

# LIGO PROCESS TRAVELER

DCC Number: **E990279-01-X**

Date Prepared: **7/8/99**

<b>Originator</b>	<b>Cognizant Engineer</b>	<b>Ext./Phone#</b>	<b>Project</b>	<b>Account Number</b>
Michael Smith	Michael Smith	2062	COS	5F515

Dwg/Part Number	Rev	Part Description	Serial Number	Qty
		<b>Beam Dump Assemblies, WBSC2</b>		
D980087	A	"glass retaining bracket, top left, cavity BD"		2
D980088	A	"glass retaining bracket, top right, cavity BD"		2
D980092	A	"glass plate 1, cavity BD"		2
D980093	A	"glass plate 2, cavity BD"		2
D980289	B	"glass mounting plate1, cavity BD"		2
D980292	B	"glass mounting plate2, cavity BD"		2
D980296	A	"glass retaining bracket, bottom left, cavity BD"		2
D980297	A	"glass retaining bracket, bottom right cavity BD"		2
D980348	B	"side plate, cavity BD"		4
D980378	B	"Stiffener Block, cavity BD"		2
D980685	A	"clamp, plate beam dump"		8
D990028	A	Beam Dump Flex Hinge Tongue		4
D990029	B	Beam Dump Flex Hinge Clevis		4
D990030	A	Beam Dump Flex Hinge Tee		4
D990031	A	Beam Dump Flex Hinge Saddle		4
D990032	A	Beam Dump Flex Hinge Attach		4
D990033	A	Beam Dump Flex Hinge Adapter		4
D990140	D	Beam Dump Housing Plate		2
D990149	C	"Cavity Beam Dump, Mounting Bracket Angle "		4
D990150	B	"Cavity Beam Dump, Mounting Bracket Gusset "		4
D990151	B	"Cavity Beam Dump, Mounting Bracket Backplate 1"		4
D990152	C	"Cavity Beam Dump, Mounting Bracket Backplate 2"		4
D990198	B	Beam Dump Flex Hinge H_tube		4
D990199	A	Beam Dump Flex Hinge Low Strap		4

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DCC Number: **E990279-01-X**

Dwg/Part Number	Rev	Part Description	Serial Number	Qty
D990200	A	Beam Dump Flex Hinge Backup		8
D990201	A	Beam Dump Flex Hinge Cap		8
D990202	B	Beam Dump Flex Hinge Top Strap		4
D990207	B	"rail, plate beam dump"		4
D990218	B	"glass, plate beam dump"		2
D990222	A	Beam Dump Housing Tube 2KBSAR3		0
D990223	C	Beam Dump Housing Tube 2KFM		0
D990225	D	"Beam Dump Housing Tube 4KITMHR3, 4KITMHR4"		0
D990236	B	"backplate_offset, plate beam dump"		0
D990240	B	"backplate, plate beam dump"		0
D990252	B	"Beam Dump Housing Tube ITMAR1,2KRMHR3"		2
D990253	A	Extension Tube		2
D990335	A	"Beam Dump Flex Hinge H_tube, 2KITMXAR4 "		0
D990336	A	"Beam Dump Flex Hinge H_tube, 2KITMYAR4"		0
WFV-10		#10 X 0.31 THK FLAT VENTED WASHER		32
93615A355		#10-24 X 0.75 LOW HD SCS		24
92196A245		#10-24 X 0.75 SHCS		8
WFV-06		#6 X 0.016 THK FLAT VENTED WASHER		8
92196A144		#6-32 X .25 SHCS		8
WFV-08		#8 FLAT VENTED WASHER		68
92185A194		#8-32 X .50 SHCS		68
91500A194		#8-32 X .500 FHPS		36
91944A450		0.406ID X 0.88OD X 0.25 THK SPHER WASH		16
92141A029		1/4 FLAT WASHER		32
N-2520-A		1/4-20 HEX NUT		16
93615A410		1/4-20 X .500 LOW HEAD SOCKET SCREW		16
92196A540		1/4-20 X 0.75 SHCS		48

# LIGO PROCESS TRAVELER

DCC Number: E990279-01-X

Dwg/Part Number	Rev	Part Description	Serial Number	Qty
92196A542		1/4-20 X 1.00 SHCS		32
C-2016-NA		"1/4-20 X 1.00 SHCS, AG/SS"		40
92196A544		1/4-20 X 1.25 SHCS		16
C-2820-NA		"1/4-28 X 1.25 SHCS, AG/SS"		24
91950A031		3/8 X 0.063 FLAT WASHER		6
WV-38		3/8 X 0.032 THK FLAT VENTED WASHER		42
94804A320		3/8-16 HEX NUT		8
N-3816-A		"3/8-16 HEX NUT, AG/SS"		4
TOP-1616-NA		3/8-16 X 1.00 SOCKT SET SCRW-OVL PT AG/SS		8
90585A626		3/8-16 X 1.25 FLT HD CAP SCREW		8
92186A626		3/8-16 X 1.25 HEX HD SCREW		16
C-1620-NA		"3/8-16 X 1.25 SHCS, AG/SS"		8
92186A630		3/8-16 X 1.75 HEX HD SCREW		4
92196A630		3/8-16 X 1.75 SHCS		12
92186A999		3/8-16 X 7.00 HEX HD SCREW		16
099-966-12-20x		BERYLLIUM-CU GND STRP		8
6032-400		Flex Pivot		8

**Used In (next higher assembly):** D990230, BSC Beam dump Installation, top assembly

**Data Package, Receiving/Inspection Remarks:**

Inspection Required Y/N	Visual Damage Y/N	Comments	Name/Initials	Date Comp.
y		Inspect for breakage during shipment		

**Process Flow:**

#	Operation	Start Date	Work Area	Instructions	Name/Initials	Date Comp.
1	Control Point	NA	NA		NA	NA

# LIGO PROCESS TRAVELER

DCC Number: **E990279-01-X**

Date Prepared: **7/8/99**

#	Operation	Start Date	Work Area	Instructions	Name/ Initials	Date Comp.									
2	Clean		LHO	per LIGO-E960022, as applicable	B. Weaver										
3	wrap and bag		LHO	per LIGO-E960022	B. Weaver										
4	Vacuum Bake		LHO	per LIGO-E960022	K. Ryan										
5	Control Point		LHO	Review/approve RGA: scan # _____ scan # _____ scan # _____ scan # _____ scan # _____ scan # _____ scan # _____ Note: attach RGA scan(s) to this traveler.	K. Ryan										
	Box for shipment to LHO			Ship in LIGO-provided container											
				<table border="1"> <thead> <tr> <th>No.</th> <th>Qty per package</th> <th>Part</th> </tr> </thead> <tbody> <tr> <td>ALL</td> <td></td> <td>BEAM DUMP PARTS</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>	No.	Qty per package	Part	ALL		BEAM DUMP PARTS					
No.	Qty per package	Part													
ALL		BEAM DUMP PARTS													
				(see also qty. for each shipping destination below)											

*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*

# LIGO PROCESS TRAVELER

DCC Number: **E990279-01-X**

Date Prepared: **7/8/99**

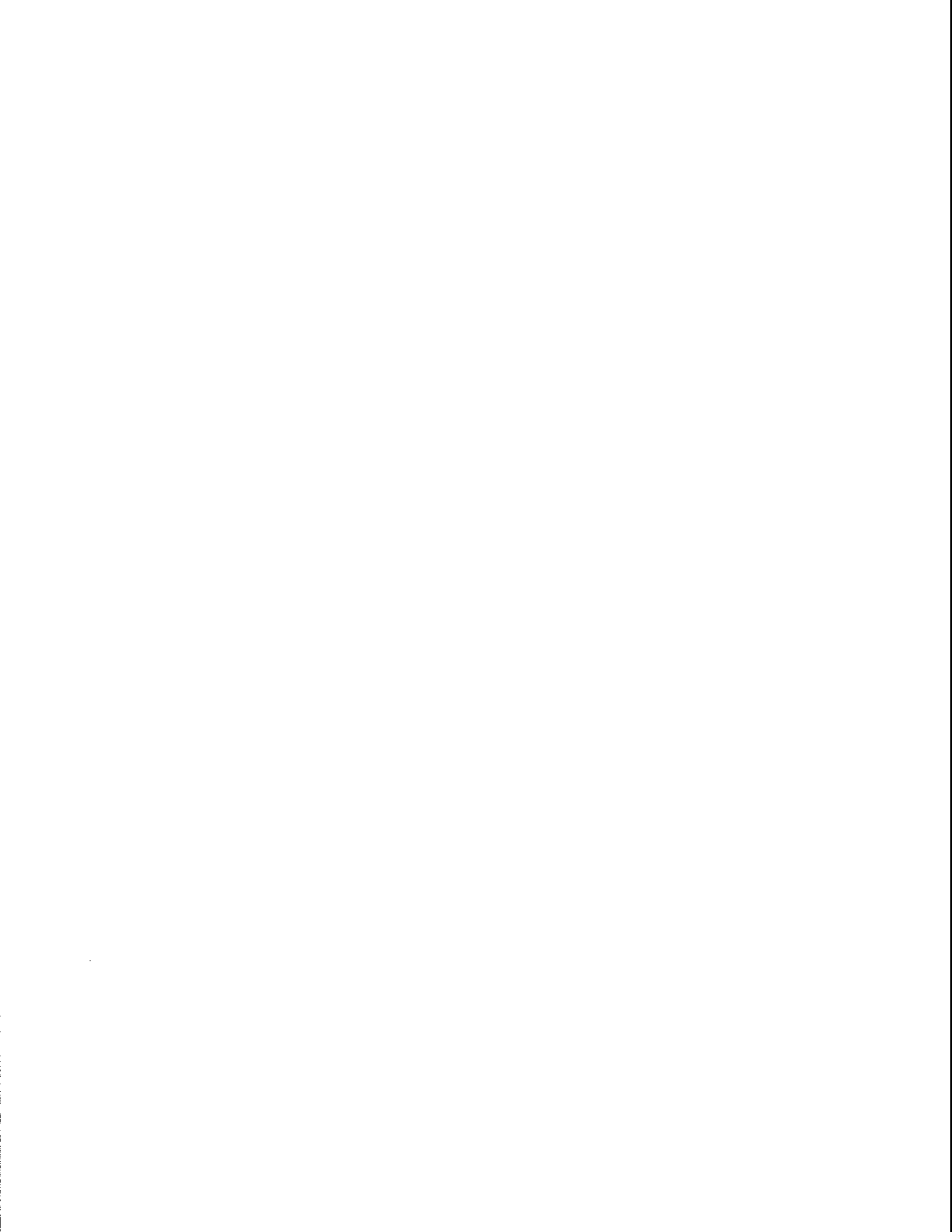
#	Operation	Start Date	Work Area	Instructions	Name/ Initials	Date Comp.													
7	Ship																		
		<table border="1"> <thead> <tr> <th rowspan="2">No.</th> <th colspan="3">Ship Qty.</th> <th rowspan="2">Part Description</th> </tr> <tr> <th>LHO</th> <th>LLO</th> <th>Other</th> </tr> </thead> <tbody> <tr> <td></td> <td>all</td> <td></td> <td></td> <td>beam dump parts</td> </tr> </tbody> </table>			No.	Ship Qty.			Part Description	LHO	LLO	Other		all			beam dump parts		
No.	Ship Qty.			Part Description															
	LHO	LLO	Other																
	all			beam dump parts															
		LHO:	Attn: Betsy Weaver, COS LIGO Hanford Observatory (LHO) Specific Purpose: beam dump BSC8																
		LLO:	Attn: Jonathan Kern LIGO Livingston Observatory (LLO) Specific Purpose: beam dump BSC8																

END: Go to Traveler associated with next higher assembly processing

**Special Instructions (Handling/Packaging Constraints, Remarks, etc.) or Notes:**

Attention: Betsy Weaver, Jonathan Kern, hold cleaned and baked parts for COS assembly

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#53

LIGO-E990279-01-X

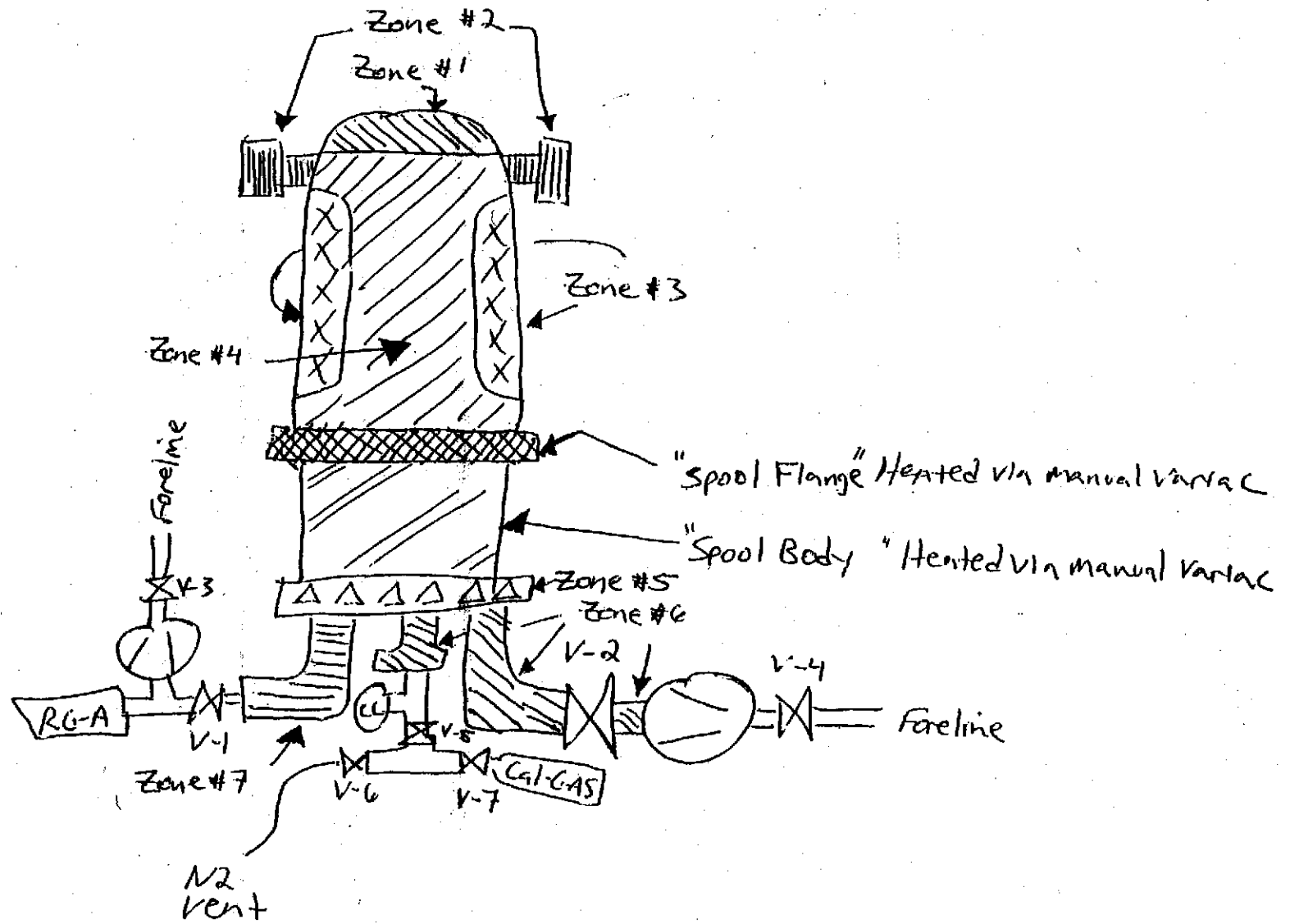
## Summary of LHO Vacuum Bake Oven A RGA Data Generation

The individual parts which comprise a "load" are cleaned as per LIGO-E960022 or as allowed by waiver(s) and loaded into the bake oven. The oven is then pumped down through the main pump "arm" (through V-2, RGA arm is valved off at this point). A heating profile is programmed and baking of the system begins. A typical "heating profile" consists of ramping up to material type soak temperature, soaking for approximately 48 hours, ramping down to approximately 70C, soaking and then ramping down to near room temperature. While soaking at 70C, an RGA background scan is taken. V-1 is then opened and V-2 closed. Enough time is allowed for the system to come into pressure equilibrium and then an elevated load temperature RGA scan is taken. V-1 is then closed and V-2 opened. Following this elevated temperature scan, the load is ramped down to near room temperature and the baking portion of the process is complete. Throughout the baking, temperature data is taken to verify the actual temperatures in the various "heat zones" of the bake oven system.

Once at near room temperature, another RGA background (V-1 closed) scan is taken. Next, V-1 and the cal-gas are opened and V-2 closed. After a 30 minute pressure equilibration time, a "calibration" scan is taken. The calculated pressure of Argon (constituent of the "mixed" calibration gas) is determined using the leak rate of Argon and the pump speed of the RGA arm port as seen by the oven chamber and compared (ratio) to the maximum amp value measured for Argon in the calibration scan. This "torr/amp" ratio becomes the Calibration Factor for the given load, converting measured current to pressure.

Finally, the cal-gas is valved out and enough time is allotted to allow all traces of it to be pumped away. A "post-bake" scan is then taken. Approval of the post-bake scan is a collective "pass/fail" determination made by either Dennis Coyne (CalTech) or Stan Whitcomb (CalTech). The data collected during the "elevated temperature scan" is entered into a spreadsheet which then calculates what the outgassing rates of AMUs 41, 43, 53, 55 and 57 ought to be at room temperature. These calculations are used to determine the room temperature outgassing rates when the signals are below the RGA's sensitivity (noise floor).

Refer to the LHO Vacuum Bake Oven A logbook for the actual ordered events of the load # of interest.





**LHO VACUUM BAKE OVEN A:  
CONTENTS LOAD #53**

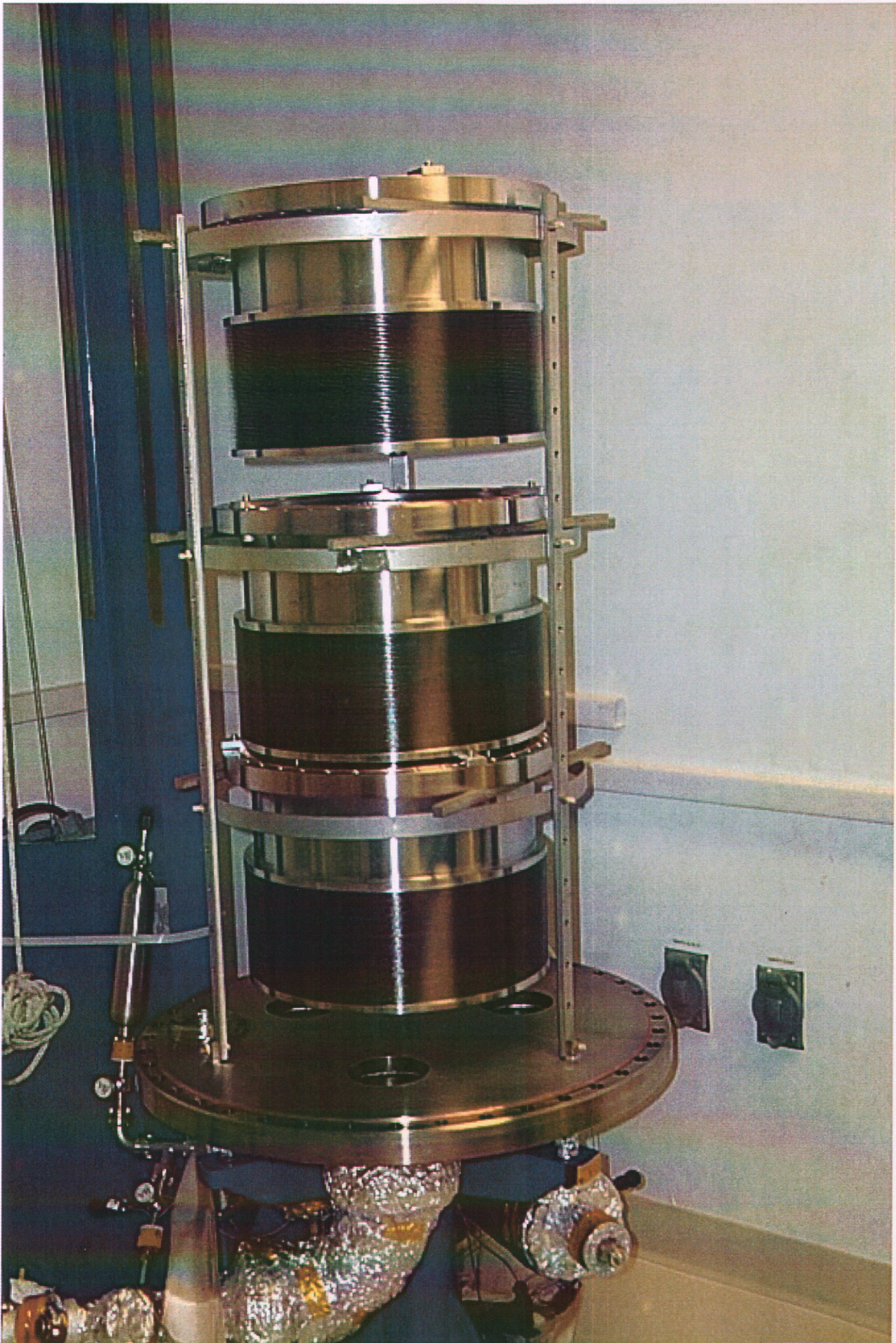
**B.S.C. BELLOW SERIAL NUMBER-051**

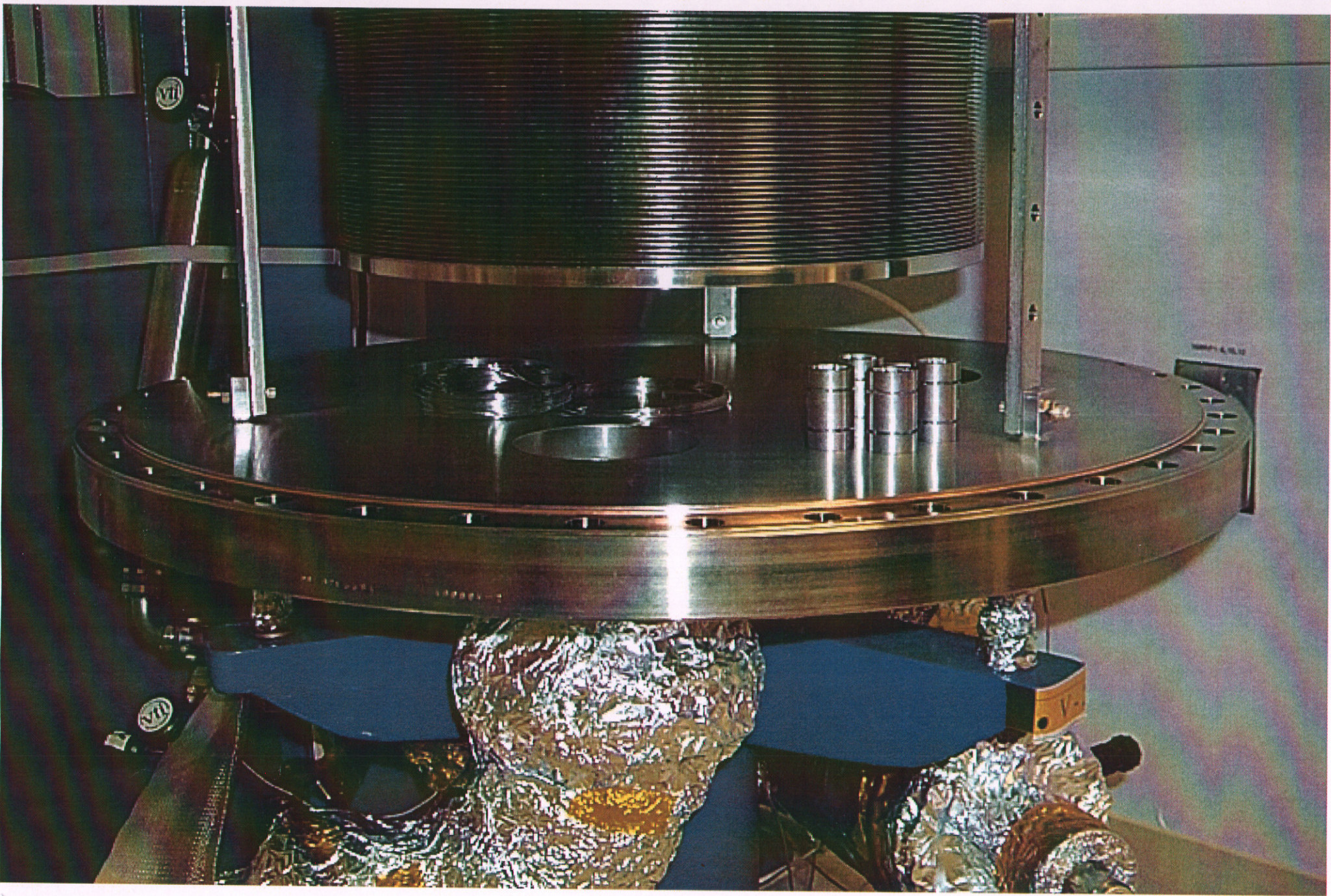
**B.S.C. BELLOW SERIAL NUMBER-057**

**B.S.C. BELLOW SERIAL NUMBER-061**

**SAFETY WIRE SERIAL NUMBER N/A**

**E.T.M. TELESCOPE PIVOT HINGES SERIAL NUMBER**





# LIGO PROCESS TRAVELER

DCC Number: E99179-00-X

Date Prepared: 8/24/99

<b>Originator</b> Betsy Weaver	<b>Cognizant Engineer</b> Janeen Hazel-Romie	<b>Ext./Phone#</b> (626) 395-8445	<b>Project</b> SUS	<b>Account Number</b> 5F518
<b>Dwg/Part Number</b>	<b>Rev</b>	<b>Part Description</b>	<b>Serial Number</b>	<b>Qty</b>
		Stainless Steel Wire for tying OSEM cables to the LOS structures		~30 feet
<b>Used In (next higher assembly):</b>				
<b>Vendor Name</b>			<b>PO/Contract Number</b>	
			P	

**Data Package, Receiving/Inspection Remarks:**

Inspection Required Y/N	Visual Damage Y/N	Comments	Name/Initials	Date Comp.

**Process Flow:**

#	Operation	Start Date	Work Area	Instructions	Name/Initials	Date Comp.
1	Clean & Vacuum Bake per LIGO Vacuum Prep. Form		LHO	Clean as Class A Hardware as per E960022.	B. Rivera <i>B. Rivera</i>	8/24/99
2	Control Point		NA	NA		
3	Wrap & Tag vacuum clean parts per E960022-A		LHO	VBO Load# <u>53</u> Scan# <u>082499C.7CA</u> <i>SG 9/14/99</i>	B. Rivera	
4			LHO	<b>Note: Copy this traveler and give to the DCC</b>	NA	

END: Go to Traveler associated with next higher assembly processing

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# LIGO PROCESS TRAVELER

DCC Number: E99179-00-X

Special Instructions (Handling/Packaging Constraints, Remarks, etc.) or Notes:

DATE	NAME	DESCRIPTION



L 0 0

# LIGO PROCESS TRAVELER

E 7 1 0 1

DCC Number: E98 -00-X

Date Prepared: 8-20-99

Originator <b>B. RIVERA</b>	Cognizant Engineer <b>MIKE FINE</b>	Ext./Phone# <b>626-395-3307</b>	Project <b>LIGO</b>	Account Number <b>50311</b>
Dwg/Part Number <b>D972122</b>	Rev	Part Description <b>BSC BELLOWSS</b>	Serial Number <b>51, 57, 62</b>	Qty <b>3</b>
Used In (next higher assembly):		<b>BSC TOP ASSEMBLY</b>		

Vendor Name <b>SENIOR FLEXONICS</b>	PO/Contract Number <b>P PC 29000</b>
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Data Package, Receiving/Inspection Remarks:

Inspection Required Y/N	Visual Damage Y/N	Comments	Name/Initials	Date Comp.
<b>YES</b>	<b>NO</b>	NOTICED GREY "SMUDGES" AROUND OUTSIDE OF BELLOWSS ATTEMPTED TO REMOVE WITH SOLVENTS DOES NOT COME OFF <b>OK. ASW</b>	<b>B. RIVERA</b>	<b>8-20-99</b>

Process Flow:

#	Operation	Start Date	Work Area	Instructions	Name/Initials	Date Comp.
1	Clean & Vacuum Bake per LIGO Vacuum Prep. Form		<b>CIT LHO</b>	per E960022-A	<b>B. RIVERA</b>	<b>8-24-99</b>
2	Control Point		<b>NA</b>	Review/approve RGA scan #082499C.KCA	<b>ASW</b>	<b>9/14/99</b>
3	Wrap & Tag vacuum clean parts per E960022-A	<b>8-24-99</b>	<b>CIT LHO</b>	1 per package	<b>B. RIVERA</b>	<b>8-25-99</b>
4			<b>CIT</b>	<b>Note: Copy this traveler and give to the DCC</b>		

END: Go to Traveler associated with next higher assembly processing

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# LIGO PROCESS TRAVELER

DCC Number: E98-00-X

Special Instructions (Handling/Packaging Constraints, Remarks, etc.) or Notes:

BELLOWS SAT 1-DAY WRAPPED IN UNVFOIL <sup>(3 LAYERS)</sup> BEFORE BEING WRAPPED IN PAPER. STAT B-2 NE RA 8-28-99

JOHN WORDEN HAS UNWRAPPED INSPECTED AND "MASSAGED" INNER BELLOW KNIFE EDGES

WITH AN ARKANSAS STONE TO PREVENT LEAKS. B. RIVERA 9-1-99 HANDLING THE PARTS WITH UNGLUED

HANDS VERBALLY OK'D BY DENNIS COYNE TO BE RE-BACKED AS A U.H.V. CLEAN PARTS





# LIGO PROCESS TRAVELER

DCC Number: E990279-01-X

Date Prepared: 7/8/99

Originator		Cognizant Engineer		Ext./Phone#		Project		Account Number				
Michael Smith		Michael Smith		2062		COS		5F515				
Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO Load 40	VBO Load 41	VBO Load 43	VBO Load 46	VBO Load 48	VBO Load 50	VBO Load 52	VBO Load 54
		<b>Beam Dump Assemblies, WBSC2</b>										
D980087	A	"glass retaining bracket, top left, cavity BD"	012-013	2			2				2	
D980088	A	"glass retaining bracket, top right, cavity BD"	012-013	2			2				2	
D980092	A	"glass plate 1, cavity BD"		2								
D980093	A	"glass plate 2, cavity BD"		2								
D980289	B	"glass mounting plate1, cavity BD"	012-013	2		2						
D980292	B	"glass mounting plate2, cavity BD"	010-011	2		2	2					
D980296	A	"glass retaining bracket, bottom left, cavity BD"	012-013	2			2				2	
D980297	A	"glass retaining bracket, bottom right cavity BD"	012-013	2			2				2	
D980348	B	"side plate, cavity BD"	025-028	4		4						
D980378	B	"Stiffener Block, cavity BD"	013-014	2		2						
D980685	A	"clamp, plate beam dump"		8								
D990028	A	Beam Dump Flex Hinge Tongue	011-014	4				4				
D990029	B	Beam Dump Flex Hinge Clevis	015-017, 019	4				4		1 (019)		
D990030	A	Beam Dump Flex Hinge Tee	013-016	4			3	4				
D990031	A	Beam Dump Flex Hinge Saddle	013-015, 010	4			4	3	1			
D990032	A	Beam Dump Flex Hinge Attach	014-017	4			4	4				
D990033	A	Beam Dump Flex Hinge Adapter	018, 015, 011	4		3						
D990140	D	Beam Dump Housing Plate	009, 010	2		2						
D990149	C	"Cavity Beam Dump, Mounting Bracket Angle "	010, 012, 014, 015	4			4	4				

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# LIGO PROCESS TRAVELER

DCC Number: E990279-01-X

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO Load 40	VBO Load 41	VBO Load 43	VBO Load 46	VBO Load 48	VBO Load 50	VBO Load 52	VBO Load 54
D990150	B	"Cavity Beam Dump, Mounting Bracket Gusset "	013, 014, 016, 017	4			4		4			
D990151	B	"Cavity Beam Dump, Mounting Bracket Backplate 1"	009, 015, 019 016	4			4		4			
D990152	C	"Cavity Beam Dump, Mounting Bracket Backplate 2"	016, 017 010, 012	4			4		4			
D990198	B	Beam Dump Flex Hinge H_tube	008, 011, 006	4								3
D990199	A	Beam Dump Flex Hinge Low Strap	012, 014, 016, 017	4				4				
D990200	A	Beam Dump Flex Hinge Backup	007, 008, 025, 027, 035, 036 019, 032	8			8		8			
D990201	A	Beam Dump Flex Hinge Cap	030, 032, 038, 035, 018, 028, 031, 037	8			8	8				
D990202	B	Beam Dump Flex Hinge Top Strap	011-014	4			4	4				
D990207	B	"rail, plate beam dump"	015-018	4			3		4			
D990218	B	"glass, plate beam dump"		2								
D990222	A	Beam Dump Housing Tube 2KBSAR3		0								
D990223	C	Beam Dump Housing Tube 2KFM		0								

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DCC Number: **E990279-01-X**

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO Load 40	VBO Load 41	VBO Load 43	VBO Load 46	VBO Load 48	VBO Load 50	VBO Load 52	VBO Load 54
D990225	D	"Beam Dump Housing Tube 4KITMHR3, 4KITMHR4"		0								
D990236	B	"backplate_offset, plate beam dump"		0								
D990240	B	"backplate, plate beam dump"		0								
D990252	B	"Beam Dump Housing Tube ITMAR1,2KRMHR3"		2								
D990253	A	Extension Tube	004, 005	2			1		1(004)			1(005)
D990335	A	"Beam Dump Flex Hinge H_tube, 2KITMXAR4 "		0								
D990336	A	"Beam Dump Flex Hinge H_tube, 2KITMYAR4"		0								
WFV-10		#10 X 0.31 THK FLAT VENTED WASHER		32								40
93615A355		#10-24 X 0.75 LOW HD SCS		24	24							
92196A245		#10-24 X 0.75 SHCS		8	8							
WFV-06		#6 X 0.016 THK FLAT VENTED WASHER		8								40
92196A144		#6-32 X .25 SHCS		8	8							
WFV-08		#8 FLAT VENTED WASHER		68	48							20
92185A194		#8-32 X .50 SHCS		68	68							
91500A194		#8-32 X .500 FHPS		36	36							
91944A450		0.406ID X 0.88OD X 0.25 THK SPHER WASH		16	16							
92141A029		1/4 FLAT WASHER		32	32							
N-2520-A		1/4-20 HEX NUT		16	16							
93615A410		1/4-20 X .500 LOW HEAD SOCKET SCREW		16	16							
92196A540		1/4-20 X 0.75 SHCS		48	48							
92196A542		1/4-20 X 1.00 SHCS		32	32							
C-2016-NA		"1/4-20 X 1.00 SHCS, AG/SS"		40	20							20
92196A544		1/4-20 X 1.25 SHCS		16	16							
C-2820-NA		"1/4-28 X 1.25 SHCS, AG/SS"		24	24							
91950A031		3/8 X 0.063 FLAT WASHER		6	6							
WFV-38		3/8 X 0.032 THK FLAT VENTED WASHER		42	42							
94804A320		3/8-16 HEX NUT		8	8							

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Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO Load 40	VBO Load 41	VBO Load 43	VBO Load 46	VBO Load 48	VBO Load So	VBO Load Sz
N-3816-A		"3/8-16 HEX NUT, AG/SS"		4	4						
TOP-1616-NA		3/8-16 X 1.00 SOCKT SET SCRW-OVL PT AG/SS		8	8						
90585A626		3/8-16 X 1.25 FLT HD CAP SCREW		8	8						
92186A626		3/8-16 X 1.25 HEX HD SCREW		16	16						
C-1620-NA		"3/8-16 X 1.25 SHCS, AG/SS"		8	8						
92186A630		3/8-16 X 1.75 HEX HD SCREW		4	4						
92196A630		3/8-16 X 1.75 SHCS		12	12						
92186A999		3/8-16 X 7.00 HEX HD SCREW		16	16						
099-966-12-20x		BERYLLIUM-CU GND STRP		8	8						
6032-400		Flex Pivot		8							4

Used In (next higher assembly): D990230, BSC Beam dump Installation, top assembly

### Data Package, Receiving/Inspection Remarks:

Inspection Required Y/N	Visual Damage Y/N	Comments	Name/Initials	Date Comp.
y		Inspect for breakage during shipment		

### Process Flow:

#	Operation	Start Date	Work Area	Instructions	Name/Initials	Date Comp.
1	Control Point	NA	NA		NA	NA
2	Clean	6/18	LHO	per LIGO-E960022, as applicable	B. Weaver	
3	Vacuum Bake	SEE NEXT PAGE	LHO	per LIGO-E960022	B. R. Weaver K. Ryan	SEE NEXT PAGE
4	Wrap and Bag		LHO	per LIGO-E960022	B. Weaver	

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DCC Number: **E990279-01-X**

Date Prepared: **7/8/99**

#	Operation	Start Date	Work Area	Instructions	Name/Initials	Date Comp.													
5	Control Point	6-24-99 6-28-99 07-06-99 07-20-99	LHO	Review/approve RGA: VBO Load# 40 scan # <u>060899C.RGA</u> VBO Load# 41 scan # <u>070299C.RGA</u> VBO Load# 43 scan # <u>REJECTED</u> VBO Load# 46 scan # <u>072699C.RGA</u> VBO Load# 48 scan # <u>080399C.RGA</u> VBO Load# 50 scan # <u>081099C.RGA</u> VBO Load# 52 scan # <u>082099C.RGA</u> Note: attach RGA scan(s) to this traveler. <u>VBO Load# 54</u>	K. Ryan  JEW JEW JEW JEW JEW	7/28/99 8/10/99 8/10/99 9/14/99													
	Box for shipment to LHO			Ship in LIGO-provided container. <u>VBO Load# 53 scan # 082499C.RGA</u> <u>VBO Load# 61 scan # 101899C.RGA</u> <u>VBO Load# 50 scan # 083099C.RGA</u> <u>VBO Load# 51 scan # 101899C.RGA</u>															
				<table border="1"> <thead> <tr> <th>No.</th> <th>Qty per package</th> <th>Part</th> </tr> </thead> <tbody> <tr> <td>ALL</td> <td></td> <td>BEAM DUMP PARTS</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>	No.	Qty per package	Part	ALL		BEAM DUMP PARTS									
No.	Qty per package	Part																	
ALL		BEAM DUMP PARTS																	
				(see also qty. for each shipping destination below)															
7	Ship																		
		<table border="1"> <thead> <tr> <th rowspan="2">No.</th> <th colspan="3">Ship Qty.</th> <th rowspan="2">Part Description</th> </tr> <tr> <th>LHO</th> <th>LLO</th> <th>Other</th> </tr> </thead> <tbody> <tr> <td></td> <td>all</td> <td></td> <td></td> <td>beam dump parts</td> </tr> </tbody> </table>			No.	Ship Qty.			Part Description	LHO	LLO	Other		all			beam dump parts		
No.	Ship Qty.			Part Description															
	LHO	LLO	Other																
	all			beam dump parts															
		LHO:	Attn: Betsy Weaver, COS LIGO Hanford Observatory (LHO) Specific Purpose: beam dump BSC8																
		LLO:	Attn: Betsy Weaver, COS LIGO Hanford Observatory (LHO) Specific Purpose: beam dump BSC8																
		<p><b>NOTE: A copy of this traveler must be submitted to the DCC each time the original is shipped with the LIGO instrument. Observations at LHO has been completed.</b></p>																	
		Specific Purpose: beam dump BSC8																	

**Special Instructions (Handling/Packaging Constraints, Remarks, etc.) or Notes:**

Attention: Betsy Weaver, Jonathan Kern, hold cleaned and baked parts for COS assembly


# LIGO PROCESS TRAVELER

DCC Number: **E990279-01-X**

Date Prepared: **7/8/99**

## ACTION ITEMS:

Table 1:

DATE	NAME	DESCRIPTION
7/20	B. Weaver	S/N 012-013 of parts D980087, D980088, D980296, and D980297 were sent back to Spacecraft Spec. for rework, as we found that they had not been manufactured completely.
7/15	B. Weaver	VBOLoad#43 - Rejected due to bad scan. Dennis Coyne sent all parts from this load (plus some) to be electropolished or etched for better cleaning.
7/23	B. Weaver	Parts received back from polishing/etching companies. - Re-cleaned as per Dennis C.'s email (attached).
8/5/99	B. Weaver	Clavis D990029 s/n-019 was sent out for modification as per DCN#: E990273-B / D990029-B. Rec. back - 8/4.
9/10/99	B. Weaver	D980348 s/n 027 & 028 Sent to Brookman Mfg. for rework - holes made into slots to compensate for low clearance.
10/11/99	B. Weaver	Giving D980348 s/n 027 & 028 to B. Rivera for vacuum rework.

