Quiet Hydraulics Board:
Purpose, Scope, Charter and Plans

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Kick-off Meeting @ Stanford, 16 Oct 2003

Purpose, Scope and Charter of the QHCB

- Purpose is to support the introduction of a “new” technology (quiet hydraulics) into LIGO
  - » LIGO Lab does not have expertise in hydraulics
  - » Stanford continues to support, but we want to augment their support with consultants familiar with the LIGO application so that we can rapidly respond if problems arise
- Scope is generally the Hydraulic External Pre-Isolation (HEPI) system, but most particularly the quiet (laminar flow) hydraulic aspects of the system (pump station, fluid distribution, servo-actuator, fluid/material compatibility, reliability, etc.)
- Charter:
  - » Become informed of the HEPI design
  - » Provide advice on remaining design and implementation
  - » Should problems arise, help diagnose what's wrong and propose solutions. Examples:
    - – Suppose subtle interactions or effects occur which limit performance and require a deep understanding of quiet hydraulics
    - – Suppose Parker drops the pneumatic servo valve that we have modified (revised nozzle), or we find that there are reliability problems. Are there other, more or less "pin compatible" units to choose from, either from Parker or other manufacturers?

Background References

- Overview of the Hydraulic External Pre-Isolator (HEPI) system:
  - » http://www.ligo.caltech.edu/docs/T/T020040-00.pdf
- Overview of the quiet hydraulic actuators:
  - » http://www.ligo.caltech.edu/docs/T/T020047-00.pdf
- More info, pictures and some test results of the full scale prototype:
  - » http://www.ligo.caltech.edu/~coyne/IL/EPI/review2/EPI_review2.htm
- Quiet Hydraulics orientation, or training, material by Dan, Brian & Corwin (presented here today)

Planned Meetings

- 10/16 Kick-off meeting: this meeting
  - » Intent is to acquaint all board members with the LIGO application, give an overview of LIGO, the vibration isolation system and especially the quite (laminar flow) hydraulic, 6 degree of freedom pre-isolation stage
- 10/22 Visit to full-scale prototype @ LASTI facility (MIT) and Fluid Distribution system plan review
  - » See an installation of a full-scale, prototype system almost identical to what we intend to start installing at the observatory in Louisiana in January through April
  - » We will also discuss issues, or concerns, associated with the fluid distribution system (manifolds, valving, maintenance/servicing, etc.) and pump station
- TBD date (late Oct, early Nov), ~2 hr Teleconference: Fluid distribution system design review.
- Observatory visit: During installation and commissioning activities at the LIGO Livingston Observatory (LLO) in Livingston, Louisiana -- approximately late Feb/early Mar 2004
- Meetings thereafter via telephone & every ~6 months
  - » unless circumstances warrant a site visit or an earlier meeting or more frequent meetings.