

WASHINGTON SITE  
INSTALLATION CONTRACTOR  
QA DATA

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CONTRACT NO.: PC 175730  
PROGRAM I.D.: LIGO VACUUM EQUIPMENT  
PSI DOCUMENT NO.: V049-8-863  
V049-8-864  
V049-8-865  
V049-8-866  
V049-8-867

SUBMITTED TO:

California Institute of Technology  
391 South Holliston Avenue  
Pasadena, CA 91125

SUBMITTED BY:

Process Systems International, Inc.  
20 Walkup Drive  
Westborough, MA 01581

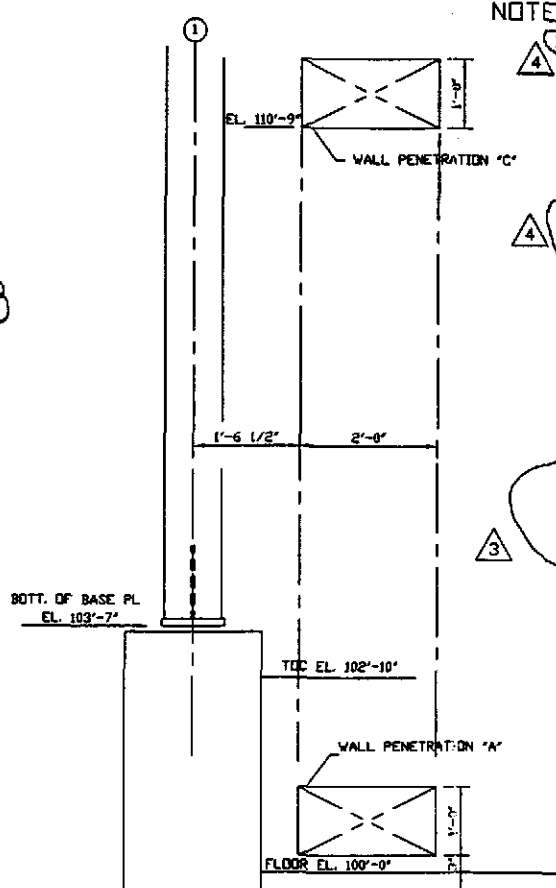
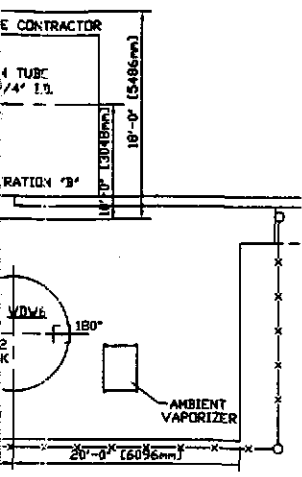


A147B  
SN 02

V049-4-109  
4-164  
PUMP INSTALLATION

WBLE 41D  
SN 001

V049-4-109  
4-166  
PUMP INSTALLATION



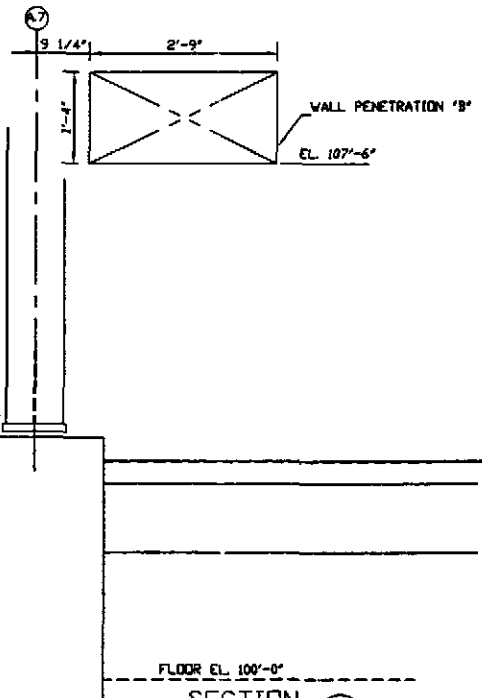
SECTION C  
SCALE: 3/4"=1'-0"  
(HOLES BY OTHERS)

NOTES:

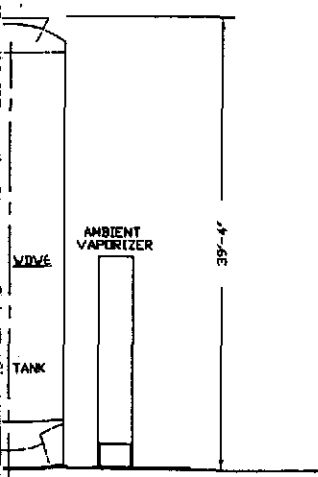
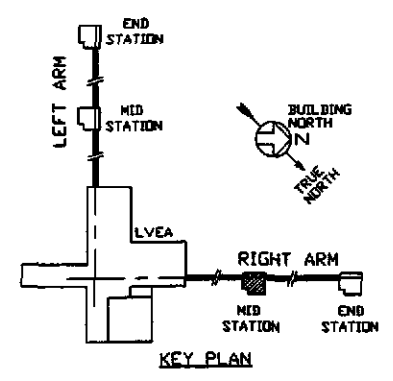
1. ALL GATE VALVES ARE SUPPLIED BY PSI.
- NOTE: SPECIAL BOLTS AND WASHERS ARE REQUIRED TO CONNECT SPOOL FLANGES TO 44" AND 48" GATE VALVES. USE PSI P/N 203567 FOR BOLTS AND PSI P/N 203568 FOR WASHERS. SEE BUILDING BOM V049100WA FOR MATERIALS.
- FOR ORIENTATION OF LARGE GATE VALVES SEE SIDE OF VALVE NOTED BY SYMBOL 'VS' IN PLAN BELOW. ALL 6", 10" & 14" GATE VALVES ARE TO HAVE SEAL SIDE MOUNTED TOWARD VESSEL.
2. SEE SPEC. V049-2-021 FOR INSTALLATION/COMMISSIONING INFORMATION.
3. FOR TUBING/PIPE SUPPORT REQUIREMENTS, SEE SPEC. V049-2-021, SECTION 10.
4. SEE DWG. D V049-4-011 FOR TURBO PUMP CART INSTALLATION. 1 UNIT REQUIRED PER MID STATION BUILDING.
5. LN TANK ANCHOR BOLTS BY OTHERS.
6. FOR ANCHOR BOLT AND VIBRATION ISOLATION PAD REQUIREMENTS FOR VACUUM SUPPORT ROOM EQUIPMENT AND ELECTRICAL CABINETS, SEE DWG. V049-4-019, DETAIL 2.

SUPPORTS LEGEND

- A 3 WAY ANCHOR
- SG SUPPORT/GUIDE (AXIALLY FLEXIBLE)
- S VALVE SUPPORT
- GATE VALVE ION PUMP LOCATION
- VS VALVE SEAL SIDE



SECTION B  
SCALE: 3/4"=1'-0"  
TYP. AT COLUMN LINES 1 AND 5  
(HOLES BY OTHERS)



REV	DESCRIPTION	CH'D	DRWN	DATE	DESN
4	REISSUED FOR CONSTRUCTION AS NOTED			6/26/97	0507
3	REISSUED FOR CONSTRUCTION AS NOTED	DHW	RDC	REC	SPIDER 6/6/97 0497
2	ISSUED FOR CONSTRUCTION	DHW	RDC	REC	PV 4/14/97 0465
1	ISSUED FOR FDR UPDATE & BID	DHW	RDC	REC	PV 2/4/97 0256
0	ISSUED FOR FDR	DHW	RDC	REC	MA 04/29/96 0147

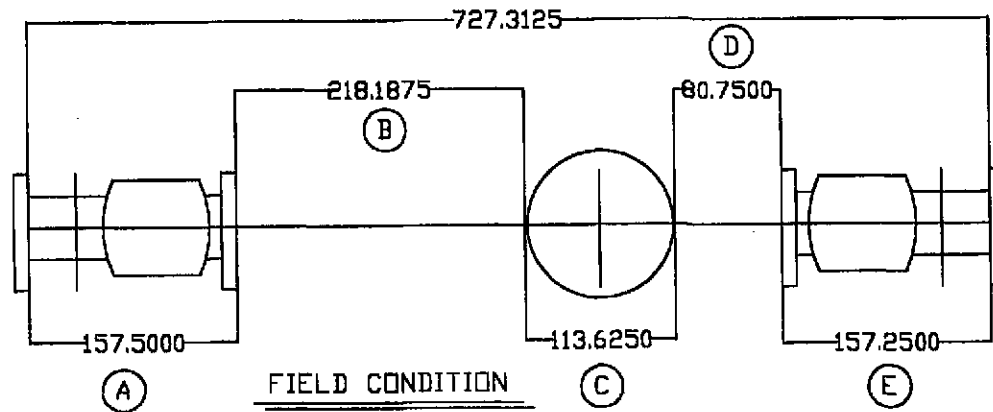
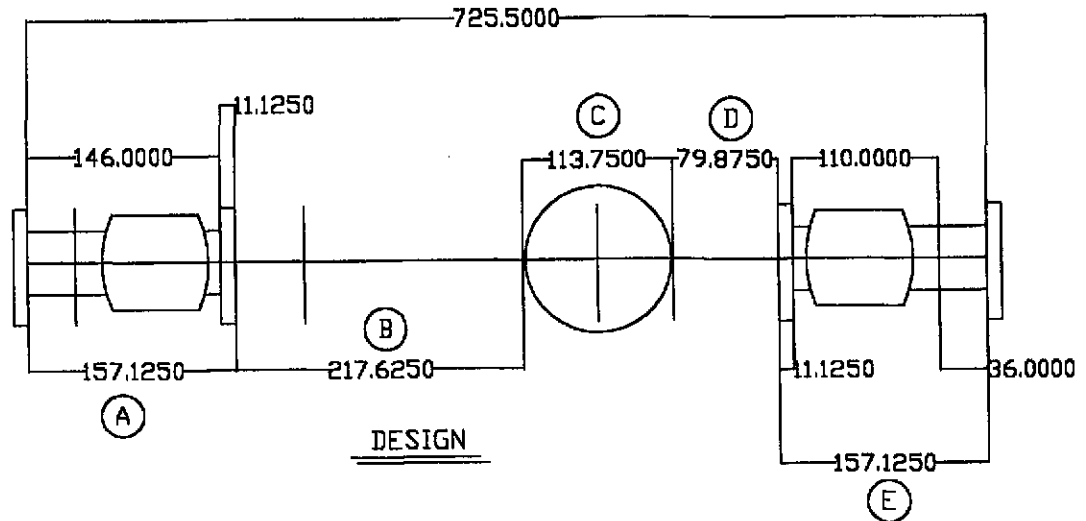
**PROCESS SYSTEMS INTERNATIONAL INC.**  
20 WALKUP DR. WESTBOROUGH, MASSACHUSETTS 01581 USA