**N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.**



**Table 1:**

DATE	NAME	DESCRIPTION

Dennis Coyne, 12:12 PM 7/22/99 -0700, Re: cleaning

X-POP3-Rcpt: bweaver@apex  
Date: Thu, 22 Jul 1999 12:12:31 -0700  
From: Dennis Coyne <coyne@ligo.caltech.edu>  
Organization: Caltech/LIGO  
X-Mailer: Mozilla 3.01Gold (Win95; I)  
To: Betsy Weaver <weaver\_b@ligo.caltech.edu>  
CC: Stan Whitcomb <stan@acrux.ligo.caltech.edu>,  
Mike Smith <smith@acrux.ligo.caltech.edu>,  
Bartie Rivera <rivera\_b@ligo-wa.caltech.edu>  
Subject: Re: cleaning

NBO LOAD 48

Betsy,

You should clean as follows (E960022-05 except since the parts are too large to ultrasonically clean, I've tailored the cleaning):

1) clean with Liquinox first (solution per E960022-05) and using a rubbing/scrubbing action (i.e. not just rinsing the liquinox over the surfaces). All holes must be cleaned with a brush (stainless steel, phosphor-bronze preferred, but nylon is acceptable). It is ESSENTIAL that the liquinox NOT dry before being rinsed with DI water.

2) Thoroughly rinse with DI water. All surfaces and holes must be rinsed THOROUGHLY.

3) Rinse & rub (with gloved hand only) all surfaces with either methanol or isopropal alcohol. Squirt the solvent into all holes.

4) Blow dry with clean, filtered air or N2, or allow to dry on a clean bench. Do not leave exposed for longer than about 15 minutes, before covering with UHV foil.

With regard to cleaning the lens, please see Stan for a confirmation, but I believe the rule that we operate under is that if all surfaces are polished, then an optics cleaning and wetting test is adequate and no baking is required. However, if the sides of the optic are not polished (as I suspect is the case for the ETM optics), then it should be cleaned and baked and re-cleaned. However, please confirm this with Stan and he may grant a waiver if he examines the surface condition of the optics.

Dennis

Betsy Weaver wrote:

- >
- > Hi Dennis--
- >
- > Two cleaning questions for you:
- >
- > 1. We just received the aluminum load (COS) from the etching company.
- > How should we clean them here, before baking them? (They are

Dennis Coyne, 12:12 PM 7/22/99 -0700, Re: cleaning

---

- > obviously too large to put in the ultrasonic cleaner...)
- >
- > 2. Mike has one large and two small lenses that are going to be
- > used in the ETM Telescope Assembly. If they wet well during cleaning,
- > do they really need to be baked? A while ago, Stan told me that the
- > small steering mirrors for IO and COS did not need to be baked, as the oven
- > would just make them dirtier, because they wetted so well during cleaning.
- > Is this the same for the lenses? If they do need to be baked, can I put
- > them in
- > the next load with the one Large Optic?
- >
- > Thanks-
- > Betsy

Dennis Coyne (Detector Installation Manager)  
LIGO Laboratory, Caltech, Physics Department  
626.395.2034 @CIT / 225.686.3168 @Livingston / 509.372.8166 @Hanford  
cell 626.695.8350



**LHO VACUUM BAKE OVEN A LOAD #53  
ELEVATED TEMPERATURE BACKGROUND**

**SCAN**

V-1 Closed

**No Elevated Temperature Background Data  
Available**

**LHO VACUUM BAKE OVEN A LOAD #53**  
**ELEVATED TEMPERATURE SCAN**

V-1 Open, Cal-Gas and V-2 Closed, 70°C

**No Elevated Temperature Data Available**

## LHO Bake Oven A Load # 53

1<sup>st</sup> Order Desorption Outgassing Rate Estimates using  $Q_{low} = SP_{low} = SP_{high} [e^{-(E_s/kT_{high})}] / [e^{-(E_s/kT_{low})}]$

Number of units in bake load	Pump Speed (L/sec)	AMU	RGA background current (amps)	RGA current (amps) @ $T_{high}$	Calibration Factor CF (torr/amps)	$T_{high}$ (K)	$T_{low}$ (K)	Es/k	Extrapolated outgassing rate (torr*L/sec) @ $T_{low}$
1	5	41	No Data	No Data	2.00E+07	No Data	No Data	13000	No Data
1	5	43	No Data	No Data	2.00E+07	No Data	No Data	8000	No Data
1	5	53	No Data	No Data	2.00E+07	No Data	No Data	13000	No Data
1	5	55	No Data	No Data	2.00E+07	No Data	No Data	15000	No Data
1	5	57	No Data	No Data	2.00E+07	No Data	No Data	15000	No Data

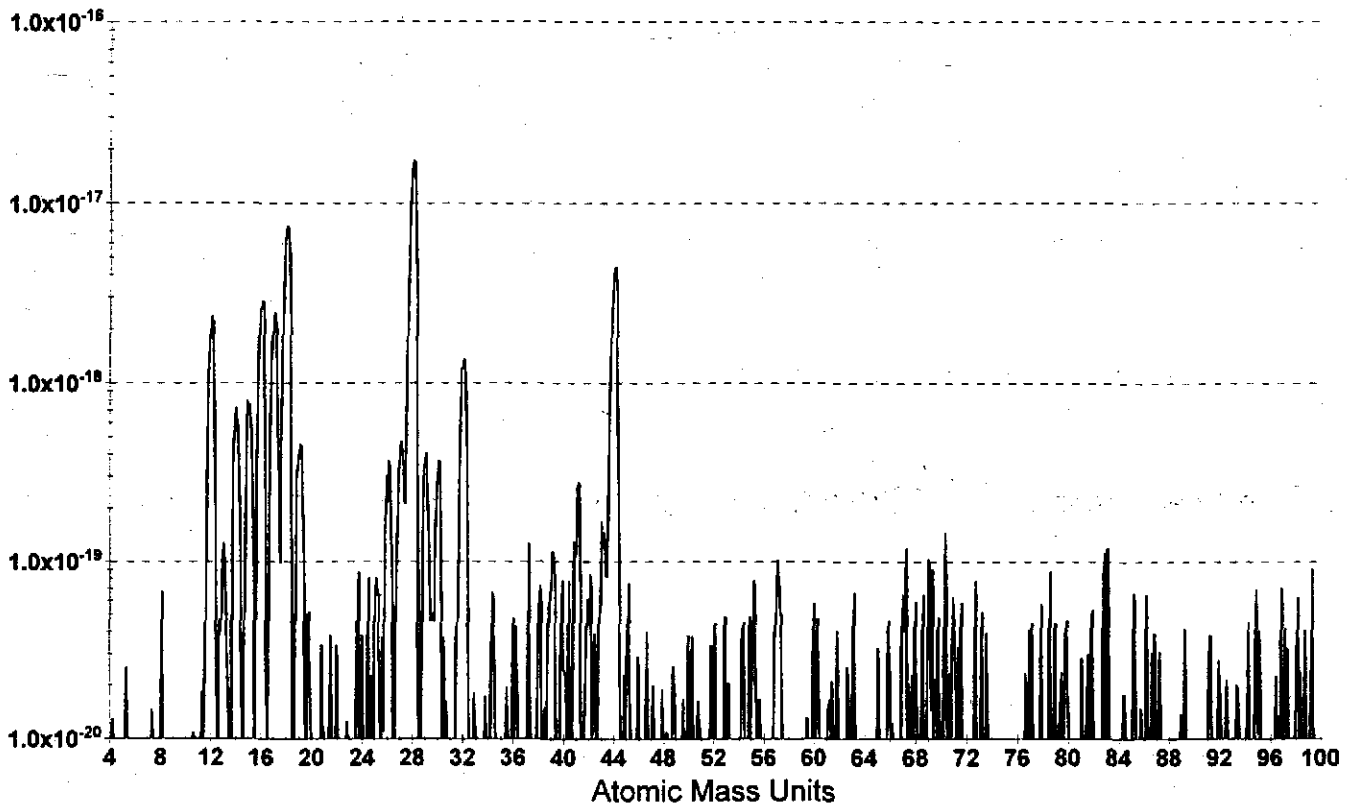
# LHO Vacuum Bake Oven A Load #53 RGA Background

V-1 Closed, Room Temp

Amps

082499a

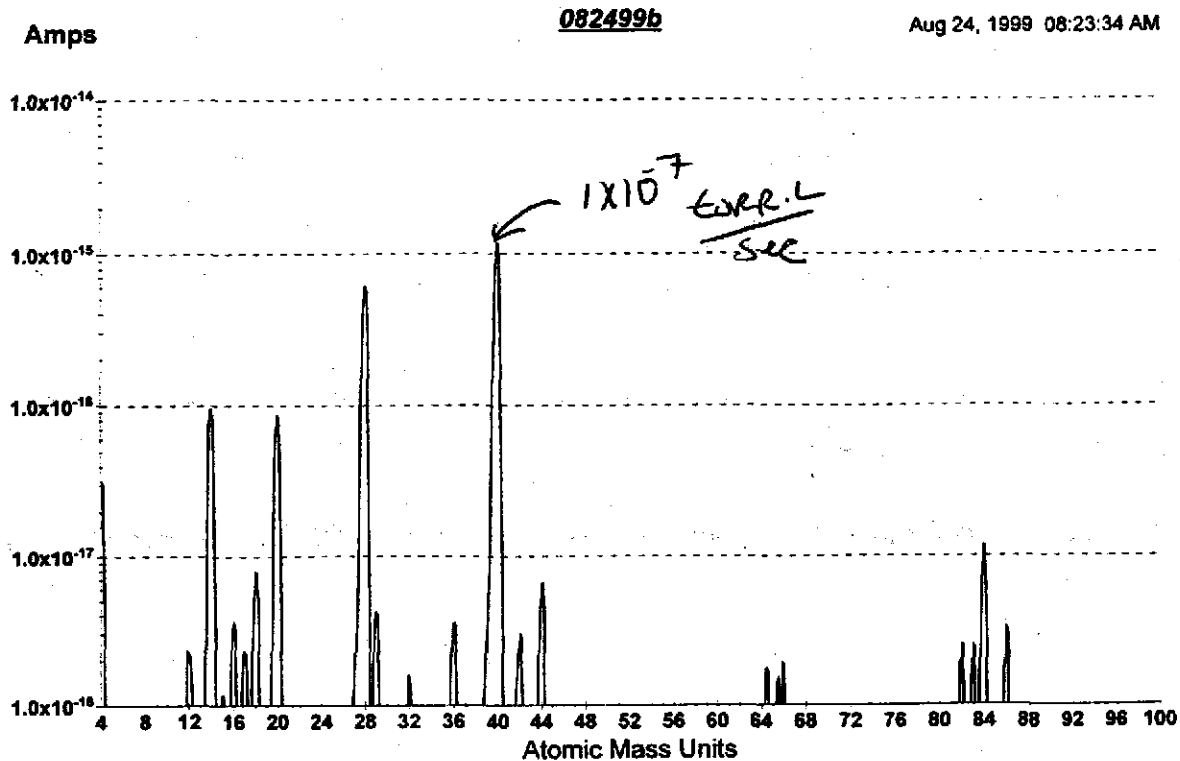
Aug 24, 1999 07:43:04 AM





# LHO Vacuum Bake Oven A Load #53 Calibration

V-1 and cal-gas open, V-2 closed in pressure equilibrium at room temperature



CF defined as  $P_{(calc)} / I_{(meas)}$

$$P_{calc(40)} = (\text{leak rate}) / (\text{pump speed}) = (1.1\text{E-}7 \text{ torr}\cdot\text{L}/\text{sec})(0.86) / (5 \text{ L}/\text{sec}) = 1.8\text{E-}8 \text{ torr}$$

$$I_{(meas)} = 1\text{E-}15 \text{ amps}$$

$$CF = (1.8\text{E-}8 \text{ torr}) / (1\text{E-}15 \text{ amps}) = 2\text{E}7 \text{ torr}/\text{amps}$$

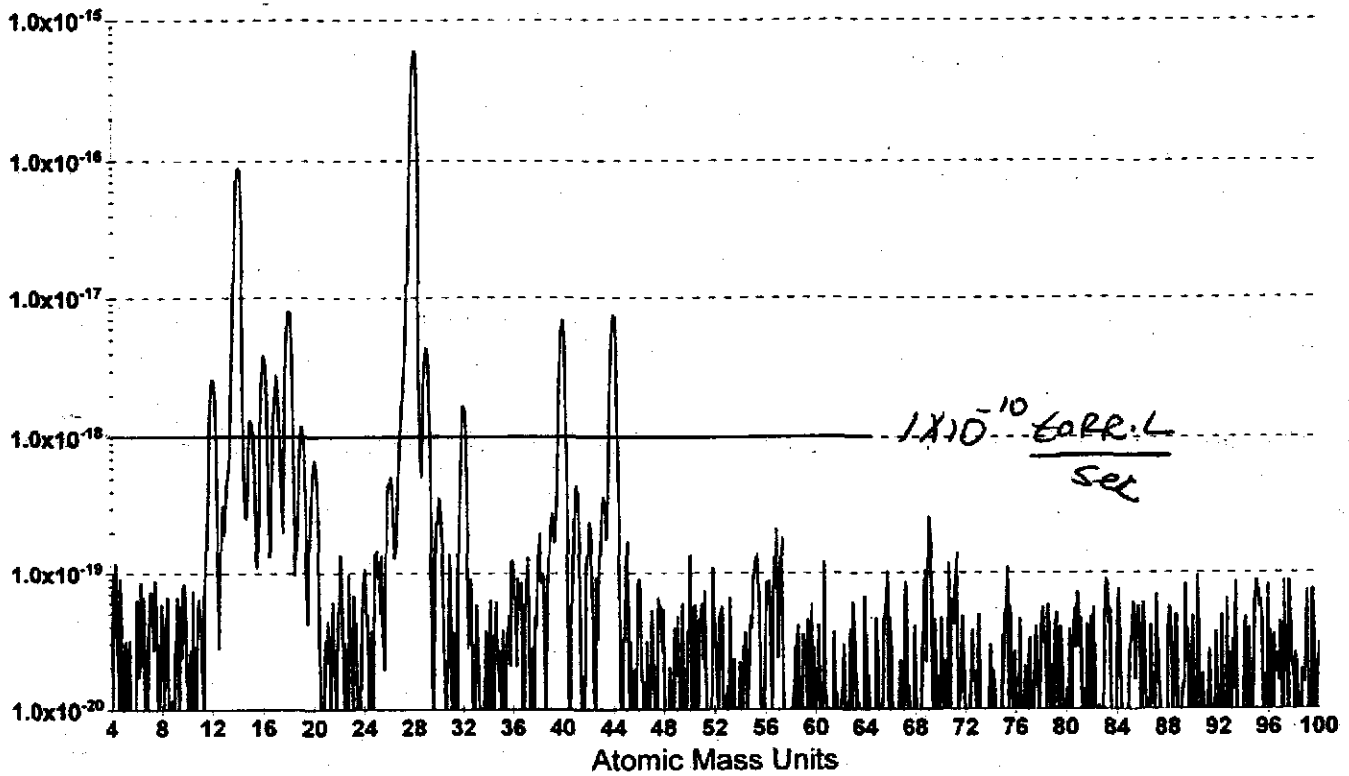
# LHO Vacuum Bake Oven A Load #53 Post-Bake Scan Room Temp

V-1 Open, Cal-Gas and V-2 Closed

Amps

082499c

Aug 24, 1999 10:29:23 AM



**Stan Whitcomb, 09:30 AM 9/1/99 -0700, Re: e-mail approval for previous scan**

---

X-POP3-Rcpt: brivera@apex  
X-Sender: stan@127.0.0.1  
X-Mailer: QUALCOMM Windows Eudora Light Version 3.0.5 (32)  
Date: Wed, 01 Sep 1999 09:30:32 -0700  
To: "Bartie J. Rivera" <rivera\_b@ligo-wa.caltech.edu>  
From: Stan Whitcomb <stan@ligo.caltech.edu>  
Subject: Re: e-mail approval for previous scan

Bartie,

I approve the scan for load 53.

stan

At 08:41 AM 9/1/99 -0700, you wrote:

>  
>Hello Stan,  
>  
>Can I get you to e-mail me an approval for load  
>53 (bsc bellows). You had approved them over the  
>phone but the traveler has not been signed and they  
>are about to be installed and I wanted to attach the  
>approval to the back of the traveler. I will re-fax the  
>scans to you at LLO.  
>  
>Thanks  
>Bartie  
>  
>



# PROCESS TRAVELERS

• E990308-00-X

• E990280-00-X →

• E990267-01-X

• E990275-02-X

• E990279-01-X

• E990311-00-X

• E990310-00-X

• E990309-00-X

D990443-B-D  
Not in database

---

D980087-A (C,D)  
D980088-A (C,D)  
D990031-A  
D990032-A  
D990033-A  
not in database

---

D980087-A-W  
D980088-A-W  
D990031-A-D  
D990032-A-D  
D990033-A-D  
not in database

---

D980087-A  
D980088-A  
D98990029-B  
D990031-A  
D990032-A  
D990033-A  
not in database

D990450-A-D  
not in database

complete drug list  
not in database

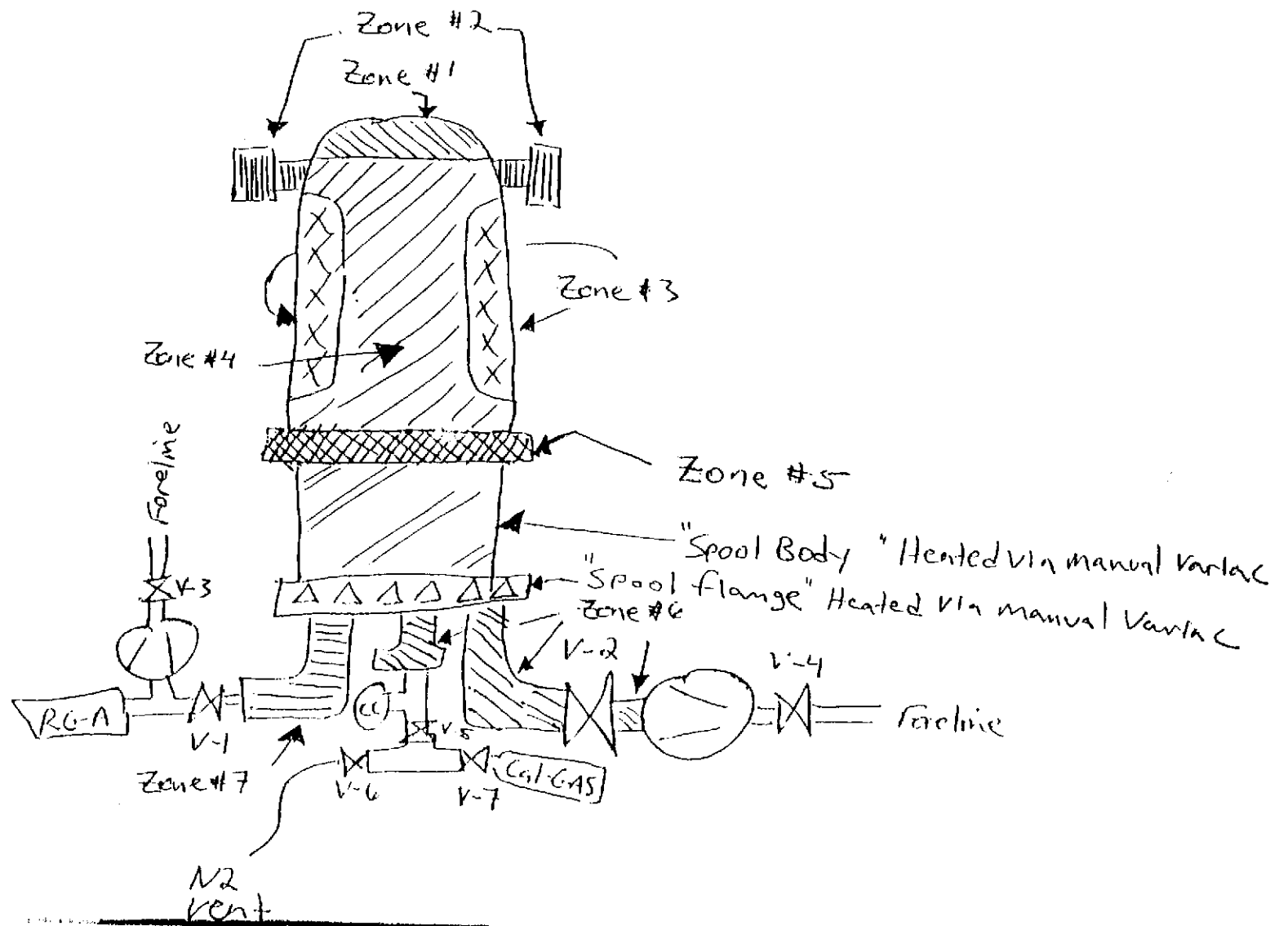
## Summary of Vacuum Bake Oven RGA Data Generation

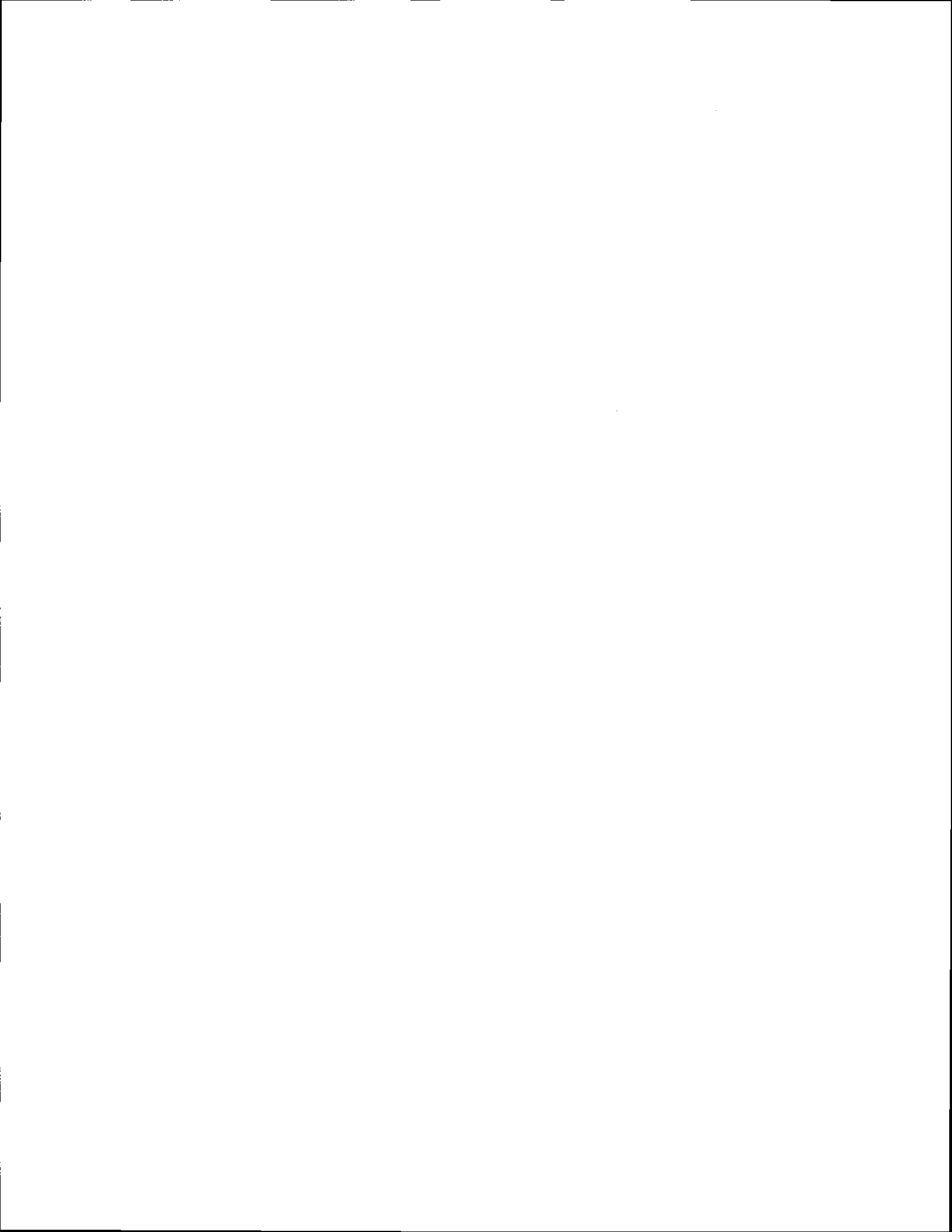
The individual parts which comprise a "load" are cleaned as per LIGO-E960022 or as allowed by waiver(s) and loaded into the bake oven. The oven is pumped down through the main pump "arm" (RGA arm is valved off at this point). A heating profile is programmed and baking of the system begins. A typical "heating profile" consists of ramping up to material type soak temperature, soaking and then ramping down to approximately 70C and soaked. At this point, an RGA background scan is taken, V-1 is opened and an elevated load temperature RGA scan is taken and V-1 closed. This data is entered into a spreadsheet which then calculates what the partial pressures of AMUs 41, 43, 53, 55 and 57 ought to be at room temperature. Following this elevated temperature scan, the load is ramped down to near room temperature. Throughout the baking, temperature data (trendplot) is taken to verify the actual temperatures in the various "zones" of the bake oven system.

Once at near room temperature, another RGA background (V-1 closed) scan is taken. The partial pressures of AMUs 41, 43, 53, 55 and 57 taken from this background scan will get subtracted from the corresponding values measured on the final "Post Bake Scan". Following this scan, V-1 and the cal-gas are opened and V-2 closed. After a 30 min partial pressure equilibration time, a second RGA scan is taken in "amp vs. amu" mode. The calculated pressure of Argon (constituent of the "mixed" calibration gas) is determined and compared (ratio) to the peak amp value recorded for Argon by the RGA scan. This "torr/amp" ratio becomes the Calibration Factor for the given load, converting measured current to pressure.

Finally, the cal-gas is valved out and enough time is allotted to allow all traces of it to be pumped away. A "post-bake" scan is then taken. This post-bake scan data is reviewed as both an analog graph (.rga file extensions) and an ASCII table (.asc file extensions) form. The highest current value between +/- 0.5 AMU of the amu of interest appearing in the ASCII table is entered into a spreadsheet. This spreadsheet then calculates the offgassing rate of AMUs 41, 43, 53, 55 and 57.

Refer to the LHO Bake Oven A logbook for the actual ordered events.







# LHO VACUUM BAKE OVEN A: CONTENTS LOAD #52

TABLE CLAMPS, SERIAL NUMBER D990443-B-098, 049, 033, 072, 043, 093, 100,  
106, 114, 035, 101, 128, 045, 031, 065, 024, 122, 044, 111, 084, 066, 083, 081, 059, 080,  
090, 131, 135, 061, 138, 069

## CAVITY BEAM DUMP COMPONENTS

GLASS RETAINING BRACKET, TOP LEFT, SERIAL NUMBER D980087-A-014,  
015

GLASS RETAINING BRACKET, TOP RIGHT, SERIAL NUMBER D980088-A-  
014, 015

GLASS RETAINING BRACKET, BOTTOM LEFT, SERIAL NUMBER-D980296-  
A-014, 015

GLASS RETAINING BRACKET, BOTTOM RIGHT, SERIAL NUMBER  
D980297-A-014, 015

GLASS RETAINING BRACKET, TOP LEFT, SERIAL NUMBER D980087-A-006,  
007, 008

GLASS RETAINING BRACKET, TOP RIGHT, SERIAL NUMBER D980088-A-  
006, 007, 008

GLASS RETAINING BRACKET, BOTTOM LEFT, SERIAL NUMBER D980296-  
A-006, 007, 008

GLASS RETAINING BRACKET, BOTTOM RIGHT SERIAL NUMBER  
D980297-006, 007, 008

BEAM DUMP HOUSING TUBE ITMAR1, 2KRMHR3 SERIAL NUMBER  
D990252-B-007

GLASS RETAINING BRACKET, TOP LEFT, SERIAL NUMBER D980087-A-009,  
010, 011

GLASS RETAINING BRACKET, TOP RIGHT, SERIAL NUMBER D980088-A-  
009, 010, 011

GLASS RETAINING BRACKET, BOTTOM LEFT, SERIAL NUMBER D980296-  
A-009, 010, 011

# LHO VACUUM BAKE OVEN A LOAD 52 CONTENTS CONT.

GLASS RETAINING BRACKET, BOTTOM RIGHT, SERIAL NUMBER  
D980297-A-009, 010, 011

BEAM DUMP FLEX HINGE H\_TUBE SERIAL NUMBER D990198-B-009, 015

GLASS RETAINING BRACKET, TOP LEFT, SERIAL NUMBER D980087-A-012,  
013

GLASS RETAINING BRACKET, TOP RIGHT, SERIAL NUMBER D980088-A-  
012, 013

GLASS RETAINING BRACKET, BOTTOM LEFT, SERIAL NUMBER D980296-  
A-012, 013

GLASS RETAINING BRACKET, BOTTOM RIGHT, SERIAL NUMBER  
D980297-A-012, 013

FLEX PIVOT PART NUMBER 6032-400 (4ea)

PICK OFF TELESCOPE\_APS

#8-32X.50 SCHS (8ea)

#8-32X.75 SCHS (8ea)

¼-20X.50 SCHS (2ea)

#8 FLAT WASHER (8ea)

PLATE, ALIGNMENT TELESCOPE SERIAL NUMBER D980587-B-001

PLATE, ALIGNMENT TELESCOPE SERIAL NUMBER D980588-B-001, 002

BRACKET, ALIGNMENT TELESCOPE SERIAL NUMBER D980589-B-001, 002

TARGET CAMERA MOUNT ASSEMBLY

1/8X.38 DOWELL PART NUMBER 90145A470 (2ea)

#2-56X.38 SHCS PART NUMBER 92196A079 (16ea)

#4-40X.38 SHCS PART NUMBER 92196A109 (8ea)

#4-40X1.00 SHCS PART NUMBER 92196A115 (8ea)

## **LOAD 52 CONTENTS CONT.**

**¼-20X.50 SHCS PART NUMBER 92196A537 (1ea)**

**PLATE, TARGET SUPPORT, LONG SERIAL NUMBER D980572-B-001, 002**

**PLATE, TARGET SUPPORT, SHORT SERIAL NUMBER D980573-B-001, 002**

**FRAME, TARGET SERIAL NUMBER D980574-B-001. 002**

**UNLISTED PART SERIAL NUMBER D980603-B-001, 002, 003, 004**

**BRACE, CAMERA/TARGET SERIAL NUMBER D980604-B-001. 002, 003, 004**

### **FRONT SUPPORT ASSEMBLY**

**¼-20X.50 SHCS PART NUMBER 92196A537 (8ea)**

**¼-20X.75 SHCS PART NUMBER 92196A540 (8ea)**

**¼-20X1.0 PART NUMBER 92196A542**

**¼-20X1.5 SHCS PART NUMBER 92196A546 (10ea)**

**SPHERICAL WASHER PART NUMBER SSPW-1 (16ea)**

**BAR, VERTICAL, FRONT SUPPORT SERIAL NUMBER D980565-B-001, 002**

**GUSSET, REAR, FRONT SUPPORT SERIAL NUMBER D980566-B-001, 002**

**GUSSET, FRONT, FRONT SUPPORT SERIAL NUMBER D980567-B-001, 002**

**BRACE, HORIZONTAL, FRONT SUPPORT SERIAL NUMBER D980568-B-001**

**PLATE, BASE FRONT SUPPORT SERIAL NUMBER D980569-B-001**

**BLOCK, INTERFACE, VERTICLE LOCK SERIAL NUMBER D980570-B-001,  
002**

**PLATE, VERTICLE LOCK, FRONT SUPPORT SERIAL NUMBER D980571-001,  
002**

**¼-20X2.00 THUMBSCREW PART NUMBER 90210A112 (1ea)**

**#8-32X.38 SHCS PART NUMBER 92196A192 (18ea)**

**#8-32X.50 SHCS PART NUMBER 92196A195 (2ea)**

**¼-20X.75 SHCS PART NUMBER 92196A540 (60ea)**

## **LOAD 52 CONTENTS CONT.**

**SQUARE TUBE, TELESCOPE PARABOLIC ASSEMBLY**

**#8-32X.38 FHPS, 100 DEGREE PART NUMBER 93085A192 (60ea)**

**¼ FLAT VENTED WASHER PART NUMBER WFV-25 (60ea)**

**SHEET, UPPER-SQUARE TUBE SERIAL NUMBER D980546-B-001**

**SHEET, LOWER, SQUARE TUBE SERIAL NUMBER D980547-B-001**

**SHEET LEFT, SQUARE BOX SERIAL NUMBER D980548-B-001**

**SHEET RIGHT, SQUARE BOX SERIAL NUMBER D980549-B-001**

**BULKHEAD TITLE PLATE SERIAL NUMBER D980550-B-001, 002, 003, 004,  
005**

**FRONT PLATE SERIAL NUMBER D980551-B-001**

**ANGLE, UPPER SERIAL NUMBER D980552-B-001, 002**

**ANGLE, LOWER LEFT SERIAL NUMBER D980553-B-001**

**ANGLE, LOWER RIGHT SERIAL NUMBER D980554-B-001**

**BLOCK, THUMBSCREW, LATERAL ADJUSTMENT SERIAL NUMBER  
D980593-B-001**

**BASE, LATERAL ADJUSTMENT SERIAL NUMBER D9805601-B-001**

**#8-32X.38 SHCS PART NUMBER 92196A192 (6ea)**

**¼-20X.50 SHCS PART NUMBER 92196A537 (24ea)**

**JACKSCREW "C" SERIAL NUMBER 001, 002 PART NUMBER NOT  
AVAILABLE**

**SPACER, 2.5X6X0.62, 300 CRESCENT SERIAL NUMBER 001, 002 PART  
NUMBER NOT AVAILABLE**

**HORIZONTAL PLATE, JACK STAND SERIAL NUMBER D980595-B-001, 002,  
003, 004, 005, 006, 007, 008**

**VERTICLE PLATE, JACK STAND SERIAL NUMBER D980596-B-001, 002**

**GLIDE PLATE, JACK SERIAL NUMBER D980597-B-001, 002**

## **CONTENTS LOAD 52 CONT.**

**BASE PLATE, JACK SERIAL NUMBER D980598-B-001, 002**

**BASE, JACK SERIAL NUMBER D980599-B-001, 002**

**VERTICLE PLATE, SHORT JACK STAND D980600-B-001, 002**

**MIRROR BOX, TELESCOPE PARABOLIC, ASSEMBLY**

**¼ FLAT EDGED SPACER WASHER PART NUMBER 90945A761 (3ea)**

**#8-32X.75 SHCS PART NUMBER 92196A197 (16ea)**

**¼-20X.75 SHCS PART NUMBER 92196A540 (16ea)**

**#8 FLAT VENTED WASHER PART NUMBER WFV-08 (32ea)**

**¼ FLAT VENTED WASHER PART NUMBER WFV-25 (16ea)**

**#8-32X1.25 SHCS PART NUMBER NOT AVAILABLE (16ea)**

**¼-20X1.0 FSH, 82 DEGREE PART NUMBER NOT AVAILABLE (3ea)**

**PLATE, BOTTOM, MIRROR BOX SERIAL NUMBER D98542-B-001**

**PLATE, TOP, MIRROR BOX SERIAL NUMBER D980543-B-001**

**PLATE, LEFT, MIRROR BOX SERIAL NUMBER D980544-B-001**

**PLATE, RIGHT, MIRROR BOX SERIAL NUMBER D980545-B-001**

**SOCKET PIVOT SERIAL NUMBER D980581-A-001, 002**

**BAR, TUBE AND BOX, LONG SERIAL NUMBER D980583-B-001, 002**

**BAR, TUBE AND BOX, SHORT SERIAL NUMBER D98594-B-001, 002**

**ANGLE, MIRROR BOX SERIAL NUMBER D980619-B-001, 002, 003, 004**

**BACK PLATE SERIAL NUMBER D990096-B-001**

**MIRROR MOUNT ASSEMBLY PRIMARY MIRROR, TELESCOPE  
PARABOLIC**

**1/8" BALL, ALUMINUM PART NUMBER 34665K29 (3ea)**

**¼X11/4 SHOULDER SCREW PART NUMBER 90298A544 (3ea)**

## CONTENTS LOAD 52 CONT.

- ¼ FLAT EDGED SPACER WASHER PART NUMBER 90945A761 (3ea)
- ¼ FLAT WASHER, NAS620C-416 PART NUMBER 90945A761 (6ea)
- #10-24X3/16 CUP PT ST SCREW PART NUMBER 92311A237 (3ea)
- BELLVILLE WASHER PART NUMBER 9713K63 (24ea)
- #10-24X3/4 FSCS PART NUMBER NOT AVAILABLE (6ea)
- #4-40X0.625 SHCS PART NUMBER NOT AVAILABLE (6ea)
- ¼-28X1.0 FSH, 82 DEGREE PART NUMBER NOT AVAILABLE (3ea)
- EXTENSION SPRING PART NUMBER 5967 (2ea)
- 1/8x.38 DOWELL PART NUMBER 90145A470 (4ea)
- #10 WASHER PART NUMBER 90945A741 (3ea)
- #10 WASHER PART NUMBER 90945A741 (3ea)
- ¼ FLAT WASHER, NAS620C-416 PART NUMBER 90945A761 (14ea)
- #8-32X.50 SHCS PART NUMER 92196A196 (4ea)
- #8-32X.75 SHCS PART NUMBER 92196A197 (2ea)
- ¼-20X1.0 SHCS PART NUMER 92196A542 (14ea)
- ¼-20X1.00 HEX BOLT PART NUMBER 92240A542 (8ea)
- #4-40X.38 SHCS SET SCREW PART NUMBER 92311A108 (1ea)
- ¼ FLAT VENTED WASHER PART NUMBER WFV-25 (6ea)
- #10-32X0.50 SPHERICAL END ADJUST SCREW PART NUMBER NOT AVAILABLE (2ea)
- #10-32X0.63 SHCS PART NUMBER NOT AVAILABLE (2ea)
- #4-40X1.25 SHCS PART NUMBER NOT AVAILABLE (3ea)
- 3/8-24X1.0 SHCS PART NUMBER NOT AVAILABLE (4ea)
- 3/8 FLAT WASHER PART NUMBER NOT AVAILABLE (4ea)

# CONTENTS LOAD 52 CONT.

COMPRESSION SPRING PART NUMBER NOT AVAILABLE (3ea)

PRIMARY MIRROR MOUNT PLATE SERIAL NUMBER D990097-B-001

PRIMARY MIRROR MOUNT CLAMP BASE SERIAL NUMBER D990098-B-001,  
002, 003

MIRROR CLAMP SHORT SIDE SERIAL NUMBER D990101-B-001

MIRROR CLAMP LONG SIDE SERIAL NUMBER D990102-B-001, 002

SERIAL NUMBER D990444-B-001, 001, 003

MIRROR MOUNT ASSEMBLY SECONDARY MIRROR, TELESCOPE  
PARABOLIC

Y-AXIS TOP PLATE SERIAL NUMBER D980314-B-001

X-Y INTERFACE PLATE SERIAL NUMBER D980315-B-001

Y-TOP END PLATE SERIAL NUMBER D980316-B-001, 002

X-AXIS WAY PLATE SERIAL NUMBER D980317-B-001

FLEXURE SPRING BLOCK SERIAL NUMBER D980318-B-001

END PLATE SERIAL NUMBER D980319-B-001, 002

ANGLE PLATE SERIAL NUMBER D980321-B-001

1/4-40X0.75 SLOTTED PUSH SCREW SERIAL NUMBER D990448-B (3ea)

