

MEMORANDUM OF UNDERSTANDING (MOU)
BETWEEN
THE NATIONAL SCIENCE FOUNDATION (NSF)
AND
THE U.S. DEPARTMENT OF ENERGY RICHLAND OPERATIONS OFFICE (DOE)
FOR
THE SITING, CONSTRUCTION, OPERATION, AND DISPOSITION OF THE
LASER INTERFEROMETER GRAVITATIONAL-WAVE OBSERVATORY (LIGO)
AT
THE HANFORD SITE

WHEREAS, NSF has a Cooperative Agreement No. PHY/9210038 (Cooperative Agreement) with the California Institute of Technology (CALTECH), for funding the design, siting, construction, operation, maintenance and repair of the LIGO; and

WHEREAS, NSF has determined that the LIGO will be constructed at the U.S. Government's Hanford Site and such location meets all of the site requirements for the LIGO; and

WHEREAS, DOE will make available the use of such government land through the issuance of a Permit to NSF; and

WHEREAS, DOE will provide use of and make available the existing and future developed site services, including the infrastructure, for the LIGO at the Hanford Site under arrangements to be agreed upon by NSF and DOE; and

WHEREAS, NSF and DOE hereby authorize CALTECH to request services from and provide funding to DOE on a cost reimbursement basis; and

WHEREAS, DOE will provide the CALTECH requested services that would not be in direct competition with the domestic private or public sectors; and

WHEREAS, NSF is responsible for funding the ultimate disposition of the LIGO and LIGO site;

Now, therefore, the Parties agree as follows:

1.0 Definitions:

- 1.1 The term "Government" means the United States of America or any agency thereof.
- 1.2 The term "DOE" means the Department of Energy or any duly authorized representative thereof, including without limitation, the Manager, Department of Energy, Richland Field Office.
- 1.3 The term "NSF" means the National Science Foundation.
- 1.4 For "NSF", the term "authorized representative" will include staff of the California Institute of Technology (CALTECH) or any of its contractors or subcontractors.

- 1.5 The term "CALTECH" means the California Institute of Technology, an authorized representative of NSF.
 - 1.6 The term "LIGO" means the Laser Interferometer Gravitational-Wave Observatory.
 - 1.7 The term "LIGO site" means the installation site of the LIGO on the Hanford site.
- 2.0 Purpose: The purpose of this MOU is to set forth the objectives and responsibilities that will govern the relationship between NSF and DOE for the siting, construction, operation, maintenance, repair and ultimate disposition of the LIGO at the Hanford Site. The Permit sets forth the terms and conditions pertaining to the use of and access to the LIGO site.
- 2.1 Authority: NSF and DOE enter into this agreement under the authorities, among others, of the Economy Act (31 U.S.C. 1535), as amended, the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (P.L. 93-438), and the Department of Energy Organization Act (P.L. 95-91), and The National Science Foundation Act of 1950 (42 U.S. C. 1861 et seq).
- 3.0 Objective: The objective of NSF, its authorized representatives and DOE is to construct and operate the LIGO for the use and benefit of the scientific community.
- 4.0 NSF Responsibilities:
- 4.1 NSF is responsible for funding the design, siting, construction, operation, maintenance and repair of the LIGO through the Cooperative Agreement with CALTECH subject to availability of appropriated funds.
 - 4.2 NSF, through CALTECH, is responsible for assuring that the design, siting, construction, operation, maintenance and repair of the LIGO meets all cultural, environmental, health and safety criteria under applicable laws and regulations.
 - 4.3 NSF is responsible for the cost of any cultural or environmental mitigation required to allow construction and/or operation of the LIGO.
 - 4.4 NSF, through CALTECH, is responsible for requesting and funding on a cost reimbursement basis the following needed LIGO services from DOE. CALTECH will determine and state that such requested services cannot be obtained from the domestic private or public sectors. (See ATTACHMENT 1 entitled "PROCEDURE CALTECH REQUEST FOR SERVICES FROM DOE FOR THE LIGO").

- 4.4.1 NSF, through CALTECH and in consultation with DOE, is responsible for siting the LIGO within the Hanford Site.
- 4.4.2 NSF, through CALTECH, is responsible for performing and documenting the environmental analysis of the siting, construction and operation of the LIGO as required by National Environmental Policy Act (NEPA) (40 CFR 1501.6).
- 4.4.3 NSF, through CALTECH, is responsible for the construction and operation of the LIGO.
- 4.5 NSF and CALTECH are responsible for compliance with all applicable laws of the United States and the State of Washington, including but not limited to environmental laws and regulations.
- 4.6 NSF is responsible, upon termination or expiration of the Permit, for funding the ultimate disposition of the LIGO and LIGO site, including performing and documenting the environmental analysis of such disposition as required by NEPA and any other applicable statutory requirements. NSF's proposed method of disposition of the LIGO and LIGO site is subject to DOE's approval.

