



		IDENTIFICATION			
		CL3N LIGO-E950064-02-B			
TITLE	FINAL CLEANING AND INSPECTION OF LIGO BEAM TUBE MODULE INNER SURFACES	REFERENCE NO.		SHT <u>1</u> OF <u>5</u>	
		930212			
PRODUCT	LIGO BEAM TUBE MODULES CALIFORNIA INSTITUTE OF TECHNOLOGY	OFFICE		REVISION	
				2	
		MADE BY	CHKD BY	MADE BY	CHKD BY
		SDH	KHF	SDH	SWP
		DATE	DATE	DATE	DATE
		11/09/93	12/4/93	10/23/95	10/23/95

1.0 SCOPE:

This procedure details the requirements for final cleaning of the LIGO tube section from the weld area back to the end open to the clean room.

2.0 PERSONNEL:

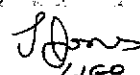

- 2.1 Experienced personnel shall perform and supervise all cleaning in accordance with this planned approach and the cleaning referenced in this plan.
- 2.2 Personnel entering the inspection and cleaning room and/or the controlled area of the beam tube access penetration during final assembly operations shall meet the conditions and clothing requirements of LIGO Procedure, CRWA-1.
- 2.3 Personnel shall participate in a training course in which this procedure and any referenced procedure is presented by an authorized instructor. The course shall be documented by means of a written examination.

3.0 REFERENCES:

The following documents detail operations in conjunction to this activity. All references should be followed during the execution of this procedure.

- 1) California Institute of Technology Technical Specification Number 1100004 for Beam Tube Modules and number 1100007 for Type 304L Stainless Steel Vacuum Products.
- 2) ASTM Designation A 380 Standard practice for Cleaning and De-scaling Stainless Steel Parts, Equipment and Systems (as a guide).
- 3) LIGO Procedure, LIGOCP; "Planned Approach to Cleaning and Cleaning Maintenance for LIGO Project"
- 4) LIGO Procedure, CRTSM; "Clean Room Transporting, Storage and Maintenance Procedure"
- 5) LIGO Procedure, BDF1; "Positive Blower/Dryer/Filtration System (BDF) Installation and Maintenance"
- 6) Deleted.
- 7) LIGO Cleaning Procedure, CL4; "Cleaning of Beam Tube Can Sections"
- 8) Deleted.

APPROVED

 11/10/95
 11/10/95



		IDENTIFICATION			
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TITLE	FINAL CLEANING AND INSPECTION OF LIGO BEAM TUBE MODULE INNER SURFACES	REFERENCE NO.		SHT <u>2</u> OF <u>5</u>	
		930212			
PRODUCT	LIGO BEAM TUBE MODULES CALIFORNIA INSTITUTE OF TECHNOLOGY	OFFICE		REVISION	
				2	
		MADE BY	CHKD BY	MADE BY	CHKD BY
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9) LIGO Procedure, CRWA-1; "Clean Room Wearing Apparel for Beam Tube Access During Construction and Inspection Activities"

4.0 EQUIPMENT:

- 4.1 See LIGO Procedure CRWA-1 for complete listing or wearing apparel for Beam Tube and Clean Room Access.
- 4.2 The following is a listing of materials used for final cleaning of LIGO beam tube inner surfaces.
 - 1) De-ionized water with a chlorine content in the range of 0.02 to 200 ppm.
 - 2) Technical grade solvents/solutions as listed on an approved materials listing.
 - 3) Lint free wiping cloths.

5.0 PROCEDURE:

WARNING

**ALL FACTORS GOVERNING "CONFINED SPACE" ENTRY
INCLUDING DOCUMENTATION SHALL BE STRICTLY ENFORCED.**

- 5.1 After welding and testing activities are complete all inflatable purge dams shall be removed from the tube. All hoses shall be coiled in their respective bins and equipment stored inside the controlled area of the clean room.
- 5.2 All cleaning and inspection equipment entering the tube shall be inventoried and logged for accountability.
- 5.3 Delete.
- 5.4 One cleaning person shall be allowed in the tube. Materials shall be mounted onto a dolly and moved down the tube to the weld joint. Wheels shall be fabricated from aluminum or stainless steel.