**EQUIPMENT ARRANGEMENT  
RIGHT MID STATION  
WASHINGTON  
LIGO VACUUM EQUIPMENT**

CAD FILE: V0495004  
SIZE: D  
DWG NO.: V049-5-004  
SHEET: 1 OF 1

JUN 18, 1997 - 145554

LOC'N	DESIGN	FIELD	DIFF.
A	157.125	157.500	0.375
B	217.625	218.188	0.563
C	113.750	113.625	-0.125
D	78.875	80.750	0.875
E	157.125	157.250	0.125
TOTAL	725.5	727.313	1.813



"AS-BUILT"

*Apollo*

1207 W. Columbia Dr. Kennewick, Wa 99336

Title: RIGHT MID STATION

Job No.: M-126

Project: LIGN Equipment Set

Scale:  
None

Dwn By:

COMPONENT CLOSE-OUT DATA SHEET

Component Tag Number:

WCP 5 / WTB 4G

Component Name:

Cryo Pump / spool

Component S/N:

SN 02 / SN 07

Vacuum Sealing Surfaces Inspection

By:

*[Signature]* 1/28/98

Buyer:

*[Signature]* 28 JAN 98

Cleanliness Inspection

By:

*[Signature]* 1/28/98

Buyer:

*[Signature]* 28 JAN 98

O-Rings Installed

By:

*[Signature]* 1/28/98

Buyer:

*[Signature]* 28 JAN 98

Comments:

Dings on WCP5 flange, PSI ok'd install  
*[Signature]*

Rework Required:

Title

# COMPONENT ALIGNMENT PROCEDURE

## ATTACHMENT B

### COMPONENT INSTALLATION DATA SHEET

Component Tag Number

WCP 5 / WBE 4 G

Component Name

CR40 Pump / spool

Component S/N

SN 02 / SN 07

Component Installation Weight (lb.)

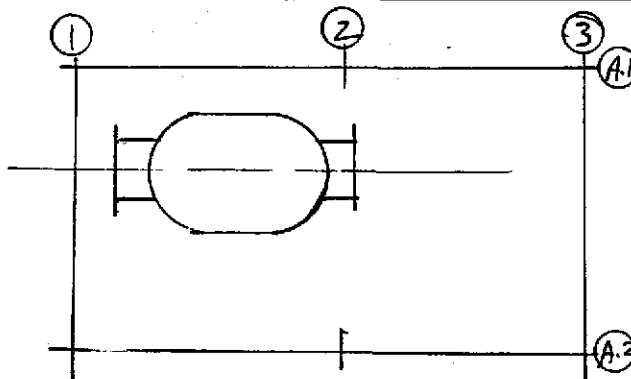
9,000 Lbs

Component Installation Position

(Ref. Build Grid)

→  
North

Right Mid Station



Signoffs (Contractor Unless Otherwise Noted)	By	Date
1. Shipping Cover Cross Hairs Verified	[Signature]	1-12-98
2. Component Located For Anchor Bolt Marking	[Signature]	1-12-98
	Buyer [Signature]	1-17-98
3. Final Component Location Complete	[Signature]	1-27-98
	Buyer [Signature]	1-28-98
	[Signature]	28 JAN 98

Number

Rev.