5.0 DOE RESPONSIBILITIES:

- 5.1 DOE is responsible for funding and conducting a cultural resources survey that will be required before clearance can be given for the LIGO project to proceed since the LIGO would be constructed in a previously undisturbed portion of the Hanford site. This survey will ensure that any undiscovered cultural properties will not be negatively impacted by the LIGO project.
- 5.2 DOE is responsible for providing the following services to CALTECH in response to requests for needed LIGO services by CALTECH. DOE will provide such services on a cost reimbursement basis. (See ATTACHMENT 1 entitled "PROCEDURE CALTECH REQUEST FOR SERVICES FROM DOE FOR THE LIGO").
 - 5.2.1 DOE is responsible for consulting with NSF, through CALTECH, for siting the LIGO within the Hanford Site.
 - 5.2.2 DOE, through its Prime Contractor(s), is responsible as the cooperating agency, in response to requests from CALTECH, for: (i) providing supporting information, and (ii) being available for consultation and support in the performance and documentation of the environmental analysis of the siting, construction and operation of the LIGO as required by NEPA. DOE is responsible for the review and concurrence of the NEPA documentation.
 - 5.2.3 DOE, through its Prime Contractor(s), is responsible for cooperating in the acquisition by NSF, through CALTECH, of

additional geotechnical data needed for construction and the operation of the LIGO.

5.2.4 DOE, through its Prime Contractor(s), is responsible for providing use of and making available the existing and future developed site support services, including the infrastructure, such as the electric power supply, security, laboratory support, computing, data communications and telecommunications support, and other needed site services for the LIGO at the Hanford Site.

5.3 DOE is responsible for providing the following services to NSF on a cost reimbursement basis.

5.3.1 DOE is responsible for assisting NSF with any cultural or environmental mitigation required to allow construction and/or operation of the LIGO.

5.3.2 DOE is responsible, upon termination or expiration of the Permit, for: (i) approving NSF's proposal for the method of final disposition of the LIGO and LIGO site, (ii) being available for consultation and support in the performance and documentation of the environmental analysis of the disposition of the LIGO and LIGO site as required by NEPA and any other applicable statutory requirements and (iii) for review and concurrence of the NEPA and any other applicable statutory documentation.

6.0 Program Funding:

6.1 DOE will fund a cultural resources survey of the LIGO site.

6.2 NSF will fund:

6.2.1 the design, siting, construction and operation of the LIGO through the Cooperative Agreement with CALTECH.

6.2.2 any cultural or environmental mitigation required to allow construction and/or operation of the LIGO.

6.2.3 the final disposition of the LIGO and LIGO site, including the performance and documentation of the environmental analysis of such disposition as required by NEPA and any other applicable statutory requirements.

7.0 Management Arrangements: This MOU allows direct communication between the DOE/DOE Prime Contractor(s) officials and NSF/CALTECH officials involved in managing the work to be performed.

8.0 Public Information Coordination: Subject to the Freedom of Information Act (5 U.S.C. 552 (6)), decisions on disclosure to the public of information regarding the LIGO that is generated by DOE or its Prime Contractor(s) shall be made by DOE following consultation with the authorized CALTECH representative.

9.0 Amendment and Termination:

9.1 This MOU may be amended by written agreement between NSF and DOE.

9.2 This MOU may be terminated by the mutual written agreement of NSF and DOE. Upon such termination, DOE shall be compensated for work performed for which DOE has not previously been compensated and any costs incurred by DOE in stopping the work, removing the NSF's property and equipment and restoring the DOE's facilities and site to the condition they were in prior to starting the work, reasonable wear and tear excepted.

10.0 Effective Date and Extensions: This MOU shall become effective upon the latter date of signature of the parties. It shall remain in effect for a 5-year term from the effective date. By the end of each successive 5-year period this MOU shall have been reviewed by the parties and a mutual decision made on whether to renew or to revise and reissue this MOU.

Signed this _____ day of _____, 1993, for the National Science Foundation.

Signature _____

Name _____

Title _____

Signed this _____ day of _____, 1993, for the U.S. Department of Energy.

