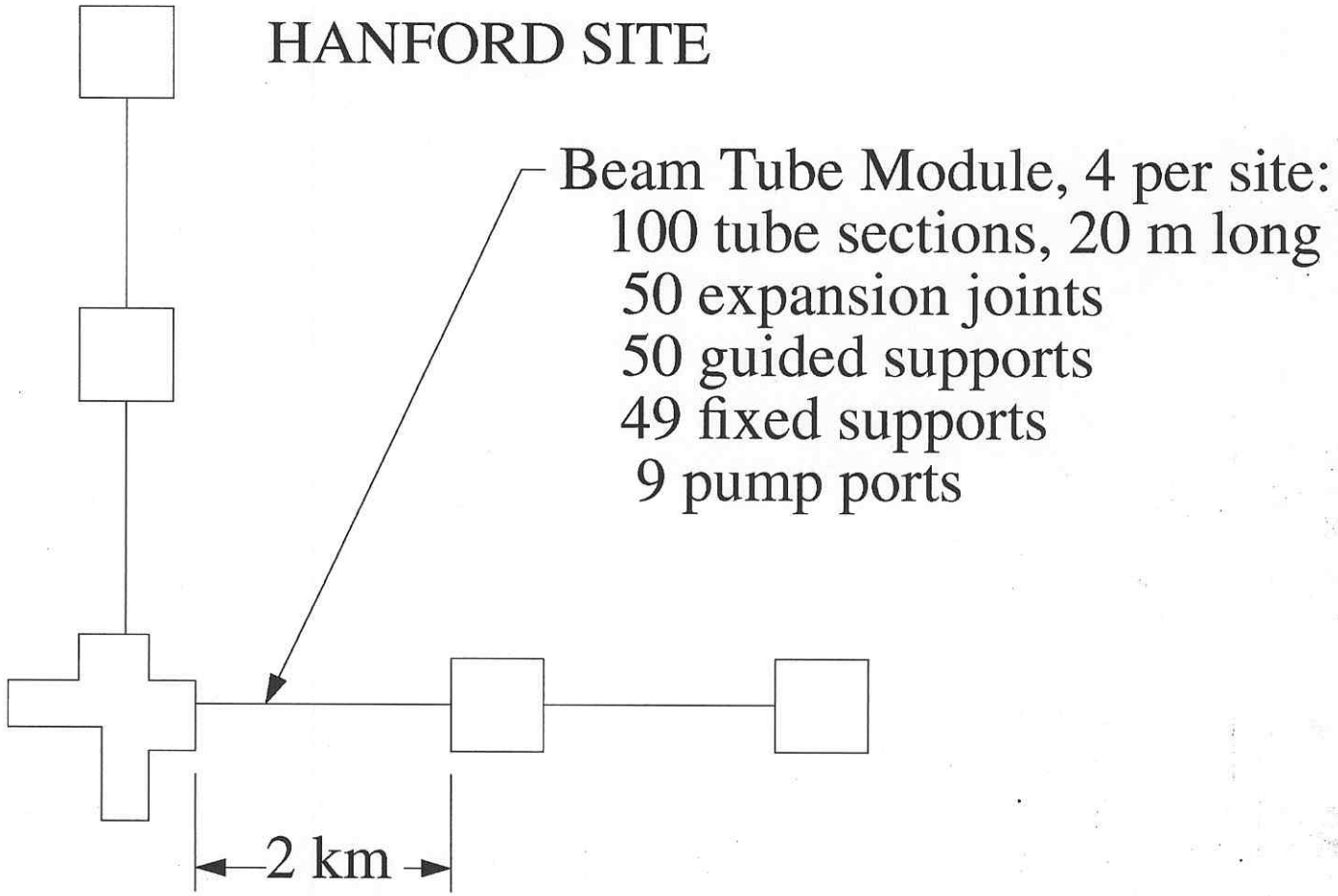
BEAM TUBE MODULES

Larry Jones
Technical Manager

May 22, 1995

BEAM TUBE MODULES

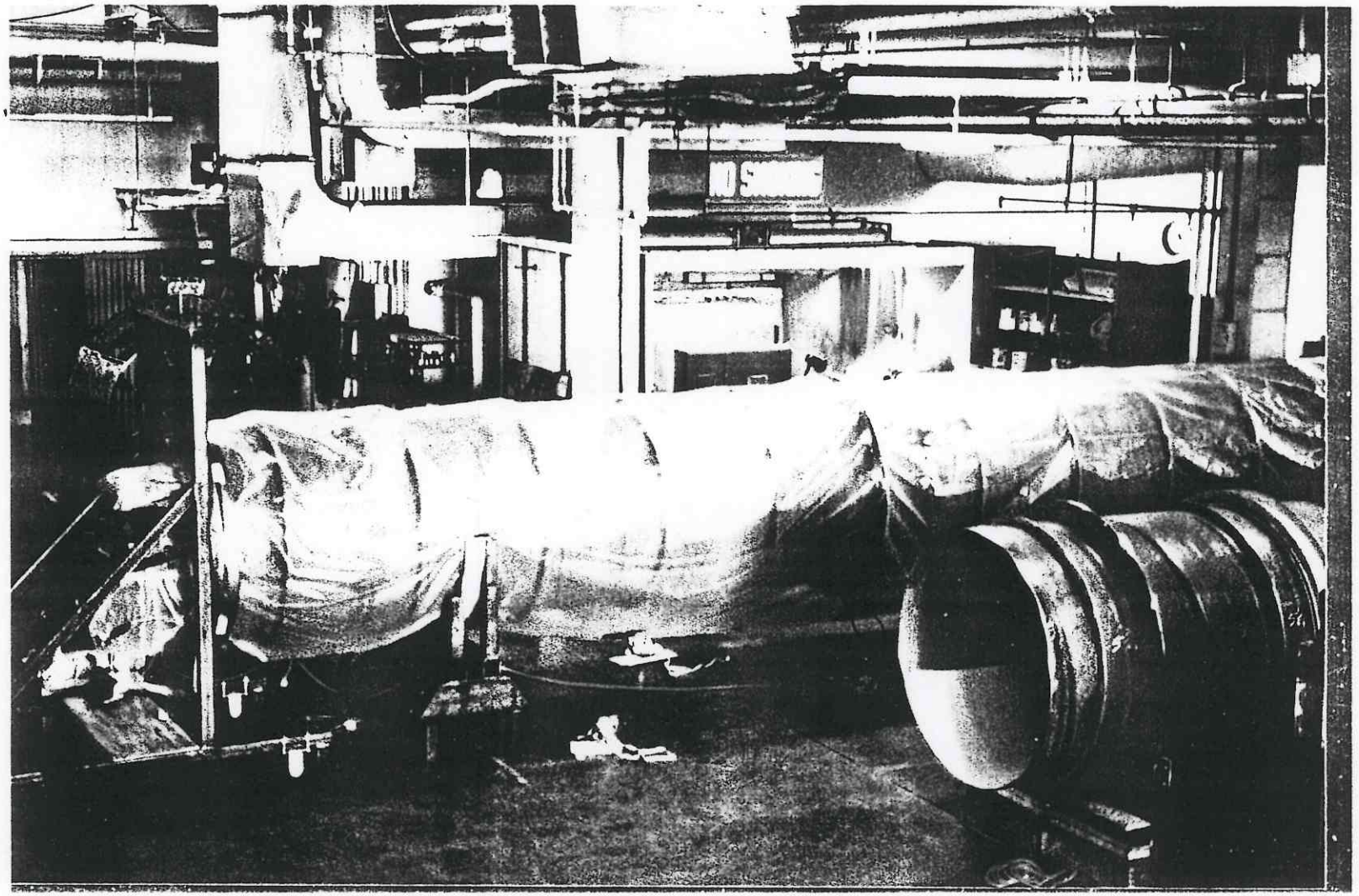


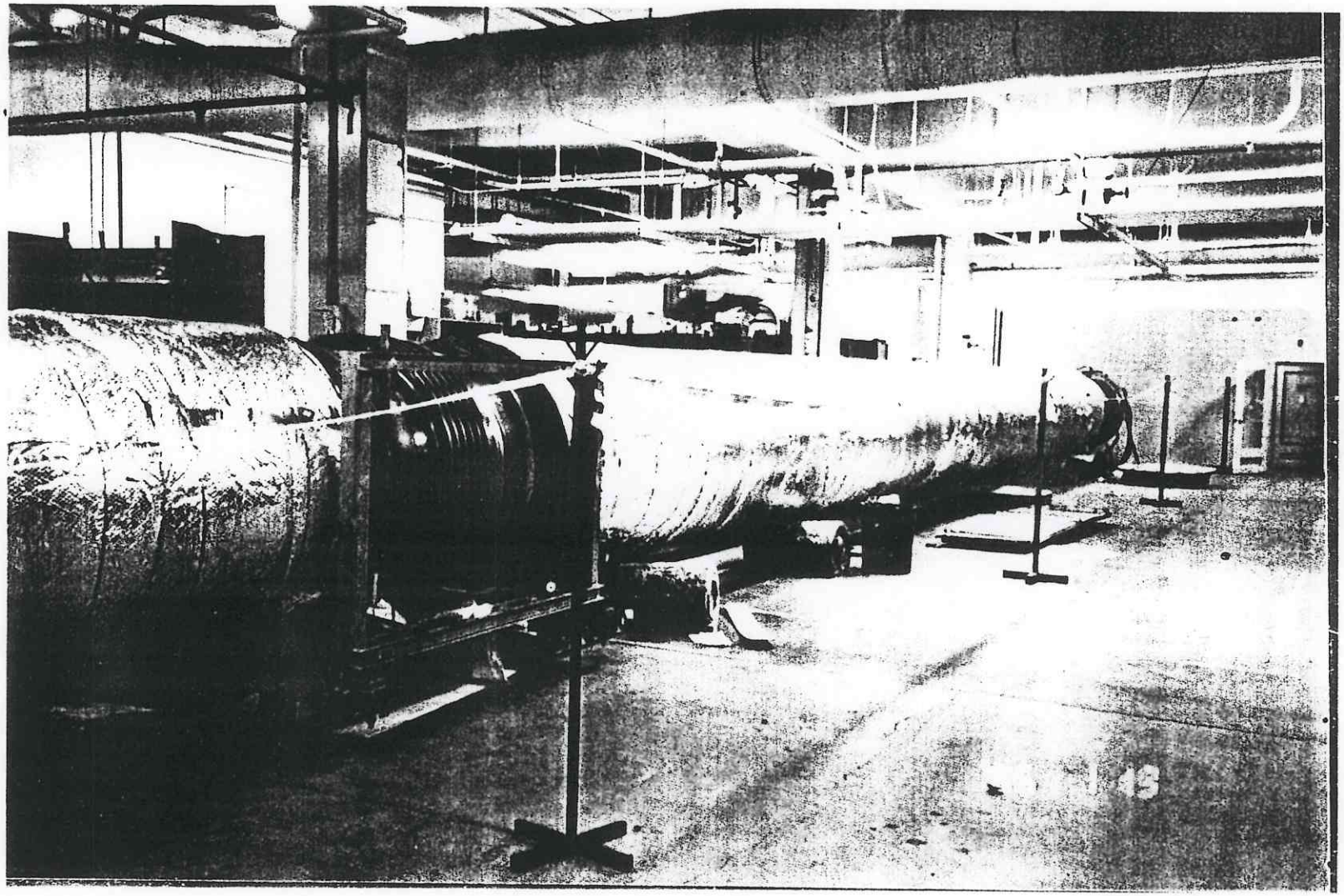
BEAM TUBE BACKGROUND

- Design & Qualification Test Phase Contract with CBI
  - Contract Initiation: August, 1993
  - Preliminary Design Review: November, 1993
  - Final Design Review: April, 1994
  - Qualification Test: March, 1995
  - Qualification Test Review: April, 1995

