



**SPECIFICATION**

Drawing No Vers.


Sheet 1 of 6

**SPECIFICATION FOR DE-INSTALLATION & INSTALLATION for ALIGO – WA AND LA LIGO SITES**

APPROVALS	DATE	REV	DCN NO.	BY	CHECK	DCC	DATE
AUTHOR:							
CHECKED:							
APPROVED:							
DCC RELEASE							

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**1.0 GENERAL SCOPE**

This specification covers the minimum requirements for the removal of equipment and utility systems not required for the WA and LA Advanced LIGO Modification of the LIGO Observatories, and the installation of new Advanced LIGO (aLIGO) equipment and utilities. All material must be handled while maintaining the strict cleanliness of the research facility. The Buyer will train the Seller personnel in site cleanliness and safety requirements (See Section 8.0 for detailed requirements).

The California Institute of Technology (Caltech) is the Buyer for these components. The Seller is the successful bidder who is awarded this contract.

The Laser Interferometer Gravitational-Wave Observatory (LIGO) is operated by Caltech and the Massachusetts Institute of Technology (MIT) under a National Science Foundation grant and includes observatories located in the Hanford Reservation (near Richland, WA) and in Livingston, LA.

It is the Seller’s responsibility to follow the requirements of this specification or to propose alternate procedures and specifications to meet the requirements. All alternate approaches must be approved in writing by the Buyer before use.

Any attachments to this specification are incorporated herein by reference and made a part of this specification.

The Buyer will provide a full time representative to work with the Seller during all activities. The Buyer’s representative will work closely with the Seller to identify the activities. The initial work will consist of removal of machined aluminum and stainless steel parts from the LIGO vacuum systems. LIGO technicians will direct much of the sensitive work inside the vacuum chambers. As components are removed, the Seller will be asked to move these components to several locations – typically storage or waste. There are hundreds of individual components in the vacuum system totaling 20-30 tons of metal – most of which will be disposed of.

To gain access to the vacuum system, LIGO technicians will work with the Seller to remove large vacuum doors (dished heads) and replace them after work inside a chamber is completed. This requires careful handling of 1000 – 2000 lb doors using LIGO cranes and forklifts. Much of the above work takes place in clean room conditions so that workers will be garbed appropriately.

Installation of aLIGO equipment at both observatory sites (LHO and LLO) will include craning chambers to new locations and connecting these to the existing vacuum system. Seller will also be installing new aLIGO hardware into the vacuum system and performing in-chamber cleaning and staging of equipment prior to installation. Seller will assist with moving equipment to be staged for installation, moving clean rooms, removing and storing vacuum doors on chambers, and fabrication of work platforms and miscellaneous small metal hardware, as needed. Much of the above work continues to be required to be conducted in clean room conditions.

The Buyer reserves the right to refuse access to the LIGO facility to any of the Seller’s personnel for failure to adhere to LIGO Site Safety Rules or for refusing to work in a safe and clean manner.



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**2.0 Schedule**

The Buyer shall conduct a Kickoff Meeting at the Jobsite one week after project award. The Kickoff Meeting will be used to meet the Seller’s key project personnel, to discuss project requirements in detail and to develop the near term project plan.

The original period of performance for LHO was 11/1/10 to 7/1/11. CWOs issued to date have extended LHO’s period of performance to 03/31/13. This modification adds a period of performance for the LLO site for 10/1/12 through 07/31/13. Both LIGO observatories will be closed from 12/24/10 to 1/4/11, 12/24/11 to 1/3/12, and 12/22/12 to 1/2/13 for the winter holidays and no labor will be required during this period.

**3.0 Commercial**

**3.1 Current Commercial**

The Buyer requests a proposal to provide manpower on a Time and Material basis for each labor class requested below. The Man-hours requested will be required between 10/1/12 and 7/31/13 for the LLO site. The proposals for the LHO site are already included in the original commercial terms below and the latest CWOs.

The Bidder shall provide All-In rates for the following Crafts:

- Millwright Foreman (1) (with Rigger certification)
- Millwrights (with Rigger Certification)
- Pipefitters
- Electricians Laborers

The total estimated labor for work at the LLO is given in the table below.

<b>Job Category</b>	<b>SOW Hours</b>
Foreman	200
Piping	
Piping Apprentice	
Sheet-metal	
Millwright	2,382
Millwright Apprentice	
Electrician	-
Laborer	
....	
<b>Total</b>	<b>2,582</b>

Weekly labor requirements will be scheduled with the Seller ahead of time on a monthly basis. The Buyer reserves the right to cancel or delay work as required by the overall LIGO project schedule.

All waste metal removed by the Seller is the property of LIGO and shall be stored at the site as directed by LIGO representatives

All Labor for this Purchase order shall comply with the Hanford Site Stabilization Agreement

All Riggers shall meet all WA and LA States and OSHA requirements for Riggers and Crane Operators



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The Seller shall provide site Insurance as required by the LIGO site requirements.

The Bidders shall also submit a list of Daily/Monthly Rental Rates for material handling equipment (fork lifts, etc.) which might be required for moving materials outside the LIGO buildings.

**3.2 Original Commercial**

The Buyer requests a proposal to provide manpower on a Time and Material basis for each labor class requested below. The Man-hours requested will be required between 11/1/10 and 7/1/11. The 7/1/11 end date at LHO has been extended by CWOs to 3/31/13.

The Bidder shall provide All-In rates for the following Crafts:

- Millwright Foreman (1) (with Rigger certification)
- Millwrights (with Rigger Certification)
- Pipefitters
- Electricians
- Laborers

Weekly labor requirements will be scheduled with the Seller ahead of time on a monthly basis. The estimated hours and period of performance per site are modified by CWOs.