Signature _____

Name _____

Title _____

PROCEDURE

CALTECH REQUEST FOR SERVICES FROM DOE FOR THE LIGO

1. Procedure.

- A. CALTECH will issue a Contract Work Order (CWO) to DOE to define and/or authorize a Prime Contractor's specific effort in the implementation of work under this MOU for support services. Each CALTECH CWO will describe the services, including the required delivery date and the estimated expenditure, to be provided by DOE, through its Prime Contractor(s), and shall state that such requested services cannot be obtained from the domestic private or public sectors. All CALTECH CWOs issued will be on the ATTACHMENT 2 form entitled "CONTRACT WORK ORDER" which is made a part of this Procedure. DOE will provide the CALTECH CWO to its Prime Contractor(s) for review and completion.
- B. DOE Prime Contractor(s) will review the CALTECH CWO, complete the CONTRACTOR'S ESTIMATE, including the start date and estimated completion date, and estimated expenditures as required by the CALTECH CWO, and provide the same to DOE. DOE will forward the CALTECH CWO to CALTECH.
- C. DOE/DOE Prime Contractor(s) and CALTECH will negotiate any differences on the CALTECH CWO.
- D. CALTECH will issue the duly executed CWO to DOE authorizing the immediate commencement of work.
- E. DOE will issue a Request for Services (DOE/RFS), including funding and the CALTECH CWO, to its Prime Contractor(s) authorizing the immediate commencement of work. Upon receipt of the DOE/RFS, the Prime Contractor(s) will immediately commence work.
- F. CALTECH will issue CWO Supplements to modify or terminate an active CWO. Each supplement will bear the number of the original CWO followed by a dash number (-1, -2, -3, etc.) as appropriate. CALTECH CWO Supplements will follow the procedure outlined in Paragraphs 1.A through 1.E. above.

2. Cost Reimbursement Terms.

CALTECH shall pay DOE for the performance of work under the CALTECH CWO on a cost reimbursement basis. All payments shall be

made to the account designated by DOE within thirty (30) calendar days after the date of each invoice. Rates charged will be the actual rates in effect at the time the costs are incurred. DOE will invoice CALTECH based on expenses actually incurred in the previous month and will continue billing until the total amount invoiced equals the total estimated expenditure for the work under the CALTECH CWO except as provided in Paragraph 8.A. below.

3. Limitation of Obligation.

- A. The total cost to CALTECH for the performance of any individual CWO issued pursuant hereto will not exceed the estimated expenditure set forth in the CWO, and DOE agrees to use its best efforts to perform the work specified in that CWO within the estimated expenditure. If at any time DOE/Prime Contractor(s) have reason to believe that the total cost to CALTECH for any CWO issued hereunder will be substantially greater or less than the estimated expenditure for that CWO, DOE shall notify CALTECH in writing to that effect, giving its revised estimate of the cost for that CWO.

- B. The cumulative total of expenditures for all CWOs issued under this MOU shall in no event exceed the authorized expenditure of \$_____. CALTECH shall not be obligated to reimburse DOE for costs incurred in excess of such amount, and DOE shall not be obligated to continue performance of the work by incurring costs in excess of such amount, unless the authorized expenditure has been increased by CALTECH by written amendment to this MOU in accordance with Paragraph 8.1. Any payments made by CALTECH in excess of the costs incurred shall be refunded to CALTECH following completion of this Agreement. DOE agrees to use its best efforts to perform the work within the authorized expenditure set forth above.

PERMIT

The UNITED STATES OF AMERICA, acting by and through the DEPARTMENT OF ENERGY, hereby grants a Permit to THE NATIONAL SCIENCE FOUNDATION (NSF), a Federal Agency, for the sole purpose of installation, operation, maintenance, and repair of a Laser Interferometer Gravitational-Wave Observatory (LIGO) on the following property situated in the County of Benton, State of Washington.

That portion of Sections 33 and Section 34 of T 12 N, R 27 E, and that portion of Sections 2, 3, 4, 9, 10, 11, 15, 16, 17, 20, and 21 of T 11 N, R 27 E of the Willimette Meridian more particularly described as:

Commencing at the LIGO Vertex Monument, located at 46° 27.3' N Latitude; 119° 24.5' W Longitude (1983/91 North American Datum), Thence S 81° E, 2,500 feet more or less to the west shoulder of Route 10, the True point of beginning; Thence S 06° W, 300 feet more or less along the west shoulder of Route 10; Thence S 54° W, 3,600 feet; Thence N 36° W, 1,000 feet; Thence S 54° W, 12,200 feet; Thence N 36° W, 2,000 feet; Thence N 54° E, 12,200 feet; Thence N 36° W, 1,000 feet; Thence N 54° E, 1,000 feet; Thence N 36° W, 12,200 feet; Thence N 54° E, 2,000 feet; Thence S 36° E, 12,200 feet; Thence N 54° E, 1,000 feet; Thence S 36° E, 3,550 feet more or less to the west shoulder of Route 10; Thence S 06° W, 300 feet more or less along the west shoulder of Route 10 to the True point of beginning.

