A new wellhead design that is easily ROV-serviceable has been developed for implementation at IODP borehole observatories. The original impetus for this development was the need for an ROV-serviceable, submarine-cable-connected wellhead design for the Monterey Bay Borehole Observatory (IODP) drilling expedition. This expedition was sponsored by the Monterey Bay Aquarium Research Institute (MBARI) and was completed in 2005. The expedition was sponsored from the action science because of permitting issues, but the design has been completed and is now available for implementation on future IODP borehole observatories and will be posted on an IODP website in the near future.

**New Design: Post-Drilling Removable Science Modules**

- A completion wellhead's changes. The entry cone and side panel frames have been removed and replaced with a protective cover that is reinstalled using a commercial ROV-operated hydraulic torque tool. The side panel frames are covered with thick plastic control the exposure of the monitoring equipment and the upper part of the borehole. This new design has been in remote deepwater locations, this exposure of the monitoring equipment and the upper part of the borehole. The new design is a radical departure from traditional re-entry cone designs used during the ODP and IODP. However, the design dimensions of the mud skirt have not been modified and the ultimate expression of the re-entry cone and completion equipment.

- The evolution of cased holes that could be re-entered started during the Deep Sea Drilling Project (DSDP) with experiments conducted during the IODP will increase the dependence on ROVs in service these facilities. Finally, the IODP will further develop research on the potential for long-term, on the seafloor to submarine cable connections for trace metal chemistry.

- The surface expression of the new wellhead design is a radical departure from traditional re-entry cone designs used during the ODP and IODP. However, the design dimensions of the mud skirt have not been modified and the ultimate expression of the re-entry cone and completion equipment.

- The Pore Water Factory is shown connected to the flow pathways through the H2O and Pore Water Factory. Cross-section showing the hot stab is connected to seawater. Non-corrosive materials are required for a 10-year useful life.

**Existing Re-entry Cone Wellhead Design**

- Wellhead mud skirt
- Fluid pathways
- Science module
- Hot stab for Fluid Connections
- Traditional Quick-Connectors
- Corrode
- Moving parts and springs
- Not-easily ROV-mateable

**New Design: Drilling Stage Re-entry Cone Cover**

- Drill pipe
- Shock absorbing panels
- Wellhead mud skirt
- Wellhead mud skirt
- Science module pin
- Hot stab

**New Design: Post-Drilling Removable Science Modules**

- Recovery stab
- Wellhead electrical and fluid connections
- Science module
- Fluid Manifold
- Fluid Manifold

**Schematic cross-section of wellhead with mini-packer installed.** This existing wellhead provides two basic borehole measurements, including temperature and pressure.