The work will be approximately split as follows:

Millwright/Rigger	30%
Laborers	60%
Pipefitters	5%
Electricians	5%

The Buyer reserves the right to cancel or delay work as required by the overall LIGO project schedule.

All waste metal removed by the Seller is the property of LIGO and shall be stored at the site as directed by LIGO representatives


All bidders must have a proven track record in successfully working safely in Cleanroom Conditions.

All Labor for this Purchase order shall comply with the Hanford Site Stabilization Agreement.

All Riggers shall meet all WA and LA States and OSHA requirements for Riggers and Crane Operators

The Seller shall provide site Insurance as required by the LIGO site requirements.

The Bidders shall also submit a list of Daily/Monthly Rental Rates for material handling equipment (fork lifts, etc.) which might be required for moving materials outside the LIGO buildings.

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#### **4.0 CODES / STANDARDS /PERMITS**

The following codes and standards are requirements for De-Installation/Installation work covered by this specification:

- OSHA - Occupational Safety and Health Act – Latest edition
- Washington State Dept. of Labor and Industry Rules and Standards
- Louisiana State Dept. of Labor and Industry Rules and Standards
- Applicable Local Codes and Standards

#### **Permits**

Before starting work on this project, it shall be the responsibility of the Seller to make certain that all necessary permits, licenses and approvals are obtained for the work to be performed at the site. The Seller shall obtain such permits, license and approvals on a time and material basis and furnish copies to the Buyer.

#### **5.0 SAFETY REQUIREMENTS**

**Note: The Seller is warned that part of the LIGO system will be operational during activities (Piping pressurized and electrical wiring energized). The part of the system to be accessed will be depressurized and electrically de-energized by the Buyer.**

4.1 All work executed by the Seller shall comply with Federal OSHA regulations. The Seller is responsible for the Safety of their personnel.

4.2 The Seller shall also comply with the Buyer's on-site Construction Safety, Health and Environmental Management program.

4.3 The Seller shall be fully responsible for providing first aid equipment and other safety equipment required for his personnel.

4.4 The Seller's foreman shall be responsible for the safe execution of the work at the site. Seller shall conduct weekly safety meetings with their crew and send a representative to all site wide safety meetings.

4.5 All piping shall be verified to have no internal pressure before it is cut or the connection opened.

All electrical wiring shall be verified to have no voltage before cutting it or breaking an electrical connection.

4.6 When directed by LIGO, areas where work is being done shall be roped off by construction tape, to warn other site personnel.

4.7 All Piping and Wiring shall be Assumed To Be Pressurized /Energized until proven safe.

4.8 The Bidders shall submit their Safety Rating as part of their bid submittal and update it quarterly during the contract.


#### **6.0 DOCUMENTATION /MARKING**

The Buyer shall provide the following Documentation:

Piping Diagrams showing the locations and names of the major components.

#### **7.0 MATERIALS**

All materials and equipment removed shall be stored by the Seller at the site in an area designated by the Buyer.

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The Seller shall take all precautions necessary to prevent damage to the remaining portion of the LIGO System. Any equipment or systems damaged by the Seller shall be repaired by the Seller at no cost to the Buyer.

## **8.0 DETAILED SCOPE**

All work shall be accomplished while maintaining the cleanliness of the LIGO research facility.

The Buyer will conduct training for the Seller's personnel relative to site cleanliness requirements and other special site requirements prior to the start of the work.

The following work shall be executed by the Seller as directed by the Buyer's representative:

- a) The bulk of the work will consist of handling of machined aluminum and stainless steel parts in to and out of the LIGO vacuum systems. LIGO technicians will perform much of the work inside the vacuum chambers. As components are removed the Seller will be asked to move these components to several locations – typically storage or waste. There are thousands of individual components in the vacuum system totaling 20-30 tons of material – most of which will be disposed of by LIGO. However, there are many high value components, both existing and new, which must be preserved.
- b) To gain access to the vacuum system, LIGO technicians will work with the Seller to remove large vacuum doors (stainless steel dished heads with o-ring seals) and replace them after the in-chamber work has been completed. These doors are bolted with 7/8 inch fasteners which must be removed and replaced with hand tools. No impact wrenches are allowed. This work requires careful handling of 1000 – 4000 lb doors (which contain critical machined sealing surfaces) using LIGO cranes and forklifts. Much of the above work takes place in clean room conditions so that workers will be garbed appropriately.
- c) LIGO may require some assistance removing obsolete plumbing and wiring and associated trays and supports and installing replacement equipment.
- d) LIGO will hold daily work meetings to determine priorities and assign work crews for the day. The Seller's personnel shall attend these meetings every morning if possible.

Note: All work must be executed while maintaining the LIGO Cleanliness Requirements. Some work will require clean room garb and practices. Seller's staff shall have new steel toed shoes dedicated to the LIGO work. These shoes should remain on site for the duration of the work so as not to bring contamination from elsewhere. The Seller's personnel must report for work in clean unscented clothing (i.e. no smoke, hydrocarbons, etc.) and be free of after-shave lotions or perfumes. The Buyer will provide all cleanroom clothing and gloves when needed.

Smoking is only allowed outside the LIGO buildings. Personnel shall be Smoke-Free for 10 minutes before re-entering the LIGO facilities.

## **9.0 HAND TOOLS / RIGGING EQUIPMENT**

All rigging equipment (fork lifts, straps, crane, etc.) used inside the LIGO facility will be provided by LIGO.

All lifting / transport equipment required to move LIGO components from the building receiving air-lock to the outside storage or disposal areas shall be provided by the Seller on a Time and Material Basis.

All small hand tools (Wrenches, etc.) will be supplied by LIGO. The seller may bring tools to the job site but all usage inside LIGO clean areas must be have prior approval from LIGO.