of safety staff in factory acceptance testing has provided valuable oversight of design-based safety into major components.

Based upon the latest documentation and discussions during this year, the Council believes that the continued focus on optimizing a comprehensive design safety ("system safety") analysis will assist in clearly mitigating identified hazards in the project. This focus will complement current critical phasing between Factory Acceptance Testing, Subsystem Assembly Verification and Summit Assembly, Integration and Verification. Experience with projects of similar complexity indicates that a stronger and more pro-active system safety effort would identify additional potentially hazardous conditions, and reduced the uncertainty associated with known and unknown hazards. Whether or not this uncertainty will result in "real" problems during subsequent phases of the project remains to be seen.

Review work planning/work control system hazard control effectiveness with respect to the project systems engineering process. Specifically, is hazard mitigation being effectively managed through the integration of project tools such as JIRA (Issue Tracking & Agile Work Planning Tool), Magic Draw (Model Based Systems Engineering Tool) Primavera P6, (Project Planning Tool), Adaptivity Test Manager (Test Planning and Execution).

The Safety Council suggests that the project add safety administrative support to assist in the further development of the project safety program.

The Safety Council suggests that the project consider developing a Fatigue Management Plan. Fatigue, both physical and mental, may be an underappreciated aspect of the safety management plan at this stage of the project.

Conclusion

The project has demonstrated continued commitment to managed risk. Those processes are being managed competently by the Project Office. The safety leadership shown by administrative and technical staff have demonstrated consistency of values to honor protecting people, property and the environment. The Safety Council applauds your past efforts and looks forward to supporting a safe project going forward.