IDENTIFICATION			
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TITLE		REFERENCE NO.	SHT <u>3</u> OF <u>5</u>
FINAL CLEANING AND INSPECTION OF LIGO BEAM TUBE MODULE INNER SURFACES		930212	
PRODUCT		OFFICE	REVISION
LIGO BEAM TUBE MODULES			2
CALIFORNIA INSTITUTE OF TECHNOLOGY		MADE BY	CHKD BY
		SDH	KHF
		MADE BY	CHKD BY
		SDH	SWP
		DATE	DATE
		11/09/93	12/4/93
		DATE	DATE
		10/23/95	10/23/95

- 5.5 The Cleaning person shall inspect the inner tube wall areas. Surfaces directly in front of his line of sight should be illuminated to a 100 candle power minimum. Areas are to be inspected for dirt, debris and any deposits of hydrocarbons or chemicals. Areas found to be contaminated shall be locally wiped with an approved solvent or cleaning solution of 1:30 Mirachem/water, water rinsed and allowed to dry. After inspection, the areas shall not be disturbed without re-inspection.
- 5.6 Document the tube designation and the final acceptance of the cleaning before moving from the tube location. Inventory all wiping cloths, containers and equipment removed from the tube and compare with the initial inventory to assure all articles are removed from the tube. Document this inventory.
- 5.7 Close the tube end using a sealed cap equipped with a one direction vent flap to allow pressure to escape the tube.
- 6.0 **DOCUMENTATION:**
- 6.1 Documentation of the confined entry activities are required per OSHA and LIGO safety procedures. Report forms shall be available from the site safety department.
- 6.2 Check lists shall be used for personnel entering the clean room areas, inventories of the equipment entering these areas, and inventories of equipment and materials entering the beam tube. See attached inventory form CR-01.
- 6.3 A Cleaning Inspection Report shall be completed with results of the final cleanliness inspection. This report shall document personnel performing cleaning, results of inspection and signed by the authorized inspector. See attached inspection form CR-02.
- 6.4 These records shall be turned into the QC Manager/Engineer at the end of each shift. The final inspection turnover documents shall include these reports.



IDENTIFICATION			
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REFERENCE NO.		SHT <u>4</u> OF <u>5</u>	
930212			
OFFICE		REVISION	
		2	
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SDH	KHF	SDH	SWP
DATE	DATE	DATE	DATE
11/09/93	12/4/93	10/23/95	10/23/95

TITLE
FINAL CLEANING AND INSPECTION OF LIGO
BEAM TUBE MODULE INNER SURFACES

PRODUCT
LIGO BEAM TUBE MODULES
CALIFORNIA INSTITUTE OF TECHNOLOGY

LIGO		INVENTORY FORM TUBE ENTRY			
	DESCRIPTION OF EQUIPMENT/MATERIAL	BY	TIME IN	TIME OUT	DATE
Line 01					
Line 02					
Line 03					
Line 04					
Line 05					
Line 06					
Line 07					
Line 08					
Line 09					
Line 10					
Line 11					
Line 12					
Line 13					
Line 14					
Line 15					
Line 16					
INSPECTION DATE: _____ LOCATION: _____ AUDITOR: _____					
INVENTORY FORM TUBE ENTRY					
SHEET _____ OF _____					


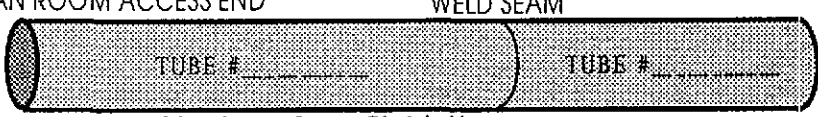


TITLE FINAL CLEANING AND INSPECTION OF LIGO BEAM TUBE MODULE INNER SURFACES PRODUCT LIGO BEAM TUBE MODULES CALIFORNIA INSTITUTE OF TECHNOLOGY	IDENTIFICATION CL3N			
	REFERENCE NO. 930212		SHT <u>5</u> OF <u>5</u>	
	OFFICE		REVISION 2	
	MADE BY SDH	CHKD BY KHF	MADE BY SDH	CHKD BY SWP
DATE 11/09/93	DATE 12/4/93	DATE 10/23/95	DATE 10/23/95	

LIGO

INSPECTION REPORT

SPECIFICATION: _____
 DATE: _____
 TIME: _____

BEAM TUBE LOCATION/POSITION	
BEAM TUBE IDENTIFICATION	
INSPECTION PERFORMED: <input type="checkbox"/> VISUAL OF WELD <small>THE WELD HAS BEEN INSPECTED AND FOUND ACCEPTABLE PER LIGO WELD STANDARDS</small> <input type="checkbox"/> CLEANING INSPECTION <small>THE BEAM TUBE HAS BEEN FOUND TO MEET THE LIGO REQUIREMENTS</small>	
DESCRIPTION: _____ _____	
INVENTORY VERIFICATION: <input type="checkbox"/> COMPLETED BY: _____ <input type="checkbox"/> DESCREPANCY	
DESCRIPTION OF DESCREPANCY: _____ _____	
TUBE ACCESS PLUG MOVED ONE SECTION FROM # _____ TO # _____ <input type="checkbox"/> INSPECTED BY: _____	
CLEAN ROOM ACCESS END 	WELD SEAM 
Map Anomalies on Sketch Above	
INSTALL CAP ON BEAM TUBE END <input type="checkbox"/> INSPECTED BY: _____	
<h1>INSPECTION FORM</h1>	
NAME _____ DATE _____ SIGNATURE _____ SHEET ____ OF ____	