REAR CAMERA MOUNT ASSEMBLY

1/4 FLAT WASHER, NAS620C-416 PART NUMBER 90945A761 (3ea)

#4-40X.38 SHCS PART NUMBER 92196A108 (2ea)

#8-32X.50 SHCS PART NUMER 92196A197 (3ea)

#4-40X.38 THUMB SCREW SERIAL NUMBER NOT AVAILABLE (2ea)

SLEAVE ALIGNMENT TELESCOPE SERIAL NUMBER D980576-B-001

REAR SUPPORT ASSEMBLY

1/4X.88 DOWELL PIN PART NUMER 90145A541 (1ea)

## CONTENTS LOAD 52 CONT.

¼ FLAT WASHER, NAS620C-416 PART NUMBER 90945A761 (4ea)

¼-20X.50 SHCS PART NUMBER 92196A537 (26ea)

¼-20X1.0 SHCS PART NUMBER 92196A542 (4ea)

PLATE VERTICLE REAR SUPPORT SERIAL NUMBER D980559-B-001, 002

STIFFNER, VERTICLE REAR SUPPORT SERIAL NUMBER D908560-B-001,  
002, 003, 004

BRACE HORIZONTAL REAR SUPPORT SERIAL NUMBER D980561-B-001

PLATE SWIVEL REAR SUPPORT SERIAL NUMBER D980562-B-001

PLATE BASE REAR SUPPORT SERIAL NUMBER D980563-B-001

PLATE VERTICLE LOCK/PIVOT, REAR SUPPORT SERIAL NUMBER  
D980564-B-001, 002

PERISCOPE ROD MOUNTS PART NUMBER 148-3410 (2ea)

STAINLESS STEELE 20" POSTS (PERISCOPE) PART NUMBER NOT  
AVAILABLE

ETM TELESCOPE MIRROR BRACKET SPACER

SPACER, MIRROR BRACKET SERIAL NUMBER D990450-A-001, 002

¼-20X1.5 SHCS PART NUMBER NOT AVAILABLE (2ea)

¼ VENTED WASHER PART NUMBER WFV-25 (2ea)

2KETM PO BEAM\_BEAM DUMP

POST MIRROR MOUNT BRACKET SERIAL NUMBER D990009-A-001

BLACK GLASS, 2.4 SQUARE SERIAL NUMBER D990445-A-001

CLAMP SERIAL NUMBER D990446-A-001, 002, 003, 004

POST, ETM BEAM DUMP HOLLOW SERIAL NUMBER D990447-A-001

BASE, ROD MOUNT, LONG SERIAL NUMBER D990453-A-001

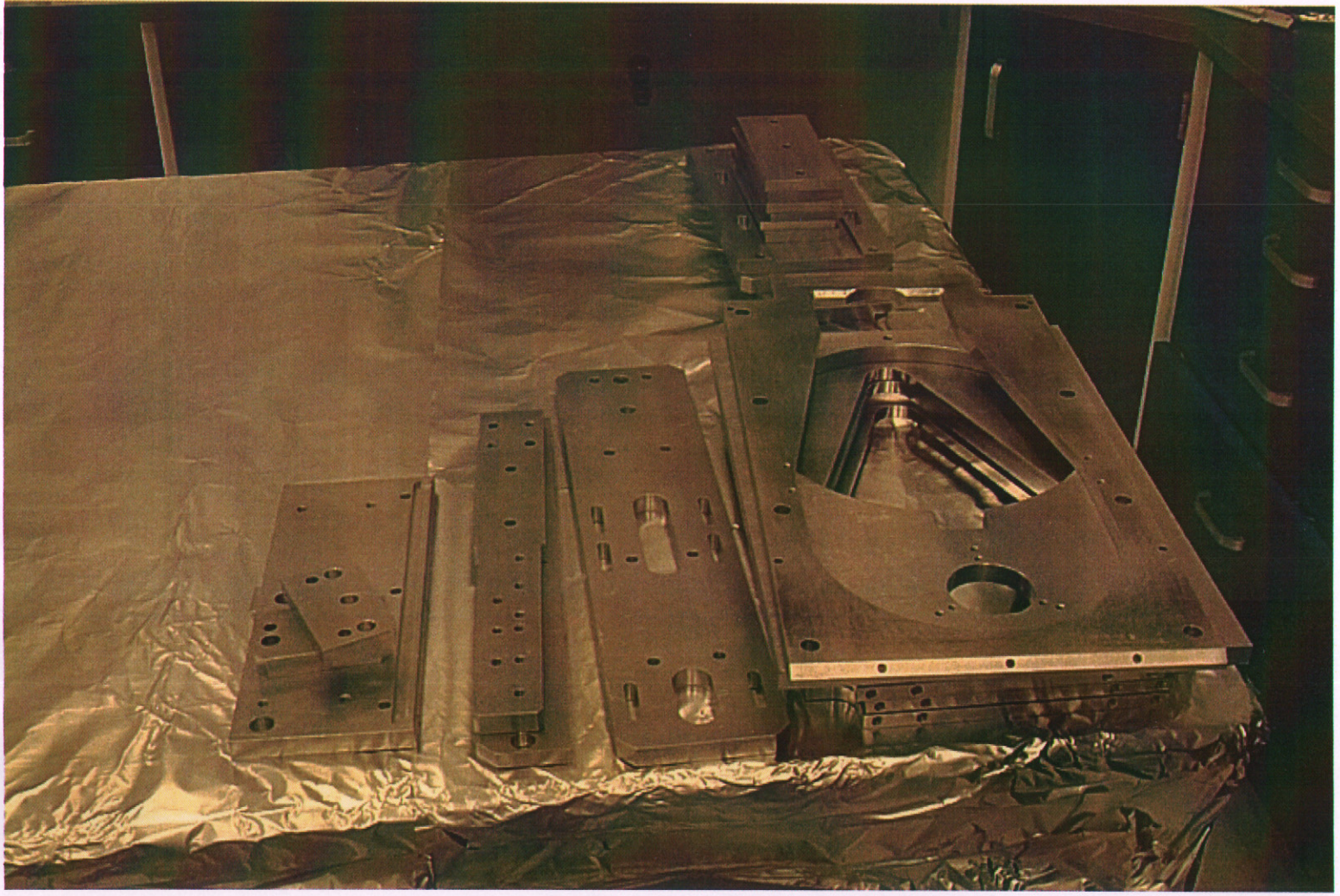
¼-20X0.50 SHCS PART NUMBER NOT AVAILABLE (4ea)

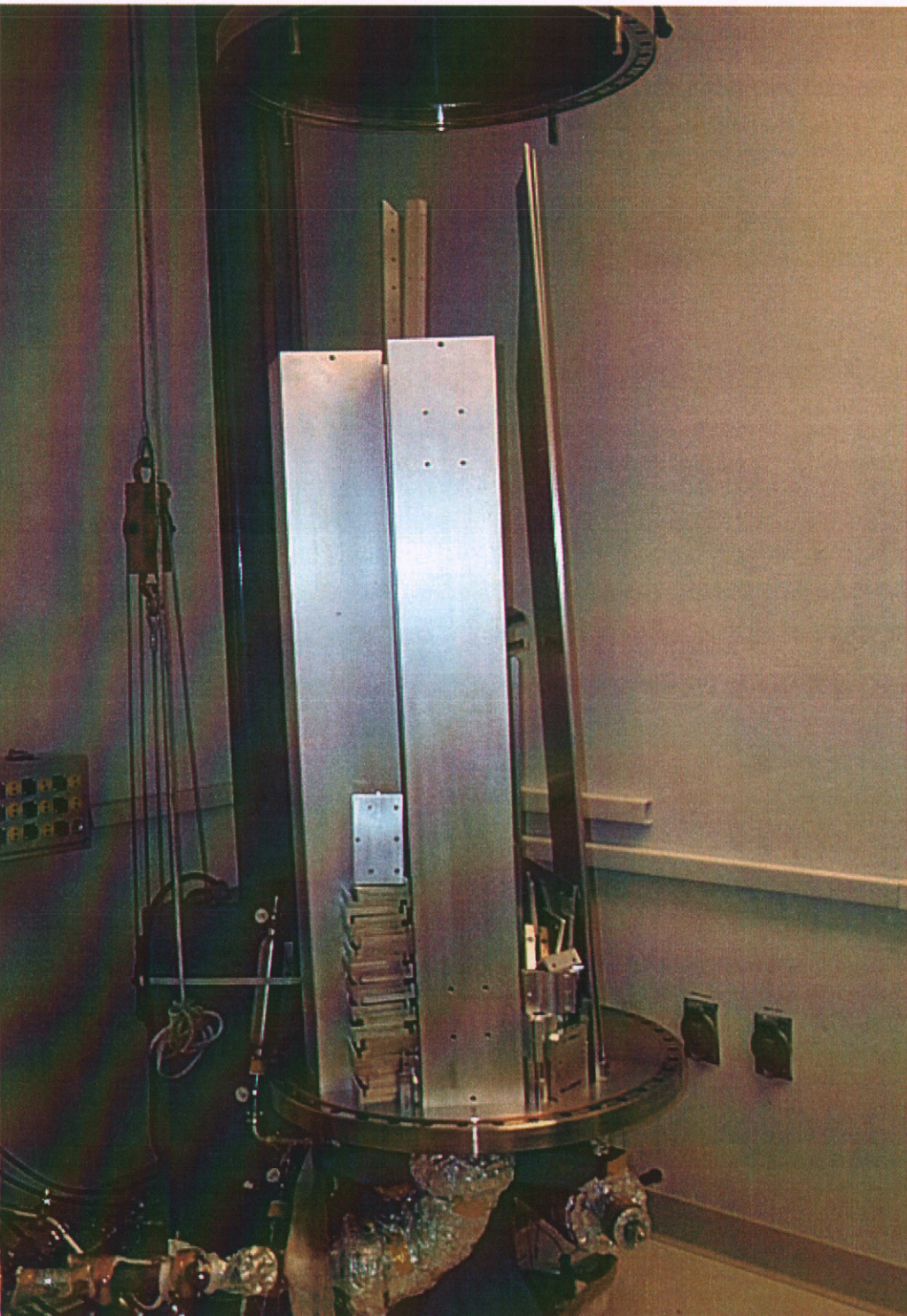


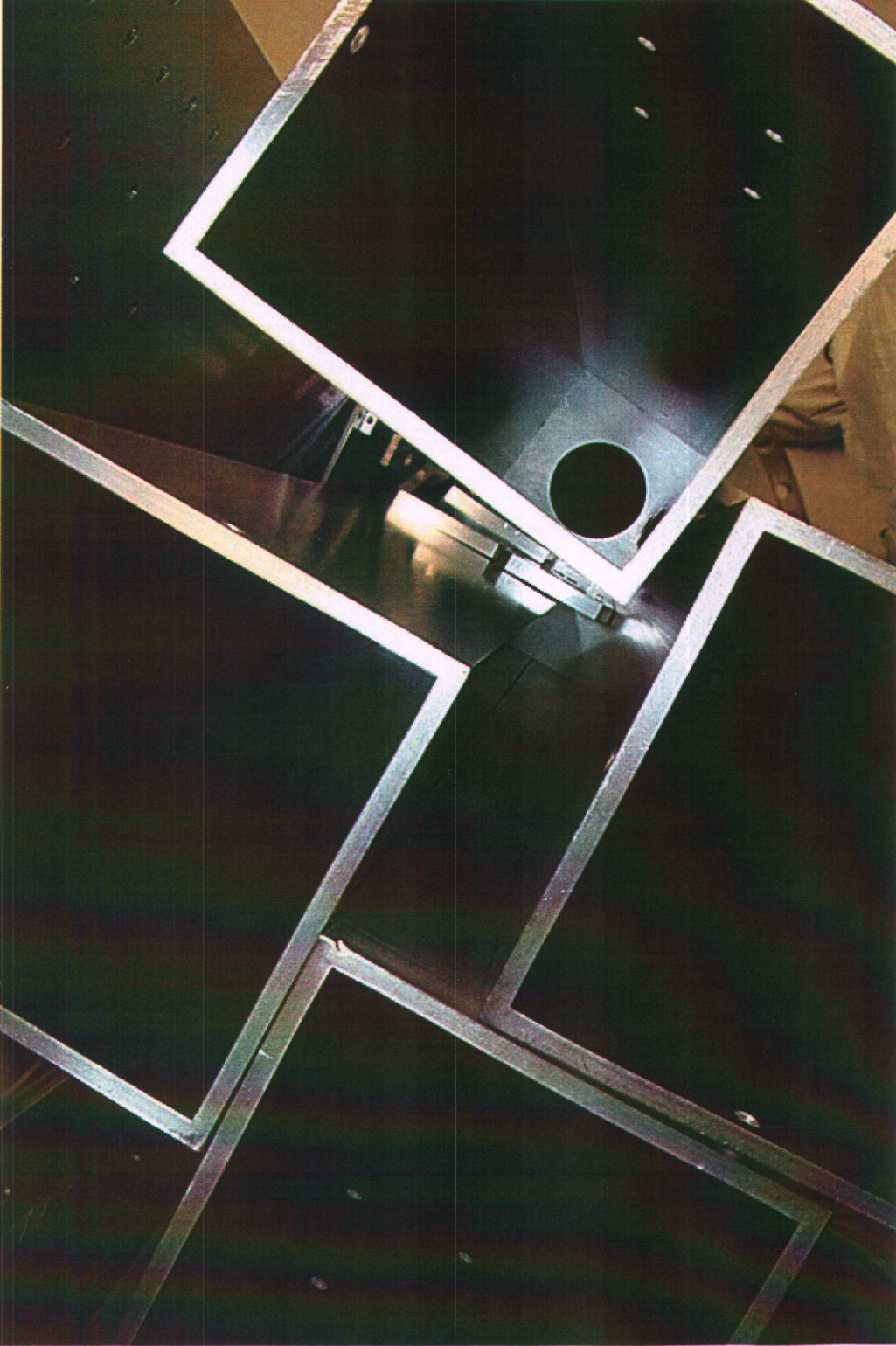
# **CONTENTS LOAD 52 CONT.**

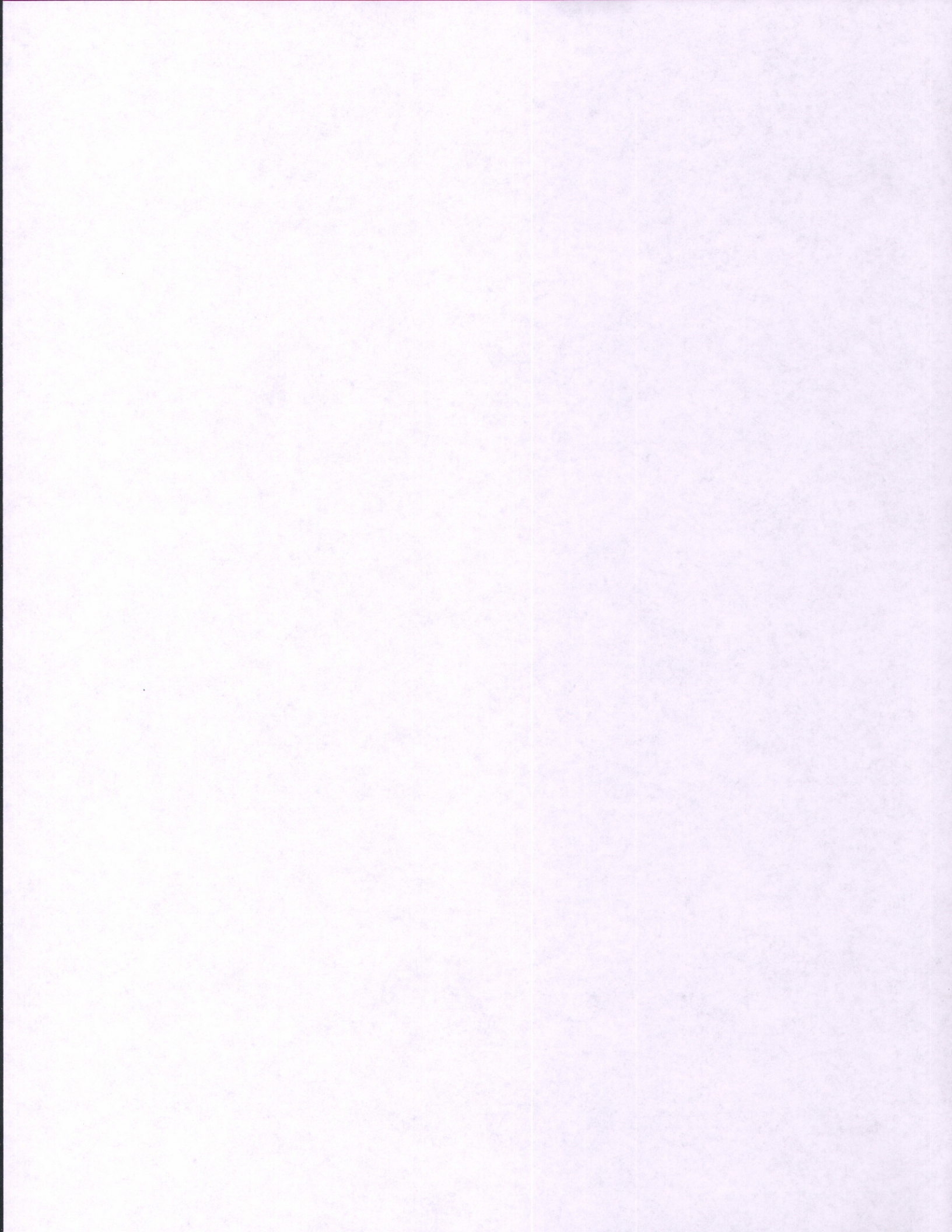
**#8-32X0.63 SHCS PART NUMBER NOT AVAILABLE (4ea)**











# LIGO PROCESS TRAVELER

DCC Number: **E990308-00-X**  
 Date Prepared: **8/6/99**

Originator		Cognizant Engineer		Ext./Phone#	Project	Account Number
Michael Smith		Michael Smith		2062	COS	51515
Dwg/Part Number	Rev	Part Description		Serial Number	Qty	
D990443	B	clamp, table		020-150	130	
Used In (next higher assembly):						

**Data Package, Receiving/Inspection Remarks:**

Inspection Required Y/N	Visual Damage Y/N	Comments	Name/Initials	Date Comp.

**Process Flow:**

#	Operation	Start Date	Work Area	Instructions	Name/Initials	Date Comp.
1	Control Point	NA	NA		NA	NA
2	Clean		LHO	per LIGO-E960022, as applicable	B. Weaver	
3	wrap and bag		LHO	per LIGO-E960022	B. Weaver	
4	Vacuum Bake		LHO	per LIGO-E960022	B. Weaver	8/20/99
5	Control Point		LHO	Review/approve RGA: VBO Load# <u>52</u> scan # <u>0826996.262</u> VBO Load# <u>51</u> scan # <u>0830996.262</u> VBO Load# <u>  </u> scan # <u>  </u> VBO Load# <u>  </u> scan # <u>  </u> VBO Load# <u>  </u> scan # <u>  </u> VBO Load# <u>  </u> scan # <u>  </u> Note: attach RGA scan(s) to this traveler.	B. Weaver <i>[Signature]</i>	9/14/99

*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*

# LIGO PROCESS TRAVELER

DCC Number: E990308-00-X

#	Operation	Start Date	Work Area	Instructions			Name/ Initials	Date Comp.
6	Box for shipment to LLO & CIT		Valley Engravers					
				No.	Qty per package	Part		
				1	20	clamps		
				2	120	clamps		
				3	10	clamps		
				(see also qty. for each shipping destination below)				



# LIGO PROCESS TRAVELER

DCC Number: E990308-00-X

#	Operation	Start Date	Work Area	Instructions	Name/Initials	Date Comp.																							
7	Ship		Valley Engravers																										
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="width: 5%;">No.</th> <th colspan="3" style="text-align: center;">Ship Qty.</th> <th rowspan="2" style="text-align: center;">Part Description</th> </tr> <tr> <th style="width: 5%;">LHO</th> <th style="width: 5%;">LLO</th> <th style="width: 5%;">CIT</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">20</td> <td></td> <td></td> <td>clamps</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">120</td> <td></td> <td></td> <td>clamps</td> </tr> <tr> <td style="text-align: center;">3</td> <td></td> <td></td> <td style="text-align: center;">10</td> <td>clamps</td> </tr> </tbody> </table>			No.	Ship Qty.			Part Description	LHO	LLO	CIT	1	20			clamps	2	120			clamps	3			10	clamps		
No.	Ship Qty.			Part Description																									
	LHO	LLO	CIT																										
1	20			clamps																									
2	120			clamps																									
3			10	clamps																									
			LHO:	Attn: Betsy Weaver, COS LIGO Hanford Observatory (LHO) Specific Purpose: beam dump BSC8																									
			LLO:	Attn: Jonathan Kern LIGO Livingston Observatory (LLO) Specific Purpose: beam dump BSC8																									
<p>END: Go to Traveler associated with next higher assembly processing</p>																													

**Special Instructions (Handling/Packaging Constraints, Remarks, etc.) or Notes:**

DATE	NAME	DESCRIPTION
8/6/99	Mike Smith	Attention: Betsy Weaver, hold cleaned baked parts for use by COS.
8/20	B. Weaver	S/N 098, 049, 033, 072, 043, 093, 100, 106, 114, 035 101, 120, 089, 045, 031, 065, 024, 122, 044, 111, 084 066, 088, 081, 059, 080, 090, 131, 135, 061, 138, 069 Baked in VBO Load 52.
8/30	B. Weaver	Rest of clamps baked in VBO Load 54.

# LIGO PROCESS TRAVELER

DCC Number: **E990308-00-X**  
Date Prepared:

Table 1: ACTION ITEMS CON'T.

DATE	NAME	DESCRIPTION

*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*



# LIGO PROCESS TRAVELER

DCC Number: **E990267-01-X**  
 Date Prepared: **6/30/99**

<b>Originator</b>	<b>Cognizant Engineer</b>	<b>Ext./Phone#</b>	<b>Project</b>	<b>Account Number</b>
Michael Smith	Michael Smith	2062	COS	5F515

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO load 40 6/ 28	VBO load 41 7/1	VBO load 43 7/ 12	VBO load 46 7/ 26	VBO load 48 7/	VBO Load 50
<b>Beam Dump Assemblies, BSC4</b>										
D980087	A	"glass retaining bracket, top left, cavity BD"	006-008	3	3		3			
D980088	A	"glass retaining bracket, top right, cavity BD"	006-008	3	3		3			
D980092	A	"glass plate 1, cavity BD"		3						
D980093	A	"glass plate 2, cavity BD"		3						
D980289	B	"glass mounting plate 1, cavity BD"	006-008	3	3					
D980292	B	"glass mounting plate 2, cavity BD"	007,008,015	3	2		1	1		
D980296	A	"glass retaining bracket, bottom left, cavity BD"	006-008	3	3		3			
D980297	A	"glass retaining bracket, bottom right cavity BD"	006-008	3	3		3			
D980348	B	"side plate, cavity BD"	012-017	6	5	1				
D980378	B	"Stiffener Block, cavity BD"	006-008	3	3					
D980685	A	"clamp, plate beam dump"		12						
D990028	A	Beam Dump Flex Hinge Tongue	004, 005, 006, 007, 010, 015	6	1	3	2	2		
D990029	A	Beam Dump Flex Hinge Clevis	005, 008-012	6	1		1	5		1 (011)
D990030	A	Beam Dump Flex Hinge Tee	005-010	6	6			6		
D990031	A	Beam Dump Flex Hinge Saddle	004-009	6		4		2		
D990032	A	Beam Dump Flex Hinge Attach	004-006, 009-011	6		4		2		
D990033	A	Beam Dump Flex Hinge Adapter	004, 005, 008-010, 014	6		6				
D990140	D	Beam Dump Housing Plate	012, 014	3				3		
D990149	C	"Cavity Beam Dump, Mounting Bracket Angle "	005-008	4	1			3		
D990150	B	"Cavity Beam Dump, Mounting Bracket Gusset "	005-008	4	4					

*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*

# LIGO PROCESS TRAVELER

DCC Number: E990267-01-X

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO load 40 6/ 28	VBO load 41 7/1	VBO load 43 7/ 12	VBO load 46 7/ 26	VBO load 48 7/	VBO Load 50
D990151	B	"Cavity Beam Dump, Mounting Bracket Backplate 1"	005-008	4	4					
D990152	C	"Cavity Beam Dump, Mounting Bracket Backplate 2"	005-008	4	4					
D990198	B	Beam Dump Flex Hinge H_tube	007, 010, 005, 003	4	1	2			1	
D990199	A	Beam Dump Flex Hinge Low Strap	004-009	6	1	5				
D990200	A	Beam Dump Flex Hinge Backup	016-018, 020-022, 010-015	12	2	10				
D990201	A	Beam Dump Flex Hinge Cap	007-017, 019	12	2	2		8		
D990202	B	Beam Dump Flex Hinge Top Strap	005-010	6	1	4		1		
D990207	B	"rail, plate beam dump"	003-006, 008, 009	6		6				
D990218	B	"glass, plate beam dump" other traveler	NA	3			3	3		
D990222	A	Beam Dump Housing Tube 2KBSAR3		0						
D990223	C	Beam Dump Housing Tube 2KFM		0						
D990225	D	"Beam Dump Housing Tube 4KITMHR3,4KITMHR4"		0						
D990236	B	"backplate_offset, plate beam dump"		0						
D990240	B	"backplate, plate beam dump"		2	1					
D990252	B	"Beam Dump Housing Tube ITMARI,2KRMHR3"	001, 005, 007	3	1	2	1			
D990253	A	Extension Tube	003	1			1		1	
D990335	A	"Beam Dump Flex Hinge H_tube, 2KITMXAR4" η	001	1			1		1	
D990336	A	"Beam Dump Flex Hinge H_tube, 2KITMYAR4" X	002	1			1		1	
WFV-10		#10 X 0.31 THK FLAT VENTED WASHER		24	24					
WFV-10		#10 X 0.31 THK FLAT VENTED WASHER		4	4					
92196A245		#10-24 X 0.75 SHCS		4	4					
93615A355		#10-24 X 0.75 LOW HD SCS		24	24					
WFV-06		#6 X 0.016 THK FLAT VENTED WASHER		4	4					
92196A144		#6-32 X .25 SHCS		4	4					
WFV-08		#8 FLAT VENTED WASHER		102	102					

# LIGO PROCESS TRAVELER

DCC Number: E990267-01-X

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO load 40 6/ 28	VBO load 41 7/1	VBO load 43 7/ 12	VBO load 46 7/ 26	VBO load 48 7/
92185A194		#8-32 X .50 SHCS		102	102				
91500A194		#8-32 X .500 FHPS		54	54				
91944A450		0.406ID X 0.88OD X 0.25 THK SPIER WASH		24	24				
92141A029		1/4 FLAT WASHER		48	48				
92141A029		1/4 FLAT WASHER		36	36				
N-2520-A		1/4-20 HEX NUT		24	24				
93615A410		1/4-20 X .500 LOW HEAD SOCKET SCREW		12	12				
92196A540		1/4-20 X 0.75 SHCS		48	48				
92196A540		1/4-20 X 0.75 SHCS		24	24				
92196A542		1/4-20 X 1.00 SHCS		48	48				
C-2016-NA		"1/4-20 X 1.00 SHCS, AG/SS"		48	48				
C-2016-NA		"1/4-20 X 1.00 SHCS, AG/SS"		12	12				
92196A544		1/4-20 X 1.25 SHCS		24	24				
C-2820-NA		"1/4-28 X 1.25 SHCS, AG/SS"		36	36				
91950A031		3/8 X 0.063 FLAT WASHER		3	3				
91950A031		3/8 X 0.063 FLAT WASHER		6	6				
WFV-38		3/8 X0.032 THK FLAT VENTED WASHER		3	3				
WFV-38		3/8 X0.032 THK FLAT VENTED WASHER		32	32				
WFV-38		3/8 X0.032 THK FLAT VENTED WASHER		8	8				
94804A320		3/8-16 HEX NUT		8	8				
N-3816-A		3/8-16 HEX NUT		6	6				
TOP-1616-NA		3/8-16 X 1.00 SOCKT SET SCRW-OVL PT AG/SS		12	12				
90585A626		3/8-16 X 1.25 FLT HD CAP SCREW		8	8				
92186A626		3/8-16 X 1.25 HEX HD SCREW		16	16				
C-1620-NA		"3/8-16 X 1.25 SHCS, AG/SS"		12	12				
92186A630		3/8-16 X 1.75 HEX HD SCREW		6	6				

# LIGO PROCESS TRAVELER

DCC Number: **E990267-01-X**  
 Date Prepared: **6/30/99**

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO load 40 6/ 28	VBO load 41 7/1	VBO load 43 7/12	VBO load 46 7/26	VBO load 48 7/52
92196A630		3/8-16 X 1.75 SHCS		18	18				
92186A999		3/8-16 X 7.00 HEX HD SCREW		16	16				
099-966-12-20x		BERYLLIUM-CU GND STRP		12	12				
6.32-400		Flex Pivot		12	12				

**Used In (next higher assembly):** D990230, BSC Beam dump Installation, top assembly

**Data Package, Receiving/Inspection Remarks:**

Inspection Required Y/N	Visual Damage Y/N	Comments	Name/Initials	Date Comp.
y		Inspect for breakage during shipment		

**Process Flow:**

#	Operation	Start Date	Work Area	Instructions	Name/Initials	Date Comp.
1	Control Point	NA	NA		NA	NA
2	Clean		LHO	per LIGO-E960022, as applicable	B. Weaver	
3	Vacuum Bake		LHO	per LIGO-E960022	K. Ryan	
4	wrap and bag		LHO	per LIGO-E960022	B. Weaver	
5	Control Point	6/24/99 6/28/99 7/6/99 7/20/99	LHO	Review/approve RGA: VBO Load# 40 scan # 062899C.RGA VBO Load# 41 scan # 070299C.RGA VBO Load# 43 scan # Rejected VBO Load# 46 scan # 072699C.RGA VBO Load# 48 scan # 080599C.RGA VBO Load# 50 scan # 081099C.RGA VBO Load# 52 scan # 082699C.RGA Note: attach RGA scan(s) to this traveler.	K. Ryan  B.W B.W B.W B.W	7/28/99 8/10/99 8/10/99 9/14/99

*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*

# LIGO PROCESS TRAVELER

DCC Number: **E990267-01-X**

Date Prepared: **6/30/99**

#	Operation	Start Date	Work Area	Instructions	Name/ Initials	Date Comp.																			
	Box for shipment to LHO			Ship in LIGO-provided container  <table border="1"> <thead> <tr> <th>No.</th> <th>Qty per package</th> <th>Part</th> </tr> </thead> <tbody> <tr> <td>ALL</td> <td></td> <td>BSC4 BEAM DUMP PARTS</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table> (see also qty. for each shipping destination below)	No.	Qty per package	Part	ALL		BSC4 BEAM DUMP PARTS															
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ALL		BSC4 BEAM DUMP PARTS																							
7	Ship			<table border="1"> <thead> <tr> <th rowspan="2">No.</th> <th colspan="3">Ship Qty.</th> <th rowspan="2">Part Description</th> </tr> <tr> <th>LHO</th> <th>LLO</th> <th>Other</th> </tr> </thead> <tbody> <tr> <td></td> <td>all</td> <td></td> <td></td> <td>BSC4 beam dump parts</td> </tr> </tbody> </table> <table border="1"> <tbody> <tr> <td></td> <td>LHO:</td> <td>Attn: Betsy Weaver, COS LIGO Hanford Observatory (LHO) Specific Purpose: beam dump BSC8</td> </tr> <tr> <td></td> <td>LLO:</td> <td>Attn: Jonathan Kern LIGO Livingston Observatory (LLO) Specific Purpose: beam dump BSC8</td> </tr> </tbody> </table>	No.	Ship Qty.			Part Description	LHO	LLO	Other		all			BSC4 beam dump parts		LHO:	Attn: Betsy Weaver, COS LIGO Hanford Observatory (LHO) Specific Purpose: beam dump BSC8		LLO:	Attn: Jonathan Kern LIGO Livingston Observatory (LLO) Specific Purpose: beam dump BSC8		
No.	Ship Qty.			Part Description																					
	LHO	LLO	Other																						
	all			BSC4 beam dump parts																					
	LHO:	Attn: Betsy Weaver, COS LIGO Hanford Observatory (LHO) Specific Purpose: beam dump BSC8																							
	LLO:	Attn: Jonathan Kern LIGO Livingston Observatory (LLO) Specific Purpose: beam dump BSC8																							
END: Go to Traveler associated with next higher assembly processing																									

*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*



# LIGO PROCESS TRAVELER

DCC Number: **E990267-01-X**  
Date Prepared: **6/30/99**

## Special Instructions (Handling/Packaging Constraints, Remarks, etc.) or Notes:

Attention: Betsy Weaver, Jonathan Kern, hold cleaned and baked parts for COS assembly
VBO Load 43 - Rejected Scan. Dennis Coyne sent all stainless steel items to be electropolished and all aluminum items to LNL anodizing to be etched, from this load. 7/15 B. Weaver
Parts received back from etching and polishing companies. Recleaned as per Dennis' email attached. 7/23 B. Weaver
S/N 006-008 of parts D980087, D980088, D980296, D980297 sent back to Spacecraft Specialists, Inc. for rework. They were rushed during manufacturing these parts, and therefore forgot to finish. 7/21 B. Weaver
6 D990030, 1 D990252 tubes sent to Electropolisher/etcher for recleaning even though they had been baked at LHO & passed. - Dennis thought they looked suspect to dirt. 8/2 - B. Weaver
Claris D990029-011 sent out for rework to make modification as per D990029-B 8/4 - B. Weaver DCN: E990273-B 7/9
Side plate D980348 s/n 014 sent to Brockman Mfg. for rework - holes made into slots to compensate for low clearance. B. Weaver 9/10

*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*

X-POP3-Rcpt: bweaver@apex  
Date: Thu, 22 Jul 1999 12:12:31 -0700  
From: Dennis Coyne <coyne@ligo.caltech.edu>  
Organization: Caltech/LIGO  
X-Mailer: Mozilla 3.01Gold (Win95; I)  
To: Betsy Weaver <weaver\_b@ligo.caltech.edu>  
CC: Stan Whitcomb <stan@acrux.ligo.caltech.edu>,  
Mike Smith <smith@acrux.ligo.caltech.edu>,  
Bartie Rivera <rivera\_b@ligo-wa.caltech.edu>  
Subject: Re: cleaning

VBO LOAD 48

Betsy.

You should clean as follows (E960022-05 except since the parts are too large to ultrasonically clean, I've tailored the cleaning):

- 1) clean with Liquinox first (solution per E960022-05) and using a rubbing/scrubbing action (i.e. not just rinsing the liquinox over the surfaces). All holes must be cleaned with a brush (stainless steel, phosphor-bronze preferred, but nylon is acceptable). It is ESSENTIAL that the liquinox NOT dry before being rinsed with DI water.
- 2) Thoroughly rinse with DI water. All surfaces and holes must be rinsed THOROUGHLY.
- 3) Rinse & rub (with gloved hand only) all surfaces with either methanol or isopropal alcohol. Squirt the solvent into all holes.
- 4) Blow dry with clean, filtered air or N2, or allow to dry on a clean bench. Do not leave exposed for longer than about 15 minutes. before covering with UHV foil.

With regard to cleaning the lens, please see Stan for a confirmation, but I believe the rule that we operate under is that if all surfaces are polished, then an optics cleaning and wetting test is adequate and no baking is required. However, if the sides of the optic are not polished (as I suspect is the case for the ETM optics), then it should be cleaned and baked and re-cleaned. However, please confirm this with Stan and he may grant a waiver if he examines the surface condition of the optics.