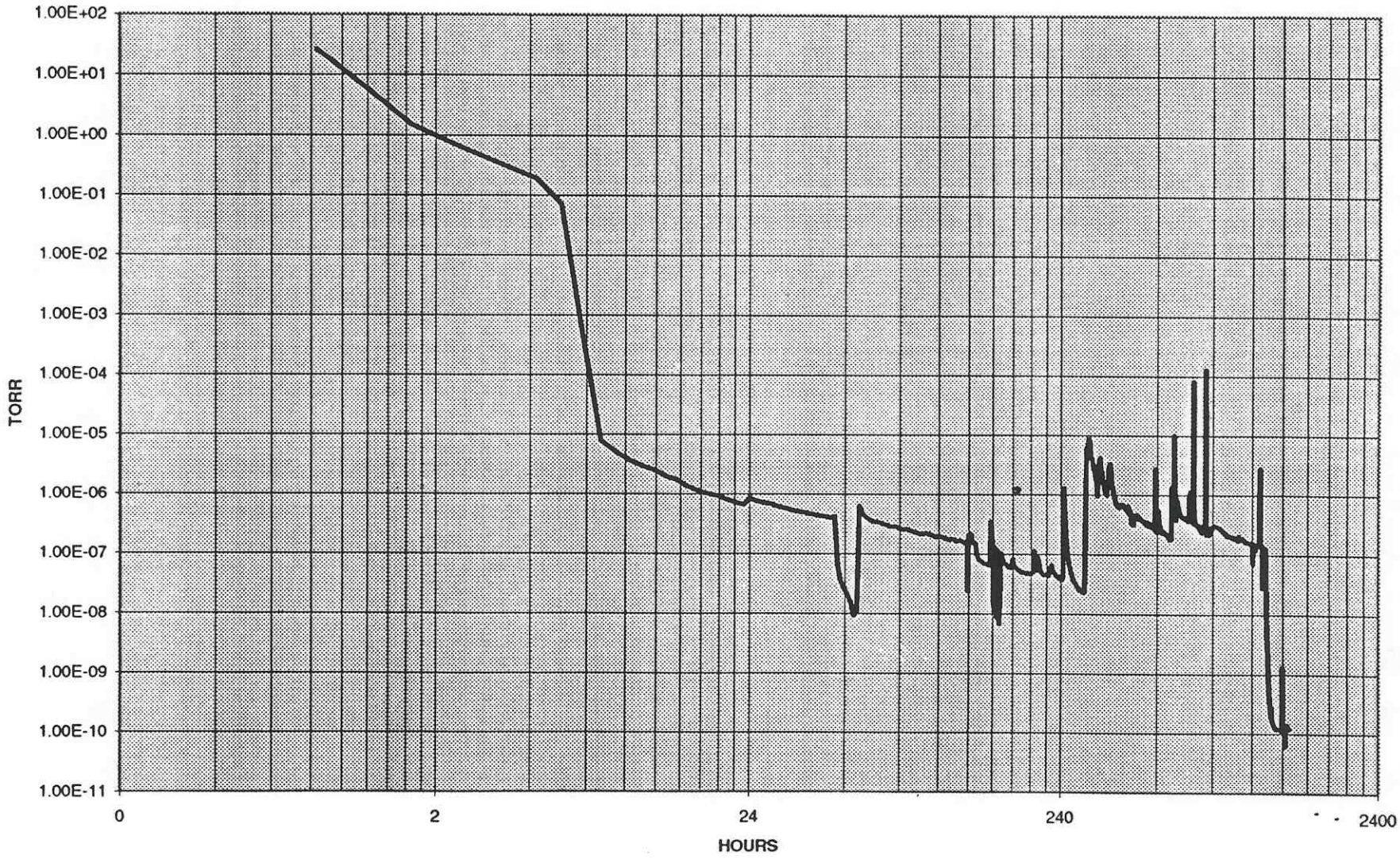
BEAM TUBE CURRENT STATUS

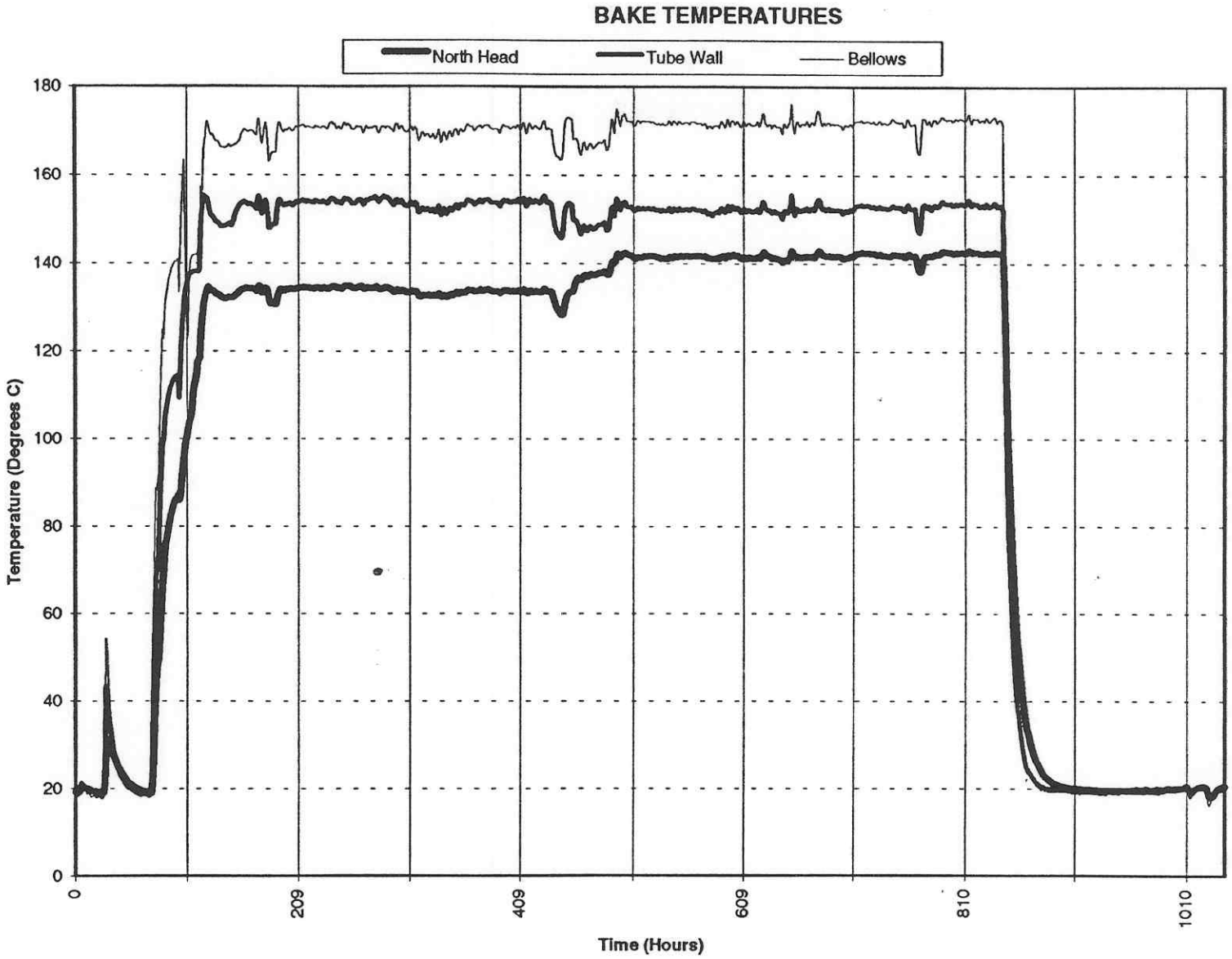
- Successfully completed Qualification Test (March, 1995)
  - ›› Demonstrated Design, Fabrication, Assembly
  - ›› Demonstrated acceptable leakage: $< 1 \times 10^{-11}$ atm cc/s
  - ›› Demonstrated acceptable outgassing: H_2, $< 1 \times 10^{-13}$ t•l/s•cm^2
    H_2O, $< 1 \times 10^{-16}$ t•l/s•cm^2
- Qualification Test Review held (April, 1995)
  - ›› Board endorsed the fact that all aspects of the test have been met
  - ›› Board concurs LIGO is ready to commence fabrication & installation of beam tubes





