

Title: COMPONENT ALIGNMENT PROCEDURE

COMPONENT ALIGNMENT PROCEDURE

FOR

LIGO VACUUM EQUIPMENT

Hanford, Washington

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1	ME		RELEASED FOR CONSTRUCTION PER AEO # 531
0	D.M.W.	RES 12/5/96	RELEASED PER DEO 0377
REV LTR.	BY-DATE	APPD. DATE	DESCRIPTION OF CHANGE

ROCESS SYSTEMS INTERNATIONAL, INC.				SPECIFICATION		
INITIAL APPROVALS	PREPARED	DATE	APPROVED	DATE	Number	Rev.
	RES	12/5/96	RES	12/5/96	V049-2-174	1
					LIGO-E960193-01-V	

Title: LIGO VACUUM EQUIPMENT COMPONENT ALIGNMENT PROCEDURE

1.0 PURPOSE

The purpose of this procedure is to define the requirements for aligning and positioning vacuum equipment components for the LIGO project.

2.0 GENERAL

The major vacuum component anchor bolts are located, drilled and installed after the component has been pre-aligned with the beam line in each building. This requires that each major vacuum boundary component (BSC, HAM, 80K Pump, Spools, etc.) be located in its final location and precision aligned (with optical surveying equipment) so that the centerline of the beam line nozzles are within ± 2 mm of the actual beam line.

The actual beam line location is established by locating target benchmarks (at removable spool locations) using the Buyer supplied floor bench marks (see Attachment A). Once the target bench marks are located along the beam line, the surveying equipment sites on two adjacent targets to establish the beam line. The component is then adjusted until it is aligned with the established beam line.

The Customer/Buyer will verify each component location as part of the installation process.

The class 100 air skid must be installed and operational prior to component alignment.

The component alignment data sheet shall be filled out as each component is installed. (S/off = data signoff point).

3.0 RESPONSIBILITIES

The Contractor is responsible for establishing the target bench marks and aligning and installing each component.

The Buyer/Owner is responsible for verifying each component location and alignment.

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ATTACHMENTS:

- A. LIGO Building Benchmark Locations
- B. Component Installation Data Sheet

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4.0 PROCEDURE

1. Establish the target bench marks in the building being worked using the Buyer supplied floor bench marks (see Attachment A).
2. Set up the surveying equipment to site on two adjacent target bench marks to establish the beam line.
3. Move the component into the installed position using the referenced dimensions on the installation documents.
4. Connect class 100 air to the component being aligned (using hoses from the mechanical room).
5. Verify that all shipping door cross hairs are located at the centerline of the nozzles (s/off).
6. Using dollies, align each shipping door cross hair with the established beam line. The alignment shall be +/- 2 mm of the beam line.
7. Mark the floor to establish the anchor bolt locations by scribing one hole in each component leg pad on to the floor (s/off).
8. Move the component back from its installed position to allow anchor bolt hole drilling.
9. Using a component anchor bolt template, mark and drill each anchor bolt hole (using a core drilling system capable of cutting rebar) per Specification V049-1-101.
10. Install anchor bolts and let cure per V049-1-101.
11. Lift the component to clear the installed anchor bolts and reposition the component to once again align the cross hairs on the shipping covers with the beam line.
12. Adjust anchor bolt nuts and washers to hold the component in the aligned position and lock into place.
13. Remove the lifting tension on the dollies and allow the anchor bolts to support the component.
14. Verify with the surveying equipment that the nozzle centerlines are within +/- 2 mm of the beam line (s/off).
15. Notify the Buyer to witness and signoff the final alignment (s/off).
16. Verify that the vessel cross hair ports are closed and disconnect the class 100 air.
17. Repeat for each major component until all of the major components are aligned. Spools that fit between major components are aligned automatically by bolting up the spool using the centering pins (provided by the Buyer).
18. Components shall be grouted into place (per V049-2-021) after approval by the Buyer (s/off).