Dennis

Betsy Weaver wrote:

- >
- > Hi Dennis-
- >
- > Two cleaning questions for you:
- >
- > 1. We just received the aluminum load (COS) from the etching company.
- > How should we clean them here, before baking them? (They are

- > obviously too large to put in the ultrasonic cleaner...)
- >
- > 2. Mike has one large and two small lenses that are going to be
- > used in the ETM Telescope Assembly. If they wet well during cleaning,
- > do they really need to be baked? A while ago, Stan told me that the
- > small steering mirrors for IO and COS did not need to be baked, as the oven
- > would just make them dirtier, because they wetted so well during cleaning.
- > Is this the same for the lenses? If they do need to be baked, can I put
- > them in
- > the next load with the one Large Optic?
- >
- > Thanks-
- > Betsy

--  
Dennis Coyne (Detector Installation Manager)  
LIGO Laboratory, Caltech, Physics Department  
626.395.2034 @CIT / 225.686.3168 @Livingston / 509.372.8166 @Hanford  
cell 626.695.8350



# LIGO PROCESS TRAVELER

DCC Number: **E990275-02-X**  
 Date Prepared: **7/8/99**

Originator	Cognizant Engineer	Ext./Phone#	Project	Account Number
Michael Smith	Michael Smith	2062	COS	5F515

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO load 40	VBO load 41	VBO load 43	VBO load 46	VBO load 48	VBO load 52
		<b>Beam Dump Assemblies, BSC7</b>								
D980087	A	"glass retaining bracket, top left, cavity BD"	009-011	3			3			3
D980088	A	"glass retaining bracket, top right, cavity BD"	009-011	3			3			3
D980092	A	"glass plate 1, cavity BD"		3						3
D980093	A	"glass plate 2, cavity BD"		3						
D980289	B	"glass mounting plate 1, cavity BD"	009-011	3		3				
D980292	B	"glass mounting plate 2, cavity BD"	007, 009, 013	3	1	2				
D980296	A	"glass retaining bracket, bottom left, cavity BD"	009-011	3			3			3
D980297	A	"glass retaining bracket, bottom right cavity BD"	009-011	3			3			3
D980348	B	"side plate, cavity BD"	018-023	6	3	3				
D980378	B	"Stiffener Block, cavity BD"	010-012	3		3				
D980685	A	"clamp, plate beam dump"		4						
D990028	A	Beam Dump Flex Hinge Tongue	008, 009	2			2	2		
D990029	B	Beam Dump Flex Hinge Clevis	013, 014	2				2		
D990030	A	Beam Dump Flex Hinge Tee	011, 012	2				2		
D990031	A	Beam Dump Flex Hinge Saddle	011, 012	2				2		
D990032	A	Beam Dump Flex Hinge Attach	012, 013	2				2		
D990033	A	Beam Dump Flex Hinge Adapter	016, 017	2				2		
D990140	D	Beam Dump Housing Plate	005-007	3		3				
D990149	C	"Cavity Beam Dump, Mounting Bracket Angle "	016-018	3			3	3		
D990150	B	"Cavity Beam Dump, Mounting Bracket Gusset "	009, 011, 012	3			3		3	
D990151	B	"Cavity Beam Dump, Mounting Bracket Backplate 1"	014, 017, 018	3		3				
D990152	C	"Cavity Beam Dump, Mounting Bracket Backplate 2"	011, 014, 013	3		2			1	
D990198	B	Beam Dump Flex Hinge H_tube	009, 015	2						2

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# LIGO PROCESS TRAVELER

DCC Number: **E990275-02-X**

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO load 40	VBO load 41	VBO load 43	VBO load 46	VBO load 48
D990199	A	Beam Dump Flex Hinge Low Strap	013, 015	2		2			
D990200	A	Beam Dump Flex Hinge Backup	026, 028-030	4		4			
D990201	A	Beam Dump Flex Hinge Cap	020, 026, 027, 029	4		4			
D990202	B	Beam Dump Flex Hinge Top Strap	015, 016	2				2	
D990207	B	"rail, plate beam dump"	010, 012	2		2			
D990218	B	"glass, plate beam dump"		1				1	
D990222	A	Beam Dump Housing Tube 2KBSAR3		0					
D990223	C	Beam Dump Housing Tube 2KFM	003, 004	2			2		2
D990225	D	"Beam Dump Housing Tube 4KITMIIR3, 4KITMHR4"	002	1			1		1
D990236	B	"backplate_offset, plate beam dump"		1					
D990240	B	"backplate, plate beam dump"		0					
D990252	B	"Beam Dump Housing Tube ITMARI,2KRMHR3"		0					
D990253	A	Extension Tube		0					
D990335	A	"Beam Dump Flex Hinge H_tube, 2KITMXAR4 "		0					
D990336	A	"Beam Dump Flex Hinge H_tube, 2KITMYAR4"		0					
WFV-10		#10 X 0.31 THK FLAT VENTED WASHER		22	22				
93615A355		#10-24 X 0.75 LOW HD SCS		18	18				
92196A245		#10-24 X 0.75 SHCS		4	4				
WFV-06		#6 X 0.016 THK FLAT VENTED WASHER		4	4				
92196A144		#6-32 X .25 SHCS		4	4				
WFV-08		#8 FLAT VENTED WASHER		102	102				
92185A194		#8-32 X .50 SHCS		102	102				
91500A194		#8-32 X .500 FHPS		54					
91944A450		0.406ID X 0.88OD X 0.25 THK SPHER WASH		8					
92141A029		1/4 FLAT WASHER		20					

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO load 40	VBO load 41	VBO load 43	VBO load 46	VBO load 48
N-2520-A		1/4-20 HEX NUT		8					
93615A410		1/4-20 X .500 LOW HEAD SOCKET SCREW		4	4				
92196A540		1/4-20 X 0.75 SHCS		16	16				
92196A542		1/4-20 X 1.00 SHCS		16	16				
C-2016-NA		"1/4-20 X 1.00 SHCS, AG/SS"		20	20				
92196A544		1/4-20 X 1.25 SHCS		8	8				
C-2820-NA		"1/4-28 X 1.25 SHCS, AG/SS"		12	12				
91950A031		3/8 X 0.063 FLAT WASHER		5	5				
WFV-38		3/8 X 0.032 THK FLAT VENTED WASHER		33	33				
N-3816-A		3/8-16 HEX NUT, AG/SS		2	2				
94804A320		3/8-16 HEX NUT		6	6				
TOP-1616-NA		3/8-16 X 1.00 SOCKT SET SCRW-OVL PT AG/SS		4	4				
90585A626		3/8-16 X 1.25 FLT HD CAP SCREW		6	6				
92186A626		3/8-16 X 1.25 HEX HD SCREW		12	12				
C-1620-NA		"3/8-16 X 1.25 SHCS, AG/SS"		4	4				
92186A630		3/8-16 X 1.75 HEX HD SCREW		6	6				
92196A630		3/8-16 X 1.75 SHCS		6	6				
92186A999		3/8-16 X 7.00 HEX HD SCREW		12	12				
099-966-12-20x		BERYLLIUM-CU GND STRP		12	12				
6032-400		Flex Pivot		4	4				

**Used In (next higher assembly):** D990230, BSC Beam dump Installation, top assembly

# LIGO PROCESS TRAVELER

DCC Number: **E990275-02-X**  
 Date Prepared: **7/8/99**

Data Package, Receiving/Inspection Remarks:

Inspection Required Y/N	Visual Damage Y/N	Comments	Name/Initials	Date Comp.
y		Inspect for breakage during shipment		

Process Flow:

#	Operation	Start Date	Work Area	Instructions	Name/Initials	Date Comp.
1	Control Point	NA	NA		NA	NA
2	Clean	6/18	LHO	per LIGO-E960022, as applicable	B. Weaver	
3	wrap and bag		LHO	per LIGO-E960022	B. Weaver	
4	Vacuum Bake	↓	LHO	per LIGO-E960022	K. Ryan	
5	Control Point	06-24-99 06-28-99 07-06-99 07-20-99	LHO	Review/approve RGA:s VBO Load# 40 scan # 060899C.RGA VBO Load# 41 scan # 070299C.RGA VBO Load# 43 scan # REJECTED VBO Load# 46 scan # 072699C.RGA VBO Load# 48 scan # 080599C.RGA VBO Load# 52 scan # 082099C.RGA VBO Load# _____ scan # _____ Note: attach RGA scan(s) to this traveler.	K. Ryan  JEW JEW JEW	7/28/99 8/10/99 9/14/99

*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*



# LIGO PROCESS TRAVELER

DCC Number: E990275-02-X

Date Prepared: 7/8/99

#	Operation	Start Date	Work Area	Instructions	Name/ Initials	Date Comp.																			
	Box for shipment to LHO			Ship in LIGO-provided container  <table border="1"> <thead> <tr> <th>No.</th> <th>Qty per package</th> <th>Part</th> </tr> </thead> <tbody> <tr> <td>ALL</td> <td></td> <td>BSC7 BEAM DUMP PARTS</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table> (see also qty. for each shipping destination below)	No.	Qty per package	Part	ALL		BSC7 BEAM DUMP PARTS															
No.	Qty per package	Part																							
ALL		BSC7 BEAM DUMP PARTS																							
7	Ship			<table border="1"> <thead> <tr> <th rowspan="2">No.</th> <th colspan="3">Ship Qty.</th> <th rowspan="2">Part Description</th> </tr> <tr> <th>LHO</th> <th>LLO</th> <th>Other</th> </tr> </thead> <tbody> <tr> <td></td> <td>all</td> <td></td> <td></td> <td>BSC7 beam dump parts</td> </tr> </tbody> </table> <table border="1"> <tbody> <tr> <td></td> <td>LHO:</td> <td>Attn: Betsy Weaver, COS LIGO Hanford Observatory (LHO) Specific Purpose: beam dump BSC8</td> </tr> <tr> <td></td> <td>LLO:</td> <td>Attn: Jonathan Kern LIGO Livingston Observatory (LLO) Specific Purpose: beam dump BSC8</td> </tr> </tbody> </table>	No.	Ship Qty.			Part Description	LHO	LLO	Other		all			BSC7 beam dump parts		LHO:	Attn: Betsy Weaver, COS LIGO Hanford Observatory (LHO) Specific Purpose: beam dump BSC8		LLO:	Attn: Jonathan Kern LIGO Livingston Observatory (LLO) Specific Purpose: beam dump BSC8		
No.	Ship Qty.			Part Description																					
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END: Go to Traveler associated with next higher assembly processing																									

*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*

# LIGO PROCESS TRAVELER

DCC Number: **E990275-02-X**  
 Date Prepared: **7/8/99**

## ACTION ITEMS:

Table 1:

DATE	NAME	DESCRIPTION
7/20	B. Weaver	S/N 009-011 of parts D980087, D980088, D980296, and D980297 were sent back to Spacecraft Spec. for rework, as we noticed that these parts had not been manufactured completely.
7/15	B. Weaver	V60 Load 43 was Rejected due to bad scan - as a result of not clean enough parts. Dennis Coyne sent all parts from this load (plus some) to be electropolished <sup>(S.S)</sup> or etched <sup>(Al)</sup> .
7/23	B. Weaver	Parts received back from etching & polishing companies. Re-cleaned large parts as per attached email.

*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*

Table 1:


X-POP3-Rcpt: bweaver@apex  
Date: Thu, 22 Jul 1999 12:12:31 -0700  
From: Dennis Coyne <coyne@ligo.caltech.edu>  
Organization: Caltech/LIGO  
X-Mailer: Mozilla 3.01Gold (Win95; I)  
To: Betsy Weaver <weaver\_b@ligo.caltech.edu>  
CC: Stan Whitcomb <stan@acrux.ligo.caltech.edu>,  
Mike Smith <smith@acrux.ligo.caltech.edu>,  
Bartie Rivera <rivera\_b@ligo-wa.caltech.edu>  
Subject: Re: cleaning

VBO LOAD 48

Betsy,

You should clean as follows (E960022-05 except since the parts are too large to ultrasonically clean, I've tailored the cleaning):

1) clean with Liquinox first (solution per E960022-05) and using a rubbing/scrubbing action (i.e. not just rinsing the liquinox over the surfaces). All holes must be cleaned with a brush (stainless steel, phosphor-bronze preferred, but nylon is acceptable). It is ESSENTIAL that the liquinox NOT dry before being rinsed with DI water.

2) Thoroughly rinse with DI water. All surfaces and holes must be rinsed THOROUGHLY.

3) Rinse & rub (with gloved hand only) all surfaces with either methanol or isopropal alcohol. Squirt the solvent into all holes.

4) Blow dry with clean, filtered air or N2, or allow to dry on a clean bench. Do not leave exposed for longer than about 15 minutes, before covering with UHV foil.

With regard to cleaning the lens, please see Stan for a confirmation, but I believe the rule that we operate under is that if all surfaces are polished, then an optics cleaning and wetting test is adequate and no baking is required. However, if the sides of the optic are not polished (as I suspect is the case for the ETM optics), then it should be cleaned and baked and re-cleaned. However, please confirm this with Stan and he may grant a waiver if he examines the surface condition of the optics.

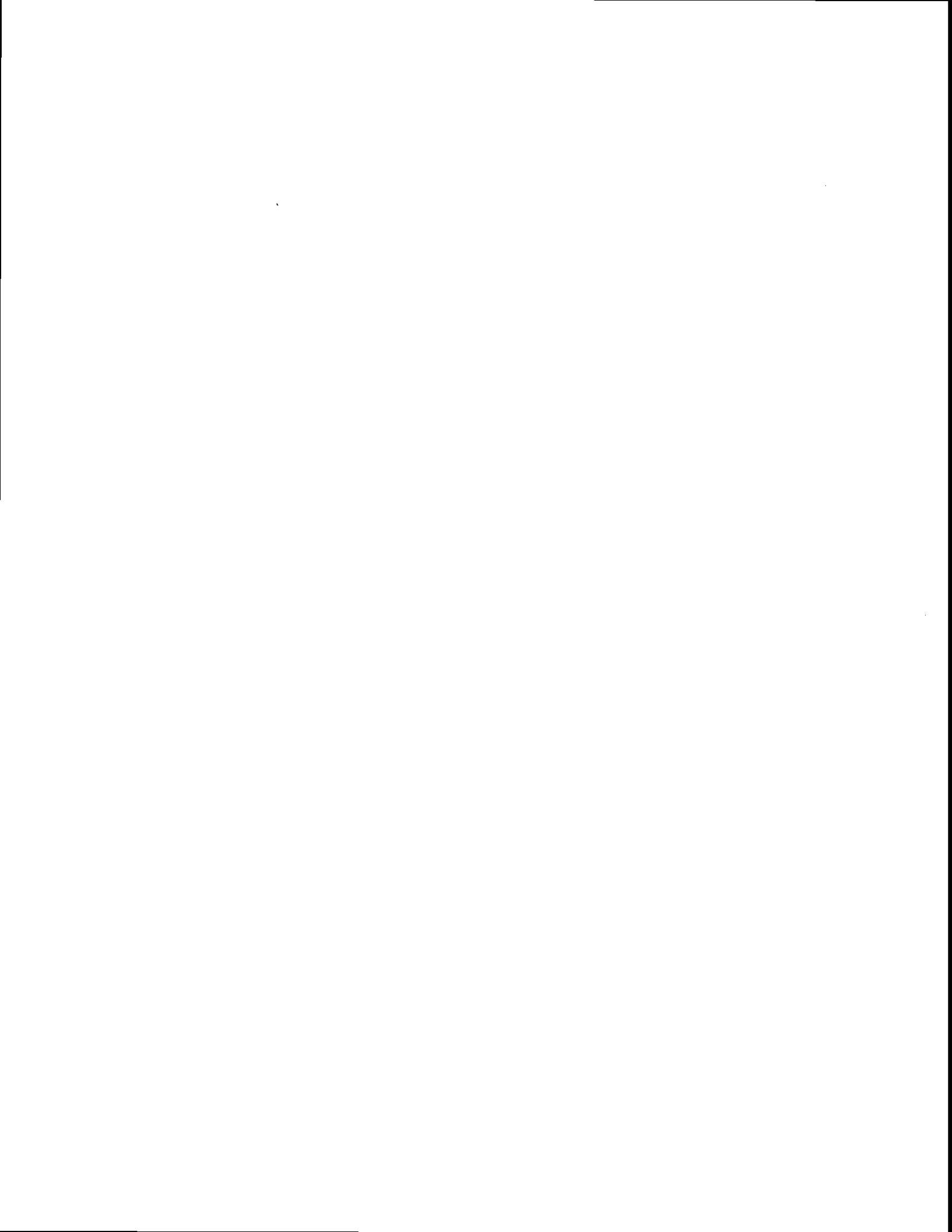
Dennis

Betsy Weaver wrote:

- >
- > Hi Dennis-
- >
- > Two cleaning questions for you:
- >
- > 1. We just received the aluminum load (COS) from the etching company.
- > How should we clean them here, before baking them? (They are

- > obviously too large to put in the ultrasonic cleaner...)
- >
- > 2. Mike has one large and two small lenses that are going to be
- > used in the ETM Telescope Assembly. If they wet well during cleaning,
- > do they really need to be baked? A while ago, Stan told me that the
- > small steering mirrors for IO and COS did not need to be baked, as the oven
- > would just make them dirtier, because they wetted so well during cleaning.
- > Is this the same for the lenses? If they do need to be baked, can I put
- > them in
- > the next load with the one Large Optic?
- >
- > Thanks-
- > Betsy

--  
Dennis Coyne (Detector Installation Manager)  
LIGO Laboratory, Caltech, Physics Department  
626.395.2034 @CIT / 225.686.3168 @Livingston / 509.372.8166 @Hanford  
cell 626.695.8350



# LIGO PROCESS TRAVELER

DCC Number: **E990279-01-X**  
 Date Prepared: **7/8/99**

<b>Originator</b>	<b>Cognizant Engineer</b>	<b>Ext./Phone#</b>	<b>Project</b>	<b>Account Number</b>
Michael Smith	Michael Smith	2062	COS	5F515

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO Load 40	VBO Load 41	VBO Load 43	VBO Load 46	VBO Load 48	VBO Load 50	VBO Load 52	VBO Load 54
<b>Beam Dump Assemblies, WBSC2</b>												
D980087	A	"glass retaining bracket, top left, cavity BD"	012-013	2			2					2
D980088	A	"glass retaining bracket, top right, cavity BD"	012-013	2			2					2
D980092	A	"glass plate 1, cavity BD"		2								
D980093	A	"glass plate 2, cavity BD"		2								
D980289	B	"glass mounting plate1, cavity BD"	012-013	2		2						
D980292	B	"glass mounting plate2, cavity BD"	010-011	2		2	2					
D980296	A	"glass retaining bracket, bottom left, cavity BD"	012-013	2			2					2
D980297	A	"glass retaining bracket, bottom right cavity BD"	012-013	2			2					2
D980348	B	"side plate, cavity BD"	025-028	4		4						
D980378	B	"Stiffener Block, cavity BD"	013-014	2		2						
D980685	A	"clamp, plate beam dump"		8								
D990028	A	Beam Dump Flex Hinge Tongue	011-014	4				4				
D990029	B	Beam Dump Flex Hinge Clevis	015-017, 019	4				4			1 (019)	
D990030	A	Beam Dump Flex Hinge Tee	013-016	4			3	4				
D990031	A	Beam Dump Flex Hinge Saddle	013-015, 010	4			4	3	1			
D990032	A	Beam Dump Flex Hinge Attach	014-017	4			4	4				
D990033	A	Beam Dump Flex Hinge Adapter	018, 015, 011	4		3						
D990140	D	Beam Dump Housing Plate	009, 010	2		2						
D990149	C	"Cavity Beam Dump, Mounting Bracket Angle "	010, 012, 014, 015	4			4	4				

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# LIGO PROCESS TRAVELER

DCC Number: **E990279-01-X**

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO Load 40	VBO Load 41	VBO Load 43	VBO Load 46	VBO Load 48	VBO Load 50	VBO Load 52	VBO Load 54
D990150	B	"Cavity Beam Dump, Mounting Bracket Gusset "	013, 014, 016, 017	4			4		4			
D990151	B	"Cavity Beam Dump, Mounting Bracket Backplate 1"	009, 015, 019 016	4			4		4			
D990152	C	"Cavity Beam Dump, Mounting Bracket Backplate 2"	016, 017 010, 012	4			4		4			
D990198	B	Beam Dump Flex Hinge H_tube	008, 011, 006	4								3
D990199	A	Beam Dump Flex Hinge Low Strap	012, 014, 016, 017	4				4				
D990200	A	Beam Dump Flex Hinge Backup	007, 008, 025, 027, 035, 036 019, 032	8			8		8			
D990201	A	Beam Dump Flex Hinge Cap	030, 032, 038, 035, 018, 028, 031, 037	8			8	8				
D990202	B	Beam Dump Flex Hinge Top Strap	011-014	4			4	4				
D990207	B	"rail, plate beam dump"	015-018	4			3		4			
D990218	B	"glass, plate beam dump"		2								
D990222	A	Beam Dump Housing Tube 2KBSAR3		0								
D990223	C	Beam Dump Housing Tube 2KFM		0								



# LIGO PROCESS TRAVELER

DCC Number: **E990279-01-X**

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO Load 40	VBO Load 41	VBO Load 43	VBO Load 46	VBO Load 48	VBO Load 50	VBO Load 52	VBO Load 54
D990225	D	"Beam Dump Housing Tube 4KITMHR3, 4KITMIIR4"		0								
D990236	B	"backplate_offset, plate beam dump"		0								
D990240	B	"backplate, plate beam dump"		0								
D990252	B	"Beam Dump Housing Tube ITMAR1,2KRMIIR3"		2								
D990253	A	Extension Tube										
D990335	A	"Beam Dump Flex Hinge H_tube, 2KITMXAR4 "	004, 005	2			1		1(004)			1(005)
D990336	A	"Beam Dump Flex Hinge H_tube, 2KITMYAR4"		0								
WFV-10		#10 X 0.31 THK FLAT VENTED WASHER		32								
93615A355		#10-24 X 0.75 LOW HD SCS		24	24							40
92196A245		#10-24 X 0.75 SHCS		8	8							
WFV-06		#6 X 0.016 THK FLAT VENTED WASHER		8	8							
92196A144		#6-32 X .25 SHCS		8	8							40
WFV-08		#8 FLAT VENTED WASHER		68	48							
92185A194		#8-32 X .50 SHCS		68	68							20
91500A194		#8-32 X .500 FHPS		36	36							
91944A450		0.406ID X 0.88OD X 0.25 THK SPHER WASH		16	16							
92141A029		1/4 FLAT WASHER		32	32							
N-2520-A		1/4-20 HEX NUT		16	16							
93615A410		1/4-20 X .500 LOW HEAD SOCKET SCREW		16	16							
92196A540		1/4-20 X 0.75 SHCS		48	48							
92196A542		1/4-20 X 1.00 SHCS		32	32							
C-2016-NA		"1/4-20 X 1.00 SHCS, AG/SS"		40	20							
92196A544		1/4-20 X 1.25 SHCS		16	16							20
C-2820-NA		"1/4-28 X 1.25 SHCS, AG/SS"		24	24							
91950A031		3/8 X 0.063 FLAT WASHER		6	6							
WFV-38		3/8 X 0.032 THK FLAT VENTED WASHER		42	42							
94804A320		3/8-16 HEX NUT		8	8							

# LIGO PROCESS TRAVELER

DCC Number: **E990279-01-X**  
 Date Prepared: **7/8/99**

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO Load 40	VBO Load 41	VBO Load 43	VBO Load 46	VBO Load 48	VBO Load 50	VBO Load 52
N-3816-A		"3/8-16 HEX NUT, AG/SS"		4	4						
TOP-1616-NA		3/8-16 X 1.00 SOCKT SET SCRW-OVL PT AG/SS		8	8						
90585A626		3/8-16 X 1.25 FLT HD CAP SCREW		8	8						
92186A626		3/8-16 X 1.25 HEX HD SCREW		16	16						
C-1620-NA		"3/8-16 X 1.25 SHCS, AG/SS"		8	8						
92186A630		3/8-16 X 1.75 HEX HD SCREW		4	4						
92196A630		3/8-16 X 1.75 SHCS		12	12						
92186A999		3/8-16 X 7.00 HEX HD SCREW		16	16						
099-966-12-20x		BERYLLIUM-CU GND STRP		8	8						
6032-400		Flex Pivot		8							4

**Used In (next higher assembly):** D990230, BSC Beam dump Installation, top assembly

**Data Package, Receiving/Inspection Remarks:**

Inspection Required Y/N	Visual Damage Y/N	Comments	Name/Initials	Date Comp.
y		Inspect for breakage during shipment		

**Process Flow:**

#	Operation	Start Date	Work Area	Instructions	Name/Initials	Date Comp.
1	Control Point	NA	NA		NA	NA
2	Clean	6/18	LHO	per LIGO-E960022, as applicable	B. Weaver	
3	Vacuum Bake	SEE NEXT PAGE	LHO	per LIGO-E960022	K. Ryan	SEE NEXT PAGE
4	Wrap and Bag		LHO	per LIGO-E960022	B. Weaver	

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# LIGO PROCESS TRAVELER

DCC Number: **E990279-01-X**  
 Date Prepared: **7/8/99**

#	Operation	Start Date	Work Area	Instructions	Name/Initials	Date Comp.													
5	Control Point	6-24-99 6-28-99 07-06-99 07-20-99	LHO	Review/approve RGA: VBO Load# 40 scan # <u>060899C.RGA</u> VBO Load# 41 scan # <u>070299C.RGA</u> VBO Load# 43 scan # <u>REJECTED</u> VBO Load# 46 scan # <u>072699C.RGA</u> VBO Load# 48 scan # <u>080399C.RGA</u> VBO Load# 50 scan # <u>081099C.RGA</u> VBO Load# 52 scan # <u>082099C.RGA</u> Note: attach RGA scan(s) to this traveler. <b>VBOLOAD54</b>	K. Ryan  JEW JEW JEW JEW	7/28/99 8/10/99 8/10/99 9/14/99													
	Box for shipment to LHO			Ship in LIGO-provided container <table border="1"> <thead> <tr> <th>No.</th> <th>Qty per package</th> <th>Part</th> </tr> </thead> <tbody> <tr> <td>ALL</td> <td></td> <td>BEAM DUMP PARTS</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table> (see also qty. for each shipping destination below)	No.	Qty per package	Part	ALL		BEAM DUMP PARTS									
No.	Qty per package	Part																	
ALL		BEAM DUMP PARTS																	
7	Ship			<table border="1"> <thead> <tr> <th rowspan="2">No.</th> <th colspan="3">Ship Qty.</th> <th rowspan="2">Part Description</th> </tr> <tr> <th>LHO</th> <th>LLO</th> <th>Other</th> </tr> </thead> <tbody> <tr> <td></td> <td>all</td> <td></td> <td></td> <td>beam dump parts</td> </tr> </tbody> </table> <p>LHO: Attn: Betsy Weaver, COS                      LIGO Hanford Observatory (LHO)                      Specific Purpose: beam dump BSC8</p> <p>LLO: <b>W.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the LIGO Livingston Observatory (LLO) is completed.</b></p> <p>Specific Purpose: beam dump BSC8</p>	No.	Ship Qty.			Part Description	LHO	LLO	Other		all			beam dump parts		
No.	Ship Qty.			Part Description															
	LHO	LLO	Other																
	all			beam dump parts															

**Special Instructions (Handling/Packaging Constraints, Remarks, etc.) or Notes:**

Attention: Betsy Weaver, Jonathan Kern, hold cleaned and baked parts for COS assembly

# LIGO PROCESS TRAVELER

DCC Number: **E990279-01-X**

Date Prepared: **7/8/99**

## ACTION ITEMS:

Table 1:

DATE	NAME	DESCRIPTION
7/20	B. Weaver	S/N 012-013 of parts D980087, D980088, D980296, and D980297 were sent back to Spacecraft Spec. for rework, as we found that they had not been manufactured completely.
7/15	B. Weaver	V60 Load #43 - Rejected due to bad scan. Dennis Coyne sent all parts from this load (plus some) to be electropolished or etched for better cleaning.
7/23	B. Weaver	Parts received back from polishing/etching companies. - Recleaned as per Dennis C.'s email (attached).
8/5/99	B. Weaver	Clavis D990029 s/n-019 was sent out for modification as per DCN#: E990273-B / D990029-B. Rec. back - 8/4.
9/10/99	B. Weaver	D980348 s/n 027 & 028 Sent to Brookman Mfg. for rework - holes made into slots to compensate for low clearance.

*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*

**Table 1:**

DATE	NAME	DESCRIPTION

X-POP3-Rcpt: bweaver@apex  
Date: Thu, 22 Jul 1999 12:12:31 -0700  
From: Dennis Coyne <coyne@ligo.caltech.edu>  
Organization: Caltech/LIGO  
X-Mailer: Mozilla 3.01Gold (Win95; I)  
To: Betsy Weaver <weaver\_b@ligo.caltech.edu>  
CC: Stan Whitcomb <stan@acrux.ligo.caltech.edu>,  
Mike Smith <smith@acrux.ligo.caltech.edu>,  
Bartie Rivera <rivera\_b@ligo-wa.caltech.edu>  
Subject: Re: cleaning

VBO LOAD 48

Betsy,

You should clean as follows (E960022-05 except since the parts are too large to ultrasonically clean, I've tailored the cleaning):

1) clean with Liquinox first (solution per E960022-05) and using a rubbing/scrubbing action (i.e. not just rinsing the liquinox over the surfaces). All holes must be cleaned with a brush (stainless steel, phosphor-bronze preferred, but nylon is acceptable). It is **ESSENTIAL** that the liquinox NOT dry before being rinsed with DI water.

2) Thoroughly rinse with DI water. All surfaces and holes must be rinsed **THOROUGHLY**.

3) Rinse & rub (with gloved hand only) all surfaces with either methanol or isopropal alcohol. Squirt the solvent into all holes.

4) Blow dry with clean, filtered air or N2, or allow to dry on a clean bench. Do not leave exposed for longer than about 15 minutes, before covering with UHV foil.

With regard to cleaning the lens, please see Stan for a confirmation, but I believe the rule that we operate under is that if all surfaces are polished, then an optics cleaning and wetting test is adequate and no baking is required. However, if the sides of the optic are not polished (as I suspect is the case for the ETM optics), then it should be cleaned and baked and re-cleaned. However, please confirm this with Stan and he may grant a waiver if he examines the surface condition of the optics.

Dennis

Betsy Weaver wrote:

- >
- > Hi Dennis-
- >
- > Two cleaning questions for you:
- >
- > 1. We just received the aluminum load (COS) from the etching company.
- > How should we clean them here, before baking them? (They are

- > obviously too large to put in the ultrasonic cleaner...)
- >
- > 2. Mike has one large and two small lenses that are going to be
- > used in the ETM Telescope Assembly. If they wet well during cleaning,
- > do they really need to be baked? A while ago, Stan told me that the
- > small steering mirrors for IO and COS did not need to be baked, as the oven
- > would just make them dirtier, because they wetted so well during cleaning.
- > Is this the same for the lenses? If they do need to be baked, can I put
- > them in
- > the next load with the one Large Optic?
- >
- > Thanks-
- > Betsy

-  
Dennis Coyne (Detector Installation Manager)  
LIGO Laboratory, Caltech, Physics Department  
626.395.2034 @CIT / 225.686.3168 @Livingston / 509.372.8166 @Hanford  
cell 626.695.8350



# LIGO PROCESS TRAVELER

DCC Number: **E990311-00-X**

Date Prepared: **8/9/99**

Originator	Cognizant Engineer	Ext./Phone#	Project	Account Number
Michael Smith	Michael Smith	2062	COS	5F515

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	Rec.	VBO Load 49	VBO Load 52	VBO Load
		Pick Off Telescope APS						
D980628	B	"front baffle, beam dump assy, BD BSAR1P/3P"		0				
D980555	B	"Brkt., End Baffle"		0				
D980558	B	"Bar, Lower - End Baffle"		0				
D980607	B	"Bar, Spring Strip Mounting"		0				
D980608	B	"Bar, Spring Strip Retainer"		0				
D980614	B	"Bar, Left - End Baffle Long"		0				
D980615	B	"Bar, Right - End Baffle Long"		0				
D980655	B	"forward camera mount, assy"		1				
116-0080	.	LASER MOUNT (Blank Anodized) - CLASS B		1				
92196A194	.	#8-32 X .50 SHCS		8	8		8	
92196A197	.	#8-32 X .75 SHCS		4	8		8	
92196A537	.	1/4-20 X .50 SHCS		2	2		2	
98019A325	.	#8 FLAT WASHER		8	8		8	
D980587	B	Plate, alignment telescope	001	1	1		1	
D980588	B		001, 002	2	2		2	
D980589	B	Bracket, alignment telescope	001, 002	2	2		2	
D980656	B	"target camera mount, assy"		1				
90145A470	.	1/8 X .38 DOWELL		4	2		2	
92196A079	.	#2-56 X .38 SHCS		16	16		16	
92196A109	.	#4-40 X .38 SHCS		8	8		8	
92196A115	.	#4-40 X 1.00 SHCS		8	8		8	
92196A537	.	1/4-20 X .50 SHCS		1	1		1	
D980572	B	Plate, target support, long	001, 002	2	2		2	

*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*

# LIGO PROCESS TRAVELER

DCC Number:

E990311-00-X

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	Rec.	VBO Load 49	VBO Load 52	VBO Load
D980573	• B	Plate, target support, short	001, 002	2	2		2	
D980574	• B	Frame, target	001, 002	2	2		2	
D980575	• B	Target — <i>Airbake</i>		2	2			
D980603	• B		001-004	4	4		4	
D980604	• B	Brace, camera/target	001-004	4	4		4	
D980621	B	“front support, assy”		1				
92196A537	•	1/4-20 X .50 SHCS		8	8		8	
92196A540	•	1/4-20 X .75 SHCS		8	8		8	
92196A542	•	1/4-20 X 1.0 SHCS		2	2		2	
92196A546	•	1/4-20 X 1.5 SHCS		10	10		10	
SSPW-1	•	SPHERICAL WASHER		16	16		16	
D980565	• B	“Bar, Vert., Front Support”	001, 002	2	2		2	
D980566	• B	“Gusset, Rear, Front Support”	001, 002	2	2		2	
D980567	• B	“Gusset, Front, Front Support”	001, 002	2	2		2	
D980568	• B	“Brace, Horiz., Front Support”	001	1	1		1	
D980569	• B	“Plate, Base Front Support”	001	1	1		1	
D980570	• B	“Block, Interface, Vert. Lock”	001, 002	2	2		2	
D980571	• B	“Plate, Vertical Lock, Front Support”	001, 002	2	2		2	
90210A112	•	1/4-20 X 2.00 THUMBSCREW		1	1		1	
92196A192	•	#8-32 X .38 SHCS		18	18		18	
92196A195	•	#8-32 X .50 SHCS		2	2		2	
92196A540	•	1/4-20 X .75 SHCS		60	60		60	
D980622	B	“square tube, telescope parabolic, assy”		1				
93085A192	•	“#8-32 X .38 FHPS, 100 DEG”		60	60		60	
WFV-25	•	1/4 FLAT VENTED WASHER		60	60		60	
D980546	• B	“Sheet , Upper-Sq. Tube”	001	1	1		1	

# LIGO PROCESS TRAVELER

DCC Number: **E990311-00-X**

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	Rec.	VBO Load 49	VBO Load 52	VBO Load
D980547	B	"Sheet, Lower, Sq. Tube"	001	1	1		1	
D980548	B	"Sheet Left, Sq. Box"	001	1	1		1	
D980549	B	"Sheet Right, Sq. Box"	001	1	1		1	
D980550	B	Bulkhead - Title Plate	001-005	5	5		5	
D980551	B	Front Plate	001	1	1		1	
D980552	B	"Angle, Upper"	001, 002	2	2		2	
D980553	B	"Angle, Lower, Left"	001	1	1		1	
D980554	B	"Angle, Lower, Right"	001	1	1		1	
D980593	B	Block, thumbscrew, lateral adjustment	001	1	1		1	
D980601	B	"Base, lateral adjustment"	001	1	1		1	
D980658	B	"jackstand, assy"		1				
5201		TRANSFER PLATE		2				
6111K61		SWIVEL LEVELING MOUNTS		2				
92196A192		#8-32 X .38 SHCS		6	6		6	
92196A537		1/4-20 X .50 SHCS		24	24		24	
		JACKSCREW 'C'	001, 002	2	2		2	
		"SPACER, 2.5X6X0.62, 300 CRES"	001, 002	2	2		2	
D980595	B	Horizontal plate, jack stand	001-008	8	8		8	
D980596	B	Vertical plate, jack stand	001, 002	2	2		2	
D980597	B	Glide plate, jack	001, 002	2	2		2	
D980598	B	Base plate, jack	001, 002	2	2		2	
D980599	B	Base, jack	001, 002	2	2		2	
D980600	B	Vertical plate, short jack stand	001, 002	2	2		2	
D980623	B	"mirror box, telescope parabolic, assy"		1				
90945A761		1/4 FLAT EDGED SPACER WASHER		3	3		3	
92196A197		#8-32 X .75 SHCS		16	16		16	

# LIGO PROCESS TRAVELER

DCC Number: **E990311-00-X**  
 Date Prepared: **8/9/99**

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	Rec.	VBO Load 49	VBO Load 52	VBO Load
92196A540	.	1/4-20 X .75 SHCS		16	16		16	
WFV-08	.	#8 FLAT VENTED WASHER		32	32		32	
WFV-25	.	1/4 FLAT VENTED WASHER		16	16		16	
	.	#8-32 X 1.25 SHCS		16	16		16	
	.	"1/4-20 X 1.0 FHSB, 82 DEG"		3	3		3	
D980541	B			1				
D980542	. B	"Plate, Bottom Mirror Box"	001	1	1		1	
D980543	. B	"Plate, Top, Mirror Box"	001	1	1		1	
D980544	. B	"Plate, Left, Mirror Box"	001	1	1		1	
D980545	. B	"Plate, Right, Mirror Box"	001	1	1		1	
D980581	<del>B</del> A	"Socket, Pivot"	001, 002	2 <del>8</del>	2		2	
D980583	. B	"Bar, Tube and Box, long"	001, 002	2	2		2	
D980594	. B	"Bar, Tube and Box, short"	001, 002	2	2		2	
D980619	. B	"Angle, Mirror Box"	001-004	4	4		4	
D990096	B	Back Plate	001	1	1		1	
D980626	B	"mirror mount assy primary mirror, telescope para- bolic"		1				
34665K29	.	"1/8 BALL, AL"		3	3		3	
90298A544	.	1/4 X 1 1/4 SHLDR SCR		3	3		3	
90945A761	.	1/4 FLAT EDGED SPACER WASHER		3	3		3	
90945A761	.	"1/4 FLAT WASHER, NAS620C-416"		6	6		6	
92311A237	.	#10-24 X 3/16 CUP PT ST SCR		3	3		3	
9713K63	.	Bellville Washer		24	24		24	
	.	#10-24 X 3/4 FSCS		6	6		6	
	.	#4-40 X 0.625 SHCS		6	6		6	
	.	"1/4-28 X 1.0 FHSB, 82 DEG"		3	3		3	
5967	.	EXTENSION SPRING		2	2		2	

*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*

# LIGO PROCESS TRAVELER

DCC Number: **E990311-00-X**  
 Date Prepared: **8/9/99**

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	Rec.	VBO Load 49	VBO Load 52	VBO Load
90145A470		1/8 X .38 DOWELL		4	4		4	
90945A741		#10 WASHER		3	3		3	
90945A741		#10 WASHER		2	2		3	
90945A761		"1/4 FLAT WASHER, NA5620C-416"		14	14		14	
92196A196		#8-32 X .50 SHCS		4	4		4	
92196A197		#8-32 X .75 SHCS		2	2		2	
92196A542		1/4-20 X 1.0 SHCS		14	14		14	
92240A542		1/4-20 X 1.00 HEX BOLT		8	8		8	
92311A108		#4-40 X .38 SET SCREW		1	1		1	
WFV-25		1/4 FLAT VENTED WASHER		6	6		6	
		#10-32 X 0.50 SPHERICAL END ADJ SCREW		2	2		2	
		#10-32 X 0.63 SHCS		2	2		2	
		#4-40 X 1.25 SHCS		3	3		3	
		3/8 FLAT WASHER		4	4		4	
		3/8-24X1.0 SHCS		4	4		4	
		COMPRESSION SPRING		3	3		3	
D990097	B	Primary Mirror Mount Plate	001	1	1		1	
D990098	B	Primary Mirror Mount Clamp Base	001, 002, 003	3	3		3	
D990099	B	"Mirror Screw, Primary"		3				
D990101	B	Mirror Clamp Short Side	001	1	1		1	
D990102	B	Mirror Clamp long Side	001, 002	2	2		2	
D990444	B		001, 002, 003	3	3		3	
D980625	B	"mirror mount assy secondary mirror, telescope para-bolic"		1				
D980314	B	Y-Axis Top Plate	001	1	1		1	
D980315	B	X-Y Interface Plate	001	1	1		1	
D980316	B	Y-Top end Plate	001, 002	2	2		2	

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# LIGO PROCESS TRAVELER

DCC Number: **E990311-00-X**  
 Date Prepared: **8/9/99**

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	Rec.	VBO Load 49	VBO Load 52	VBO Load
D980317	B	X-Axis Way Plate	001	1	1		1	
D980318	B	Flexure Spring Block	001	1	1		1	
D980319	B	Flexure	001	1	1		1	
D980320	B	End Plate	001, 002	2	2		2	
D980321	B	Angle Plate	001	1	1		1	
D980578	B	"Threaded Rod, secondary mirror"		2				
D990100	B	"Mirror Screw, Base Primary"		3				
D990104	B	"Secondary Mirror, Clamp"		3				
D990443	B			2				
D990448	B	1/4-40 X 0.75 SLOTTED PUSH SCREW		3	3		3	
D980657	B	rear camera mount assy		1				
90945A761		"1/4 FLAT WASHER, NAS620C-416"		3	3		3	
92196A108		#4-40 X .38 SHCS		2	2		2	
92196A197		#8-32 X .50 SHCS		3	3		3	
98019A325		#8 FLAT WASHER		3	3		3	
		#4-40 X .38 THUMB SCREW		2	2		2	
D980576	B	"Sleeve, Alignment telescope"	001	2	1		1	
D980620	B	"rear support, assy"		1				
90145A541		"1/4" X .88 DOWEL PIN"		1	1		1	
90945A761		"1/4 FLAT WASHER, NAS620C-416"		4	4		4	
92196A537		1/4-20 X .50 SHCS		26	26		26	
92196A542		1/4-20 X 1.0 SHCS		4	4		4	
D980559	B	Plate Vert. Rear Support	001, 002	2	2		2	
D980560	B	"Stiffener, Vert., Rear Support"	001-004	4	4		4	
D980561	B	Brace Horz. Rear Support	001	1	1		1	
D980562	B	Plate Swivel Rear Support	001	1	1		1	
D980563	B	Plate Base Rear Support	001	1	1		1	

*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*

# LIGO PROCESS TRAVELER

DCC Number: **E990311-00-X**  
 Date Prepared: **8/9/99**

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	Rec.	VBO Load 49	VBO Load 52	VBO Load
D980564	B	"Plate Vert. Lock/Pivot, Rear Support"	001, 002	2	2		2	
D980580	B	"Set Screw, Pivot"		2				
D980582	B	"Pin, Pivot"		2				
E980129		"par primary mirror, s polarization, APS"	#4650-00	1	1	1		
E980130		"par secondary mirror, s polarization, APS"	#4550-00	1	1	1		
14B-3410		Rod Mounts (Periscope)		2			2	
		Stainless Steel 20" Post (Periscope)		1			1	

**Used In (next higher assembly):** D980620, Assy, rear support; D980621, Assy, front support; D980622, Assy, square tube; D980623, Assy, mirror box; D980625, Assy, 2nd mirror nest; D980626, Assy, primary mirror nest; D980655, Assy, forward camera mount; D980656, Assy, target/camera mount; D980657, Assy, rear camera mount; D980658, Assy, jackstand;

**Data Package, Receiving/Inspection Remarks:**

Inspection Required Y/N	Visual Damage Y/N	Comments	Name/Initials	Date Comp.
y		Inspect for breakage during shipment		

**Process Flow:**

#	Operation	Start Date	Work Area	Instructions	Name/Initials	Date Comp.
1	Control Point	NA	NA		NA	NA
2	Clean		LHO	per LIGO-E960022, as applicable	B. Weaver	
3	wrap and bag		LHO	per LIGO-E960022	B. Weaver	
4	Vacuum Bake	8-3-99	LHO	per LIGO-E960022	K. Ryan B. Rivera	8-6-99

*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*

# LIGO PROCESS TRAVELER

DCC Number: E990311-00-X  
 Date Prepared: 8/9/99

#	Operation	Start Date	Work Area	Instructions	Name/ Initials	Date Comp.									
5	Control Point	8-3-99 8-16-99	LHO	Review/approve RGA: scan # <del>080677C-RGA</del> VBO load 49 (2 min) scan # <del>08299C-RGA</del> VBO load 52 scan # _____ scan # _____ scan # _____ scan # _____ scan # _____	K. Ryan K/R	8/11/99 9/14/99									
	Box for shipment to LHO			Note: attach RGA scan(s) to this traveler. <table border="1" data-bbox="863 630 1570 857"> <thead> <tr> <th>No.</th> <th>Qty per package</th> <th>Part</th> </tr> </thead> <tbody> <tr> <td>ALL</td> <td></td> <td>PO telescope parts</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>(see also qty. for each shipping destination below)</p>	No.	Qty per package	Part	ALL		PO telescope parts					
No.	Qty per package	Part													
ALL		PO telescope parts													

*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*



# LIGO PROCESS TRAVELER

DCC Number: **E990311-00-X**  
 Date Prepared: **8/9/99**

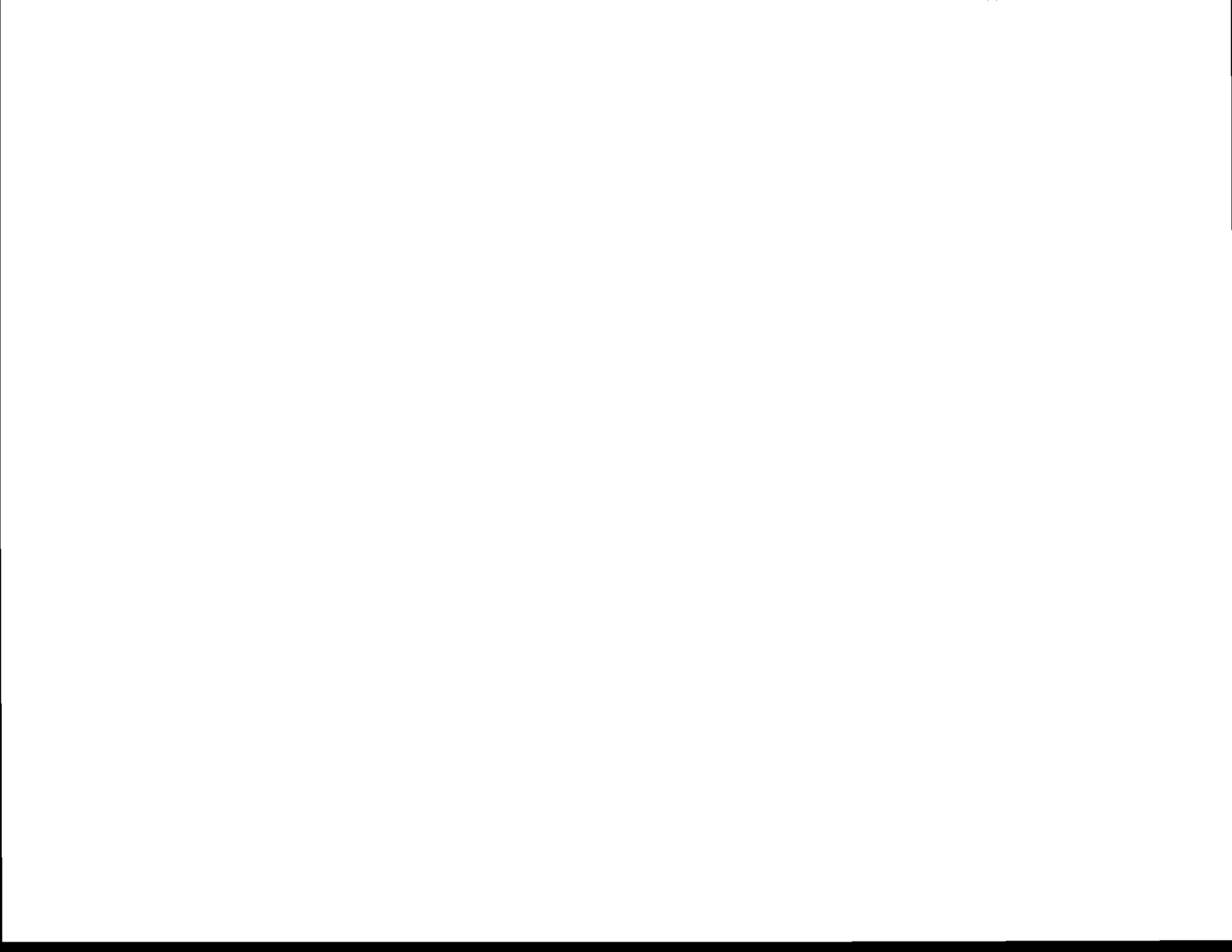
#	Operation	Start Date	Work Area	Instructions	Name/Initials	Date Comp.													
7	Ship																		
		<table border="1"> <thead> <tr> <th rowspan="2">No.</th> <th colspan="3">Ship Qty.</th> <th rowspan="2">Part Description</th> </tr> <tr> <th>LHO</th> <th>LLO</th> <th>Other</th> </tr> </thead> <tbody> <tr> <td></td> <td>all</td> <td></td> <td></td> <td>BSC4 beam dump parts</td> </tr> </tbody> </table>			No.	Ship Qty.			Part Description	LHO	LLO	Other		all			BSC4 beam dump parts		
No.	Ship Qty.			Part Description															
	LHO	LLO	Other																
	all			BSC4 beam dump parts															
		LHO:	Attn: Betsy Weaver, COS LIGO Hanford Observatory (LHO) Specific Purpose: beam dump BSC8																
		LLO:	Attn: Jonathan Kern LIGO Livingston Observatory (LLO) Specific Purpose: beam dump BSC8																
END: Go to Traveler associated with next higher assembly processing																			

**Special Instructions (Handling/Packaging Constraints, Remarks, etc.) or Notes:**

Attention: Betsy Weaver, Jonathan Kern, hold cleaned and baked parts for COS assembly

Part # D980317 was dropped behind the VBO during loading or unloading (exact time unknown) & found later. It was cleaned as per EG60022 & airbaked for 24 hrs. as per Stan. W. BW 8/24/99.