## SPECIFICATION

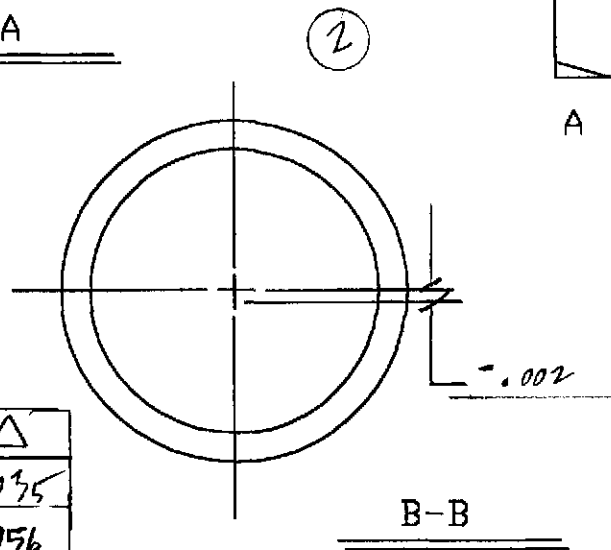
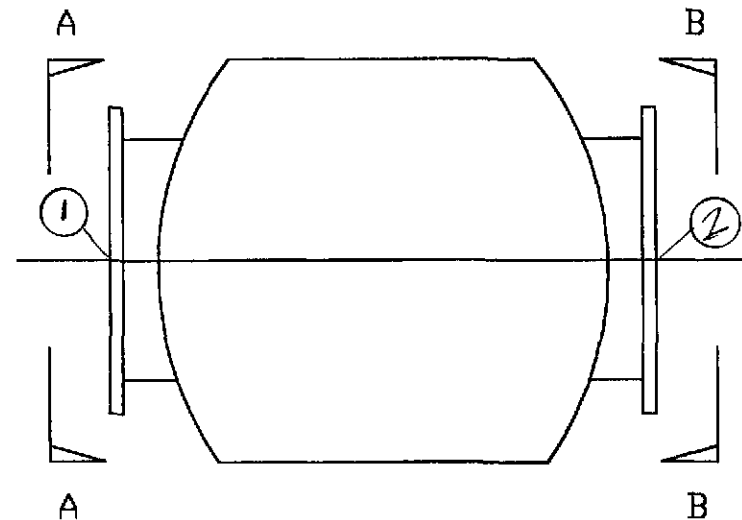
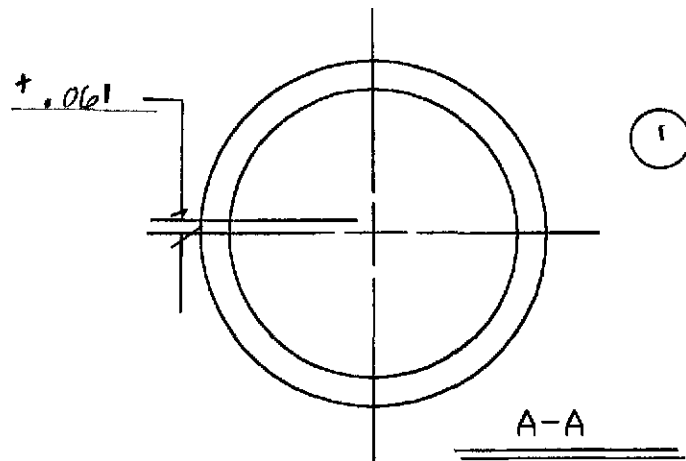
Number

A

Rev.

1

Y010 2-174



LIG EAST

WCP-5	①	②	△
MODEL	.174	.139	.035
SHOT	+.054	-.002	.056

.021 < .079 OK ✓

Component ID:

WCP-5

Serial No.:

5/N-02

**Apollo**

1207 W. Columbia Dr. Kennewick, Wa 99336

Title: CRYO PUMP  
INSTALLED POSITION

Job No.: M-126

Project: LIGO Equipment Set

Scale:  
None

Dwn By: Meloy

1.0

### Apollo Expansion Anchor Installation Report

Project: LIGO Vacuum Equipment Installation & Commissioning		Job No.: M-126	
Drawing: <u>V049-5-004</u>	Rev. <u>A</u>	Date: <u>1-14-98</u>	
Item Anchored: <u>INCP-5</u>	No. of Anchors <u>16</u>	Size: <u>1"</u>	Type: <u>HVA</u>

Attribute	a. Installer	b. Accepted	c. N/A	d. Date
Anchor Type (HAS Std or <u>Super</u> )		<u>BW</u>		<u>1/14/98</u>
Spacing & Location		<u>BW</u>		<u>1/14/98</u>
Anchor Size & Length		<u>BW</u>		<u>1/14/98</u>
Hole Size		<u>BW</u>		<u>1/14/98</u>
Hole & Core Condition (no voids, etc.)		<u>BW</u>		<u>1/14/98</u>
Embedment (minus 0 plus 1/8")		<u>BW</u>		<u>1/14/98</u>
Angle (90 deg. + 1deg.)		<u>BW</u>		<u>1/14/98</u>
Floor Scarified (if required)		<u>BW</u>		<u>1/14/98</u>
Proper Nut Engagement		<u>BW</u>		<u>1/14/98</u>
Tightening <u>400 FT LB.</u>		<u>BW</u>		<u>3-11-98</u>

Torque Device Identification: UN31 #10

Open Items				
Item No.	Description	Corrective Action	Accept	Date

Comments:

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Inspection by:	Date:
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COMPONENT CLOSE-OUT DATA SHEET

Component Tag Number:

WCP 6 / WBE 4D

Component Name:

CR40 Pump / SP001

Component S/N:

SN 03 / SN 04

Vacuum Sealing Surfaces Inspection

By:

Jim For Foreman Rockwell 1/20/98

Buyer:

NUE

Cleanliness Inspection

By:

Jim For Foreman Rockwell 1/20/98

Buyer:

NUE

O-Rings Installed

By:

Jim For Foreman Rockwell 1/20/98

Buyer:

NUE

Comments:

Rework Required:

Title

# COMPONENT ALIGNMENT PROCEDURE

## ATTACHMENT B

### COMPONENT INSTALLATION DATA SHEET

Component Tag Number

WCPL6 / WIBE 4D

Component Name

CR40 Pump / spool

Component S/N

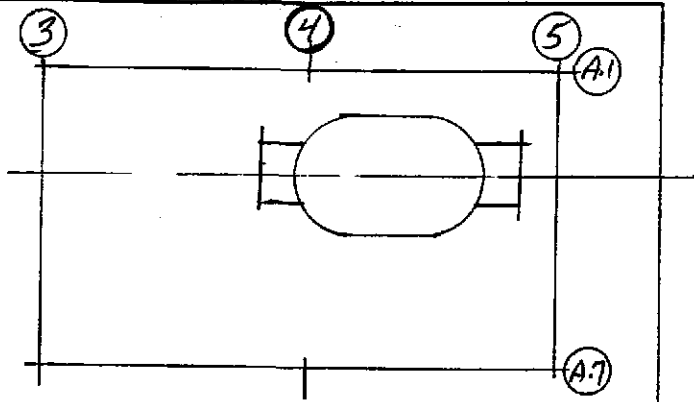
S/N 03 / S/N 04

Component Installation Weight (lb.)

9,000 Lbs

Component Installation Position

(Ref. Build Grid)



Signoffs (Contractor Unless Otherwise Noted)		By	Date
1.	Shipping Cover Cross Hairs Verified	<i>[Signature]</i>	1-12-98
2.	Component Located For Anchor Bolt Marking	<i>[Signature]</i>	1-12-98
		Buyer <i>[Signature]</i>	1-12-98
3.	Final Component Location Complete	<i>[Signature]</i>	1-20-98
		Buyer <i>[Signature]</i>	1-20-98

*[Handwritten note]*

Number  
Rev.

## SPECIFICATION

Number

Rev.

## Apollo Concrete Anchor Installation Report

Project: LIGO Vacuum Equipment Installation & Commissioning		Job No.: M-126	
Drawing: V04A-5-004	Rev. A	Date: 1.14.98	
Item Anchored: WCP 6	No. of Anchors: 16	Size: 1"	Type: HVA

Attribute	a. Installer	b. Accepted	c. N/A	d. Date
Anchor Type (HAS Std or Super)		BW		1-14-98
Spacing & Location		BW		1-14-98
Anchor Size & Length		BW		1-14-98
Hole Size		BW		1-14-98
Hole & Core Condition (no voids, etc.)		BW		1-14-98
Embedment (minus 0 plus 1/8")		BW		1-14-98
Angle (90 deg. ± 1deg.)		BW		1-14-98
Floor Scarified		BW		1-14-98
Proper Nut Engagement		BW		3-11-98
Tightening 400 FT LB-		BW		3-11-98

Torque Device Identification:

Open Items				
Item No.	Description	Corrective Action	Accept	Date

Comments:

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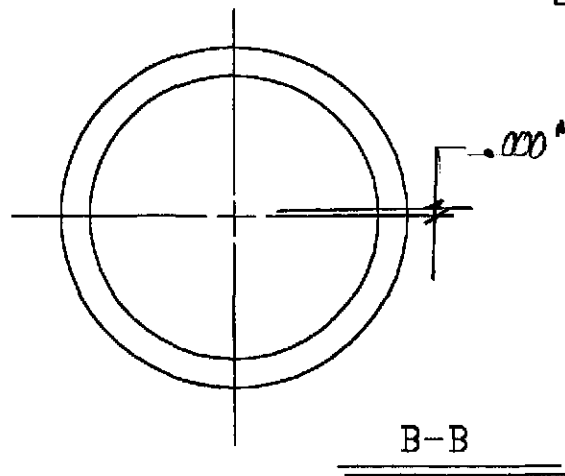
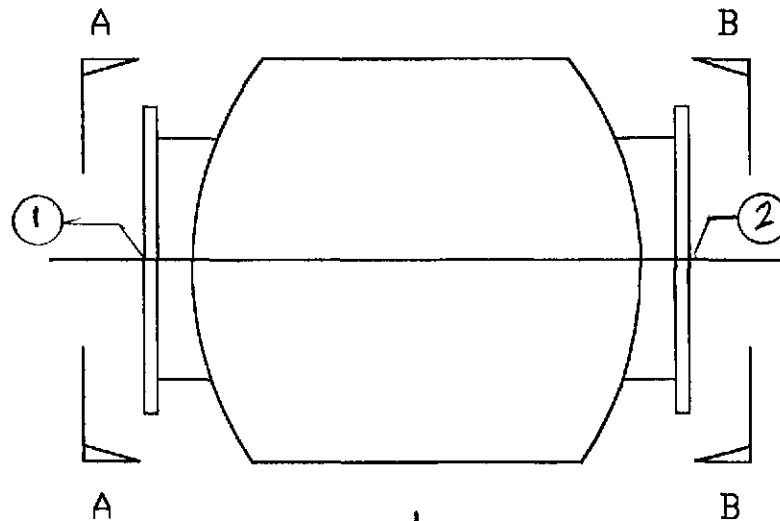
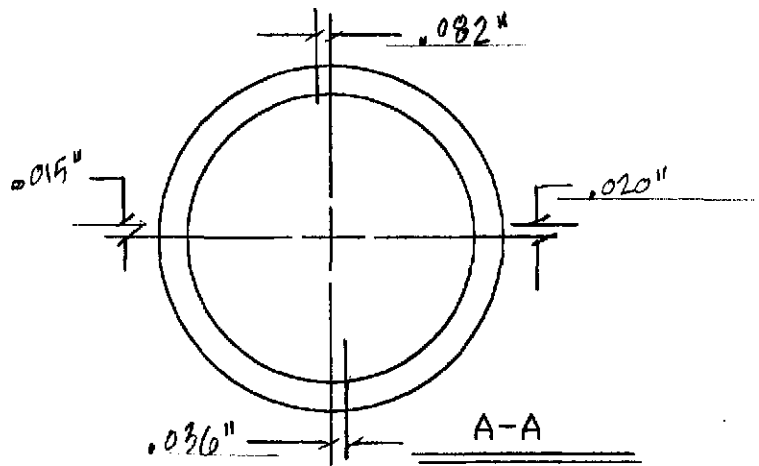