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COMPONENT ALIGNMENT PROCEDURE

ATTACHMENT B

COMPONENT INSTALLATION DATA SHEET

Component Tag Number _____

Component Name _____

Component S/N _____

Component Installation Weight (lb.) _____

Component Installation Position
(Ref. Build Grid)

	Signoffs (Contractor Unless Otherwise Noted)	By	Date
1.	Shipping Cover Cross Hairs Verified		
2.	Component Located For Anchor Bolt Marking		
	Buyer		
3.	Final Component Location Complete		
	Buyer		

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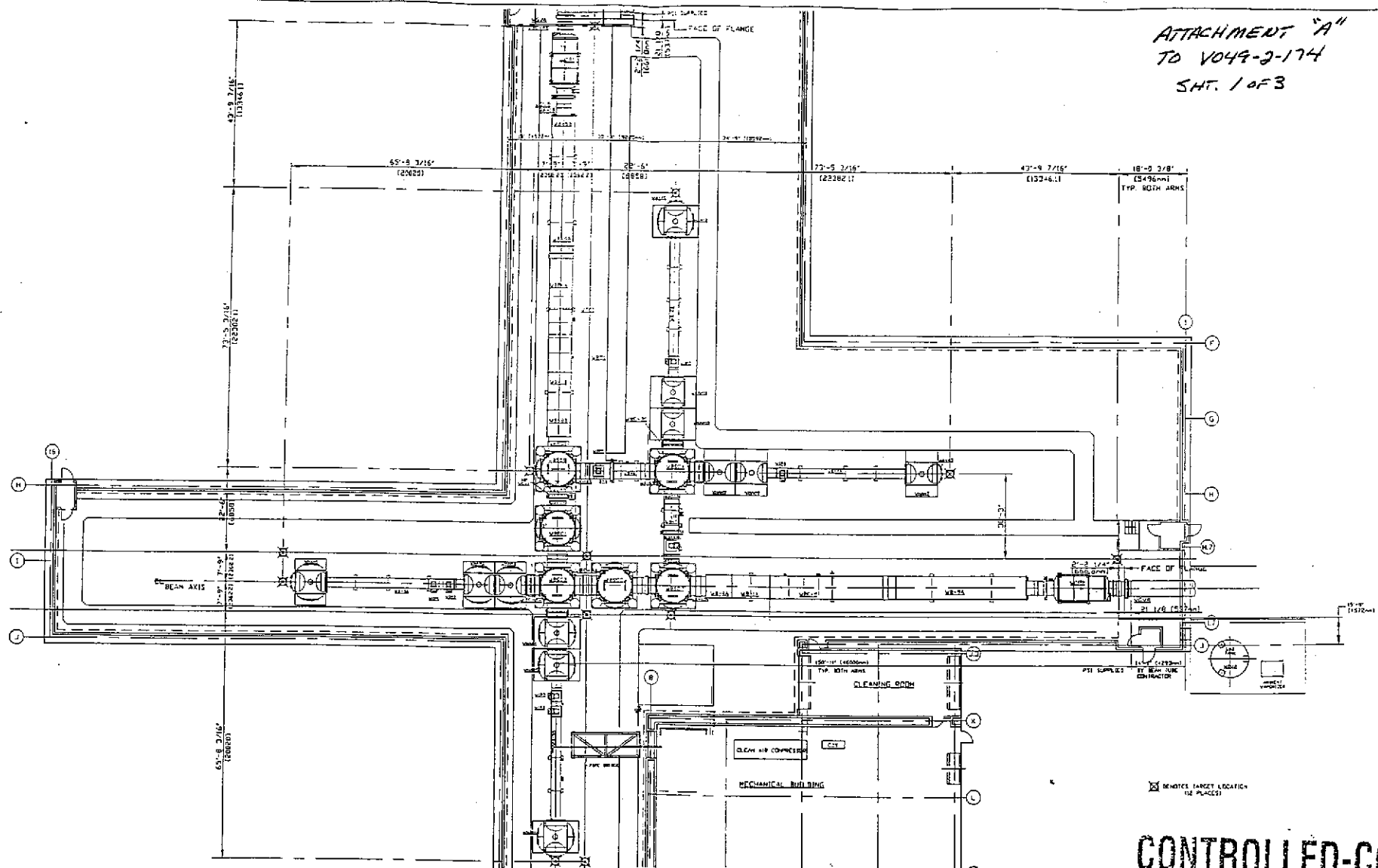
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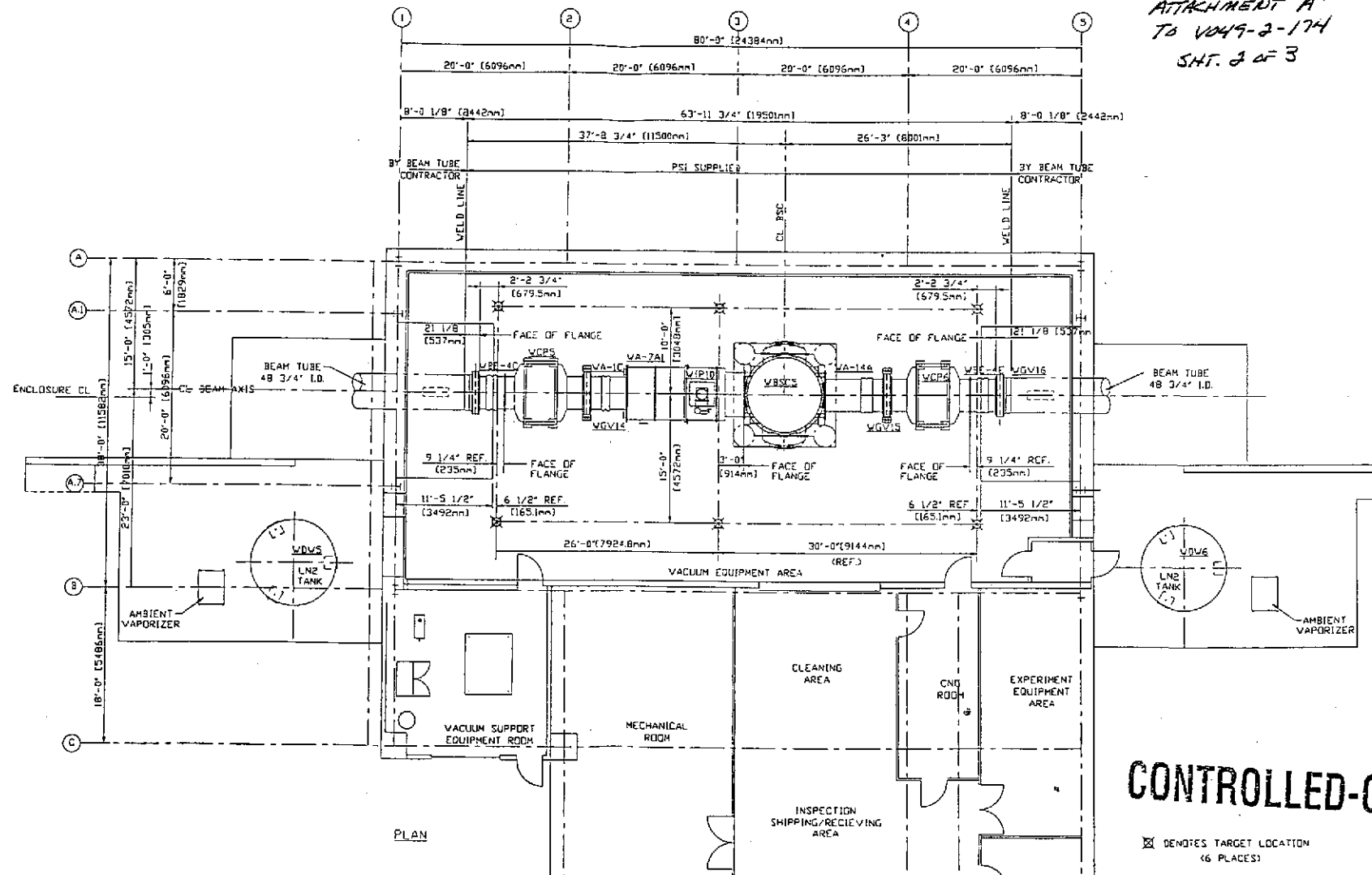