*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*



# LIGO PROCESS TRAVELER

DCC Number: **E990310-00-X**  
 Date Prepared: **8/9/99**

Originator Michael Smith	Cognizant Engineer Michael Smith	Ext./Phone# 2062	Project COS	Account Number 5F515
-----------------------------	-------------------------------------	---------------------	----------------	-------------------------

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	Rec.	VBO Load	VBO Load
D990450	A	ETM Tel Mirror Bracket Spacer Spacer, Mirror Bracket		2	2	2	
WFV-25		1/4-20 x 1.5 SHCS 1/4 vented washer		2	2	2	
				2	2	2	
Used In (next higher assembly):		D990053, ETM Telescope					

Data Package, Receiving/Inspection Remarks:

Inspection Required Y/N	Visual Damage Y/N	Comments	Name/Initials	Date Comp.

Process Flow:

#	Operation	Start Date	Work Area	Instructions	Name/Initials	Date Comp.
1	Control Point	NA	NA			
2	Clean		LHO	per LIGO-E960022, as applicable	NA B. Weaver	NA
3	wrap and bag		LHO	per LIGO-E960022	B. Weaver	
4	Vacuum Bake		LHO	per LIGO-E960022 <i>B. Weaver</i>	B. Weaver	

*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*

# LIGO PROCESS TRAVELER

DCC Number: E990310-00-X

#	Operation	Start Date	Work Area	Instructions	Name/ Initials	Date Comp.												
5	Control Point		LHO	Review/approve RGA: VBO Load# <u>52</u> scan # <u>0900730100</u> VBO Load# _____ scan # _____ VBO Load# _____ scan # _____ VBO Load# _____ scan # _____ VBO Load# _____ scan # _____ VBO Load# _____ scan # _____	B. Weaver <i>BW</i>	8/30/99 9/14/99												
6	Box for shipment to LLO		CIT	Note: attach RGA scan(s) to this traveler.  <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">No.</th> <th style="width: 15%;">Qty per package</th> <th style="width: 75%;">Part</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">all</td> <td style="text-align: center;">spacer assy</td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> <p style="text-align: center;">(see also qty. for each shipping destination below)</p>	No.	Qty per package	Part	1	all	spacer assy							K. Mailand	
No.	Qty per package	Part																
1	all	spacer assy																

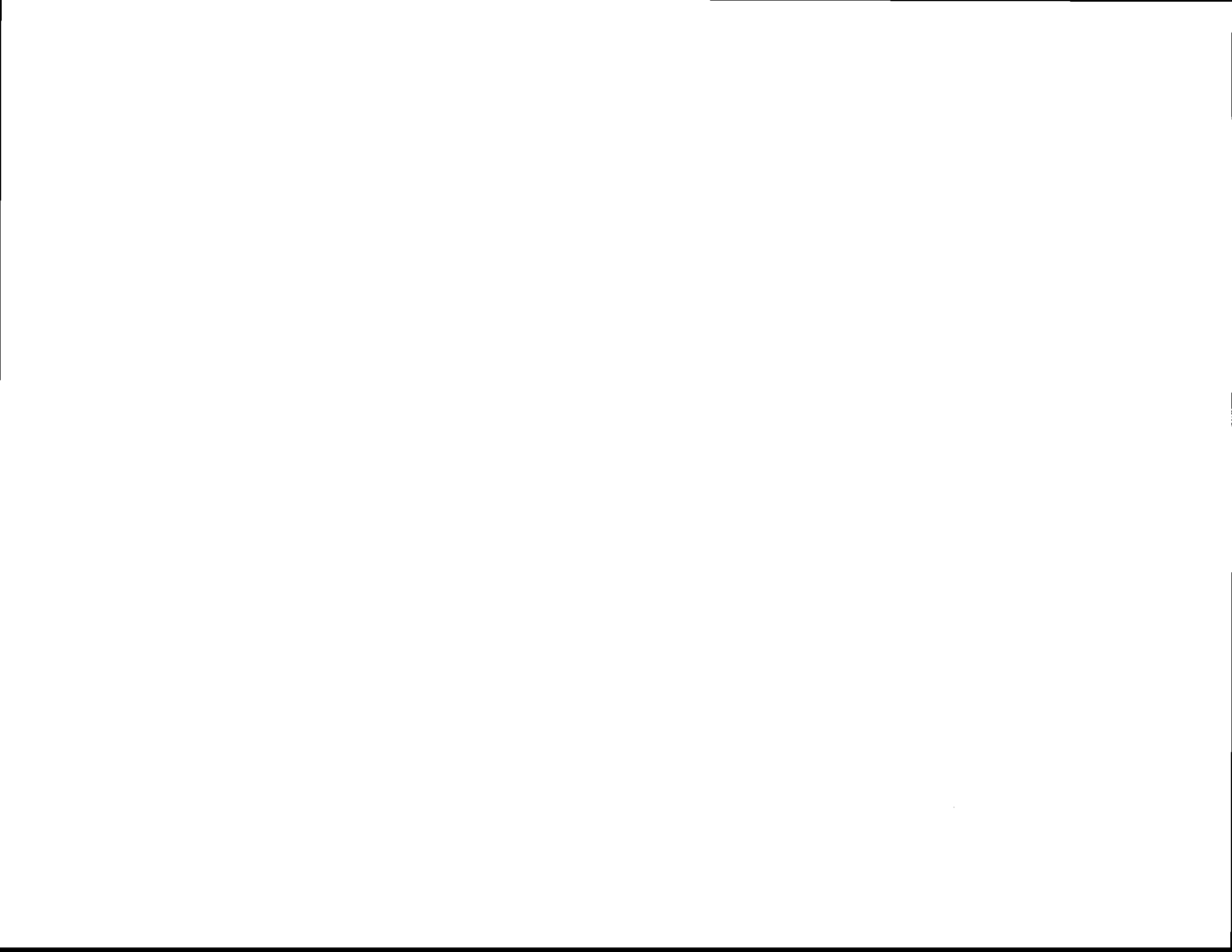
# LIGO PROCESS TRAVELER

DCC Number: **E990310-00-X**

Date Prepared:

DATE	NAME	DESCRIPTION


*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*



# LIGO PROCESS TRAVELER

DCC Number: **E990309-00-X**  
 Date Prepared: **8/6/99**

Originator	Cognizant Engineer	Ext./Phone#	Project	Account Number
Michael Smith	Michael Smith	2062	COS	5F515

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	Rec.	VBO Load 50	VBO Load 52
D990451	A	2K ETM PO Beam_Beam Dump					
D990009	A	Post Mirror Mount Bracket 	001	1	1		1
D990445	A	Black Glass, 2.4 Square	001	1	1		1
D990446	A	Clamp	001 - 004	4	4		4
D990447	A	Post, ETM Beam Dump ~27" Hollow (Al)	001	1	1		1
D990453	A	Base, Red Mount, Long	001	1	1	1	
		1/4-20 x 0.50 SHCS		4	4		4
		#8-32 x 0.63 SHCS		4	4		4

Used In (next higher assembly): D990451 2K ETM PO Beam\_Beam Dump

**Data Package, Receiving/Inspection Remarks:**

Inspection Required Y/N	Visual Damage Y/N	Comments	Name/Initials	Date Comp.

**Process Flow:**

#	Operation	Start Date	Work Area	Instructions	Name/Initials	Date Comp.
1	Control Point	NA	NA		NA	NA
2	Clean		LHO	per LIGO-E960022, as applicable	B. Weaver	
3	wrap and bag		LHO	per LIGO-E960022	B. Weaver	
4	Vacuum Bake		LHO	per LIGO-E960022	B. Weaver	

*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*

# LIGO PROCESS TRAVELER

DCC Number: E990309-00-X

#	Operation	Start Date	Work Area	Instructions	Name/ Initials	Date Comp.						
5	Control Point		LHO	Review/approve RGA: VBO Load# <u>50</u> scan # <u>0810990.116A</u> VBO Load# <u>52</u> scan # <u>0820990.007</u> VBO Load# _____ scan # _____ VBO Load# _____ scan # _____ VBO Load# _____ scan # _____ VBO Load# _____ scan # _____ Note: attach RGA scan(s) to this traveler.	B. Weaver <i>BW</i>	9/14/99						
6	Box for shipment to LLO & CIT		CIT	<table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 10%;">No.</th> <th style="width: 15%;">Qty per package</th> <th style="width: 75%;">Part</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">all</td> <td style="text-align: center;">beam dump assy</td> </tr> </tbody> </table> (see also qty. for each shipping destination below)	No.	Qty per package	Part	1	all	beam dump assy	M. Smith	8/5/99
No.	Qty per package	Part										
1	all	beam dump assy										



#	Operation	Start Date	Work Area	Instructions	Name/Initials	Date Comp.														
7	Ship		CIT		M. Smith	8/5/99														
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4" style="text-align: center;">Ship Qty.</th> <th rowspan="2" style="text-align: center;">Part Description</th> </tr> <tr> <th style="text-align: center;">No.</th> <th style="text-align: center;">LHO</th> <th style="text-align: center;">LLO</th> <th style="text-align: center;">CIT</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">all</td> <td></td> <td></td> <td style="text-align: center;">beam dump assy</td> </tr> </tbody> </table>			Ship Qty.				Part Description	No.	LHO	LLO	CIT	1	all			beam dump assy		
Ship Qty.				Part Description																
No.	LHO	LLO	CIT																	
1	all			beam dump assy																
		LHO:	Attn: Betsy Weaver, COS LIGO Hanford Observatory (LHO) Specific Purpose: beam dump BSC8																	
		LLO:	Attn: Jonathan Kern LIGO Livingston Observatory (LLO) Specific Purpose: beam dump BSC8																	
END: Go to Traveler associated with next higher assembly processing																				

**ACTION ITEMS**

**Special Instructions (Handling/Packaging Constraints, Remarks, etc.) or Notes:**

DATE	NAME	DESCRIPTION
8/5/99	Mike Smith	Attention: Betsy Weaver, hold cleaned baked parts for use by COS
8/18	B. Weaver	John Worden cut Post D990447 down to 20" as per Mike Smith's instructions. (Pre vacuum baking).

# LIGO PROCESS TRAVELER

DCC Number: E990309-00-X

Date Prepared:

DATE	NAME	DESCRIPTION

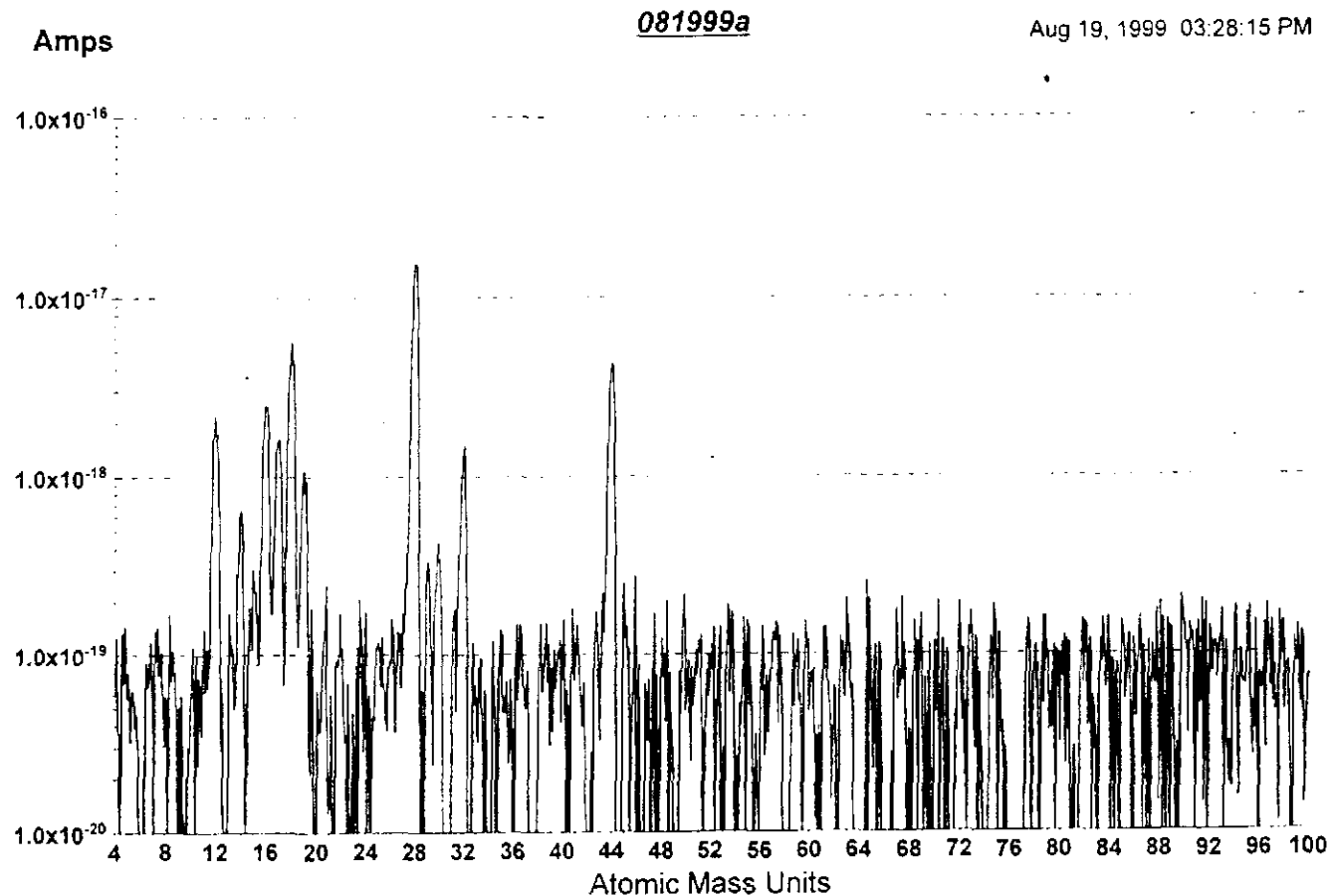
*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*



# LHO VACUUM BAKE OVEN A LOAD #52 ELEVATED TEMPERATURE BACKGROUND

## SCAN

V-1 Closed

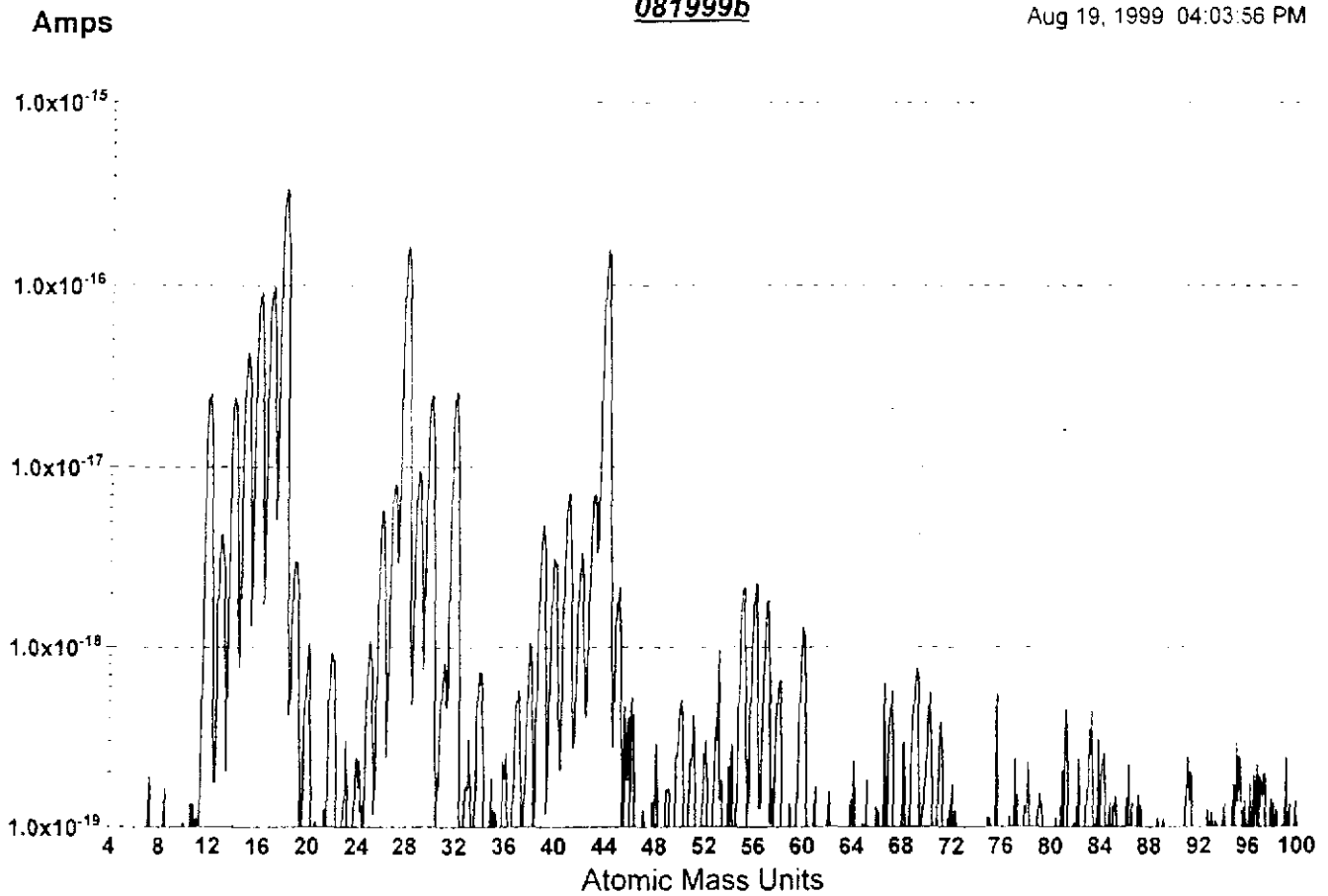


# LHO VACUUM BAKE OVEN A LOAD #52 ELEVATED TEMPERATURE SCAN

V-1 Open, Cal-Gas and V-2 Closed, 64°C

081999b

Aug 19, 1999 04:03:56 PM



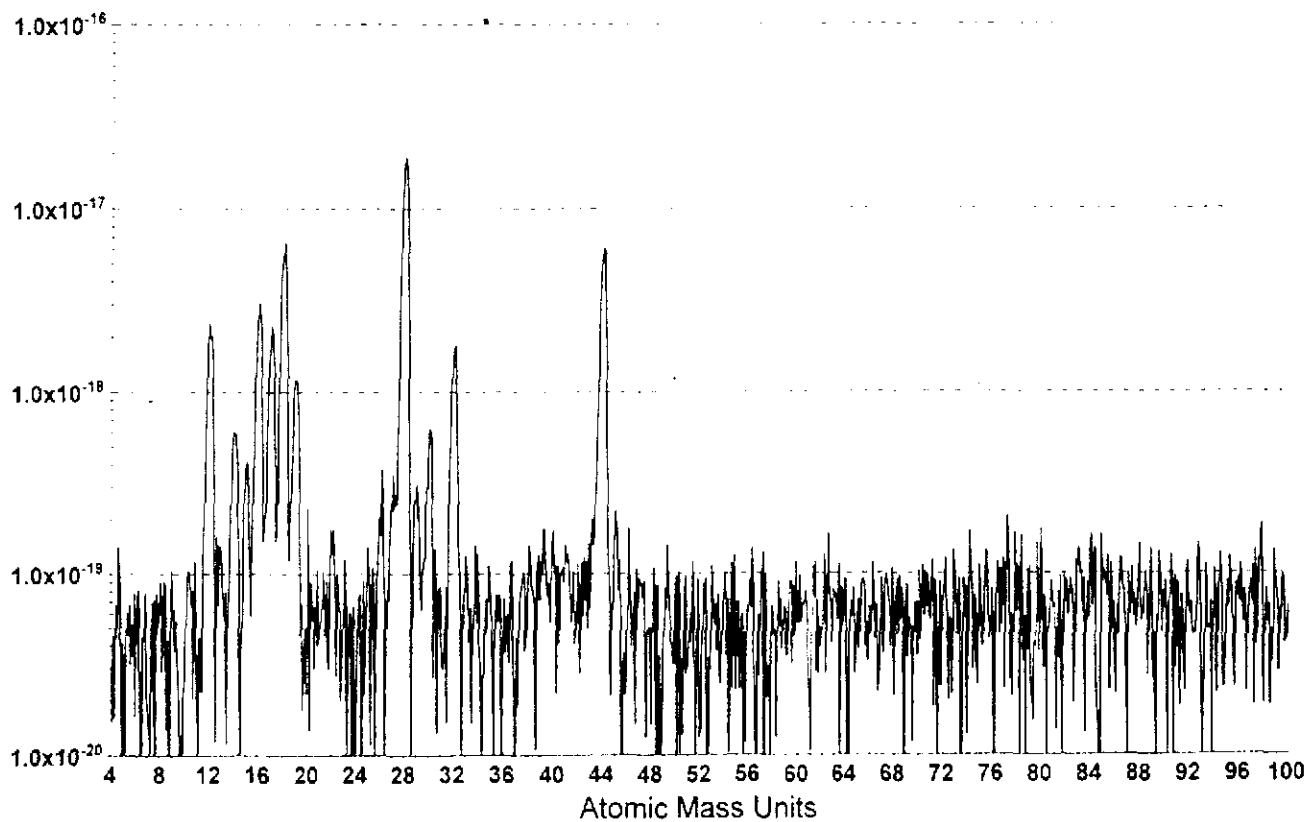
# LHO Vacuum Bake Oven A Load #52 RGA Background

V-1 Closed, Room Temp

Amps

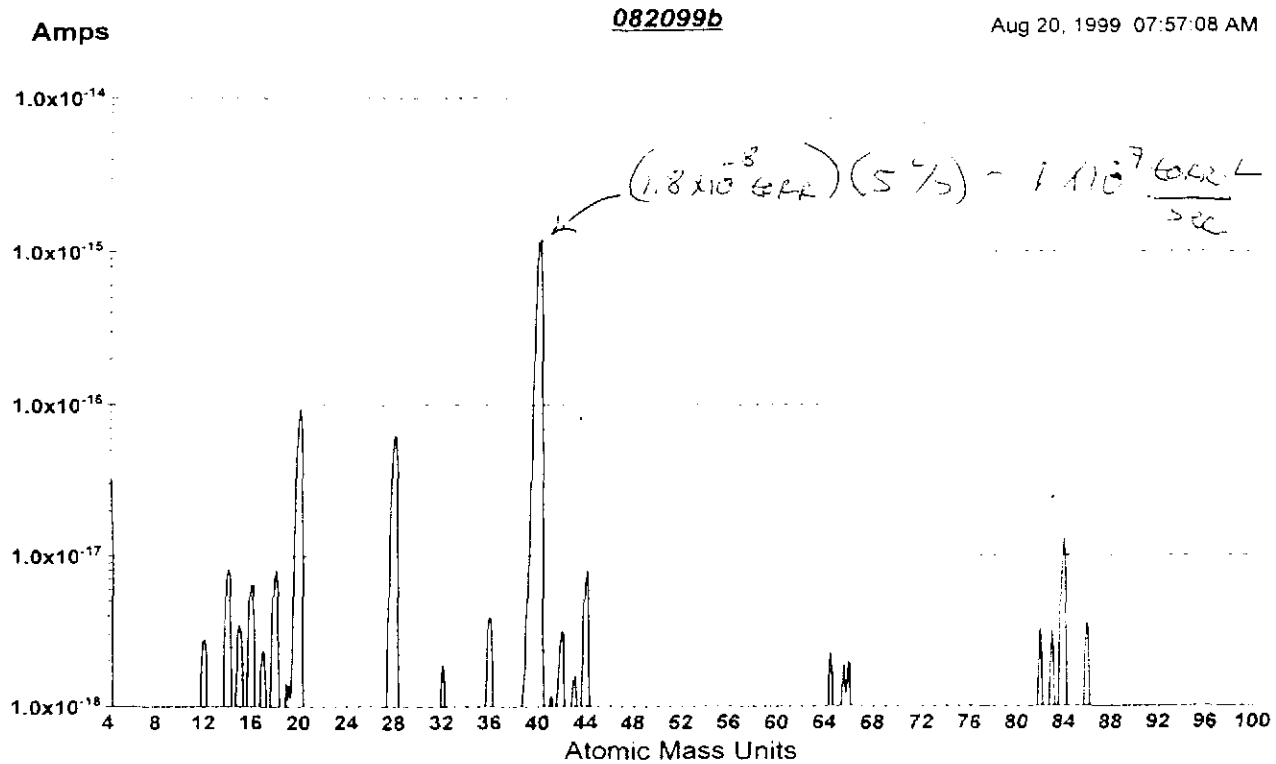
082099a

Aug 20, 1999 07:22:55 AM



# LHO Vacuum Bake Oven A Load #52 Calibration

V-1 and cal-gas open V-2 closed in pressure equilibrium at room temperature



CF defined as  $P_{\text{calc}(40)} / I_{\text{meas}(40)}$

$$P_{\text{calc}(40)} = (\text{leak rate}) / (\text{pump speed}) = (1.1\text{E-}7 \text{ torr} \cdot \text{L}/\text{sec})(0.86) / (5 \text{ L}/\text{sec}) = 1.8\text{E-}8 \text{ torr}$$

$$I_{\text{meas}(40)} = 1\text{E-}15 \text{ amps}$$

$$\text{CF} = (1.8\text{E-}8 \text{ torr}) / (1\text{E-}15 \text{ amps}) = 2\text{E}7 \text{ torr}/\text{amps}$$

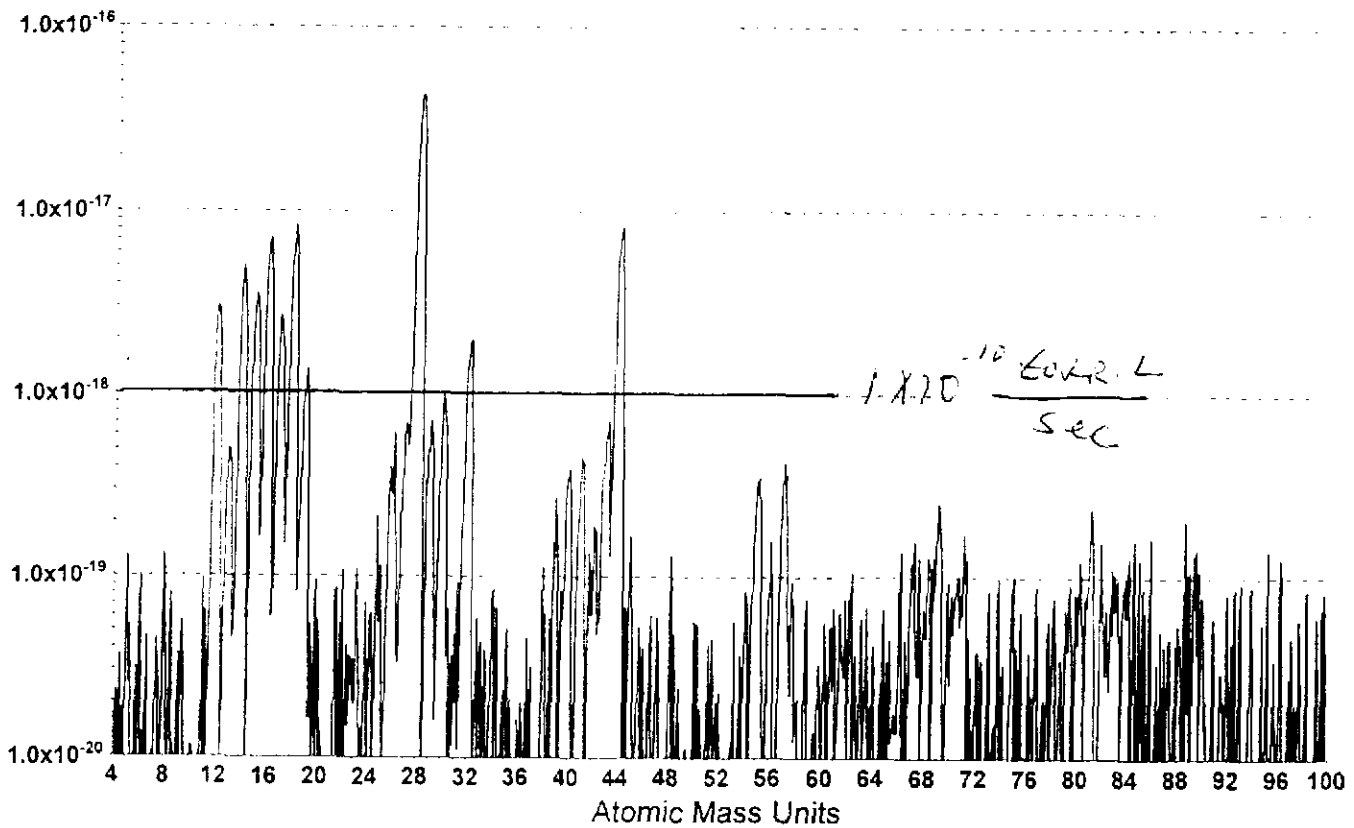
# LHO Vacuum Bake Oven A Load #52 Post-Bake Scan Room Temp

V-1 Open, Cal-Gas and V-2 Closed

Amps

082099c

Aug 20, 1999 08:31:04 AM





## LHO Bake Oven A Load # 52

1<sup>st</sup> Order Desorption Outgassing Rate Estimates using  $Q_{low} = SP_{low} = SP_{high} [e^{-(E_s/kT_{high})}] / [e^{-(E_s/kT_{low})}]$

Number of units in bake load	Pump Speed (L/sec)	AMU	RGA	RGA current (amps) @ T <sub>high</sub>	Calibration Factor CF (torr/amps)	T <sub>high</sub> (K)	T <sub>low</sub> (K)	Es/k	Extrapolated
			background current (amps)						outgassing rate (torr*L/sec) @ T <sub>low</sub>
1	5	41	1.40E-19	4.50E-19	2.00E+07	3.37E+02	2.97E+02	13000	1.72E-13
1	5	43	2.00E-19	7.20E-19	2.00E+07	3.37E+02	2.97E+02	8000	2.13E-12
1	5	53	1.10E-19	below noise	2.00E+07	3.37E+02	2.97E+02	13000	below noise
1	5	55	1.20E-19	3.50E-19	2.00E+07	3.37E+02	2.97E+02	15000	5.73E-14
1	5	57	1.30E-19	3.70E-19	2.00E+07	3.37E+02	2.97E+02	15000	5.98E-14

X-POP3-Rcpt: brivera@apex  
X-Sender: stan@127.0.0.1  
X-Mailer: QUALCOMM Windows Eudora Light Version 3.0.5 (32)  
Date: Wed, 08 Sep 1999 12:28:56 -0700  
To: "Bartie J. Rivera" <rivera\_b@ligo-wa.caltech.edu>  
From: Stan Whitcomb <stan@ligo.caltech.edu>  
Subject: Re: load 52

Right, I remember. You may consider this email my formal approval,  
and I will sign any paperwork next week.

stan

At 11:56 AM 9/8/99 -0700, you wrote:

>  
>Hello Stan,  
>  
>Hope you are feeling better. I am just writing  
>a reminder because load 52's post bake scan  
>was approved in the lab off the computer screen, so  
>I never got a signiture on the documentation and it took  
>me forever to reconstruct the events surrounding this load.  
>The load contained Betsy's cos structures and was "borderline"  
>passing. This load was so "borderline" that you had suggested we  
>follow it with a 200C bake to "clean up" the oven.  
>  
>I just wanted to drop a line to remind.  
>  
>Thanks  
>Bartie  
>  
>



E990267-01-X  
E990280-00-X  
E990279-01-X  
E990275-02-X  
E990251-00-X  
E990274-00-X

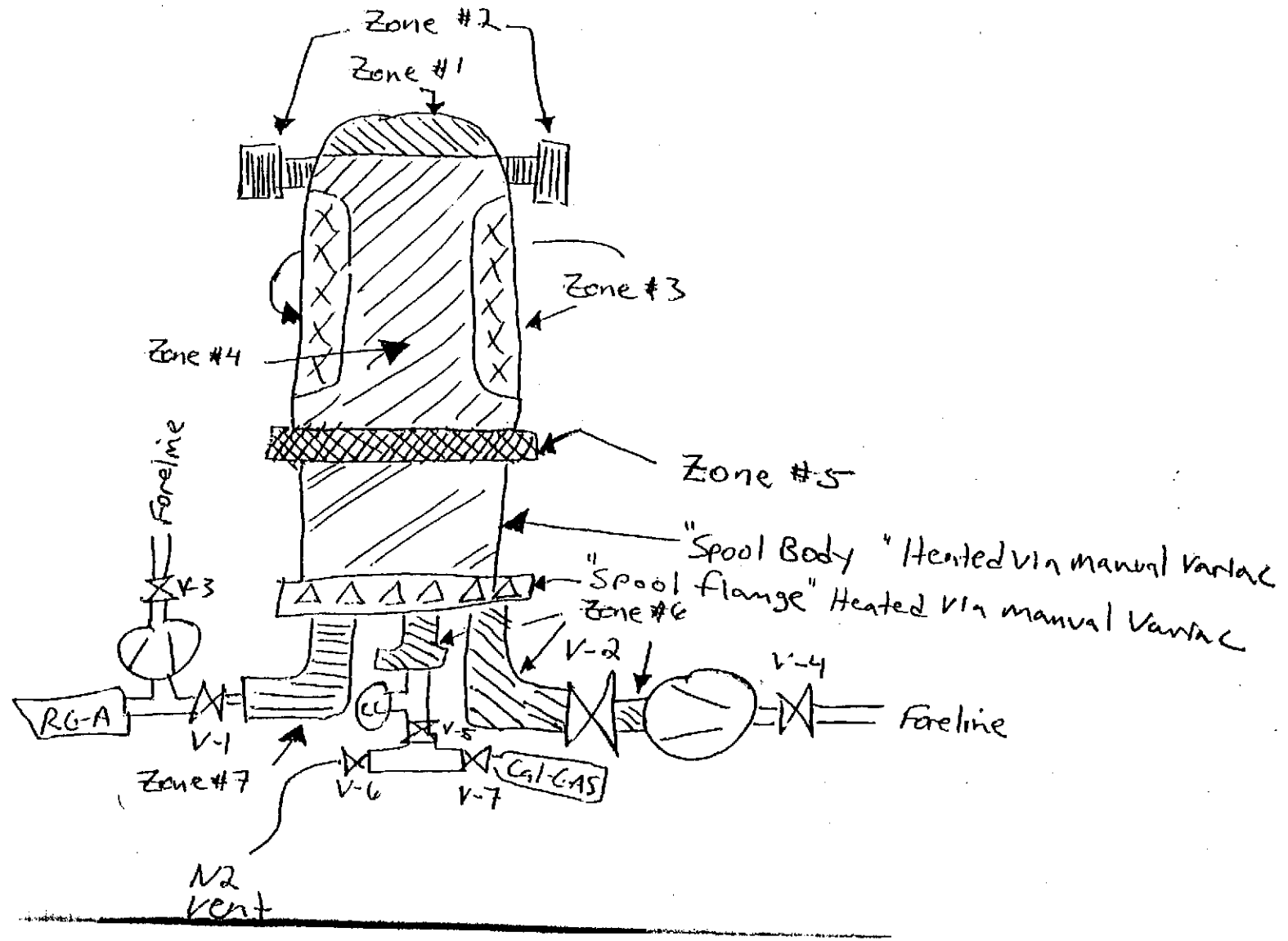
## Summary of LHO Vacuum Bake Oven A RGA Data Generation

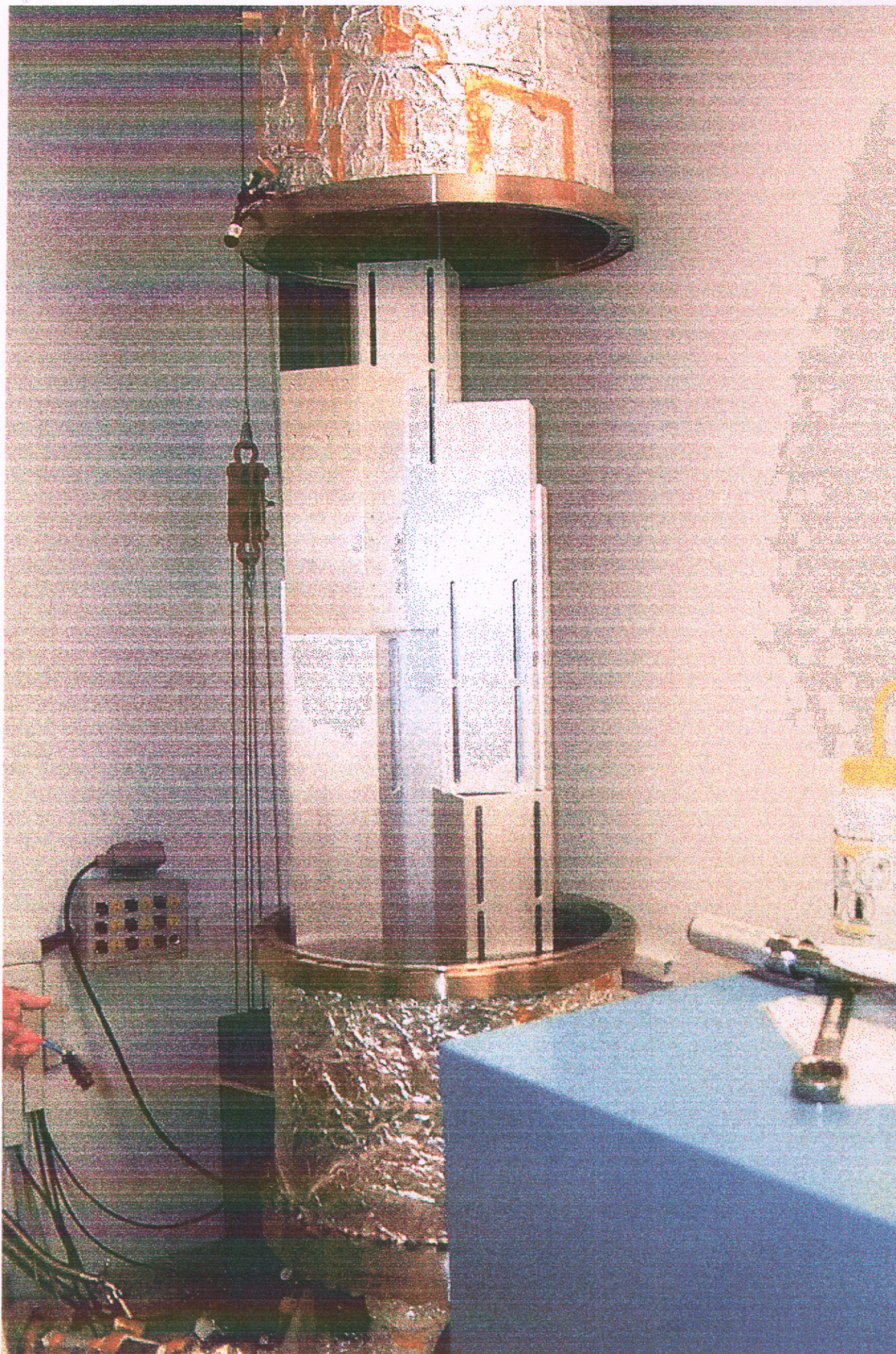
The individual parts which comprise a "load" are cleaned as per LIGO-E960022 or as allowed by waiver(s) and loaded into the bake oven. The oven is then pumped down through the main pump "arm" (through V-2, RGA arm is valved off at this point). A heating profile is programmed and baking of the system begins. A typical "heating profile" consists of ramping up to material type soak temperature, soaking for approximately 48 hours, ramping down to approximately 70C, soaking and then ramping down to near room temperature. While soaking at 70C, an RGA background scan is taken. V-1 is then opened and V-2 closed. Enough time is allowed for the system to come into pressure equilibrium and then an elevated load temperature RGA scan is taken. V-1 is then closed and V-2 opened. Following this elevated temperature scan, the load is ramped down to near room temperature and the baking portion of the process is complete. Throughout the baking, temperature data is taken to verify the actual temperatures in the various "heat zones" of the bake oven system.