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Inspection by:	Date
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(FOR TILT)

WCP-6	①	②	△
MODEL	.035"	.000	.035"
SHOT	.018"	.000"	.018"

.017" < .079" ✓

Component ID:

WCP-6

Serial No.:

S/N 03

**Apollo**

1207 W. Columbia Dr. Kennewick, Wa 99336

Title:

CRYO PUMP  
INSTALLED POSITION

Job No.: M-126

Project: LIGO Equipment Set

Scale:  
None

Dwn By:

*Meloy*

COMPONENT CLOSE-OUT DATA SHEET

Component Tag Number:

WVG 14

Component Name:

44" Gate Valve

Component S/N:

SN 11

Vacuum Sealing Surfaces Inspection

By:

John For Foreman Rockwell 1/19/98

Buyer:

JMS

Cleanliness Inspection

By:

John For Foreman Rockwell 1/19/98

Buyer:

JMS

O-Rings Installed

By:

- N/A - 1/19/98

Buyer:

JMS

Comments:

Rework Required:

Title

# COMPONENT ALIGNMENT PROCEDURE

## ATTACHMENT B

### COMPONENT INSTALLATION DATA SHEET

Component Tag Number

WVG 14

Component Name

44" Gate Valve

Component S/N

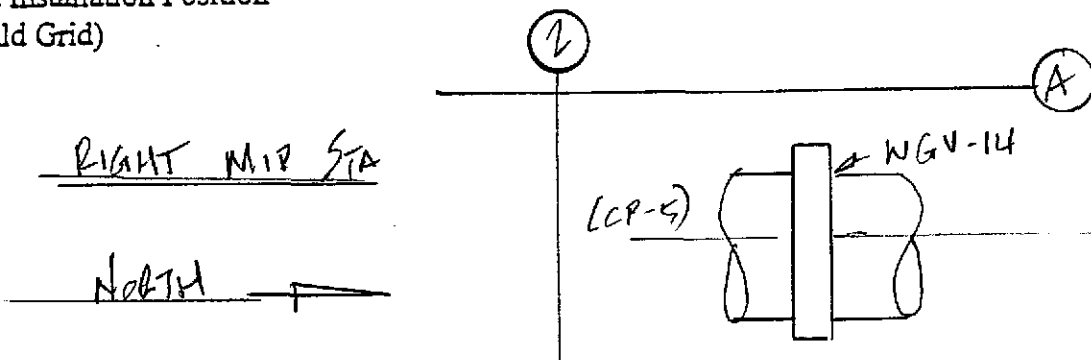
SN M

Component Installation Weight (lb.)

7200 Lbs

Component Installation Position

(Ref. Build Grid)



Signoffs (Contractor Unless Otherwise Noted)	By	Date
1. Shipping Cover Cross Hairs Verified	<i>[Signature]</i> <sup>PO</sup> RAN OLIVER	1/12/98
2. Component Located For Anchor Bolt Marking	<i>[Signature]</i>	1/12/98
	Buyer <i>[Signature]</i>	12 JAN 98
3. Final Component Location Complete	<i>[Signature]</i>	1/20/98
	Buyer <i>[Signature]</i>	12 JAN 98

Number

Rev.

## SPECIFICATION

Number

**A**

V049-2-174

Rev.

**1**

## Apollo Concrete Anchor Installation Report

Project: LIGO Vacuum Equipment Installation & Commissioning		Job No.: M-126	
Drawing: 104A-5-004	Rev. 4	Date: 1/12/98	
Item Anchored: WGV-121	No. of Anchors 4	Size: 3/4"	Type: HVA

Attribute	a. Installer	b. Accepted	c. N/A	d. Date
Anchor Type (HAS Std or Super)		FW		1/12/98
Spacing & Location		FW		1/12/98
Anchor Size & Length		FW		1/12/98
Hole Size		FW		1/12/98
Hole & Core Condition (no voids, etc.)		FW		1/12/98
Embedment (minus 0 plus 1/8")		FW		1/12/98
Angle (90 deg. ± 1deg.)		FW		1/12/98
Floor Scarified		FW		1/12/98
Proper Nut Engagement		FW		3-11-98
Tightening				