TUBE PUMP DOWN




BAKE TEMPERATURES
North Head
Tube Wall
Bellows
180
160
140
120
100
80
60
40
20
0
Temperature (Degrees C)
0
209
409
609
810
1010
Time (Hours)

BEAM TUBE PLANS

- Phase B (fab/install) contract to be negotiated under competitive pressure:
  - CBI submits complete design package in support of Phase B bid
  - CBI submits firm, fixed price proposal with incentive options by 7/15
- Current schedule accommodates competition
  - CBI is the preferred contractor: experience base, familiarity
  - New contractor may impact schedule

Start:	04/01/95
Finish:	04/01/95
Time Now:	04/01/95
Project:	SPECIAL
Run:	05/18/95
Page:	1 of 2

Planned
Critical
Actual Dates
Milestone-Baseline
Milestone-Planned
Milestone-Completed
Baseline Dates

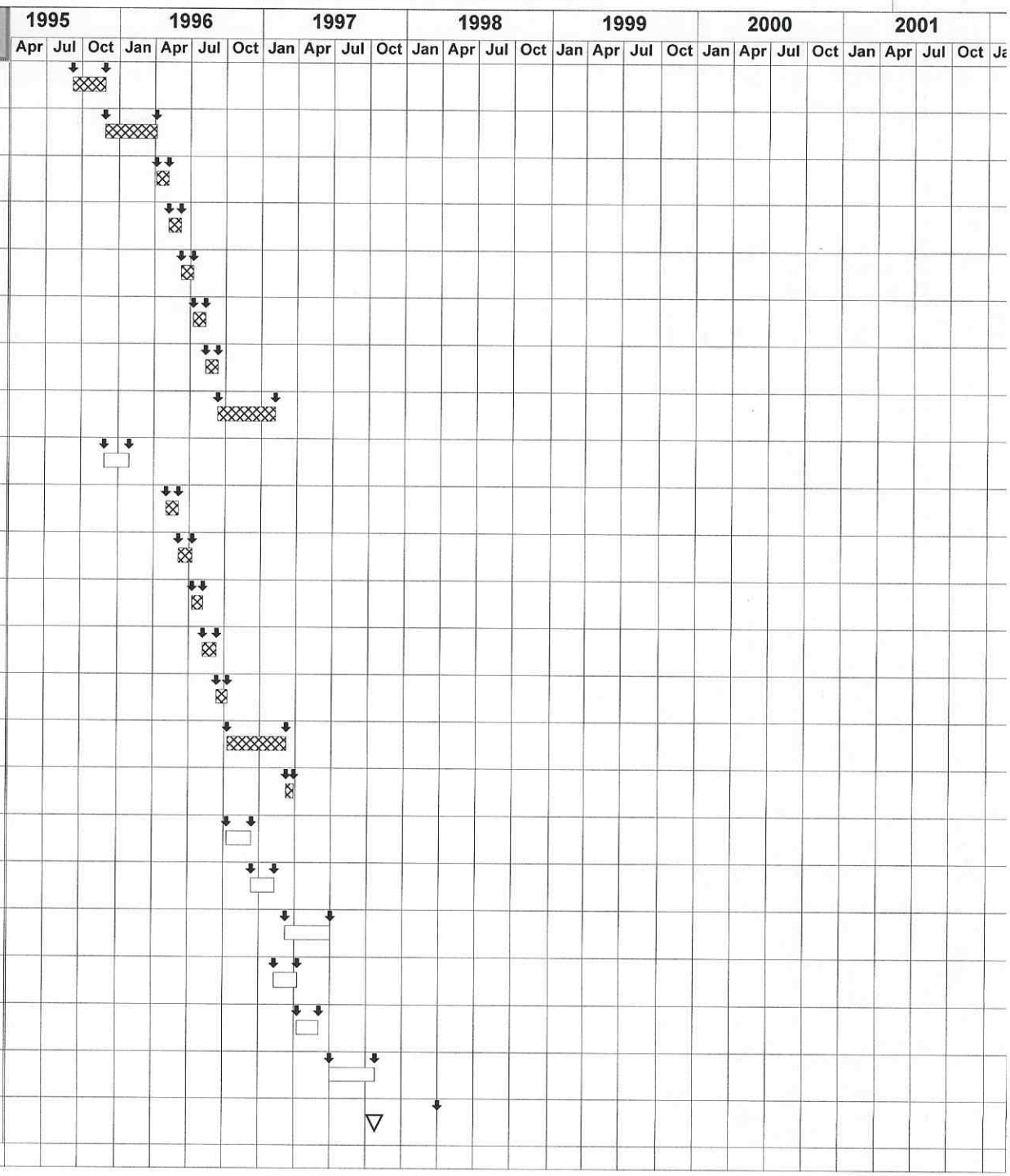
Caltech

BEAM TUBE DESIGN / FAB / INSTALLATION

Open Plan Professional by Welcom Software

LIGO

Activity Desc.	EStart	EFinish
BEAM TUBE DESIGN VERIFICATION	09/05/95	11/29/95
FAB MOBILIZATION - WA	11/30/95	04/04/96
FAB ARM 1 TUBE SECTIONS 1- 40 - WA	04/05/96	05/06/96
FAB ARM 1 TUBE SECTIONS 41- 80 - WA	05/07/96	06/06/96