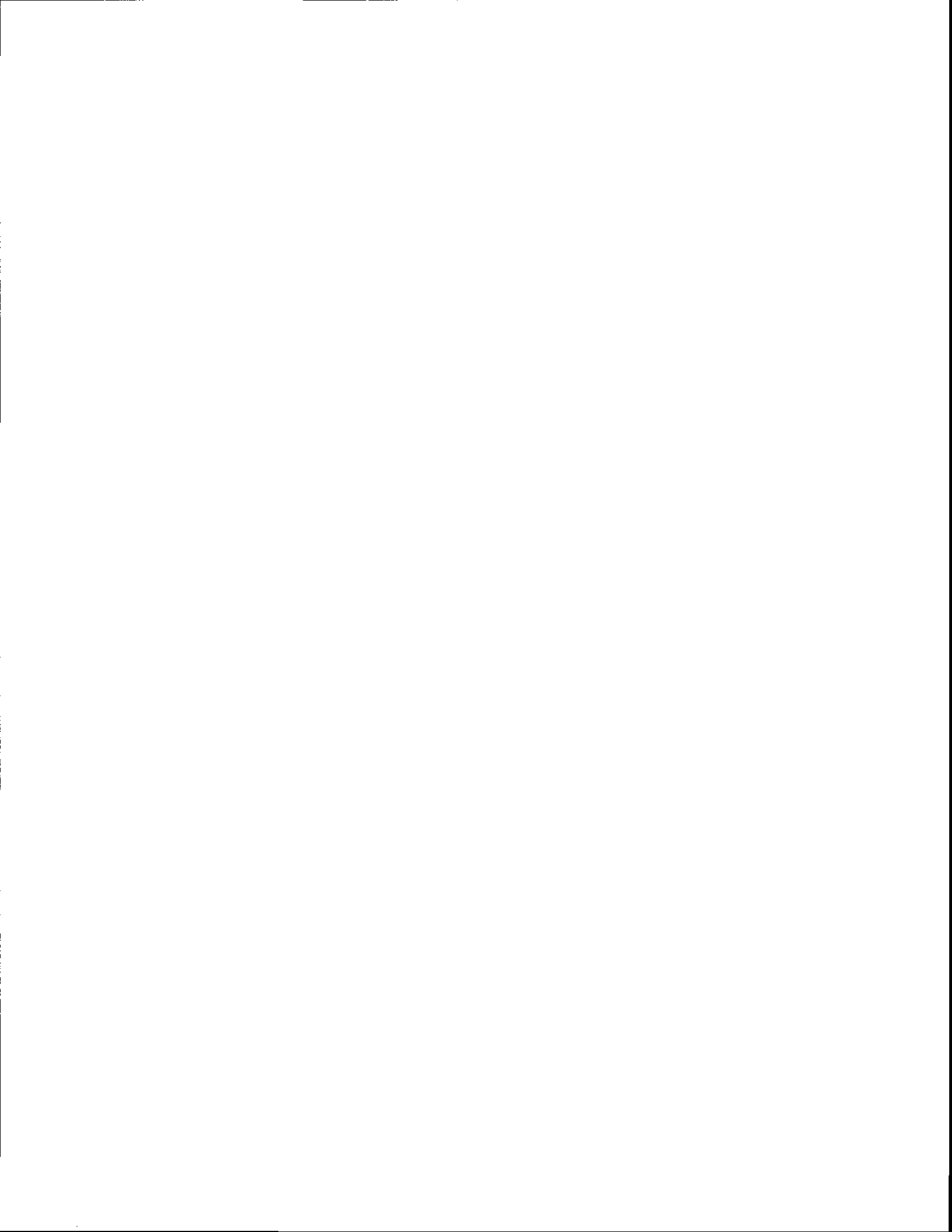
Once at near room temperature, another RGA background (V-1 closed) scan is taken. Next, V-1 and the cal-gas are opened and V-2 closed. After a 30 minute pressure equilibration time, a "calibration" scan is taken. The calculated pressure of Argon (constituent of the "mixed" calibration gas) is determined using the leak rate of Argon and the pump speed of the RGA arm port as seen by the oven chamber and compared (ratio) to the maximum amp value measured for Argon in the calibration scan. This "torr/amp" ratio becomes the Calibration Factor for the given load, converting measured current to pressure.

Finally, the cal-gas is valved out and enough time is allotted to allow all traces of it to be pumped away. A "post-bake" scan is then taken. Approval of the post-bake scan is a collective "pass/fail" determination made by either Dennis Coyne (CalTech) or Stan Whitcomb (CalTech). The data collected during the "elevated temperature scan" is entered into a spreadsheet which then calculates what the outgassing rates of AMUs 41, 43, 53, 55 and 57 ought to be at room temperature. These calculations are used to determine the room temperature outgassing rates when the signals are below the RGA's sensitivity (noise floor).

Refer to the LHO Vacuum Bake Oven A logbook for the actual ordered events of the load # of interest.







# **LHO VACUUM BAKE OVEN A: CONTENTS LOAD #48**

**LARGE "H" TUBE SERIAL NUMBER D990336-A-002**

**SMALL "H" TUBE SERIAL NUMBER D990253-A-003**

**SMALL "H" TUBE SERIAL NUMBER D990253-A-004**

**LARGE "H" TUBE SERIAL NUMBER D990198-B-007**

**SMALL "H" TUBE SERIAL NUMBER D990252-B-001 & 005**

**LARGE "H" TUBE SERIAL NUMBER D990223-C-003 & 004**

**LARGE "H" TUBE SERIAL NUMBER D990335-A-001**

## **ETM TELESCOPE ASSEMBLY**

**TUBE, ETM MOUNT (HOUSING) SERIAL NUMBER D980630-B-001**

**PLATE, ETM INTERFACE SERIAL NUMBER D980631-B-002**

**PLATE, BACKING SERIAL NUMBER D980650-B-001, 002**

## **BEAM DUMP ASSEMBLY, BSC 8**

**MOUNTING BRACKET GUSSET SERIAL NUMBER D990150-B-003, 004**

**MOUNTING BRACKET BACKPLATE 1 SERIAL NUMBER D990151-A/B-003,  
004**

**MOUNTING BRACKET BACKPLATE 2 SERIAL NUMBER D990152-C-003, 004**

## **BEAM DUMP ASSEMBLIES, BSC7**

**CAVITY BEAM DUMP, MOUNTING BRACKET GUSSET SERIAL NUMBER  
D990150-B-009, 011, 012**

**CAVITY BEAM DUMP, MOUNTING BRACKET BACKPLATE 2 SERIAL  
NUMBER D990152-C-013**



# **LHO VACUUM BAKE OVEN A LOAD #48 CONT.**

**BEAM DUMP HOUSING TUBE 2KFM SERIAL NUMBER D990223-C-003, 004**

**BEAM DUMP HOUSING TUBE 2KITMHR3, 4KITMHR4 SERIAL NUMBER  
D990225-D-002**

## **BEAM DUMP ASSEMBLIES, WBSC2**

**BEAM DUMP FLEX HINGE SADDLE SERIAL NUMBER D990031-A-010**

**CAVITY BEAM DUMP, MOUNTING BRACKET GUSSET SERIAL NUMBER  
D990150-B-013, 014, 016, 017**

**CAVITY BEAM DUMP, MOUNTING BRACKET BACKPLATE 1 SERIAL  
NUMBER D990151-B-009, 015, 019, 016**

**CAVITY BEAM DUMP, MOUNTING BRACKET BACKPLATE 2 SERIAL  
NUMBER D990152-C-016, 017, 010, 012**

**BEAM DUMP FLEX HINGE BACKUP SERIAL NUMBER D990200-A-030, 032,  
038, 035, 018, 028, 031, 037**

**RAIL, PLATE BEAM DUMP SERIAL NUMBER D990207-B-015, 016, 017, 018**

**EXTENSION TUBE SERIAL NUMBER D990253-A-004**

## **BEAM DUMP ASSEMBLIES, LBSC2**

**BEAM DUMP FLEX HINGE TEE SERIAL NUMBER 990030-A-017, 018, 019, 020**

**BEAM DUMP FLEX HINGE ATTACH SERIAL NUMBER D990032-A-007, 008,  
018, 019**

**CAVITY BEAM DUMP, MOUNTING BRACKET GUSSET SERIAL NUMBER  
D990150-B-018, 019, 015, 010**

**CAVITY BEAM DUMP, MOUNTING BRACKET BACKPLATE 1 SERIAL  
NUMBER D990151-B-010, 011, 012, 013**

**CAVITY BEAM DUMP, MOUNTING BRACKET BACKPLATE 2 SERIAL  
NUMBER D990152-C-009, 015, 018, 019**

**BEAM DUMP FLEX HINGE LOW STRAP SERIAL NUMBER D990199-A- 011**

**LHO VACUUM BAKE OVEN A: LOAD #48  
CONT.**

**BEAM DUMP FLEX HINGE BACKUP SERIAL NUMBER D990200-A-009, 031**

**BEAM DUMP FLEX HINGE TOP STRAP SERIAL NUMBER D990202-B-004,  
017, 019**



# LIGO PROCESS TRAVELER

DCC Number: **E990267-01-X**

Date Prepared: **6/30/99**

<b>Originator</b>	<b>Cognizant Engineer</b>	<b>Ext./Phone#</b>	<b>Project</b>	<b>Account Number</b>
Michael Smith	Michael Smith	2062	COS	5F515

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO load 40 6/ 28	VBO load 41 7/1	VBO load 43 7/ 12	VBO load 46 7/ 26	VBO load 48 7/	VBO Load 50
		<b>Beam Dump Assemblies, BSC4</b>								
D980087	A	"glass retaining bracket, top left, cavity BD"	006-008	3	3		3			
D980088	A	"glass retaining bracket, top right, cavity BD"	006-008	3	3		3			
D980092	A	"glass plate 1, cavity BD"		3						
D980093	A	"glass plate 2, cavity BD"		3						
D980289	B	"glass mounting plate1, cavity BD"	006-008	3	3					
D980292	B	"glass mounting plate2, cavity BD"	007,008,015	3	2		1	1		
D980296	A	"glass retaining bracket, bottom left, cavity BD"	006-008	3	3		3			
D980297	A	"glass retaining bracket, bottom right cavity BD"	006-008	3	3		3			
D980348	B	"side plate, cavity BD"	012-017	6	5	1				
D980378	B	"Stiffener Block, cavity BD"	006-008	3	3					
D980685	A	"clamp, plate beam dump"		12						
D990028	A	Beam Dump Flex Hinge Tongue	004, 005, 006, 007, 010, 015	6	1	3	2	2		
D990029	A	Beam Dump Flex Hinge Clevis	005, 008-012	6	1		1	5		1 (011)
D990030	A	Beam Dump Flex Hinge Tee	005-010	6	6			6		
D990031	A	Beam Dump Flex Hinge Saddle	004-009	6		4		2		
D990032	A	Beam Dump Flex Hinge Attach	004-006, 009-011	6		4		2		
D990033	A	Beam Dump Flex Hinge Adapter	004, 005, 008-010, 014	6		6				
D990140	D	Beam Dump Housing Plate	012, 014	3				3		
D990149	C	"Cavity Beam Dump, Mounting Bracket Angle "	005-008	4	1			3		
D990150	B	"Cavity Beam Dump, Mounting Bracket Gusset "	005-008	4	4					

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# LIGO PROCESS TRAVELER

DCC Number: **E990267-01-X**

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO load 40 6/ 28	VBO load 41 7/1	VBO load 43 7/ 12	VBO load 46 7/ 26	VBO load 48 7/	VBO Load 50
D990151	B	"Cavity Beam Dump, Mounting Bracket Backplate 1"	005-008	4	4					
D990152	C	"Cavity Beam Dump, Mounting Bracket Backplate 2"	005-008	4	4					
D990198	B	Beam Dump Flex Hinge H_tube	007,010, 003, 005	4	1	2			1	
D990199	A	Beam Dump Flex Hinge Low Strap	004-009	6	1	5				
D990200	A	Beam Dump Flex Hinge Backup	016-018, 020-022, 010-015	12	2	10				
D990201	A	Beam Dump Flex Hinge Cap	007-017, 019	12	2	2		8		
D990202	B	Beam Dump Flex Hinge Top Strap	005-010	6	1	4		1		
D990207	B	"rail, plate beam dump"	003-006, 008, 009	6		6				
D990218	B	"glass, plate beam dump" other traveler	NA	3			3	3		
D990222	A	Beam Dump Housing Tube 2KBSAR3		0						
D990223	C	Beam Dump Housing Tube 2KFM		0						
D990225	D	"Beam Dump Housing Tube 4KITMHR3,4KITMHR4"		0						
D990236	B	"backplate_offset, plate beam dump"		0						
D990240	B	"backplate, plate beam dump"		2	1					
D990252	B	"Beam Dump Housing Tube ITMAR1,2KRMHR3"	001,005,007	3	1	2	1	2		
D990253	A	Extension Tube	003	1			1		1	
D990335	A	"Beam Dump Flex Hinge H_tube, 2KITMXAR4 " 1	001	1			1		1	
D990336	A	"Beam Dump Flex Hinge H_tube, 2KITMYAR4" X	002	1			1		1	
WFV-10		#10 X 0.31 THK FLAT VENTED WASHER		24	24					
WFV-10		#10 X 0.31 THK FLAT VENTED WASHER		4	4					
92196A245		#10-24 X 0.75 SHCS		4	4					
93615A355		#10-24 X 0.75 LOW HD SCS		24	24					
WFV-06		#6 X 0.016 THK FLAT VENTED WASHER		4	4					
92196A144		#6-32 X .25 SHCS		4	4					
WFV-08		#8 FLAT VENTED WASHER		102	102					

# LIGO PROCESS TRAVELER

DCC Number: **E990267-01-X**

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO load 40 6/ 28	VBO load 41 7/1	VBO load 43 7/ 12	VBO load 46 7/ 26	VBO load 48 7/ 26
92185A194		#8-32 X .50 SHCS		102	102				
91500A194		#8-32 X .500 FHPS		54	54				
91944A450		0.406ID X 0.88OD X 0.25 THK SPHER WASH		24	24				
92141A029		1/4 FLAT WASHER		48	48				
92141A029		1/4 FLAT WASHER		36	36				
N-2520-A		1/4-20 HEX NUT		24	24				
93615A410		1/4-20 X .500 LOW HEAD SOCKET SCREW		12	12				
92196A540		1/4-20 X 0.75 SHCS		48	48				
92196A540		1/4-20 X 0.75 SHCS		24	24				
92196A542		1/4-20 X 1.00 SHCS		48	48				
C-2016-NA		"1/4-20 X 1.00 SHCS, AG/SS"		48	48				
C-2016-NA		"1/4-20 X 1.00 SHCS, AG/SS"		12	12				
92196A544		1/4-20 X 1.25 SHCS		24	24				
C-2820-NA		"1/4-28 X 1.25 SHCS, AG/SS"		36	36				
91950A031		3/8 X 0.063 FLAT WASHER		3	3				
91950A031		3/8 X 0.063 FLAT WASHER		6	6				
WFV-38		3/8 X0.032 THK FLAT VENTED WASHER		3	3				
WFV-38		3/8 X0.032 THK FLAT VENTED WASHER		32	32				
WFV-38		3/8 X0.032 THK FLAT VENTED WASHER		8	8				
94804A320		3/8-16 HEX NUT		8	8				
N-3816-A		3/8-16 HEX NUT		6	6				
TOP-1616-NA		3/8-16 X 1.00 SOCKT SET SCRW-OVL PT AG/SS		12	12				
90585A626		3/8-16 X 1.25 FLT HD CAP SCREW		8	8				
92186A626		3/8-16 X 1.25 HEX HD SCREW		16	16				
C-1620-NA		"3/8-16 X 1.25 SHCS, AG/SS"		12	12				
92186A630		3/8-16 X 1.75 HEX HD SCREW		6	6				

# LIGO PROCESS TRAVELER

DCC Number: **E990267-01-X**  
 Date Prepared: **6/30/99**

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO load 40 6/ 28	VBO load 41 7/1	VBO load 43 7/ 12	VBO load 46 7/ 26	VBO load 48 7/
92196A630		3/8-16 X 1.75 SHCS		18	18				
92186A999		3/8-16 X 7.00 HEX HD SCREW		16	16				
099-966-12-20x		BERYLLIUM-CU GND STRP		12	12				
6.32-400		Flex Pivot		12	12				

Used In (next higher assembly): **D990230, BSC Beam dump Installation, top assembly**

**Data Package, Receiving/Inspection Remarks:**

Inspection Required Y/N	Visual Damage Y/N	Comments	Name/Initials	Date Comp.
y		Inspect for breakage during shipment		

**Process Flow:**

#	Operation	Start Date	Work Area	Instructions	Name/Initials	Date Comp.
1	Control Point	NA	NA		NA	NA
2	Clean		LHO	per LIGO-E960022, as applicable	B. Weaver	
3	Vacuum Bake		LHO	per LIGO-E960022	K. Ryan	
4	wrap and bag		LHO	per LIGO-E960022	B. Weaver	
5	Control Point	6/24/99 6/28/99 7/6/99 7/20/99	LHO	Review/approve RGA: VBO Load# 40 scan # 062899C.RGA VBO Load# 41 scan # 070299C.RGA VBO Load# 43 scan # Rejected VBO Load# 46 scan # 072699C.RGA VBO Load# 48 scan # 080599C.RGA VBO Load# 50 scan # 081099C.RGA VBO Load# 52 scan # 082099C.RGA VBO Load# 61 scan # 101899C.RGA Note: attach RGA scan(s) to this traveler.	K. Ryan  REW REW REW REW	7/28/99 8/10/99 8/10/99 9/14/99

**N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.**

# LIGO PROCESS TRAVELER

DCC Number: **E990267-01-X**  
 Date Prepared: **6/30/99**

#	Operation	Start Date	Work Area	Instructions	Name/ Initials	Date Comp.																			
	Box for shipment to LHO			Ship in LIGO-provided container  <table border="1"> <thead> <tr> <th>No.</th> <th>Qty per package</th> <th>Part</th> </tr> </thead> <tbody> <tr> <td>ALL</td> <td></td> <td>BSC4 BEAM DUMP PARTS</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table> (see also qty. for each shipping destination below)	No.	Qty per package	Part	ALL		BSC4 BEAM DUMP PARTS															
No.	Qty per package	Part																							
ALL		BSC4 BEAM DUMP PARTS																							
7	Ship			<table border="1"> <thead> <tr> <th rowspan="2">No.</th> <th colspan="3">Ship Qty.</th> <th rowspan="2">Part Description</th> </tr> <tr> <th>LHO</th> <th>LLO</th> <th>Other</th> </tr> </thead> <tbody> <tr> <td></td> <td>all</td> <td></td> <td></td> <td>BSC4 beam dump parts</td> </tr> </tbody> </table> <table border="1"> <tr> <td></td> <td>LHO:</td> <td>Attn: Betsy Weaver, COS LIGO Hanford Observatory (LHO) Specific Purpose: beam dump BSC8</td> </tr> <tr> <td></td> <td>LLO:</td> <td>Attn: Jonathan Kern LIGO Livingston Observatory (LLO) Specific Purpose: beam dump BSC8</td> </tr> </table>	No.	Ship Qty.			Part Description	LHO	LLO	Other		all			BSC4 beam dump parts		LHO:	Attn: Betsy Weaver, COS LIGO Hanford Observatory (LHO) Specific Purpose: beam dump BSC8		LLO:	Attn: Jonathan Kern LIGO Livingston Observatory (LLO) Specific Purpose: beam dump BSC8		
No.	Ship Qty.			Part Description																					
	LHO	LLO	Other																						
	all			BSC4 beam dump parts																					
	LHO:	Attn: Betsy Weaver, COS LIGO Hanford Observatory (LHO) Specific Purpose: beam dump BSC8																							
	LLO:	Attn: Jonathan Kern LIGO Livingston Observatory (LLO) Specific Purpose: beam dump BSC8																							
END: Go to Traveler associated with next higher assembly processing																									

*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*



# LIGO PROCESS TRAVELER

DCC Number: E990267-01-X

Date Prepared: 6/30/99

## Special Instructions (Handling/Packaging Constraints, Remarks, etc.) or Notes:

Attention: Betsy Weaver, Jonathan Kern, hold cleaned and baked parts for COS assembly
VBO Load 43 - Rejected Scan. Dennis Coyne sent all stainless steel items to be electropolished and all aluminum items to LNL anodizing to be etched, from this load. 7/15 B. Weaver
Parts received back from etching and polishing companies. Recleaned as per Dennis' email attached. 7/23 B. Weaver
S/N 006-008 of parts D980087, D980088, D980296, D980297 sent back to Spacecraft Specialists, Inc. for rework. They were rushed during manufacturing these parts, and therefore forgot to finish. 7/21 B. Weaver
6 D990030, 1 D990252 tubes sent to Electropolisher for Stecher for recleaning even though they had been baked at Lto & passed. - Dennis thought they looked suspect to dirt. 8/2 - B. Weaver
Clevis D990029-011 sent out for rework to make modification as per D990029-B 8/4 - B. Weaver DCN: E990273-B 7/9
Side plate D980348 s/n 014 sent to Brockman Mfg. for rework - holes made into slots to compensate for low clearance. B. Weaver 9/10
D980348 s/n 014 given to B. Rivera for vacuum baking. B. Weaver 10/11
Clevis D990029 s/n 011 sent out <u>Again</u> to have 1/4-20 tapped holes retapped. 12/1/99 B. Weaver
Received clevis D990029 s/n 011 back from Brockman - reworking above. Giving to B. Rivera for recleaning & VBoing. 12/14/99 B. Weaver

N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.

X-POP3-Rcpt: bweaver@apex  
Date: Thu, 22 Jul 1999 12:12:31 -0700  
From: Dennis Coyne <coyne@ligo.caltech.edu>  
Organization: Caltech/LIGO  
X-Mailer: Mozilla 3.01Gold (Win95; I)  
To: Betsy Weaver <weaver\_b@ligo.caltech.edu>  
CC: Stan Whitcomb <stan@acrux.ligo.caltech.edu>, Mike Smith <smith@acrux.ligo.caltech.edu>, Bartie Rivera <rivera\_b@ligo-wa.caltech.edu>  
Subject: Re: cleaning

MSO LOAD 48

Betsy,

You should clean as follows (E960022-05 except since the parts are too large to ultrasonically clean, I've tailored the cleaning):

- 1) clean with Liquinox first (solution per E960022-05) and using a rubbing/scrubbing action (i.e. not just rinsing the liquinox over the surfaces). All holes must be cleaned with a brush (stainless steel, phosphor-bronze preferred, but nylon is acceptable). It is ESSENTIAL that the liquinox NOT dry before being rinsed with DI water.
- 2) Thoroughly rinse with DI water. All surfaces and holes must be rinsed THOROUGHLY.
- 3) Rinse & rub (with gloved hand only) all surfaces with either methanol or isopropal alcohol. Squirt the solvent into all holes.
- 4) Blow dry with clean, filtered air or N2, or allow to dry on a clean bench. Do not leave exposed for longer than about 15 minutes, before covering with UHV foil.

With regard to cleaning the lens, please see Stan for a confirmation, but I believe the rule that we operate under is that if all surfaces are polished, then an optics cleaning and wetting test is adequate and no baking is required. However, if the sides of the optic are not polished (as I suspect is the case for the ETM optics), then it should be cleaned and baked and re-cleaned. However, please confirm this with Stan and he may grant a waiver if he examines the surface condition of the optics.

Dennis

Betsy Weaver wrote:

- >
- > Hi Dennis-
- >
- > Two cleaning questions for you:
- >
- > 1. We just received the aluminum load (COS) from the etching company.
- > How should we clean them here, before baking them? (They are

Dennis Coyne, 12:12 PM 7/22/99 -0700, Re: cleaning

---

- > obviously too large to put in the ultrasonic cleaner...)
- >
- > 2. Mike has one large and two small lenses that are going to be
- > used in the ETM Telescope Assembly. If they wet well during cleaning,
- > do they really need to be baked? A while ago, Stan told me that the
- > small steering mirrors for IO and COS did not need to be baked, as the oven
- > would just make them dirtier, because they wetted so well during cleaning.
- > Is this the same for the lenses? If they do need to be baked, can I put
- > them in
- > the next load with the one Large Optic?
- >
- > Thanks-
- > Betsy

--  
Dennis Coyne (Detector Installation Manager)  
LIGO Laboratory, Caltech, Physics Department  
626.395.2034 @CIT / 225.686.3168 @Livingston / 509.372.8166 @Hanford  
cell 626.695.8350

# LIGO PROCESS TRAVELER

LLO Copy

DCC Number: E990280-00-X

Date Prepared: 7/8/99

Originator		Cognizant Engineer		Ext./Phone#	Project	Account Number					
Michael Smith		Michael Smith		2062	COS	5F515					
Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO Load 43	VBO Load 46	VBO Load 48	VBO Load 50	Sent to LLO	VBO Load 52	Sent to LLO 9/3
		<b>Beam Dump Assemblies, LBSC2</b>									
D980087	A	"glass retaining bracket, top left, cavity BD"	014, 015	2	1					2	2
D980088	A	"glass retaining bracket, top right, cavity BD"	014, 015	2	1					2	2
D980092	A	"glass plate 1, cavity BD"		2							
D980093	A	"glass plate 2, cavity BD"		2							
D980289	B	"glass mounting plate 1, cavity BD"	014, 015	2		2			2		
D980292	B	"glass mounting plate 2, cavity BD"	012, 014	2	2	2			2		
D980296	A	"glass retaining bracket, bottom left, cavity BD"	014, 015	2	1					2	2
D980297	A	"glass retaining bracket, bottom right cavity BD"	014, 015	2	1					2	2
D980348	B	"side plate, cavity BD"	004, 024, 029, 030	4		4			4		
D980378	B	"Stiffener Block, cavity BD"	003, 009	2	2	2			2		
D980685	A	"clamp, plate beam dump"		8							
D990028	A	Beam Dump Flex Hinge Tongue	016-019	4	4	4			4		
D990029	A	Beam Dump Flex Hinge Clevis	006, 007, 018, 004	4				4	4		
D990030	A	Beam Dump Flex Hinge Tee	017-020	4			4		4		
D990031	A	Beam Dump Flex Hinge Saddle	016-019 ** See Note	4							
D990032	A	Beam Dump Flex Hinge Attach	007, 008, 018, 019	4			4		4		
D990033	A	Beam Dump Flex Hinge Adapter	** See Note	4							
D990140	D	Beam Dump Housing Plate	011, 013	2							
D990149	C	"Cavity Beam Dump, Mounting Bracket Angle "	011, 019	4	2	2					

sent 12/15/99

N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.

# LIGO PROCESS TRAVELER

DCC Number:

E990280-00-X

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO Load 43	VBO Load 46	VBO Load 48	VBO Load 50	Sent to LLO	VBO Load 52	Sent to LLO 9/3	
D990150	B	"Cavity Beam Dump, Mounting Bracket Gusset "	018, 019, 015, 010	4	4		4		4			
D990151	B	"Cavity Beam Dump, Mounting Bracket Backplate 1"	010-013	4			4		4			
D990152	C	"Cavity Beam Dump, Mounting Bracket Backplate 2"	009, 015, 018, 019	4			4		4			
D990198	B	Beam Dump Flex Hinge H_tube	013, 014, 016, 017	4					4			
D990199	A	Beam Dump Flex Hinge Low Strap	018, 019, 010, 011	4	3	3	1		4			
D990200	A	Beam Dump Flex Hinge Backup	023, 024, 033, 034, 037, 038, 009, 031	8		6	2		6			
D990201	A	Beam Dump Flex Hinge Cap	021-025, 033, 034, 036	8	8	8			8			
D990202	B	Beam Dump Flex Hinge Top Strap	004, 017-019	4		1	3		4			
D990207	B	"rail, plate beam dump"	007, 010, 013, 014	4	4	4			4			
D990218	B	"glass, plate beam dump"		2	Sent 12/5/99 (52)							
D990222	A	Beam Dump Housing Tube 2KBSAR3		0								
D990223	C	Beam Dump Housing Tube 2KFM		0								
D990225	D	"Beam Dump Housing Tube 4KITMHR3, 4KITMHR4"		0								
D990236	B	"backplate_offset, plate beam dump"		0								
D990240	B	"backplate, plate beam dump"		0								
D990252	B	"Beam Dump Housing Tube ITMAR1,2KRMHR3"	002, 004	2					2			
D990253	A	Extension Tube	001, 002	2					2			
D990335	A	"Beam Dump Flex Hinge H_tube, 2KITMXAR4 "		0								
D990336	A	"Beam Dump Flex Hinge H_tube, 2KITMYAR4"		0								
WFV-10		#10 X 0.31 THK FLAT VENTED WASHER		24							24	

# LIGO PROCESS TRAVELER

DCC Number: **E990280-00-X**

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO Lead 43	VBO Lead 46	VBO Lead 48	VBO Lead 50	Sent to LLO	VBO Lead 51	Sent to LLO 9/3
WFV-10		#10 X 0.31 THK FLAT VENTED WASHER		32							*60
93615A355		#10-24 X 0.75 LOW HD SCS		24							48
92196A245		#10-24 X 0.75 SHCS		32							*50
WFV-06		#6 X 0.016 THK FLAT VENTED WASHER		32							*60
92196A144		#6-32 X .25 SHCS		32							*50
WFV-08		#8 FLAT VENTED WASHER		68							*80
92185A194		#8-32 X .50 SHCS		68							*100
91500A194		#8-32 X .500 FHPS		36							72
91944A450		0.406ID X 0.88OD X 0.25 THK SPHER WASH		16							16
92141A029		1/4 FLAT WASHER		56							100
N-2520-A		1/4-20 HEX NUT AG/SS		16							20
93615A410		1/4-20 X .500 LOW HEAD SOCKET SCREW		8							*50
92196A540		1/4-20 X 0.75 SHCS		48							78
92196A542		1/4-20 X 1.00 SHCS		32							*100
C-2016-NA		"1/4-20 X 1.00 SHCS, AG/SS"		40							*60
92196A544		1/4-20 X 1.25 SHCS		16							*100
C-2820-NA		"1/4-28 X 1.25 SHCS, AG/SS"		24							30
91950A031		3/8 X 0.063 FLAT WASHER		6							12
WFV-38		3/8 X 0.032 THK FLAT VENTED WASHER		42							72
N-3816-A		3/8-16 HEX NUT, AG/SS		4							6
94804A320		3/8-16 HEX NUT		8							16
TOP-1616-NA		3/8-16 X 1.00 SOCKT SET SCRW-OVL PT AG/SS see traveler # E990324		8							16
90585A626		3/8-16 X 1.25 FLT HD CAP SCREW		8							12
92186A626		3/8-16 X 1.25 HEX HD SCREW		16							40
C-1620-NA		"3/8-16 X 1.25 SHCS, AG/SS"		8							
92186A630		3/8-16 X 1.75 HEX HD SCREW		4							10

# LIGO PROCESS TRAVELER

DCC Number: E990280-00-X

Date Prepared: 7/8/99

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO Load 43	VBO Load 46	VBO Load 48	VBO Load 50	Sent to LLO	VBO Load 52	Sent to LLO 9/3
92196A630		3/8-16 X 1.75 SHCS		12							12
92186A999		3/8-16 X 7.00 HEX HD SCREW	NA (baked in load 38-OKed by Stan W.)	16					18		
099-966-12-20x		BERYLLIUM-CU GND STRP	NA (baked in load 38-OKed by Stan W.)	8					8		
6032-400		Flex Pivot		8							
Used In (next higher assembly):		D990230, BSC Beam dump Installation, top assembly									

9 sent by Mike Smith 12/5/99

### Data Package, Receiving/Inspection Remarks:

Inspection Required Y/N	Visual Damage Y/N	Comments	Name/Initials	Date Comp.
y		Inspect for breakage during shipment		

### Process Flow:

#	Operation	Start Date	Work Area	Instructions	Name/Initials	Date Comp.
1	Control Point	NA	NA		NA	NA
2	Clean		LHO	per LIGO-E960022, as applicable	B. Weaver	
3	wrap and bag		LHO	per LIGO-E960022	B. Weaver	
4	Vacuum Bake		LHO	per LIGO-E960022	K. Ryan	SEE NEXT PAGE

N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.

# LIGO PROCESS TRAVELER

DCC Number: **E990280-00-X**  
 Date Prepared: **7/8/99**

#	Operation	Start Date	Work Area	Instructions	Name/Initials	Date Comp.													
5	Control Point (43) (46)	7.6.99 7.20.99	LHO	Review/approve RGA: VBO Load# <u>43</u> scan # <u>REJECTED</u> VBO Load# <u>46</u> scan # <u>072699C.RGA</u> VBO Load# <u>48</u> scan # <u>080379C.RGA</u> VBO Load# <u>50</u> scan # <u>081099C.RGA</u> VBO Load# <u>52</u> scan # <u>082099C.RGA</u> VBO Load# _____ scan # _____  Note: attach RGA scan(s) to this traveler.	K. Ryan <i>REW</i> <i>REW</i> <i>REW</i> <i>REW</i>	7/29/99 8/10/99 8/10/99 9/14/99													
	Box for shipment to LLO	8/11 9/7	PARTIAL PARTIAL	Ship in LIGO-provided container  <table border="1"> <thead> <tr> <th>No.</th> <th>Qty per package</th> <th>Part</th> </tr> </thead> <tbody> <tr> <td>ALL</td> <td></td> <td>BEAM DUMP PARTS</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>(see also qty. for each shipping destination below)</p>	No.	Qty per package	Part	ALL		BEAM DUMP PARTS				<i>BN</i> <i>BN</i>	8/12 9/7				
No.	Qty per package	Part																	
ALL		BEAM DUMP PARTS																	
7	Ship			<table border="1"> <thead> <tr> <th rowspan="2">No.</th> <th colspan="3">Ship Qty.</th> <th rowspan="2">Part Description</th> </tr> <tr> <th>LHO</th> <th>LLO</th> <th>Other</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td>all</td> <td></td> <td>beam dump parts</td> </tr> </tbody> </table> <p>LHO: _____ Attn: Betsy Weaver, COS                      LIGO Hanford Observatory (LHO)                      Specific Purpose: beam dump DSCB</p>	No.	Ship Qty.			Part Description	LHO	LLO	Other			all		beam dump parts		
No.	Ship Qty.			Part Description															
	LHO	LLO	Other																
		all		beam dump parts															

**N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.**



## ACTION ITEMS:

Table 1:

DATE	NAME	DESCRIPTION
8/5/99	Betsy Weaver	Clavis' D990029-006, 007, 004, 018 were sent out for rework for modification as per: DCN#E99028-B/D990029-B. Received back 8/4. Being baked here.
8/12/99	Betsy Weaver	Sending the parts listed above in far R-hand column attention: Jonathan Kern @ LLO. The 8 tubes (D990198, D990252, & D990253's) will need to be cleaned & baked, as per the instructions attached. I will send all fasteners & missing parts separately (being baked here).
8/12/99	Betsy Weaver	Parts D990031 s/n 016-019 & D990033 s/n 006, 007, 012, 013 were sent out for rework & will be sent to LLO separately.
9/3/99	Betsy Weaver	* Parts "sent to LLO 9/3" Need to be cleaned & baked as per E960022. (This partial shipment sent 9/7). Place all other listed, cleaned & baked hardware with the other stored B.O. LBSC2 stuff.
9/3/99	Betsy Weaver	Staple this "copy" of traveler to the original traveler, upon receipt @ LLO.

