Modular Hydraulic Packer and Port System – U.S. Patent Pending

Invention
This invention is used to provide targeted water sampling and/or monitoring in new or existing wells with an easily assembled and disassembled system for temporary or permanent use. This device provides increased capacity to measure multiple variables over existing tools. Such targeted sampling and/or monitoring are needed at many sites with contamination or other engineering management issues that require location-specific information in an aquifer.

Boise State University has invented a modular device with greater measurement capacity for well site sampling and monitoring.

Advantages
- Ease of assembly, maintenance, and disassembly compared to current technology.
- Eliminates the need for supplementary pressurization through a manifold at the wellhead which saves time, aggravation, and money.
- Use of simple hydraulic head in an open riser to inflate the packers and maintain the packer inflation during the testing period.

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**Patent Application Name**
Modular Hydraulic Packer and Port System

**Patent Application Abstract**
The Modular Hydraulic Packer-and-Port System is used to provide targeted water sampling and/or monitoring in new or existing wells with an easily assembled and disassembled system that does not require dedicated wells. Such targeted sampling and/or monitoring are needed at many sites with contamination or other engineering management issues that require location-specific information in an aquifer. The system is a collection of easily assembled riser (PVC pipe) sections and riser-with-attached-inflatable-packer sections that provide the means to isolate specific intervals of a well for simultaneously sampling water and/or monitoring water for pressure, temperature, and/or other parameters in the separate intervals. The measurements or samples can be taken through common plastic tubes connecting the isolated zone(s) to the surface; the samples are pumped to the surface or direct measurements are taken with narrow-gauge sensors (e.g., fiber optic transducers) inserted down the tube(s) to the water associated with the isolated zone(s). The packers inflate with hydraulic pressure that is greater than static pressure in the undisturbed borehole; the excess hydraulic pressure is generated by simply pouring water into the riser (which is capped at the bottom) to a particular level above the static water level in the well (static water level is known by simple measurement taken before placing the packer and port system in the well; amount of excess head is known from tables we will provide). Similarly, the system can be removed by pumping water from the riser until the packers deflate – at which point the column can be raised with little effort because of buoyancy.

**The Inventor**

*Dr. Warren Barrash* is a professor of CGISS at Boise State University. Dr. Barrash’s areas of research are hydrogeology; applications of geophysics to hydrogeology; parameter measurement methods and modeling; heterogeneity and geostatistics; contaminant transport and tracer testing.