FAB ARM 1 TUBE SECTIONS 81- 120 - WA	06/07/96	07/10/96
FAB ARM 1 TUBE SECTIONS 121- 160 - WA	07/11/96	08/09/96
FAB ARM 1 TUBE SECTIONS 161- 200 - WA	08/12/96	09/11/96
FAB BEAM TUBE ARM 2 - WA	09/12/96	02/06/97
FIELD MOBILIZATION - WA	11/30/95	01/30/96
INSTALL ARM 1 SECTIONS 1- 40 - WA	05/03/96	06/04/96
INSTALL ARM 1 SECTIONS 41- 80 - WA	06/05/96	07/08/96
INSTALL ARM 1 SECTIONS 81- 120 - WA	07/09/96	08/07/96
INSTALL ARM 1 SECTIONS 121- 160 - WA	08/08/96	09/09/96
INSTALL ARM 1 SECTIONS 161- 200 - WA	09/10/96	10/09/96
INSTALL BEAM TUBE ARM 2 - WA	10/10/96	03/06/97
FIELD DEMOBILIZATION - WA	03/07/97	03/27/97
INSULATE & BAKE ARM 1 MODULE 1 - WA	10/10/96	12/09/96
INSULATE & BAKE ARM 1 MODULE 2 - WA	12/10/96	02/07/97
INSULATE AND BAKE ARM 2 - WA	03/07/97	06/30/97
ACCEPT BEAM TUBE ARM 1 MODULE 1 - WA	02/10/97	04/07/97
ACCEPT BEAM TUBE ARM 1 MODULE 2 - WA	04/08/97	06/03/97
ACCEPT BEAM TUBE ARM 2 - WA	07/01/97	10/23/97
ACCEPT WA BEAM TUBES AND COVERS	10/23/97	10/23/97



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Planned
Critical
Actual Dates
Milestone-Baseline
Milestone-Planned
Milestone-Completed
Baseline Dates