N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.

X-POP3-Rcpt: bweaver@apex  
Date: Thu, 22 Jul 1999 12:12:31 -0700  
From: Dennis Coyne <coyne@ligo.caltech.edu>  
Organization: Caltech/LIGO  
X-Mailer: Mozilla 3.01Gold (Win95; I)  
To: Betsy Weaver <weaver\_b@ligo.caltech.edu>  
CC: Stan Whitcomb <stan@acrux.ligo.caltech.edu>,  
Mike Smith <smith@acrux.ligo.caltech.edu>,  
Bartie Rivera <rivera\_b@ligo-wa.caltech.edu>  
Subject: Re: cleaning

WBO LOAD 48

Betsy,

You should clean as follows (E960022-05 except since the parts are too large to ultrasonically clean, I've tailored the cleaning):

- 1) clean with Liquinox first (solution per E960022-05) and using a rubbing/scrubbing action (i.e. not just rinsing the liquinox over the surfaces). All holes must be cleaned with a brush (stainless steel, phosphor-bronze preferred, but nylon is acceptable). It is **ESSENTIAL** that the liquinox **NOT** dry before being rinsed with DI water.
- 2) Thoroughly rinse with DI water. All surfaces and holes must be rinsed **THOROUGHLY**.
- 3) Rinse & rub (with gloved hand only) all surfaces with either methanol or isopropal alcohol. Squirt the solvent into all holes.
- 4) Blow dry with clean, filtered air or N2, or allow to dry on a clean bench. Do not leave exposed for longer than about 15 minutes, before covering with UHV foil.

With regard to cleaning the lens, please see Stan for a confirmation, but I believe the rule that we operate under is that if all surfaces are polished, then an optics cleaning and wetting test is adequate and no baking is required. However, if the sides of the optic are not polished (as I suspect is the case for the ETM optics), then it should be cleaned and baked and re-cleaned. However, please confirm this with Stan and he may grant a waiver if he examines the surface condition of the optics.

Dennis

Betsy Weaver wrote:

- >
- > Hi Dennis-
- >
- > Two cleaning questions for you:
- >
- > 1. We just received the aluminum load (COS) from the etching company.
- > How should we clean them here, before baking them? (They are



# LIGO PROCESS TRAVELER

DCC Number: **E990279-01-X**

Date Prepared: **7/8/99**

Originator		Cognizant Engineer			Ext./Phone#		Project		Account Number			
Michael Smith		Michael Smith			2062		COS		5F515			
Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO Load 40	VBO Load 41	VBO Load 43	VBO Load 46	VBO Load 48	VBO Load 50	VBO Load 52	VBO Load 54
Beam Dump Assemblies, WBSC2												
D980087	A	"glass retaining bracket, top left, cavity BD" ✓	012-013	2			2				2	
D980088	A	"glass retaining bracket, top right, cavity BD" ✓	012-013	2			2				2	
D980092	A	"glass plate 1, cavity BD" ✓		2								
D980093	A	"glass plate 2, cavity BD" ✓		2								
D980289	B	"glass mounting plate1, cavity BD" ✓	012-013	2		2						
D980292	B	"glass mounting plate2, cavity BD" ✓	010-011	2		2	2					
D980296	A	"glass retaining bracket, bottom left, cavity BD" ✓	012-013	2			2				2	
D980297	A	"glass retaining bracket, bottom right cavity BD" ✓	012-013	2			2				2	
D980348	B	"side plate, cavity BD" ✓	025-028	4		4						
D980378	B	"Stiffener Block, cavity BD" ✓	013-014	2		2						
D980685	A	"clamp, plate beam dump" ✓		8								
D990028	A	Beam Dump Flex Hinge Tongue ✓	011-014	4				4				
D990029	B	Beam Dump Flex Hinge Clevis ✓	015-017, 019	4				4		1 (019)		
D990030	A	Beam Dump Flex Hinge Tee ✓	013-016	4			3	4				
D990031	A	Beam Dump Flex Hinge Saddle ✓	013-015, 010	4			4	3	1			
D990032	A	Beam Dump Flex Hinge Attach ✓	014-017	4			4	4				
D990033	A	Beam Dump Flex Hinge Adapter ✓	018, 015, 011	4		3						
D990140	D	Beam Dump Housing Plate ✓	009, 010	2		2						
D990149	C	"Cavity Beam Dump, Mounting Bracket Angle " ✓	010, 012, 014, 015	4			4	4				

*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*

# LIGO PROCESS TRAVELER

DCC Number: **E990279-01-X**

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO Load 40	VBO Load 41	VBO Load 43	VBO Load 46	VBO Load 48	VBO Load 50	VBO Load 52	VBO Load 54
D990150	B	"Cavity Beam Dump, Mounting Bracket Gusset "	✓ 013, 014, 016, 017	4			4		4			
D990151	B	"Cavity Beam Dump, Mounting Bracket Backplate 1"	✓ 009, 015, 019 016	4			4		4			
D990152	C	"Cavity Beam Dump, Mounting Bracket Backplate 2"	✓ 016, 017 010, 012	4			4		4			
D990198	B	Beam Dump Flex Hinge H_tube	✓ 008, 011, 006 012	4								3
D990199	A	Beam Dump Flex Hinge Low Strap	✓ 012, 014, 016, 017	4				4				
D990200	A	Beam Dump Flex Hinge Backup	✓ 007, 008, 025, 027, 035, 036 019, 032	8			8		8			
D990201	A	Beam Dump Flex Hinge Cap	✓ 030, 032, 038, 035, 018, 028, 031, 037	8			8	8				
D990202	B	Beam Dump Flex Hinge Top Strap	✓ 011-014	4			4	4				
D990207	B	"rail, plate beam dump"	015-018	4			3		4			
D990218	B	"glass, plate beam dump"		2								
D990222	A	Beam Dump Housing Tube 2KBSAR3	✓	0								
D990223	C	Beam Dump Housing Tube 2KFM	✓	0								

# LIGO PROCESS TRAVELER

DCC Number: **E990279-01-X**

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO Load 40	VBO Load 41	VBO Load 43	VBO Load 46	VBO Load 48	VBO Load 50	VBO Load 52	VBO Load 54
D990225	D	"Beam Dump Housing Tube 4KITMHR3, 4KITMHR4"		0								
D990236	B	"backplate_offset, plate beam dump"		0								
D990240	B	"backplate, plate beam dump"		0								
D990252	B	"Beam Dump Housing Tube ITMAR1,2KRMHR3"		2								
D990253	A	Extension Tube	004, 005	2			1		1(004)			1(005)
D990335	A	"Beam Dump Flex Hinge H_tube, 2KITMXAR4 "		0								
D990336	A	"Beam Dump Flex Hinge H_tube, 2KITMYAR4"		0								
WFV-10		#10 X 0.31 THK FLAT VENTED WASHER		32								40
93615A355		#10-24 X 0.75 LOW HD SCS		24	24							
92196A245		#10-24 X 0.75 SHCS		8	8							
WFV-06		#6 X 0.016 THK FLAT VENTED WASHER		8								40
92196A144		#6-32 X .25 SHCS		8	8							
WFV-08		#8 FLAT VENTED WASHER		68	48							20
92185A194		#8-32 X .50 SHCS		68	68							
91500A194		#8-32 X .500 FHPS		36	36							
91944A450		0.406ID X 0.88OD X 0.25 THK SPHER WASH		16	16							
92141A029		1/4 FLAT WASHER		32	32							
N-2520-A		1/4-20 HEX NUT		16	16							
93615A410		1/4-20 X .500 LOW HEAD SOCKET SCREW		16	16							
92196A540		1/4-20 X 0.75 SHCS		48	48							
92196A542		1/4-20 X 1.00 SHCS		32	32							
C-2016-NA		"1/4-20 X 1.00 SHCS, AG/SS"		40	20							20
92196A544		1/4-20 X 1.25 SHCS		16	16							
C-2820-NA		"1/4-28 X 1.25 SHCS, AG/SS"		24	24							
91950A031		3/8 X 0.063 FLAT WASHER		6	6							
WFV-38		3/8 X 0.032 THK FLAT VENTED WASHER		42	42							
94804A320		3/8-16 HEX NUT		8	8							

# LIGO PROCESS TRAVELER

DCC Number: **E990279-01-X**  
 Date Prepared: **7/8/99**

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO Load 40	VBO Load 41	VBO Load 43	VBO Load 46	VBO Load 48	VBO Load 50	VBO Load 52
N-3816-A		"3/8-16 HEX NUT, AG/SS"		4	4						
TOP-1616-NA		3/8-16 X 1.00 SOCKT SET SCRW-OVL PT AG/SS		8	8						
90585A626		3/8-16 X 1.25 FLT HD CAP SCREW		8	8						
92186A626		3/8-16 X 1.25 HEX HD SCREW		16	16						
C-1620-NA		"3/8-16 X 1.25 SHCS, AG/SS"		8	8						
92186A630		3/8-16 X 1.75 HEX HD SCREW		4	4						
92196A630		3/8-16 X 1.75 SHCS		12	12						
92186A999		3/8-16 X 7.00 HEX HD SCREW		16	16						
099-966-12-20x		BERYLLIUM-CU GND STRP		8	8						
6032-400		Flex Pivot		8							4

Used In (next higher assembly): **D990230, BSC Beam dump Installation, top assembly**

**Data Package, Receiving/Inspection Remarks:**

Inspection Required Y/N	Visual Damage Y/N	Comments	Name/Initials	Date Comp.
y		Inspect for breakage during shipment		

**Process Flow:**

#	Operation	Start Date	Work Area	Instructions	Name/Initials	Date Comp.
1	Control Point	NA	NA		NA	NA
2	Clean	6/18	LHO	per LIGO-E960022, as applicable	B. Weaver	
3	Vacuum Bake	SEE NEXT PAGE	LHO	per LIGO-E960022	K. Ryan	SEE NEXT PAGE
4	Wrap and Bag		LHO	per LIGO-E960022	B. Weaver	

*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*

# LIGO PROCESS TRAVELER

DCC Number: E990279-01-X

Date Prepared: 7/8/99

#	Operation	Start Date	Work Area	Instructions	Name/ Initials	Date Comp.									
5	Control Point	6-24-99 6-28-99 07-06-99 07-20-99	LHO	Review/approve RGA: VBO Load# <u>40</u> scan # <u>0602899C.RCA</u> VBO Load# <u>41</u> scan # <u>070299C.RCA</u> VBO Load# <u>43</u> scan # <u>REJECTED</u> VBO Load# <u>46</u> scan # <u>072699C.RCA</u> VBO Load# <u>48</u> scan # <u>080399C.RCA</u> VBO Load# <u>50</u> scan # <u>081599C.RCA</u> VBO Load# <u>52</u> scan # <u>082699C.RCA</u> Note: attach RGA scan(s) to this traveler. VBO LOAD # 54	K. Ryan	7/28/99 8/10/99 8/10/99 9/14/99									
	Box for shipment to LHO			Ship in LIGO-provided containers <table border="1" data-bbox="879 630 1598 852"> <thead> <tr> <th>No.</th> <th>Qty per package</th> <th>Part</th> </tr> </thead> <tbody> <tr> <td>ALL</td> <td></td> <td>BEAM DUMP PARTS</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>(see also qty. for each shipping destination below)</p>	No.	Qty per package	Part	ALL		BEAM DUMP PARTS				<p>3010010053 scan # 081499C.RCA                      VBO LOAD # 61 scan # 101599C.RCA                      D Coyne 10/18/99</p>	
No.	Qty per package	Part													
ALL		BEAM DUMP PARTS													
7	Ship														

**NOTE:** A copy of this traveler must be submitted to the DCC each time the original is shipped with the LIGO Livingston Observatory (LeO) as been completed.



**Special Instructions (Handling/Packaging Constraints, Remarks, etc.) or Notes:**

Attention: Betsy Weaver, Jonathan Kern, hold cleaned and baked parts for COS assembly

# LIGO PROCESS TRAVELER

DCC Number: **E990279-01-X**  
Date Prepared: **7/8/99**

## ACTION ITEMS:

Table 1:

DATE	NAME	DESCRIPTION
7/20	B. Weaver	S/N 012-013 of parts D980087, D980088, D980296, and D980297 were sent back to Spacecraft Spec. for rework, as we found that they had not been manufactured completely.
7/15	B. Weaver	V60load #43 - Rejected due to bad scan. Dennis Coyne sent all parts from this load (plus some) to be electropolished or etched for better cleaning.
7/23	B. Weaver	Parts received back from polishing/etching companies. - Recleaned as per Dennis C.'s email (attached).
8/5/99	B. Weaver	Clavis D990029 s/n-019 was sent out for modification as per DCN#: E990273-B / D990029-B. Rec. back - 8/4.
9/10/99	B. Weaver	D980348 s/n 027 & 028 Sent to Brookman Mfg. for rework - holes made into slots to compensate for low clearance.
10/11/99	B. Weaver	Giving D980348 s/n 027 & 028 to B. Rivera for vacuum rebake.

**N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.**

**Table 1:**

<b>DATE</b>	<b>NAME</b>	<b>DESCRIPTION</b>

Dennis Coyne, 12:12 PM 7/22/99 -0700, Re: cleaning

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X-POP3-Rcpt: bweaver@apex  
Date: Thu, 22 Jul 1999 12:12:31 -0700  
From: Dennis Coyne <coyne@ligo.caltech.edu>  
Organization: Caltech/LIGO  
X-Mailer: Mozilla 3.01Gold (Win95; I)  
To: Betsy Weaver <weaver\_b@ligo.caltech.edu>  
CC: Stan Whitcomb <stan@acrux.ligo.caltech.edu>, Mike Smith <smith@acrux.ligo.caltech.edu>, Bartie Rivera <rivera\_b@ligo-wa.caltech.edu>  
Subject: Re: cleaning

VBO LOAD 48

Betsy,

You should clean as follows (E960022-05 except since the parts are too large to ultrasonically clean, I've tailored the cleaning):

- 1) clean with Liquinox first (solution per E960022-05) and using a rubbing/scrubbing action (i.e. not just rinsing the liquinox over the surfaces). All holes must be cleaned with a brush (stainless steel, phosphor-bronze preferred, but nylon is acceptable). It is ESSENTIAL that the liquinox NOT dry before being rinsed with DI water.
- 2) Thoroughly rinse with DI water. All surfaces and holes must be rinsed THOROUGHLY.
- 3) Rinse & rub (with gloved hand only) all surfaces with either methanol or isopropal alcohol. Squirt the solvent into all holes.
- 4) Blow dry with clean, filtered air or N2, or allow to dry on a clean bench. Do not leave exposed for longer than about 15 minutes, before covering with UHV foil.

With regard to cleaning the lens, please see Stan for a confirmation, but I believe the rule that we operate under is that if all surfaces are polished, then an optics cleaning and wetting test is adequate and no baking is required. However, if the sides of the optic are not polished (as I suspect is the case for the ETM optics), then it should be cleaned and baked and re-cleaned. However, please confirm this with Stan and he may grant a waiver if he examines the surface condition of the optics.

Dennis

Betsy Weaver wrote:

- >
- > Hi Dennis-
- >
- > Two cleaning questions for you:
- >
- > 1. We just received the aluminum load (COS) from the etching company.
- > How should we clean them here, before baking them? (They are

Dennis Coyne, 12:12 PM 7/22/99 -0700, Re: cleaning

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- > obviously too large to put in the ultrasonic cleaner...)
- >
- > 2. Mike has one large and two small lenses that are going to be
- > used in the ETM Telescope Assembly. If they wet well during cleaning,
- > do they really need to be baked? A while ago, Stan told me that the
- > small steering mirrors for IO and COS did not need to be baked, as the oven
- > would just make them dirtier, because they wetted so well during cleaning.
- > Is this the same for the lenses? If they do need to be baked, can I put
- > them in
- > the next load with the one Large Optic?
- >
- > Thanks-
- > Betsy

-  
Dennis Coyne (Detector Installation Manager)  
LIGO Laboratory, Caltech, Physics Department  
626.395.2034 @CIT / 225.686.3168 @Livingston / 509.372.8166 @Hanford  
cell 626.695.8350



# LIGO PROCESS TRAVELER

DCC Number: E990279-01-X

Date Prepared: 7/8/99

Originator		Cognizant Engineer			Ext./Phone#		Project		Account Number			
Michael Smith		Michael Smith			2062		COS		5F515			
Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO Load 40	VBO Load 41	VBO Load 43	VBO Load 46	VBO Load 48	VBO Load 50	VBO Load 52	VBO Load 54
<b>Beam Dump Assemblies, WBSC2</b>												
D980087	A	"glass retaining bracket, top left, cavity BD"	012-013	2			2				2	
D980088	A	"glass retaining bracket, top right, cavity BD"	012-013	2			2				2	
D980092	A	"glass plate 1, cavity BD"		2								
D980093	A	"glass plate 2, cavity BD"		2								
D980289	B	"glass mounting plate1, cavity BD"	012-013	2		2						
D980292	B	"glass mounting plate2, cavity BD"	010-011	2		2	2					
D980296	A	"glass retaining bracket, bottom left, cavity BD"	012-013	2			2				2	
D980297	A	"glass retaining bracket, bottom right cavity BD"	012-013	2			2				2	
D980348	B	"side plate, cavity BD"	025-028	4		4						
D980378	B	"Stiffener Block, cavity BD"	013-014	2		2						
D980685	A	"clamp, plate beam dump"		8								
D990028	A	Beam Dump Flex Hinge Tongue	011-014	4				4				
D990029	B	Beam Dump Flex Hinge Clevis	015-017, 019	4				4		1 (019)		
D990030	A	Beam Dump Flex Hinge Tee	013-016	4			3	4				
D990031	A	Beam Dump Flex Hinge Saddle	013-015, 010	4			4	3	1			
D990032	A	Beam Dump Flex Hinge Attach	014-017	4			4	4				
D990033	A	Beam Dump Flex Hinge Adapter	018, 015, 011	4		3						
D990140	D	Beam Dump Housing Plate	009, 010	2		2						
D990149	C	"Cavity Beam Dump, Mounting Bracket Angle "	010, 012, 014, 015	4			4	4				

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# LIGO PROCESS TRAVELER

DCC Number: E990279-01-X

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO Load 40	VBO Load 41	VBO Load 43	VBO Load 46	VBO Load 48	VBO Load 50	VBO Load 52	VBO Load 54
D990150	B	"Cavity Beam Dump, Mounting Bracket Gusset "	013, 014, 016, 017	4			4		4			
D990151	B	"Cavity Beam Dump, Mounting Bracket Backplate 1"	009, 015, 019 016	4			4		4			
D990152	C	"Cavity Beam Dump, Mounting Bracket Backplate 2"	016, 017 010, 012	4			4		4			
D990198	B	Beam Dump Flex Hinge H_tube	008, 011, 006	4								3
D990199	A	Beam Dump Flex Hinge Low Strap	012, 014, 016, 017	4				4				
D990200	A	Beam Dump Flex Hinge Backup	007, 030 008, 038 025, 018 027, 028 035, 036 019, 032	8			8		8			
D990201	A	Beam Dump Flex Hinge Cap	030, 032, 038, 035, 018, 028, 031, 037	8			8	8				
D990202	B	Beam Dump Flex Hinge Top Strap	011-014	4			4	4				
D990207	B	"rail, plate beam dump"	015-018	4			3		4			
D990218	B	"glass, plate beam dump"		2								
D990222	A	Beam Dump Housing Tube 2KBSAR3		0								
D990223	C	Beam Dump Housing Tube 2KFM		0								



# LIGO PROCESS TRAVELER

DCC Number: **E990279-01-X**

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO Load 40	VBO Load 41	VBO Load 43	VBO Load 46	VBO Load 48	VBO Load 50	VBO Load 52	VBO Load 54
D990225	D	"Beam Dump Housing Tube 4KITMHR3, 4KITMHR4"		0								
D990236	B	"backplate_offset, plate beam dump"		0								
D990240	B	"backplate, plate beam dump"		0								
D990252	B	"Beam Dump Housing Tube ITMARI,2KRMHR3"		2								
D990253	A	Extension Tube	004, 005	2			1		1(004)			1(005)
D990335	A	"Beam Dump Flex Hinge H_tube, 2KITMXAR4 "		0								
D990336	A	"Beam Dump Flex Hinge H_tube, 2KITMYAR4"		0								
WFV-10		#10 X 0.31 THK FLAT VENTED WASHER		32								40
93615A355		#10-24 X 0.75 LOW HD SCS		24	24							
92196A245		#10-24 X 0.75 SHCS		8	8							
WFV-06		#6 X 0.016 THK FLAT VENTED WASHER		8								40
92196A144		#6-32 X .25 SHCS		8	8							
WFV-08		#8 FLAT VENTED WASHER		68	48							20
92185A194		#8-32 X .50 SHCS		68	68							
91500A194		#8-32 X .500 FHPS		36	36							
91944A450		0.406ID X 0.88OD X 0.25 THK SPHER WASH		16	16							
92141A029		1/4 FLAT WASHER		32	32							
N-2520-A		1/4-20 HEX NUT		16	16							
93615A410		1/4-20 X .500 LOW HEAD SOCKET SCREW		16	16							
92196A540		1/4-20 X 0.75 SHCS		48	48							
92196A542		1/4-20 X 1.00 SHCS		32	32							
C-2016-NA		"1/4-20 X 1.00 SHCS, AG/SS"		40	20							20
92196A544		1/4-20 X 1.25 SHCS		16	16							
C-2820-NA		"1/4-28 X 1.25 SHCS, AG/SS"		24	24							
91950A031		3/8 X 0.063 FLAT WASHER		6	6							
WFV-38		3/8 X 0.032 THK FLAT VENTED WASHER		42	42							
94804A320		3/8-16 HEX NUT		8	8							

# LIGO PROCESS TRAVELER

DCC Number: **E990279-01-X**

Date Prepared: **7/8/99**

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO Load 40	VBO Load 41	VBO Load 43	VBO Load 46	VBO Load 48	VBO Load 50	VBO Load 52
N-3816-A		"3/8-16 HEX NUT, AG/SS"		4	4						
TOP-1616-NA		3/8-16 X 1.00 SOCKT SET SCRW-OVL PT AG/SS		8	8						
90585A626		3/8-16 X 1.25 FLT HD CAP SCREW		8	8						
92186A626		3/8-16 X 1.25 HEX HD SCREW		16	16						
C-1620-NA		"3/8-16 X 1.25 SHCS, AG/SS"		8	8						
92186A630		3/8-16 X 1.75 HEX HD SCREW		4	4						
92196A630		3/8-16 X 1.75 SHCS		12	12						
92186A999		3/8-16 X 7.00 HEX HD SCREW		16	16						
099-966-12-20x		BERYLLIUM-CU GND STRP		8	8						
6032-400		Flex Pivot		8							4

Used In (next higher assembly): **D990230, BSC Beam dump Installation, top assembly**

**Data Package, Receiving/Inspection Remarks:**

Inspection Required Y/N	Visual Damage Y/N	Comments	Name/Initials	Date Comp.
y		Inspect for breakage during shipment		

**Process Flow:**

#	Operation	Start Date	Work Area	Instructions	Name/Initials	Date Comp.
1	Control Point	NA	NA		NA	NA
2	Clean	6/18	LHO	per LIGO-E960022, as applicable	B. Weaver	
3	Vacuum Bake	SEE NEXT PAGE	LHO	per LIGO-E960022	K. Ryan	SEE NEXT PAGE
4	Wrap and Bag		LHO	per LIGO-E960022	B. Weaver	

*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*



**Special Instructions (Handling/Packaging Constraints, Remarks, etc.) or Notes:**

Attention: Betsy Weaver, Jonathan Kern, hold cleaned and baked parts for COS assembly

# LIGO PROCESS TRAVELER

DCC Number: **E990279-01-X**  
 Date Prepared: **7/8/99**

## ACTION ITEMS:

Table 1:

DATE	NAME	DESCRIPTION
7/20	B. Weaver	S/N 012-013 of parts D980087, D980088, D980296, and D980297 were sent back to Spacecraft Spec. for rework, as we found that they had not been manufactured completely.
7/15	B. Weaver	VBOLoad#43 - Rejected due to bad scan. Dennis Coyne sent all parts from this load (plus some) to be electropolished or etched for better cleaning.
7/23	B. Weaver	Parts received back from polishing/etching companies. - Recleaned as per Dennis C.'s email (attached).
8/5/99	B. Weaver	Clavis D990029 s/n-019 was sent out for modification as per DCN#: E990273-B / D990029-B. Rec. back-8/4.
9/10/99	B. Weaver	D980348 s/n 027 & 028 Sent to Brookman Mfg. for rework - holes made into slots to compensate for low clearance.
10/11/99	B. Weaver	Giving D980348 s/n 027 & 028 to B. Rivera for vacuum rebake.

**N.B.:** A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.

**Table 1:**

<b>DATE</b>	<b>NAME</b>	<b>DESCRIPTION</b>

Dennis Coyne, 12:12 PM 7/22/99 -0700, Re: cleaning

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X-POP3-Rcpt: bweaver@apex  
Date: Thu, 22 Jul 1999 12:12:31 -0700  
From: Dennis Coyne <coyne@ligo.caltech.edu>  
Organization: Caltech/LIGO  
X-Mailer: Mozilla 3.01Gold (Win95; I)  
To: Betsy Weaver <weaver\_b@ligo.caltech.edu>  
CC: Stan Whitcomb <stan@acrux.ligo.caltech.edu>, Mike Smith <smith@acrux.ligo.caltech.edu>, Bartie Rivera <rivera\_b@ligo-wa.caltech.edu>  
Subject: Re: cleaning

VBO LOAD 48

Betsy,

You should clean as follows (E960022-05 except since the parts are too large to ultrasonically clean, I've tailored the cleaning):

- 1) clean with Liquinox first (solution per E960022-05) and using a rubbing/scrubbing action (i.e. not just rinsing the liquinox over the surfaces). All holes must be cleaned with a brush (stainless steel, phosphor-bronze preferred, but nylon is acceptable). It is ESSENTIAL that the liquinox NOT dry before being rinsed with DI water.
- 2) Thoroughly rinse with DI water. All surfaces and holes must be rinsed THOROUGHLY.
- 3) Rinse & rub (with gloved hand only) all surfaces with either methanol or isopropal alcohol. Squirt the solvent into all holes.
- 4) Blow dry with clean, filtered air or N2, or allow to dry on a clean bench. Do not leave exposed for longer than about 15 minutes, before covering with UHV foil.

With regard to cleaning the lens, please see Stan for a confirmation, but I believe the rule that we operate under is that if all surfaces are polished, then an optics cleaning and wetting test is adequate and no baking is required. However, if the sides of the optic are not polished (as I suspect is the case for the ETM optics), then it should be cleaned and baked and re-cleaned. However, please confirm this with Stan and he may grant a waiver if he examines the surface condition of the optics.

Dennis

Betsy Weaver wrote:

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- > Hi Dennis-
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- > Two cleaning questions for you:
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- > 1. We just received the aluminum load (COS) from the etching company.
- > How should we clean them here, before baking them? (They are

Dennis Coyne, 12:12 PM 7/22/99 -0700, Re: cleaning

---

> obviously too large to put in the ultrasonic cleaner...)

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> 2. Mike has one large and two small lenses that are going to be

> used in the ETM Telescope Assembly. If they wet well during cleaning,

> do they really need to be baked? A while ago, Stan told me that the

> small steering mirrors for IO and COS did not need to be baked, as the oven

> would just make them dirtier, because they wetted so well during cleaning.

> Is this the same for the lenses? If they do need to be baked, can I put

> them in

> the next load with the one Large Optic?

>

> Thanks-

> Betsy

-

Dennis Coyne (Detector Installation Manager)

LIGO Laboratory, Caltech, Physics Department

626.395.2034 @CIT / 225.686.3168 @Livingston / 509.372.8166 @Hanford

cell 626.695.8350





# LIGO PROCESS TRAVELER

DCC Number: **E990275-02-X**

Date Prepared: **7/8/99**

<b>Originator</b>	<b>Cognizant Engineer</b>	<b>Ext./Phone#</b>	<b>Project</b>	<b>Account Number</b>
Michael Smith	Michael Smith	2062	COS	5F515

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO load 40	VBO load 41	VBO load 43	VBO load 46	VBO load 48	VBO load 52
<b>Beam Dump Assemblies, BSC7</b>										
D980087	A	"glass retaining bracket, top left, cavity BD"	009-011	3			3			3
D980088	A	"glass retaining bracket, top right, cavity BD"	009-011	3			3			3
D980092	A	"glass plate 1, cavity BD"		3						
D980093	A	"glass plate 2, cavity BD"		3						
D980289	B	"glass mounting plate1, cavity BD"	009-011	3		3				
D980292	B	"glass mounting plate2, cavity BD"	007, 009, 013	3	1	2				
D980296	A	"glass retaining bracket, bottom left, cavity BD"	009-011	3			3			3
D980297	A	"glass retaining bracket, bottom right cavity BD"	009-011	3			3			3
D980348	B	"side plate, cavity BD"	018-023	6	3	3				
D980378	B	"Stiffener Block, cavity BD"	010-012	3		3				
D980685	A	"clamp, plate beam dump"		4						
D990028	A	Beam Dump Flex Hinge Tongue	008, 009	2			2	2		
D990029	B	Beam Dump Flex Hinge Clevis	013, 014	2				2		
D990030	A	Beam Dump Flex Hinge Tee	011, 012	2				2		
D990031	A	Beam Dump Flex Hinge Saddle	011, 012	2				2		
D990032	A	Beam Dump Flex Hinge Attach	012, 013	2				2		
D990033	A	Beam Dump Flex Hinge Adapter	016, 017	2				2		
D990140	D	Beam Dump Housing Plate	005-007	3		3				
D990149	C	"Cavity Beam Dump, Mounting Bracket Angle "	016-018	3			3	3		
D990150	B	"Cavity Beam Dump, Mounting Bracket Gusset "	009, 011, 012	3			3		3	
D990151	B	"Cavity Beam Dump, Mounting Bracket Backplate 1"	014, 017, 018	3		3				
D990152	C	"Cavity Beam Dump, Mounting Bracket Backplate 2"	011, 014, 013	3		2			1	
D990198	B	Beam Dump Flex Hinge H_tube	009, 015	2						2

*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*

# LIGO PROCESS TRAVELER

DCC Number: **E990275-02-X**

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO load 40	VBO load 41	VBO load 43	VBO load 46	VBO load 48
D990199	A	Beam Dump Flex Hinge Low Strap	013, 015	2		2			
D990200	A	Beam Dump Flex Hinge Backup	026, 028-030	4		4			
D990201	A	Beam Dump Flex Hinge Cap	020, 026, 027, 029	4		4			
D990202	B	Beam Dump Flex Hinge Top Strap	015, 016	2				2	
D990207	B	"rail, plate beam dump"	010, 012	2		2			
D990218	B	"glass, plate beam dump"		1				1	
D990222	A	Beam Dump Housing Tube 2KBSAR3		0					
D990223	C	Beam Dump Housing Tube 2KFM	003, 004	2			2		2
D990225	D	"Beam Dump Housing Tube 4KITMHR3, 4KITMHR4"	002	1			1		1
D990236	B	"backplate_offset, plate beam dump"		1					
D990240	B	"backplate, plate beam dump"		0					
D990252	B	"Beam Dump Housing Tube ITMAR1,2KRMHR3"		0					
D990253	A	Extension Tube		0					
D990335	A	"Beam Dump Flex Hinge H_tube, 2KITMXAR4 "		0					
D990336	A	"Beam Dump Flex Hinge H_tube, 2KITMYAR4"		0					
WFV-10		#10 X 0.31 THK FLAT VENTED WASHER		22	22				
93615A355		#10-24 X 0.75 LOW HD SCS		18	18				
92196A245		#10-24 X 0.75 SHCS		4	4				
WFV-06		#6 X 0.016 THK FLAT VENTED WASHER		4	4				
92196A144		#6-32 X .25 SHCS		4	4				
WFV-08		#8 FLAT VENTED WASHER		102	102				
92185A194		#8-32 X .50 SHCS		102	102				
91500A194		#8-32 X .500 FHPS		54					
91944A450		0.406ID X 0.88OD X 0.25 THK SPHER WASH		8					
92141A029		1/4 FLAT WASHER		20					

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO load 40	VBO load 41	VBO load 43	VBO load 46	VBO load 48
N-2520-A		1/4-20 HEX NUT		8					
93615A410		1/4-20 X .500 LOW HEAD SOCKET SCREW		4	4				
92196A540		1/4-20 X 0.75 SHCS		16	16				
92196A542		1/4-20 X 1.00 SHCS		16	16				
C-2016-NA		"1/4-20 X 1.00 SHCS, AG/SS"		20	20				
92196A544		1/4-20 X 1.25 SHCS		8	8				
C-2820-NA		"1/4-28 X 1.25 SHCS, AG/SS"		12	12				
91950A031		3/8 X 0.063 FLAT WASHER		5	5				
WV-38		3/8 X 0.032 THK FLAT VENTED WASHER		33	33				
N-3816-A		3/8-16 HEX NUT, AG/SS		2	2				
94804A320		3/8-16 HEX NUT		6	6				
TOP-1616-NA		3/8-16 X 1.00 SOCKT SET SCRW-OVL PT AG/SS		4	4				
90585A626		3/8-16 X 1.25 FLT HD CAP SCREW		6	6				
92186A626		3/8-16 X 1.25 HEX HD SCREW		12	12				
C-1620-NA		"3/8-16 X 1.25 SHCS, AG/SS"		4	4				
92186A630		3/8-16 X 1.75 HEX HD SCREW		6	6				
92196A630		3/8-16 X 1.75 SHCS		6	6				
92186A999		3/8-16 X 7.00 HEX HD SCREW		12	12				
099-966-12-20x		BERYLLIUM-CU GND STRP		12	12				
6032-400		Flex Pivot		4	4				

**Used In (next higher assembly):** D990230, BSC Beam dump Installation, top assembly

# LIGO PROCESS TRAVELER

DCC Number: **E990275-02-X**  
 Date Prepared: **7/8/99**

**Data Package, Receiving/Inspection Remarks:**

Inspection Required Y/N	Visual Damage Y/N	Comments	Name/Initials	Date Comp.
y		Inspect for breakage during shipment		

**Process Flow:**

#	Operation	Start Date	Work Area	Instructions	Name/Initials	Date Comp.
1	Control Point	NA	NA		NA	NA
2	Clean	6/18	LHO	per LIGO-E960022, as applicable	B. Weaver	
3	wrap and bag		LHO	per LIGO-E960022	B. Weaver	
4	Vacuum Bake	↓	LHO	per LIGO-E960022	K. Ryan	←
5	Control Point	06.24.99 06.28.99 07.06.99 07.20.99	LHO	Review/approve RGA:s VBO Load# <u>40</u> scan # <u>062899C.RGA</u> VBO Load# <u>41</u> scan # <u>070599C.RGA</u> VBO Load# <u>43</u> scan # <u>REJECTED</u> VBO Load# <u>46</u> scan # <u>072699C.RGA</u> VBO Load# <u>48</u> scan # <u>080399C.RGA</u> VBO Load# <u>52</u> scan # <u>082099C.RGA</u> VBO Load# _____ scan # _____ Note: attach RGA scan(s) to this traveler.	K. Ryan  SEW SEW SEW	7/28/99 8/10/99 9/14/99

*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*

# LIGO PROCESS TRAVELER

DCC Number: **E990275-02-X**

Date Prepared: **7/8/99**

#	Operation	Start Date	Work Area	Instructions	Name/ Initials	Date Comp.																	
	Box for shipment to LHO			Ship in LIGO-provided container  <table border="1"> <thead> <tr> <th>No.</th> <th>Qty per package</th> <th>Part</th> </tr> </thead> <tbody> <tr> <td>ALL</td> <td></td> <td>BSC7 BEAM DUMP PARTS</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table> (see also qty. for each shipping destination below)	No.	Qty per package	Part	ALL		BSC7 BEAM DUMP PARTS													
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END: Go to Traveler associated with next higher assembly processing																							

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# LIGO PROCESS TRAVELER

DCC Number: **E990275-02-X**  
 Date Prepared: **7/8/99**

## ACTION ITEMS:

Table 1:

DATE	NAME	DESCRIPTION
7/20	B. Weaver	S/N 009-011 of parts D980087, D980088, D980296, and D980297 were sent back to Spacecraft Spec. for rework, as we noticed that these parts had not been manufactured completely.
7/15	B. Weaver	V60 Load 43 was Rejected due to bad scan - as a result of not clean enough parts. Dennis Coyne sent all parts from this load (plus some) to be electropolished or etched. <sup>(S.S)</sup> <sup>(A1)</sup>
7/23	B. Weaver	Parts received back from etching & polishing companies. Re-cleaned large parts as per attached email.