Torque Device Identification:

### Open Items

Item No.	Description	Corrective Action	Accept	Date

Comments:

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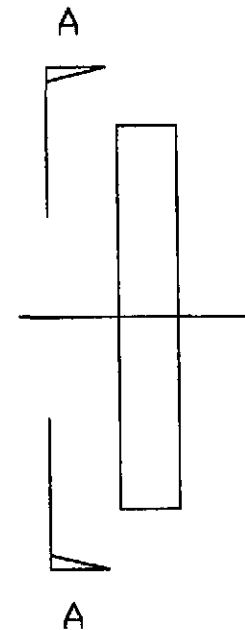
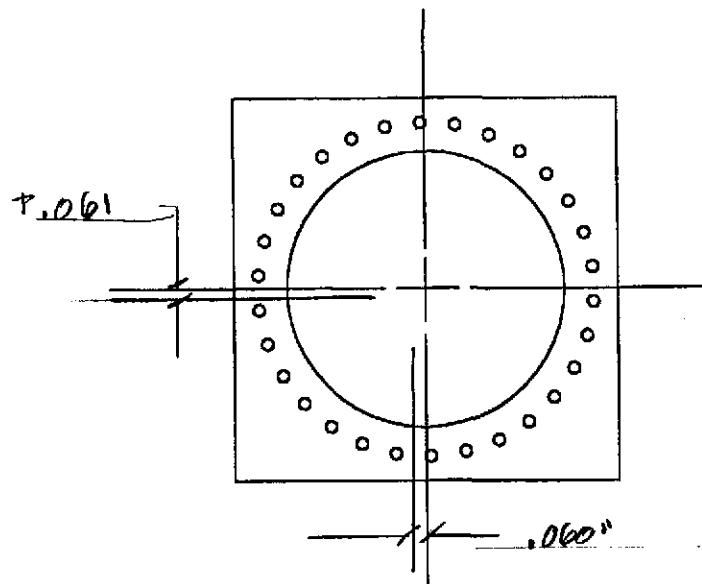
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Inspection by:

Date



A-A  
 (L.H.G. SOUTH)

Component ID: WGV-14  
 Serial No.: 5/N-11

**Apollo**

1207 W. Columbia Dr. Kennewick, Wa 99336

Title: GATE VALVE  
 INSTALLED POSITION

Job No.: M-126

Project: LIGO Equipment Set

Scale: None

Dwn By: MELOY



COMPONENT CLOSE-OUT DATA SHEET

Component Tag Number: WVG 15

Component Name: 44" Gate Valve

Component S/N: SN 15

Vacuum Sealing Surfaces Inspection

By: John For Foreman Rockwell 1/20/08

Buyer: [Signature]

Cleanliness Inspection

By: John For Foreman Rockwell 1/20/08

Buyer: [Signature]

O-Rings Installed

By: - N/A - 1/20/08

Buyer: [Signature]

Comments:

Rework Required:

Title

# COMPONENT ALIGNMENT PROCEDURE

## ATTACHMENT B

### COMPONENT INSTALLATION DATA SHEET

Component Tag Number

WVC 15

Component Name

44" Gate Valve

Component S/N

5/11/15

Component Installation Weight (lb.)

7200 Lbs

Component Installation Position  
(Ref. Build Grid)

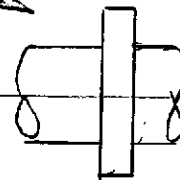
EIGHT MID. STA.

NORTH →

WGV-15

BEAM LINE

4



Signoffs (Contractor Unless Otherwise Noted)	By	Date
1. Shipping Cover Cross Hairs Verified	RON OLIVER	1-13-98
2. Component Located For Anchor Bolt Marking	[Signature]	1-13-98
	Buyer [Signature]	BJAWSS
3. Final Component Location Complete	[Signature]	1/20/98
	Buyer [Signature]	JOTAWSS