1. DEFINITIONS:

- a. The term "Government" means the United States of America or any agency thereof.
- b. The term "DOE" means the Department of Energy or any duly authorized representative thereof, including without limitation, the Manager, Department of Energy, Richland Field Office.
- c. The term "NSF" means the National Science Foundation, the permittee herein.
- d. For "NSF", the term "authorized representative" will include staff of the California Institute of Technology (CALTECH) or any of its contractors or subcontractors.
- e. The term "CALTECH" means the California Institute of Technology, an authorized representative of NSF.
- f. The term "LIGO site" means the installation site of the LIGO on the Hanford Site Property.

2. USE OF THE PROPERTY: NSF's use of the LIGO site shall be for the sole purpose of installing, operating, maintaining and repairing the Laser Interferometer Gravitational-Wave Observatory (LIGO), and shall be in accordance with the terms of the permit.

3. ACCESS: NSF and its authorized representatives shall have the right of ingress and egress to and from the LIGO site over the existing Government-owned roads which enter the Hanford Site. Such access is for the installation, operation, maintenance and repair of the LIGO and for no other purposes.
4. TERMINATION: This permit may be terminated in whole or in part by written agreement between NSF and DOE. The parties agree that the required schedule for disposition or demolition of the LIGO facilities, if necessary, issues related to site restoration, or other issues arising as a result of the proposed termination, are subject to negotiation and mutual agreement prior to actual termination of the permit. This Permit shall become effective upon the latter date of signature of the parties. NSF may terminate this permit in whole or in part by giving written notice 30 days prior to the termination date. DOE, in accordance with DOE Order 4300.1C, may terminate this Permit in whole or in part by giving written notice 30 days prior to the termination date. In the event that DOE Order 4300.1C or its governing legislation is changed or modified, any such changes or modifications affecting the required timing of written termination notification shall be incorporated into this document by written amendment.
5. EXPIRATION OF PERMIT: Unless terminated earlier as provided herein, this Permit shall expire twenty-five years from the date thereof. The permit may be extended by mutual consent of the parties.
6. INDEMNITY: NSF agrees that it shall require in its contractual agreements with non-governmental agents and authorized representatives that they agree to indemnify and save harmless DOE, the contractors of DOE and the officers, employees, authorized representatives and subcontractors of DOE from any claims, costs (including, but not limited to attorney fees, consultant fees and/or expert witness fees) or liabilities (including, but not limited to sums paid in settlement of claims), arising during the term of this Permit or thereafter from the injury or death of any person or persons or the damage of any property directly attributable to the LIGO construction and operation and not otherwise attributable to any preexisting conditions. This provision shall not apply if injury, death or damage to any property is attributable to the negligence or willful misconduct on the part of DOE, the contractors of DOE or the officers, employees, authorized representatives or subcontractors of DOE.
7. ENVIRONMENTAL INDEMNITY: NSF agrees that it shall require in its contractual agreements with non-governmental agents and authorized representatives that they agree to indemnify and save harmless the Government, DOE, the contractors of DOE and the officers, employees, authorized representatives and subcontractors of DOE from any claims, costs (including, but not limited to, attorney fees, consultant fees and/or expert witness fees) or liabilities (including, but not limited to, sums paid in settlement of claims), which arise during or after the

term of this Permit from or in connection with the presence or suspected presence of hazardous substances in the air, soil, water, groundwater or soil vapor directly attributable to the LIGO construction and operation and not otherwise attributable to any preexisting conditions, unless the hazardous substances are present as a result of the actions of DOE, the contractors of DOE or the officers, employees, authorized representatives or subcontractors of DOE. Hazardous substances, for the purposes of this Permit shall include, but not be limited to, any hazardous or toxic substance, material or waste which is (1) petroleum or petroleum derivative; (2) asbestos; (3) polychlorinated biphenyls (PCB); (4) designated as "Dangerous Waste" or "Extremely Hazardous Waste" by the State of Washington under authority of the Hazardous Waste Disposal Act, RCW Chap. 70-105, and associated regulations, WAC Chap. 173-303; (5) designated as "Hazardous Substance" pursuant to the Comprehensive Environmental Response, Compensation and Liability Act, 42 USC Sections 9601, et seq.; (6) designated as "Hazardous Waste" pursuant to the Resource Conservation and Recovery Act (RCRA), 42 USC Sections 6901, et seq.; (7) designated as a "Hazardous Substance" under the Clean Water Act, 33 USC § 1321, or listed pursuant to 33 USC § 1317; (8) listed by the U.S. Department of Transportation at 49 CFR 172.101 or the U.S. Environmental Protection Agency at 40 CFR Part 302; (9) is subject to corrective action requirements pursuant to Section 3003 of RCRA; and (10) any other substance, waste or material which is regulated as hazardous, dangerous or solid waste by any federal, state or local agency.