☒ NOTES TARGET LOCATION (SEE PLACES)

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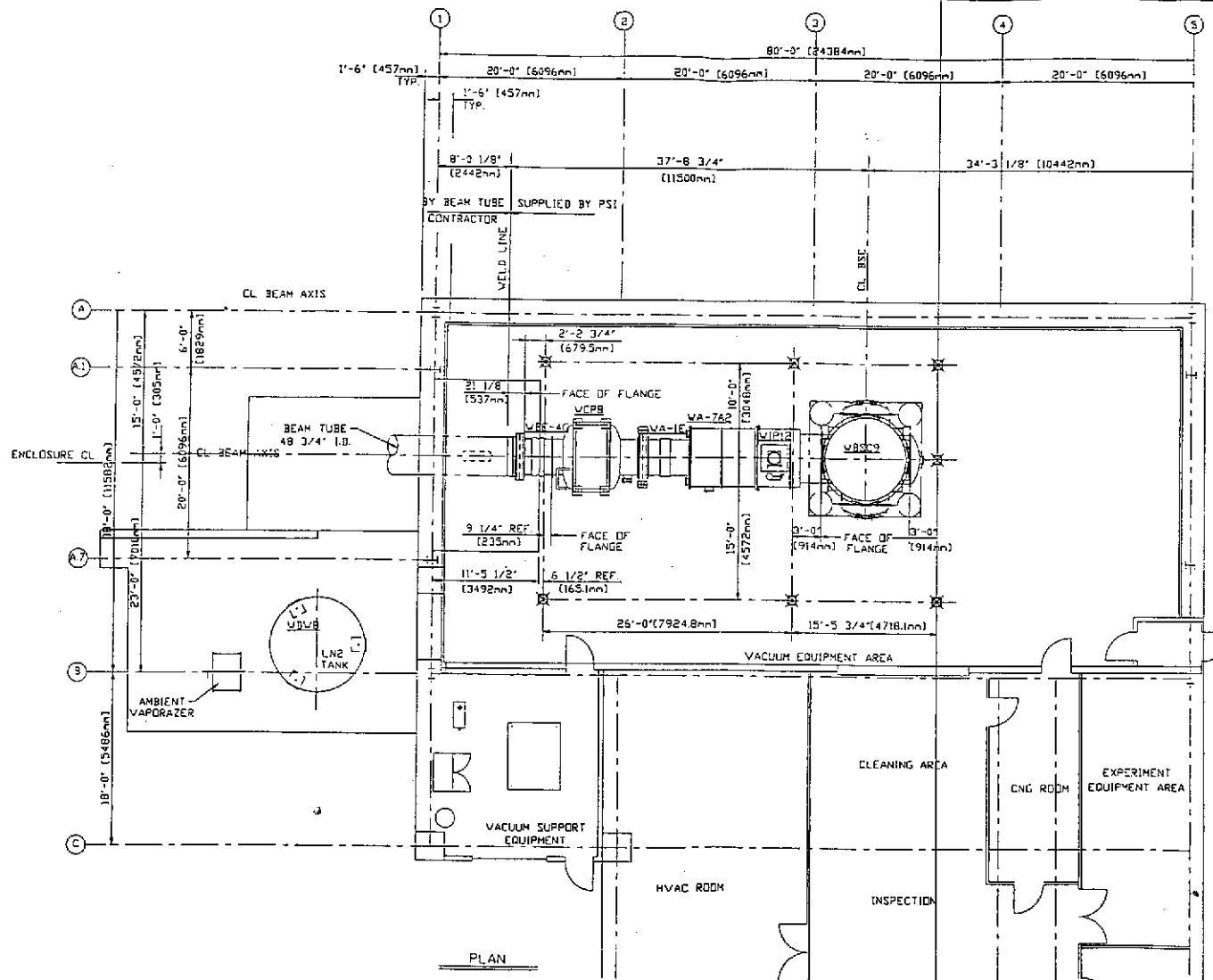
PLAN

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☒ DENOTES TARGET LOCATION
 (6 PLACES)

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PLAN

☒ DENOTES TARGET LOCATION
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