**N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.**

**Table 1:**




Dennis Coyne, 12:12 PM 7/22/99 -0700, Re: cleaning

---

X-POP3-Rcpt: bweaver@apex  
Date: Thu, 22 Jul 1999 12:12:31 -0700  
From: Dennis Coyne <coyne@ligo.caltech.edu>  
Organization: Caltech/LIGO  
X-Mailer: Mozilla 3.01Gold (Win95; I)  
To: Betsy Weaver <weaver\_b@ligo.caltech.edu>  
CC: Stan Whitcomb <stan@acrux.ligo.caltech.edu>, Mike Smith <smith@acrux.ligo.caltech.edu>, Bartie Rivera <rivera\_b@ligo-wa.caltech.edu>  
Subject: Re: cleaning

VBO LOAD 48

Betsy,

You should clean as follows (E960022-05 except since the parts are too large to ultrasonically clean, I've tailored the cleaning):

- 1) clean with Liquinox first (solution per E960022-05) and using a rubbing/scrubbing action (i.e. not just rinsing the liquinox over the surfaces). All holes must be cleaned with a brush (stainless steel, phosphor-bronze preferred, but nylon is acceptable). It is ESSENTIAL that the liquinox NOT dry before being rinsed with DI water.
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**Dennis Coyne, 12:12 PM 7/22/99 -0700, Re: cleaning**

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- >
- > Thanks-
- > Betsy

-  
Dennis Coyne (Detector Installation Manager)  
LIGO Laboratory, Caltech, Physics Department  
626.395.2034 @CIT / 225.686.3168 @Livingston / 509.372.8166 @Hanford  
cell 626.695.8350



# LIGO PROCESS TRAVELER

DCC Number: E990251-00-X

Date Prepared: 6/15/99

Originator	Cognizant Engineer	Ext./Phone#	Project	Account Number
Michael Smith	Michael Smith	2062	COS	5F515

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	Rec 6/18	VBO load 38 6/21	VBO load 46 7/26	VBO load 46
<b>Beam Dump Assemblies - BSC 8</b>								
D980087	A	Glass Retaining Bracket, Top Left	002-005	4	4	2	2	
D980088	A	Glass Retaining Bracket, Top Right	003-006	4	4	2	2	
D980092	A	Glass Plate 1	NA	0				
D980093	A	Glass Plate 2	NA	0				
D980289	A	Glass Mounting Plate 1	001-004	4	4	2	2	
D980292	A	Glass Mounting Plate 2	002-004, 007	4	4	2	2	
D980296	A	Glass Retaining Bracket, Bottom Left	001-003, 006	4	4	2	2	
D980297	A	Glass Retaining Bracket, Bottom Right	002, 004-006	4	4	2	2	
D980348	A	Side Plate	003, 005-006, 007-011, 062	8	8	4	3	
D980378	A/B	Stiffener Block	001, 002, 004, 005	4	4	2	2	
D990140	D	Beam Dump Housing Plate	001-004	4	4	2	2	
D990028	A	Beam Dump Flex Hinge Tongue	001-003	3	3	2	1	
D990029	A	Beam Dump Flex Hinge Clevis	001-003	3	3	2	1	
D990030	A	Beam Dump Flex Hinge Tee	001-003	3	3	2	1	
D990031	A	Beam Dump Flex Hinge Saddle	001-003	3	3	2	1	
D990032	A	Beam Dump Flex Hinge Attach	001-003	3	3	2	1	
D990033	A	Beam Dump Flex Hinge Adapter	001-003	3	3	2	1	
D990198	B	Beam Dump Flex Hinge H_Tube	001-002	23	2	2		
D990199	A	Beam Dump Flex Hinge Low Strap	001-003	3	3	2		
D990200	A	Beam Dump Flex Hinge Backup	001-006	6	6	4		
D990201	A	Beam Dump Hinge Cap	001-006	6	6	4	2	
D990202	B	Beam Dump Flex Hinge Top Strap	002, 004,	3	3	2		
D990335	A	Beam Dump Flex Hinge H_Tube, 2KITMXAR4	NA	0				

*N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.*

# LIGO PROCESS TRAVELER

DCC Number: E990251-00-X

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	Rec 6/18	VBO load 38 6/21	VBO load 46 7/26	VBO load 48 7/26
D990336	A	Beam Dump Flex Hinge H_Tube, 2KITMYAR4	NA	0				
92196A542		1/4-20x1.00 SHCS		24	24	24		
C-2016		1/4-20x1.00 SHCS, AG/SS		30	143	143		
92196A544		1/4-20x1.25 SHCS		12	12	12		
C-2820-NA		1/4-28x1.25 SHCS, AG/SS	Shipped to LHO directly	18	120	120		
91950A031		3/8x0.063 FLAT WASHER		11	11			
WFV-38		3/8x0.032 THK FLAT VENTED WASHER		48	48			
N-3816-A		3/8-16 HEX NUT AG/SS		3	25	25		
94804A626		3/8-16 HEX NUT		8	8	8		
90585A626		3/8-16X1.25 FLAT HEAD CAP SCREW		8	8	8		
92186A626		3/8-16X1.25 HEX HD SCREW		16	16	16		
C-1620-NA		3/8-16X1.25 SHCS, AG/SSA		12	12	12		
92186A630		3/8-16X1.75 HEX HD SCREW		16	16	16		
92196A630		3/8-16X1.75 SHCS		9	9	9		
92186A999		3/8-16X7.00 HEX HD SCREW		16	30	30		
099-966-12-20X		BERYLLIUM-CU GND STRIP		6	30	30		
6032-400		FLEX PIVOT		6	6	6		
93615A355		#10-24X0.75 LOW HD SHCS		24	24	24		
D990149	C	MOUNTING BRACKET ANGLE	001-004	4	4	2	2	<del>2</del>
D990150	B	MOUNTING BRACKET GUSSET	001-004	4	4	2		2
D990151	A/B	MOUNTING BRACKET BACKPLATE 1	001-004	4	4	2		2
D990152	C	MOUNTING BRACKET BACKPLATE 2	001-004	4	4	2		2
D990222	A	BEAM DUMP HOUSING TUBE 2KBSAR3	001	1	1	1		
D990223	C	BEAM DUMP HOUSING TUBE 2KFM	001-002	2	2	1		
D990225	D	BEAM DUMP HOUSING TUBE 4KITMHR3, 4KITMHR4	001	1	1			
D990252	B	BEAM DUMP HOUSING TUBE ITMAR1, 2KITMHR3	NA	0				
D990253	A	EXTENSION TUBE	NA	0				

# LIGO PROCESS TRAVELER

DCC Number: D990251

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	Rec 6/18	VBO load 38 6/21	VBO load 46 7/26	VBO load 46 7/26	VBO load 46 7/26
D980685	A	CLAMP, PLATE BD		4	4	4			
D990207	B	RAIL, PLATE BD	001-002	2	2	2			
D990218	B	GLASS, PLATE BD		1	12	2	4		
D990236	B	BACKPLATE_OFFSET, PLATE BD	001	1	1	1			
D990240	B	BACKPLATE, PLATE BD	NA	0					
WFV-10		#10X0.31 THK FLAT VENTED WASHER		28	28	28			
92196A245		#10-24X0.75 SHCS		4	4	4			
93615A360		#10-24x1.00 LOW HD SCREW	OBSOLETE PART	24					
WFV-06		#6X0.016 THK FLAT VENTED WASHER		4	60	60			
92196A144		#6-32X0.25 SHCS		4	4	4			
WFV-08		#8 FLAT VENTED WASHER		30	30	30			
92185A194		#8-32X0.50 SHCS		30	30	30			
91500A194		#8-32X0.500 FHPS		72	72	72			
91944A450		0.4061DX0.88ODX0.25 THK SPHER. WASHER		12	12	12			
90945A761		1/4 FLAT WASHER		28	28	28			
N-2520-A		1/4-20 HEX NUT, AG/SS		12	12	12			
93615A410		1/4-20X0.50 LOW HD SCREW		4	4	4			
92196A540		1/4-20X0.75 SHCS		24	24	24			

Used In (next higher assembly):

Vendor Name	PO/Contract Number
	P

**Data Package, Receiving/Inspection Remarks:**

Inspection Required Y/N	Visual Damage Y/N	Comments	Name/ Initials	Date Comp.

# LIGO PROCESS TRAVELER

DCC Number: D990251

**Process Flow:**

#	Operation	Start Date	Work Area	Instructions	Name/Initials	Date Comp.
1	Clean & Vacuum Bake per LIGO Vacuum Prep. Form		LHO	per E960022-A	B. Rivera	
2	Control Point (38) (46) (40)	6-18-99 7-20-99 6-24-99	NA	Review/approve RGA VBO Load# 38 scan # 062299C.RGA VBO Load# 46 scan # 072699C.RGA VBO Load# 50 scan # 081099C.RGA VBO Load# 40 scan # 062899C.RGA VBO Load# 48 scan # 080399C.RGA VBO Load# 61 scan # 101899C.RGA	B. Rivera <i>[Signature]</i> <i>[Signature]</i> <i>[Signature]</i> <i>[Signature]</i> <i>[Signature]</i>	7/29/99 8/10/99 9/14/99 10/19/99
3	Wrap & Tag vacuum clean parts per E960022-A		LHO	_____ per package	B. Weaver <i>[Signature]</i>	
4			LHO	<b>Note: Copy this traveler and give to the DCC</b>		

END: Go to Traveler associated with next higher assembly processing

**Special Instructions (Handling/Packaging Constraints, Remarks, etc.) or Notes:**

DATE	NAME	DESCRIPTION
7/26	B. Weaver	Four 7' screws (92186A999) and one plate (D990152-003) were replaced due to in-situ galling.
6/21	B. Rivera	H-Tube s/n D990198-002 corner came into contact with the floor during unloading of VBO. Corner was thoroughly wiped with acetone.
8/5	B. Weaver	Clavis D990029 s/n 003 was sent out for modification as per DCN# E990273-B. Recheck 8/4.
8/19	B. Weaver	6 Flex Pivots baked in load 40 inventory. Part# 6032-400.

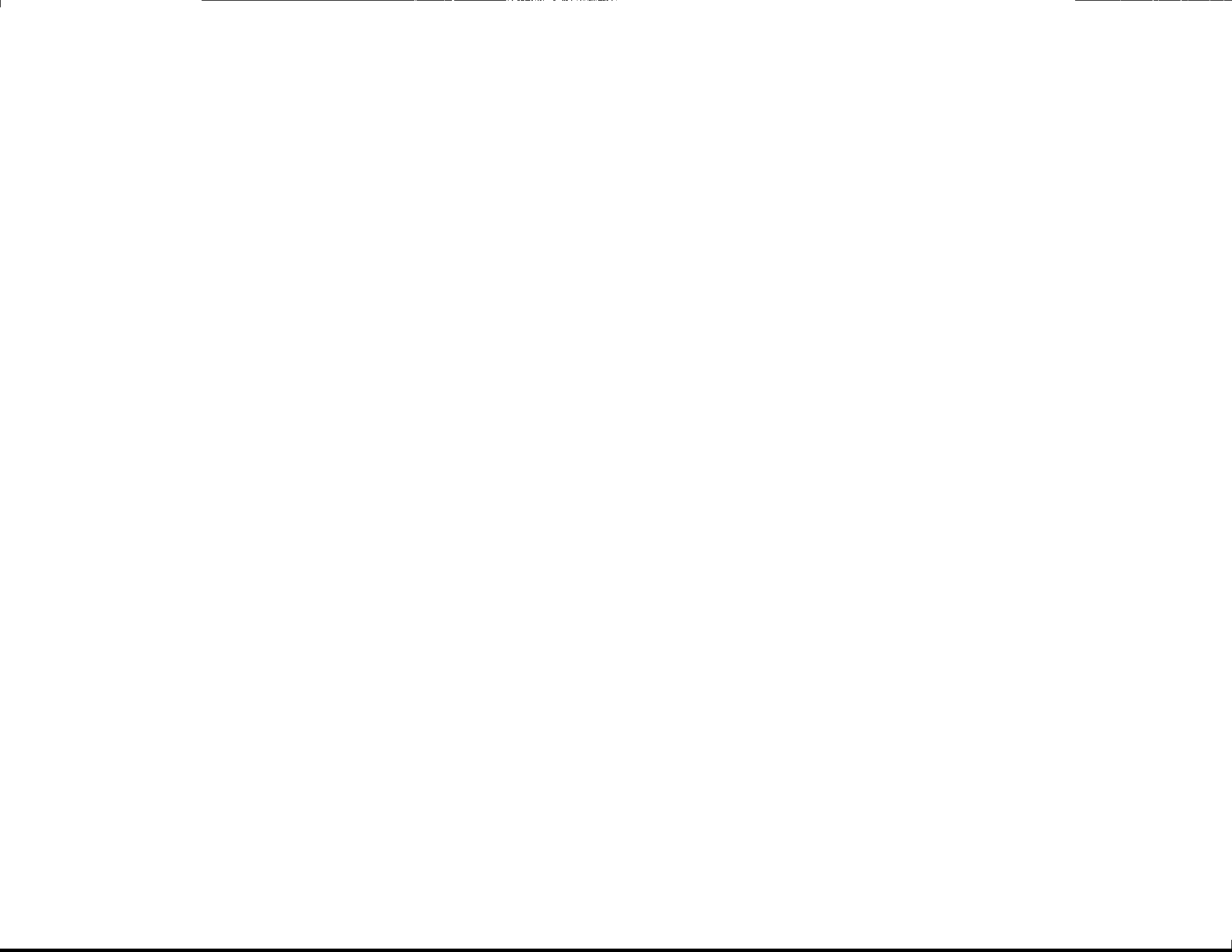
9/10/99	Bob Weaver	Side Plates D980348 s/n 002,003,005,006 were sent to Brookman Mfg. to have some holes turned into slots as the beam dumps could not be assembled with the low clearances.
10/11/99	Bob Weaver	The above pieces were given to B. Rivera for cleaning & vacuum baking.
12/1/99	B. Weaver	Part D990152-004 galled to 7" bolts during installation - Was replaced w/ another s/n part... <del>Part</del> Sending 004 out to be retapped.
12/14/99	B. Weaver	D990152-004 received back from reworking @ Brookman Mach. Giving to B. Rivera for recleaning & reVBoing.



**LIGO PROCESS TRAVELER**

DCC Number: 

D990251
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# LIGO PROCESS TRAVELER

COPY

DCC Number: E990274-00-X

Date Prepared: 7/8/99

Originator Michael Smith	Cognizant Engineer Michael Smith	Ext./Phone# 2062	Project COS	Account Number 5F515
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Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO Load 43	VBO Load 46	VBO Load 48
		<b>ETM Telescope Assembly</b>					
D980630	B	TUBE, ETM MOUNT (HOUSING)	001	1	1		1
D980631	B	PLATE, ETM INTERFACE	002	1			1
D980632	B	BRACKET, REAR LEFT, ETM RETAINING	001	1		1	
D980633	B	BRACKET, FRONT RIGHT, ETM RETAINING	001	1		1	
D980634	B	ANGLE, ETM ADJUSTING	001	1		1	
D980635	B	BLOCK, ETM ADJUSTING	001, 002	2		2	
D980636	B	TUBE, MAIN BODY (ROUND)		1		1	
D980637	B	CLAMP, UPPER	001, 002	2		2	
D980638	B	CLAMP, LOWER	001, 002	2		2	
D980639	B	END CAP REAR	001	1	1	1	
D980641	B	PLATE, MIRROR MOUNTING	001	1		1	
D980643	B	L1_LENS RING	001	1		1	
D980644	B	RING, RETAINING FOREWRD EYEPIECE LENS		1		1	
D980646	B	RETAINER, REAR EYEPIECE LENS		1		1	
D980647	B	SPACER REAR EYEPIECE LENS		1			
D980648	B	BRACKET, REAR RIGHT, ETM RETAINING	001	1		1	
D980649	B	BRACKET, FRONT LEFT, ETM RETAINING	001	1		1	
D980650	B	PLATE, BACKING	002, 001	1			2
D990124	B	SIDE MOUNT	001, 002	2		2	
D990125	B	SIDE MOUNT FOOT	001, 002	2		2	
D990126	B	LENS FOCUS, BARREL		1		1	
D990127	B	BLOCK, ETM NON_ADJUSTING	065	1			
D990128	B	PLATE, BACKING_NON_ADJUSTING	065	1			

N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.

# LIGO PROCESS TRAVELER

DCC Number: **E990274-00-X**

Dwg/Part Number	Rev	Part Description	Serial Number	Qty	VBO Load 43	VBO Load 46	VBO Load 48	VBO Load 47
		Insertion Tool, Lens Element 1, ETM Telescope		1		1		
		Insertion Tool, Lens Element 2, ETM Telescope		1		1		
		Insertion Tool, Lens Element 3A, ETM Telescope		1		1		
		Insertion Tool, Lens Element 3B, ETM Telescope		1		1		
E980328-1	A	Lens Element 1, ETM Telescope		1				
E980328-2	A	Lens Element 2, ETM Telescope		1				1
E980328-3	A	Lens Element 3, ETM Telescope		1				1
34665K29		1/8 Ball, Aluminum Rod		4		4		
92185Axxx		8-32 X 0.38 SHCS		2		2		
92196A112		4-40 X 0.63 SHCS		1		1		
92185Axxx		8-32 X 0.75 SHCS		4		4		
92196A542		1/4-20 X 1.00 SHCS		43		43		
92196A544		1/4-20 X 1.25 SHCS		1		1		
92141A029		1/4-20 flat washer		23		23		

Used In (next higher assembly): D990053, ETM Telescope

**Data Package, Receiving/Inspection Remarks:**

Inspection Required Y/N	Visual Damage Y/N	Comments	Name/Initials	Date Comp.
y		Inspect for breakage during shipment		

**Process Flow:**

#	Operation	Start Date	Work Area	Instructions	Name/Initials	Date Comp.
1	Control Point	NA	NA		NA	NA
2	Clean		LHO	per LIGO-E960022, as applicable	B. Weaver	
3	wrap and bag		LHO	per LIGO-E960022	B. Weaver	

# LIGO PROCESS TRAVELER

DCC Number: **E990274-00-X**

#	Operation	Start Date	Work Area	Instructions	Name/Initials	Date Comp.														
4	Vacuum Bake		LHO	per LIGO-E960022	K. Ryan	7-29-99														
5	Control Point (43) (46) (47)	7.6.99 7.20.99 7.20.99	LHO	Review/approve RGA:	K. Ryan	7/29/99 8/10/99														
				VBO Load# 43			scan # <u>REJECTED</u>													
				VBO Load# 46			scan # <u>072699C RGA</u>													
				VBO Load# <del>48</del>			scan # _____													
				VBO Load# 47			scan # <u>072999C RGA</u>													
VBO Load# 48	scan # <u>080599C RGA</u>																			
VBO Load# _____	scan # _____																			
				Note: attach RGA scan(s) to this traveler.																
6	Package		CIT	<table border="1"> <thead> <tr> <th>No.</th> <th>Qty per package</th> <th>Part</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>3</td> <td>ETM Telescope</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>		No.	Qty per package	Part	1	3	ETM Telescope				Mike Smith					
				No.	Qty per package	Part														
				1	3	ETM Telescope														
(see also qty. for each shipping destination below)																				
7	Ship		CIT	<table border="1"> <thead> <tr> <th rowspan="2">No.</th> <th colspan="3">Ship Qty.</th> <th rowspan="2">Part Description</th> </tr> <tr> <th>LHO</th> <th>LLO</th> <th>Other</th> </tr> </thead> <tbody> <tr> <td></td> <td>all</td> <td></td> <td></td> <td>ETM Telescope</td> </tr> </tbody> </table>		No.	Ship Qty.			Part Description	LHO	LLO	Other		all			ETM Telescope	Mike Smith	
				No.	Ship Qty.			Part Description												
LHO	LLO	Other																		
	all			ETM Telescope																

# LIGO PROCESS TRAVELER

DCC Number: E990274-00-X

Date Prepared: 7/8/99

## ACTION ITEMS:

Table 1:

DATE	NAME	DESCRIPTION
7/20	B. Weaver	VBO Load# 43 Rejected due to bad scan of dirty parts. Dennis Coyne sent the parts in this load (D980630 & D980639) to LNL Anodizing to be etched for better cleaning. When received back at LHO, they were recleaned as per Dennis' attached instructions.
8/25	B. Weaver	Spacer D980647 was lost in shipping or receiving. Brockman Machine fabricated a new one which was cleaned as per E960022 & airbaked for 48 hours at 120°C (see attached waiver).
10/28/99	B. Weaver	Installed ETMy telescope in BSC 6 w/ Ken. Mailand & Mike Smith.
11/30/99	B. Weaver	Completed Traveler — original being sent to DCC.

N.B.: A copy of this traveler must be submitted to the DCC each time the original is shipped with the associated part(s) and when the traveler has been completed.

X-POP3-Rcpt: bweaver@apex  
Date: Thu, 22 Jul 1999 12:12:31 -0700  
From: Dennis Coyne <coyne@ligo.caltech.edu>  
Organization: Caltech/LIGO  
X-Mailer: Mozilla 3.01Gold (Win95; I)  
To: Betsy Weaver <weaver\_b@ligo.caltech.edu>  
CC: Stan Whitcomb <stan@acrux.ligo.caltech.edu>,  
Mike Smith <smith@acrux.ligo.caltech.edu>,  
Bartie Rivera <rivera\_b@ligo-wa.caltech.edu>  
Subject: Re: cleaning

NB0 LOAD 48

Betsy,  
You should clean as follows (E960022-05 except since the parts are too large to ultrasonically clean, I've tailored the cleaning):

- 1) clean with Liquinox first (solution per E960022-05) and using a rubbing/scrubbing action (i.e. not just rinsing the liquinox over the surfaces). All holes must be cleaned with a brush (stainless steel, phosphor-bronze preferred, but nylon is acceptable). It is ESSENTIAL that the liquinox NOT dry before being rinsed with DI water.
- 2) Thoroughly rinse with DI water. All surfaces and holes must be rinsed THOROUGHLY.
- 3) Rinse & rub (with gloved hand only) all surfaces with either methanol or isopropal alcohol. Squirt the solvent into all holes.
- 4) Blow dry with clean, filtered air or N2, or allow to dry on a clean bench. Do not leave exposed for longer than about 15 minutes, before covering with UHV foil.

With regard to cleaning the lens, please see Stan for a confirmation, but I believe the rule that we operate under is that if all surfaces are polished, then an optics cleaning and wetting test is adequate and no baking is required. However, if the sides of the optic are not polished (as I suspect is the case for the ETM optics), then it should be cleaned and baked and re-cleaned. However, please confirm this with Stan and he may grant a waiver if he examines the surface condition of the optics.

Dennis

Betsy Weaver wrote:

- >
- > Hi Dennis-
- >
- > Two cleaning questions for you:
- >
- > 1. We just received the aluminum load (COS) from the etching company.
- > How should we clean them here, before baking them? (They are

Dennis Coyne, 12:12 PM 7/22/99 -0700, Re: cleaning

---

- > obviously too large to put in the ultrasonic cleaner...)
- >
- > 2. Mike has one large and two small lenses that are going to be
- > used in the ETM Telescope Assembly. If they wet well during cleaning,
- > do they really need to be baked? A while ago, Stan told me that the
- > small steering mirrors for IO and COS did not need to be baked, as the oven
- > would just make them dirtier, because they wetted so well during cleaning.
- > Is this the same for the lenses? If they do need to be baked, can I put
- > them in
- > the next load with the one Large Optic?
- >
- > Thanks-
- > Betsy

-  
Dennis Coyne (Detector Installation Manager)  
LIGO Laboratory, Caltech, Physics Department  
626.395.2034 @CIT / 225.686.3168 @Livingston / 509.372.8166 @Hanford  
cell 626.695.8350



Dennis Coyne, 09:28 PM 8/24/99 -0700, Re: waiver request

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X-POP3-Rcpt: bweaver@apex  
Date: Tue, 24 Aug 1999 21:28:58 -0700  
From: Dennis Coyne <coyne@ligo.caltech.edu>  
Organization: Caltech/LIGO  
X-Mailer: Mozilla 3.01Gold (Win95; I)  
To: Stan Whitcomb <stan@ligo.caltech.edu>  
CC: Betsy Weaver <weaver\_b@ligo.caltech.edu>  
Subject: Re: waiver request

RE: D980647

Betsy & Stan,  
I'm OK with an airbake for this single, simple and small part.  
Dennis

Stan Whitcomb wrote:

>  
> I am ok with an airbake for such a simple part if Dennis agrees. Can  
> you airbake it for 48 hours and still get the telescope aligned this week?  
>  
> stan  
>  
> At 05:45 PM 8/24/99 -0700, you wrote:  
>>  
>>Stan-  
>>As you heard in the morning telecom meeting, we (COS group)  
>>were still missing one small piece for the ETM Telescope. Doug  
>>was nice enough to have Brockman Machine fab a new one up for  
>>us and we were even able to pick it up at lunch today. I've cleaned  
>>it as per E960022 and have put it in the airbake oven. It is a small,  
>>Al ring ~1-1 1/2" in diameter, ~1/4" thick, with no threads or holes -  
>>very simple and plain... What should we do with it for processing?  
>>Can we have an airbaking waiver? Bartie looked in the bake oven and  
>>did not find the missing one, and I'm not sure we ever will.  
>>  
>>Thanks-  
>>Betsy  
>>  
>>

-  
Dennis Coyne (Detector Installation Manager)  
LIGO Laboratory, Caltech, Physics Department  
626.395.2034 @CIT / 225.686.3168 @Livingston / 509.372.8166 @Hanford  
cell 626.695.8350



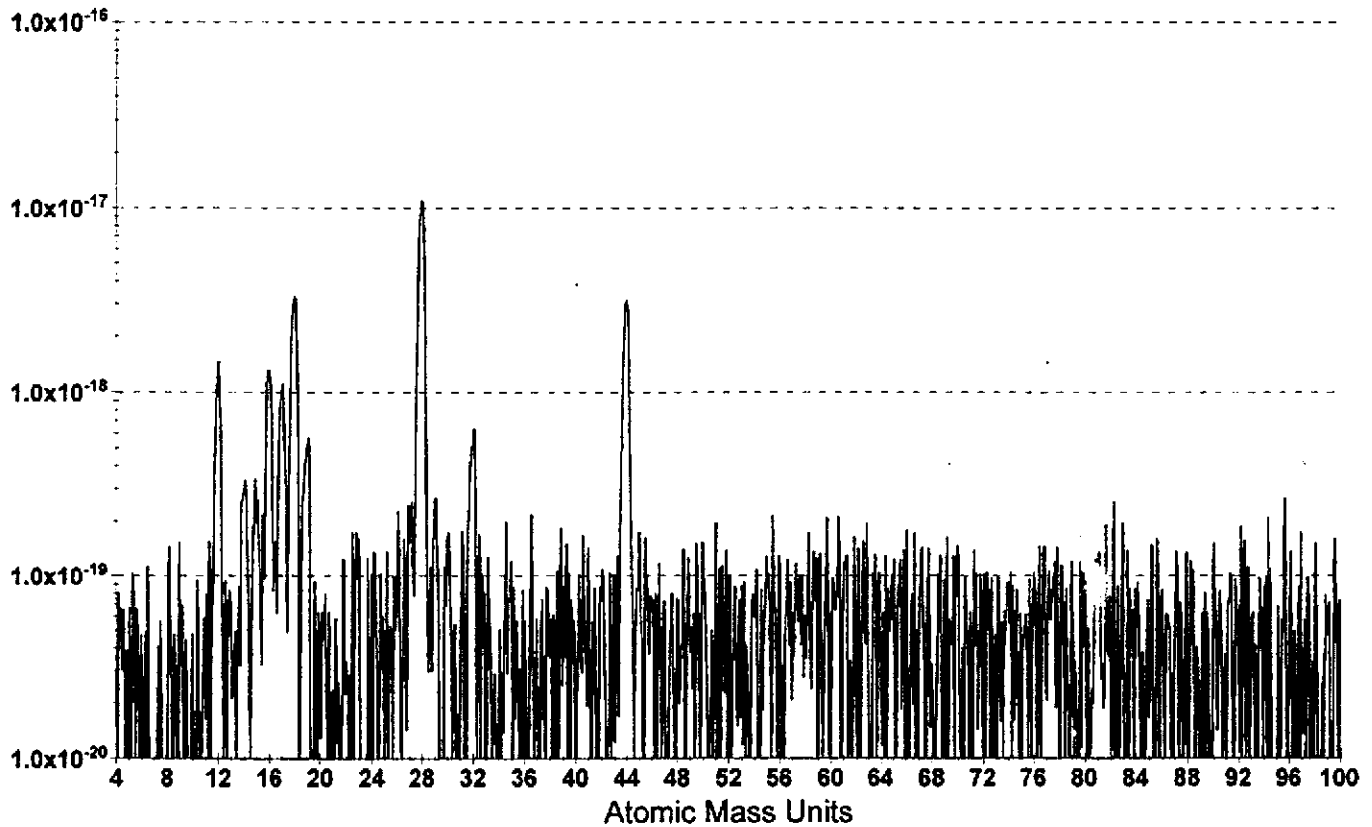
# LHO VACUUM BAKE OVEN A LOAD #48 BACKGROUND FOR ELEVATED TEMPERATURE SCAN

V-1 Closed

Amps

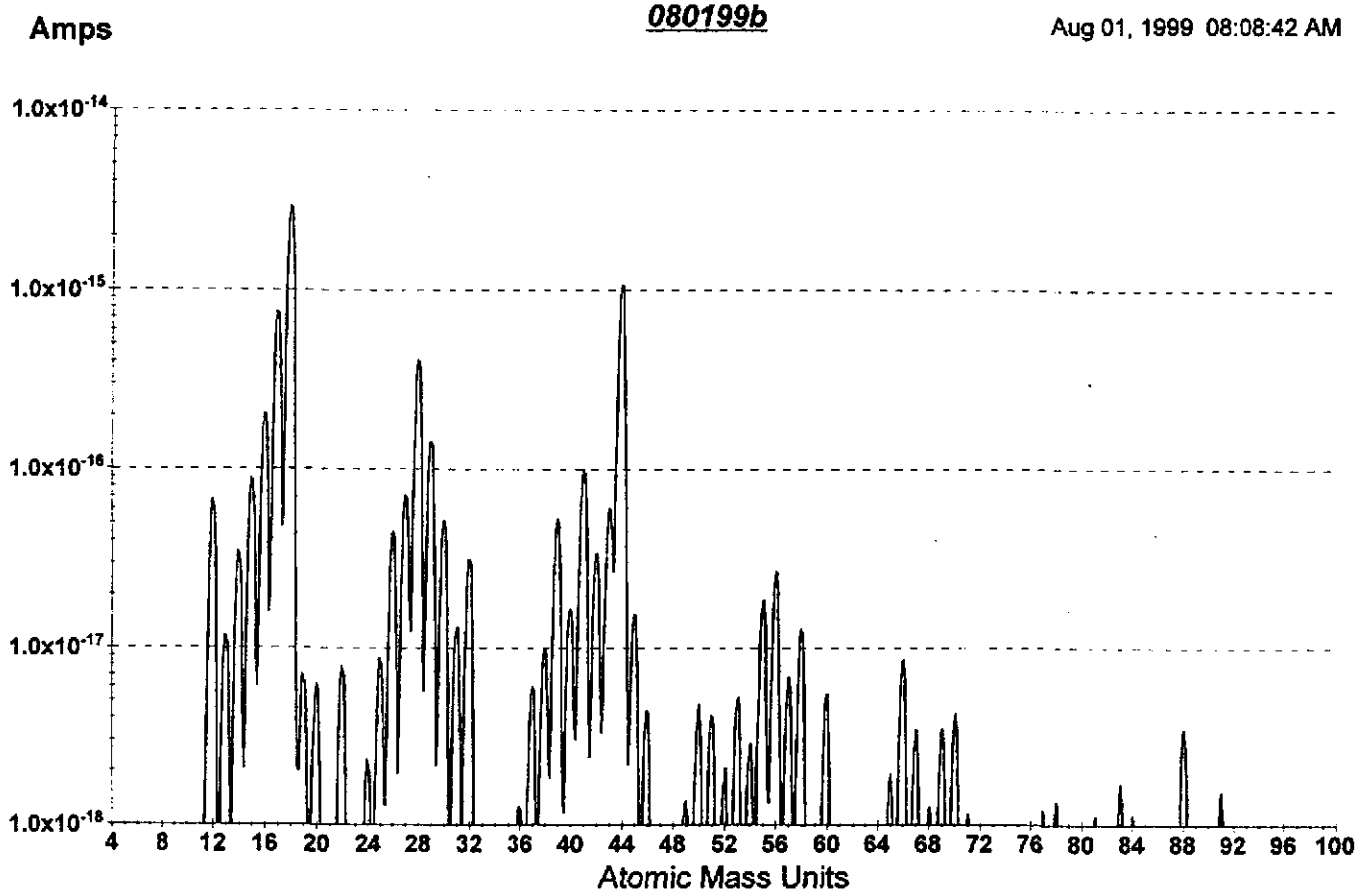
080199a

Aug 01, 1999 07:46:44 AM



# LHO VACUUM BAKE OVEN A LOAD #48 ELEVATED TEMPERATURE SCAN

V-1 Open, Cal-Gas and V-2 Closed, 70°C



## LHO Bake Oven A Load # 48

1<sup>st</sup> Order Desorption Outgassing Rate Estimates using  $Q_{low} = SP_{low} = SP_{high} [e^{-(E_s/kT_{high})}] / [e^{-(E_s/kT_{low})}]$

Number of units in bake load	Pump Speed (L/sec)	AMU	RGA background current (amps)	RGA current (amps) @ High Temp	Calibration Factor CF (torr/amps)	High Temp (K)	Low Temp (K)	Es/k	Extrapolated outgassing rate (torr*L/sec) @ T <sub>low</sub>
1	5	41	1.60E-19	1.00E-16	3.00E+07	not in equilibrium	2.96E+02	13000	#VALUE!
1	5	43	6.00E-19	2.40E-16	3.00E+07	not in equilibrium	2.96E+02	8000	#VALUE!
1	5	53	9.20E-20	5.20E-18	3.00E+07	not in equilibrium	2.96E+02	13000	#VALUE!
1	5	55	2.10E-19	1.80E-17	3.00E+07	not in equilibrium	2.96E+02	15000	#VALUE!
1	5	57	1.20E-19	6.80E-18	3.00E+07	not in equilibrium	2.96E+02	15000	#VALUE!

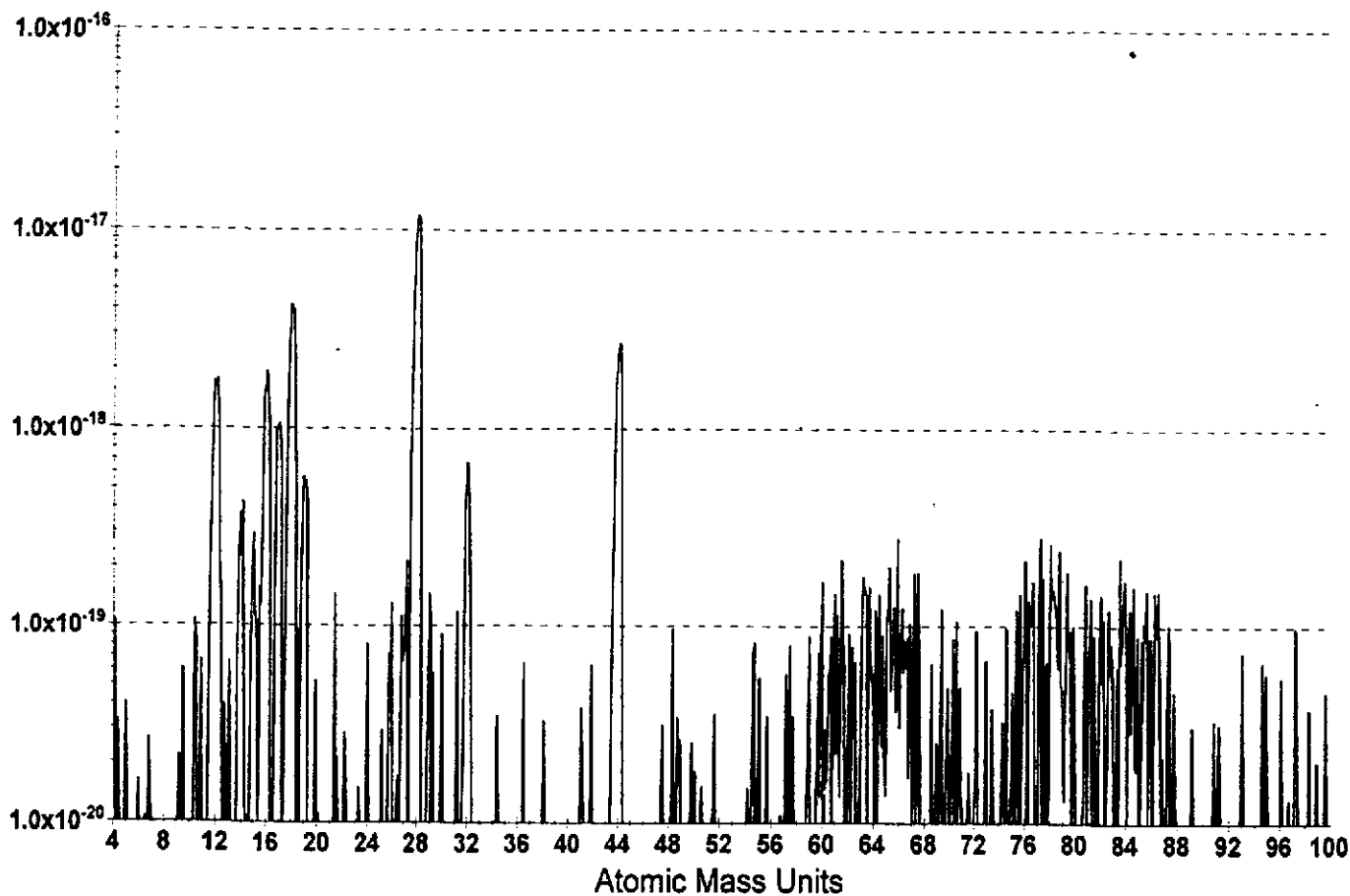
# LHO Vacuum Bake Oven A Load #48 RGA Background

V-1 Closed, Room Temperature

Amps

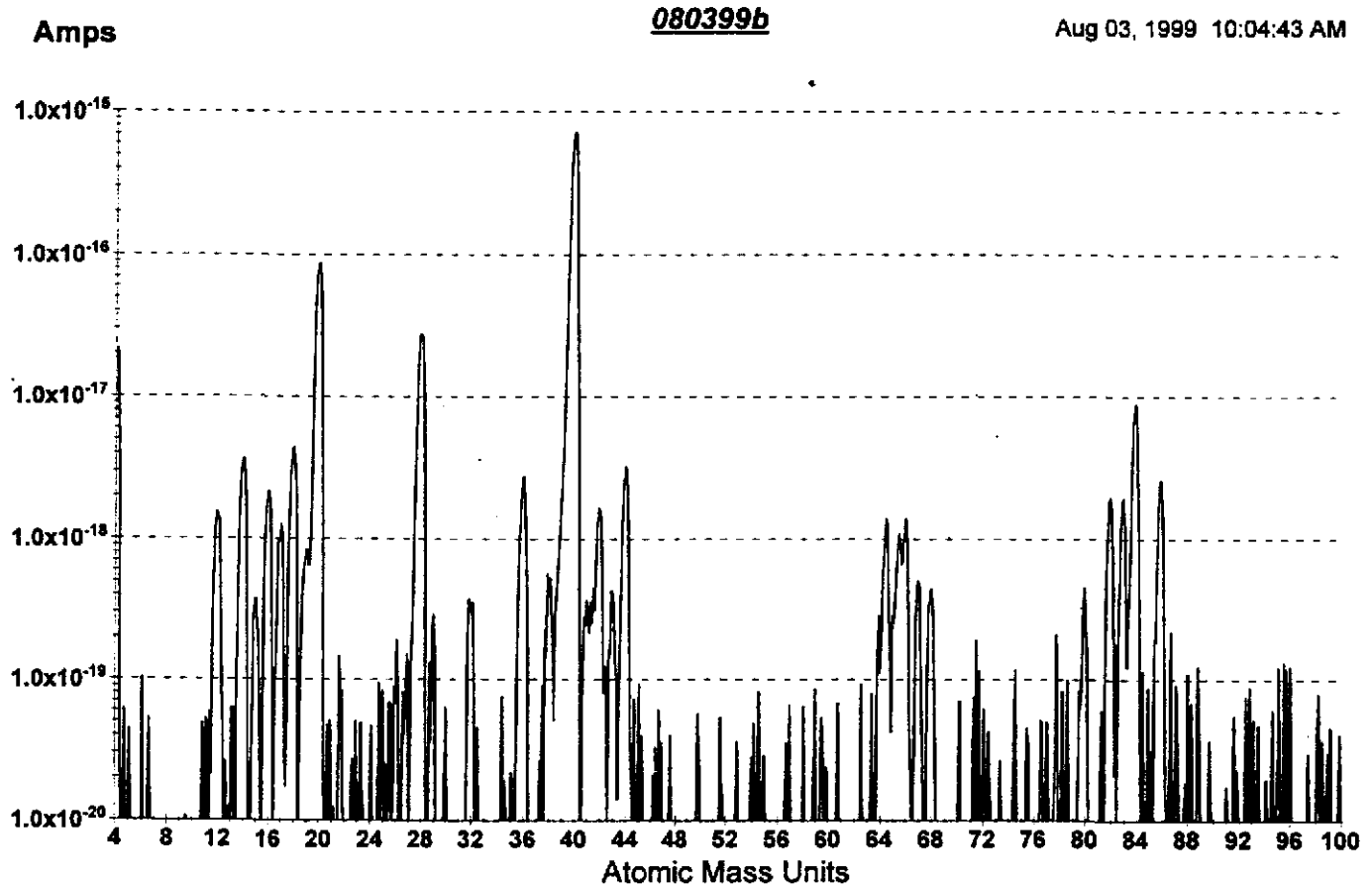
080399a

Aug 03, 1999 09:10:30 AM



# LHO Vacuum Bake Oven A Load #48 Calibration

V-1 and cal-gas open V-2 closed in pressure equilibrium at room temperature



CF defined as  $P_{(40)calc} / I_{(40)meas}$

$$P_{(40)calc} = (\text{leak rate}) / (\text{pump speed}) = (1.1\text{E-}7 \text{ torr}\cdot\text{L}/\text{sec})(0.86) / (5 \text{ L}/\text{sec}) = 1.8\text{E-}8 \text{ torr}$$

$$I_{(40)meas} = 7.2\text{E-}16 \text{ amps} \quad (\text{Taken from } 080399b.asc)$$

$$CF = (1.8\text{E-}8\text{torr}) / (7.2\text{E-}16\text{amps}) = 3\text{E}7\text{torr}/\text{amps}$$

# LHO Vacuum Bake Oven A Load #48 Post-Bake Scan Room Temp.

V-1 Open, Cal-Gas and V-2 Closed

Amps

080399c

Aug 03, 1999 10:27:10 AM