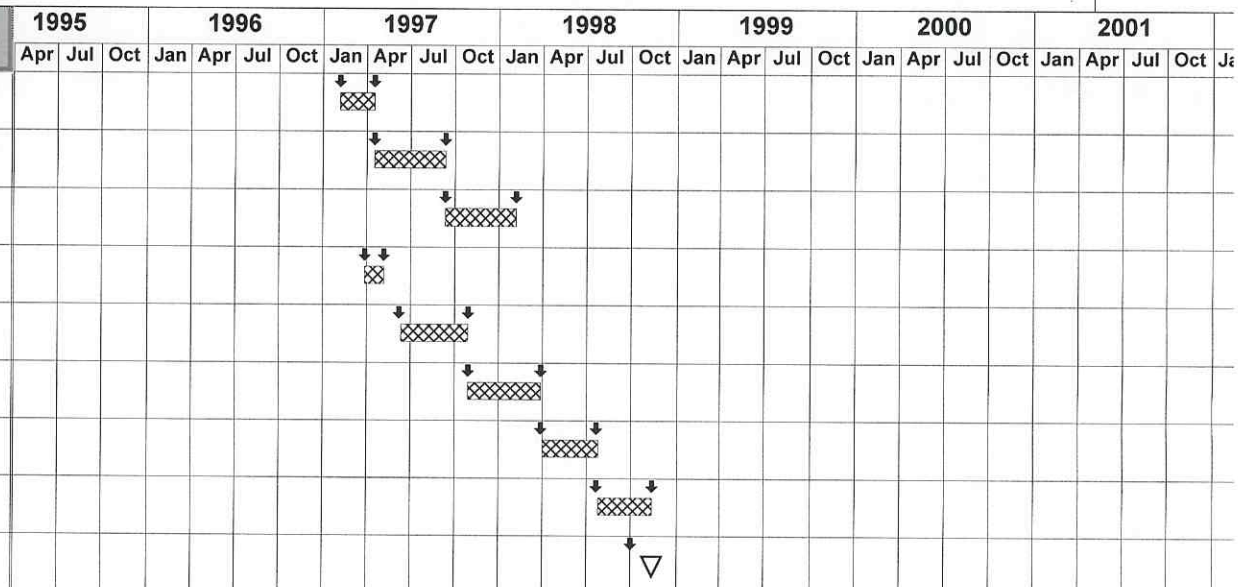
Caltech

BEAM TUBE DESIGN / FAB / INSTALLATION

Open Plan Professional by Welcom Software

LIGO

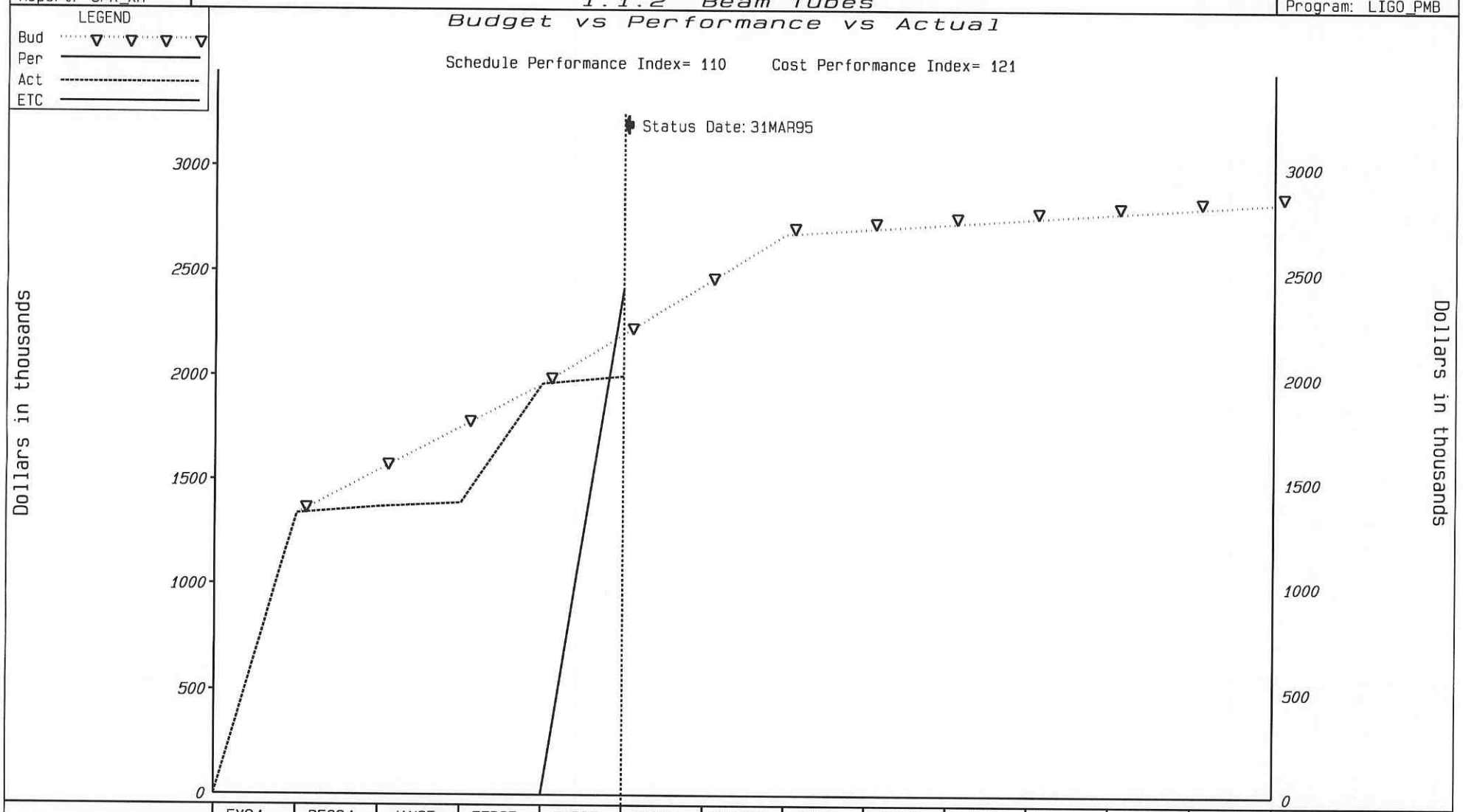
Activity Desc.	EStart	EFinish
FAB MOBILIZATION - LA	02/07/97	04/17/97
FAB BEAM TUBE ARM 3 - LA	04/18/97	09/09/97
FAB BEAM TUBE ARM 4 - LA	09/10/97	02/05/98
FIELD MOBILIZATION - LA	03/28/97	05/08/97
INSTALL BEAM TUBE ARM 3 - LA	06/10/97	10/29/97
INSTALL BEAM TUBE ARM 4 - LA	10/30/97	03/27/98
INSULATE AND BAKE ARM 4 - LA	03/30/98	07/22/98
ACCEPT BEAM TUBE ARM 4 - LA	07/23/98	11/13/98
ACCEPT LA BEAM TUBES AND COVERS	11/13/98	11/13/98