On the date of execution of this Permit the Grantee's responsibilities under the indemnification clause become effective. The Grantee's responsibilities of indemnifications are prospective from the date of execution.

Without limiting the generality of the indemnification undertaken in contractual agreements with non-governmental agents and authorized representatives of NSF, the indemnification shall specifically cover costs incurred in connection with any investigation of site conditions or any cleanup, removal, restoration or remedial action directly attributable to the LIGO construction and operation and not otherwise attributable to any preexisting conditions, required by any federal, state or local regulatory authority, or undertaken by the Government, DOE or its authorized representatives to comply with any federal, state or local environmental protection or restoration laws, regulations or ordinances deemed applicable to the site by the Government or DOE.

8. DAMAGE TO GOVERNMENT PROPERTY: Any property owned or under the jurisdiction of DOE that is damaged or destroyed as a result of the negligence and/or willful misconduct of NSF, or its authorized representatives, directly attributable to the LIGO construction and operation and not otherwise attributable to any preexisting conditions

shall be promptly repaired or replaced by NSF to the satisfaction of DOE, or in lieu of such repair or replacement NSF shall, if required by DOE, pay DOE a sufficient sum of money to compensate for the loss sustained by the DOE as a result of the damage to or destruction of such DOE property.

9. **NOTIFICATIONS:** NSF and/or its authorized representatives shall be notified as soon as reasonably possible of any discovery of hazardous, toxic or radioactive substances, including waste, or other contaminants, or threatened release of same, on or near the LIGO site where work is to be performed by its authorized representatives, their employees, and subcontractors on behalf of NSF.
10. **PERMITS AND LICENSES:** NSF and CALTECH will abide by all federal, state and local laws and regulations applicable to the construction, occupancy and operation of the permitted facility. NSF will ensure that its operations of the permitted facilities are fully protective of the environment and of human health and safety. At the request of DOE, NSF will produce any required licenses, permits, certifications or authorizations as evidence of compliance with this paragraph. Compliance with the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) is of particular significance to DOE and failure to comply may constitute grounds for termination of this Permit.
11. **FEDERAL, STATE, AND LOCAL TAXES:** NSF or its authorized representatives shall pay all applicable Federal, state, and local taxes levied in connection with LIGO.
12. **DOE APPROVAL OF PLANS:** Any significant changes to the LIGO installation construction and operation plans disclosed in the Site Solicitation Announcement will be submitted to DOE for review and approval. Such approval shall not be unreasonably withheld.
13. **REASSIGNMENT:** Neither this Permit or any interest therein or claim thereunder may be assigned or transferred by NSF except as expressly authorized in writing by DOE.
14. **CONSIDERATION:** As consideration for this Permit, DOE recognizes that NSF is a Federal agency and as such mutual benefits are derived from this Permit.
15. **COVENANT AGAINST CONTINGENT FEES:** NSF warrants that no person or selling agency has been employed or retained to solicit or secure this Permit upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees, or bona fide established commercial or selling agencies maintained by NSF for the purpose of securing business.

16. OFFICIALS NOT TO BENEFIT: No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this Permit, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this Permit if made with a corporation for its general benefit.
17. AGREEMENT BY NSF: By affixing the signature of its authorized representative at the location indicated below, NSF hereby agrees to the terms and conditions of the Permit.
18. HEADINGS: The headings in this Permit are for the purposes of reference and convenience only and shall not limit or otherwise define the meaning thereof.

IN WITNESS WHEREOF, the United States of America, acting by and through the United States Department of Energy, has caused this Permit to be executed by its duly authorized representative on the 26th day of August, 1993.

UNITED STATES OF AMERICA
DEPARTMENT OF ENERGY

By *Charles L. Starnes*
Title *Lead Officer*

APPROVED AND AGREED:

UNITED STATES OF AMERICA
NATIONAL SCIENCE FOUNDATION

By *Wayne K. Thomas*
Title Grants and Agreements Officer
Date 23 August 1993