W. M. Keck Observatory | FAQs
Updated October 5, 2018

HYDRAULIC FLUID SEEPAGE AT KECK

How did Keck Observatory discover the hydraulic fluid seepage?
In the course of maintenance in mid-April, observatory technicians discovered the hydraulic fluid seepage on the pier wall supporting the Keck I telescope, an area normally concealed behind drywall inside the telescope facility.

How much hydraulic fluid is involved?
That will be determined by an immediate investigation. Keck Observatory officials retained the environmental, geotechnical, and hydrogeological consulting and engineering firm Masa Fujioka and Associates to conduct an investigation of the seepage and recommend appropriate remedial measures, if necessary, in consultation with Hawaii Department of Health (HDOH) and Office of Maunakea Management (OMKM).

How long has this been going on?
Because the slow seepage was hidden behind the drywall, we do not know for sure. Our environmental consultant and engineering staff are working to better understand exactly how long the seepage has been occurring.

What is the composition of the hydraulic fluid?
Keck Observatory uses Mobil SHC 525 hydraulic fluid, which is formulated from synthetic, wax-free hydrocarbon base fluids.

Substances in the hydraulic fluid are listed in the Safety Data Sheet. None of these substances are in the Reportable Quantities table in the HDOH's Office of Hazard Evaluation and Emergency Response (HEER) Technical Guidance Manual (TGM), Appendix 2-B; however, "oil" (generically) is listed so that a release of the material requires reporting.

When did you report to the Hawaii Department of Health?
On June 4, technicians extracted samples of cinder from a narrow isolation joint, or seam, in the floor of Keck I. The cinder sample appeared to be wet; Keck Observatory sent an immediate notification to HDOH.

Did the May 4 earthquake cause or worsen this situation?
That will be determined by an immediate investigation, although Keck Observatory technicians observed hydraulic fluid on the Keck I pier before the May 4 earthquake.

When did you first discover the hydraulic fluid seepage?
Here's a timeline of events leading up to our report to the HDOH:

Timeline of events:

- April 19, 2018: Technicians noted the presence of a small amount of hydraulic fluid on the pier wall; action taken to contain the seepage using absorbent material.

- May 24, 2018: Senior management was briefed on the presence of hydraulic fluid on the Keck I pier.
- May 29, 2018: Internal task force formed to pursue high-priority investigation.
- June 4, 2018: Cinder sampling suggests presence of hydraulic fluid; immediate notification to HDOH.
- Next steps: Environmental consultants, Masa Fujioka and Associates, are conducting a third-party investigation to determine the extent of the release and recommend appropriate remedial measures as necessary. Containment measures are in place to prevent any new hydraulic fluid from reaching the ground.

How has the fluid been contained to prevent further release to the environment?
Upon discovery of the release, Keck Observatory took immediate action to prevent any further release by ensuring hydraulic fluid is captured by absorbing material affixed to the dome beneath the hydraulic bearing system.

On September 28, 2018, Keck Observatory permanently contained the release. Sakoda Construction, a Hilo-based contractor hired by Keck Observatory, re-sealed the one-inch wide gap between the pier supporting the Keck I telescope and the building's floor. This gap was identified during the Observatory's investigation as the pathway through which hydraulic fluid seeped out of the hydraulic bearing system and traveled to the ground below.

With the installation of the sealant, there is no longer a path for hydraulic fluid, or any other substances, to release into the environment.

We are committed to bringing in any additional resources and expertise required to respond appropriately to the findings of the investigation.

Where is the seepage happening?
All of the drywall surrounding the base of the piers for both Keck I and Keck II has been removed and the underlying concrete pier walls have been inspected by Keck Observatory technicians. There were six seepage areas identified on the pier supporting Keck I and no seepage areas identified on the pier supporting Keck II.

Independent consultants, Masa Fujioka and Associates, conducted an investigation that revealed the total release includes a small leak coming from a hydraulic fluid return line located a few feet away from the Keck ll pier, which was also immediately contained. Containment measures remain in place to ensure no further hydraulic fluid can travel to the ground.

Now that we understand the full scope of releases to the environment, we are continuing to execute preventative measures for all seepage locations.

Have regulatory officials inspected the site?
On Wednesday, August 1, 2018, representatives from the Department of Land and Natural Resources (DLNR) and OMKM conducted an in-person site inspection of the telescope facilities. Their analysis of the site and Keck Observatory's containment efforts was positive and reaffirmed all measures taken met expectations.

W. M. KECK OBSERVATORY
Maunakea, Island of Hawai'i

On Wednesday, September 5, 2018, HDOH Senior Environmental Scientist, two of their Environmental Health Specialists and members of OMKM participated in a site visit to assess the release. We remain in close contact with the HDOH and are taking proactive measures to supply them with additional information through the Environmental Hazard Evaluation (EHE) and Environmental Hazard Management Plan (EHMP) being prepared by third-party environmental consultant, Masa Fujioka & Associates.

We remain committed to working in accordance with the HDOH and are treating this investigation as our top priority.