COBRA (R)
Report: SPA_XM

LIGO PROJECT
1.1.2 Beam Tubes
Budget vs Performance vs Actual

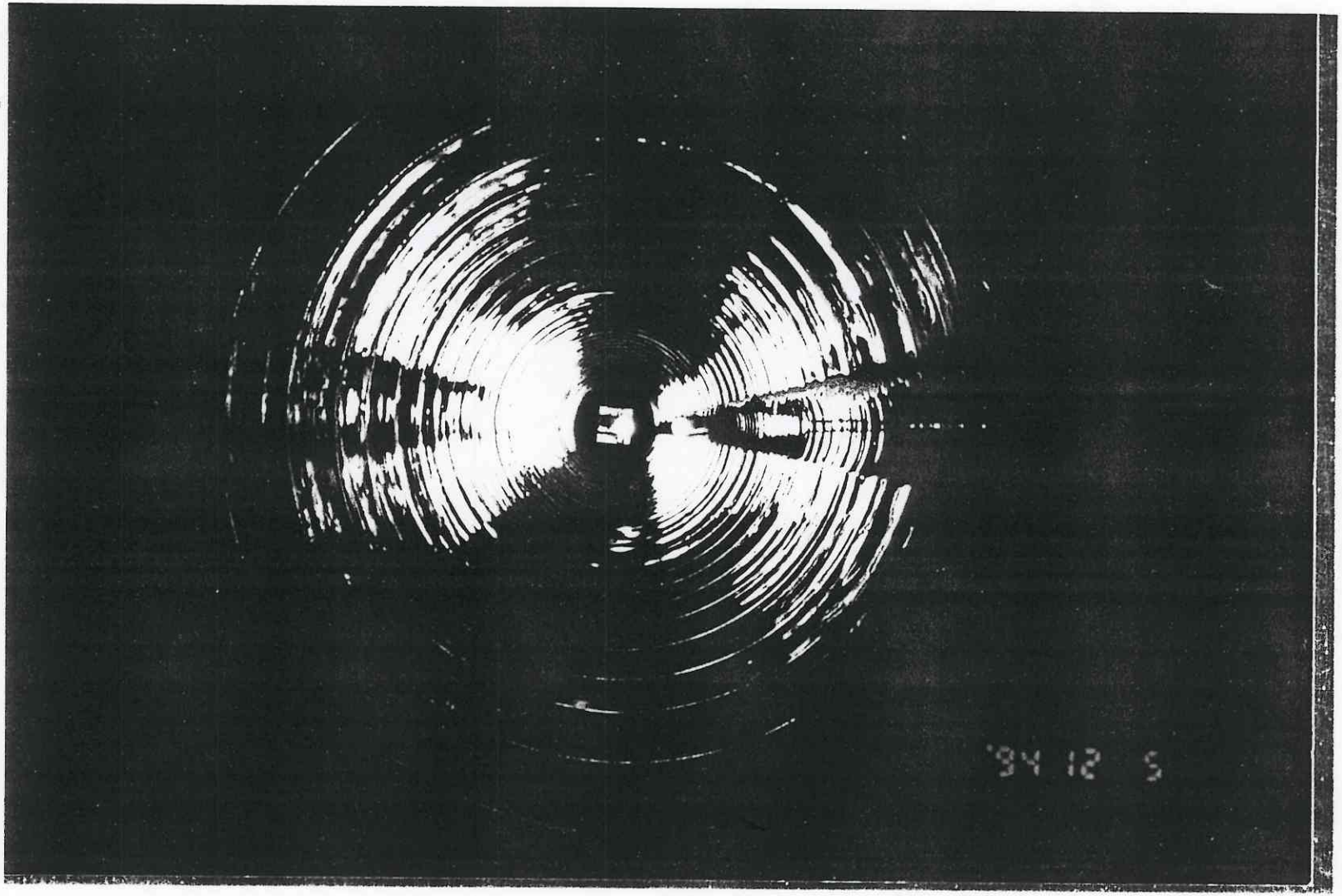
Date: 18MAY95
Program: LIGO_PMB



	FY94	DEC94	JAN95	FEB95	MAR95	APR95	MAY95	JUN95	JUL95	AUG95	SEP95	OCT95	NOV95	SCALE
Budget	1,338	1,546	1,754	1,962	2,200	2,439	2,677	2,702	2,727	2,752	2,777	2,801	2,826	K$
Performance	0	0	0	0	2,421									K$
Actual/Forecast	1,339	1,371	1,391	1,963	1,999									K$
Schedule Variance	-1,338	-1,546	-1,754	-1,962	221									K$
Cost Variance	-1,339	-1,371	-1,391	-1,963	422									K$

Schedule Variance = Perf-Budg Cost Variance = Perf-Actual Schedule Performance Index= Perf/Budg Cost Performance Index= Perf/Actual

*** Prepared by LIGO Project Controls Group ***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