Number  
Row

## SPECIFICATION

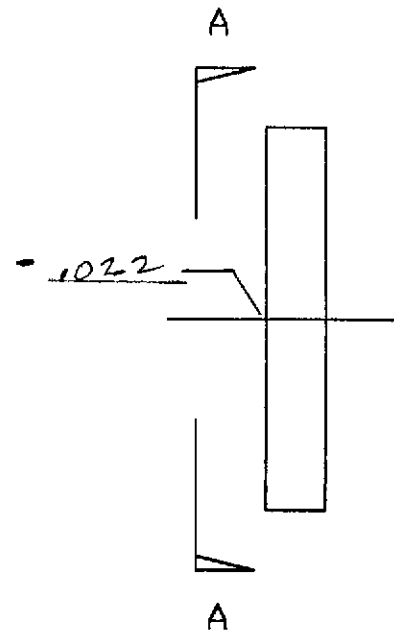
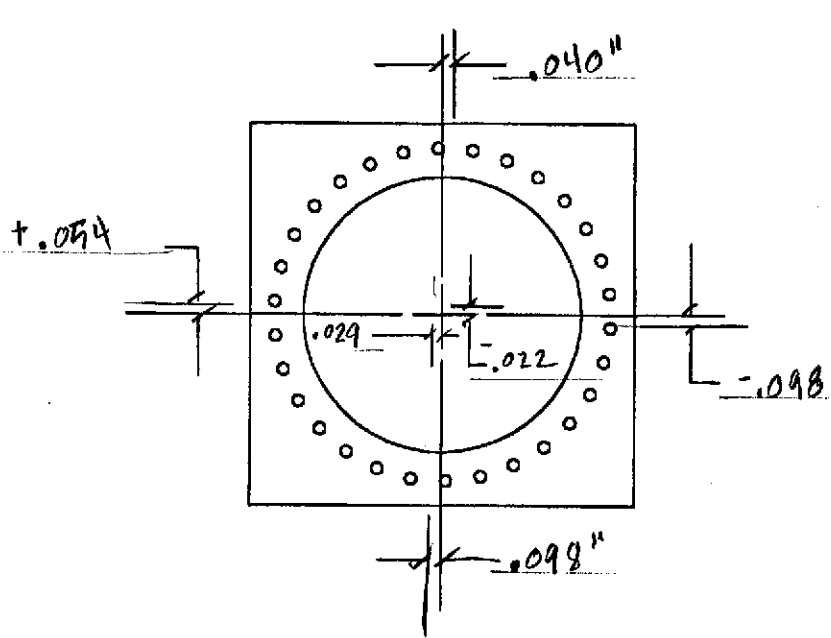
Number

A

V049-2-174

Rev.

1



A-A  
 (LIGA Not.)

Component ID: WIGV-15  
 Serial No.: 5/1

**Apollo**

1207 W. Columbia Dr. Kennewick, Wa 99336

Title: GATE VALVE INSTALLED POSITION	Job No.: M-126	
	Scale: None	Dwn By: <i>Meloy</i>
Project: LIGO Equipment Set		

## Apollo Concrete Anchor Installation Report

Project: LIGO Vacuum Equipment Installation & Commissioning		Job No.: M-126	
Drawing: V049-5-104	Rev: 4	Date: 1-14-98	
Item Anchored: WVG15	No. of Anchors: 4	Size: 3/4"	Type: HVA

Attribute	a. Installer	b. Accepted	c. N/A	d. Date
Anchor Type (HAS Std or Super)		BW		1-14-98
Spacing & Location		BW		1-14-98
Anchor Size & Length		BW		1-14-98
Hole Size		BW		1-14-98
Hole & Core Condition (no voids, etc.)		BW		1-14-98
Embedment (minus 0 plus 1/8")		BW		1-14-98
Angle (90 deg. $\pm$ 1deg.)		BW		1-14-98
Floor Scarified (roughen)		BW		1/15/98
Proper Nut Engagement				
Tightening				

Torque Device Identification:

Open Items				
Item No.	Description	Corrective Action	Accept	Date

Comments:

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Inspection by:	Date
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COMPONENT CLOSE-OUT DATA SHEET

Component Tag Number:

WBSC 05

Component Name:

Bear Splitter

Component S/N:

SN 04

Vacuum Sealing Surfaces Inspection

By:

*[Signature]*

1/27/98

Buyer:

*[Signature]*

Cleanliness Inspection

By:

*[Signature]*

1/27/98

Buyer:

*[Signature]*

O-Rings Installed

By:

*[Signature]*

1/27/98

Buyer:

*[Signature]*

Comments:

Rework Required:

COMPONENT CLOSE-OUT DATA SHEET

Component Tag Number:

WA7A1

Component Name:

SPOOL

Component S/N:

SN 01

Vacuum Sealing Surfaces Inspection

By:

 1/29/98

Buyer:

 29 JAN 98

Cleanliness Inspection

By:

 1/29/98

Buyer:

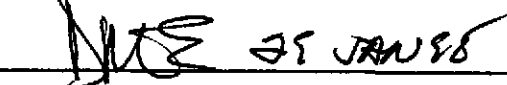
 29 JAN 98

O-Rings Installed

By:

 1/29/98

Buyer:

 29 JAN 98

Comments:

Rework Required:

12.0

Title

# COMPONENT ALIGNMENT PROCEDURE

## ATTACHMENT B

### COMPONENT INSTALLATION DATA SHEET

Component Tag Number

WA 7 A 1

Component Name

Spool

Component S/N

SN 01

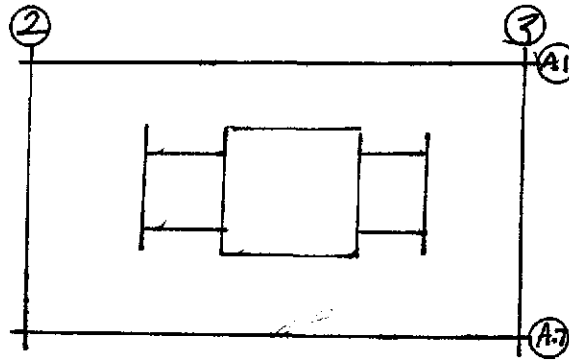
Component Installation Weight (lb.)

Component Installation Position

(Ref. Build Grid)

→  
Bldg North

Right Mid



Signoffs (Contractor Unless Otherwise Noted)		By	Date
1.	Shipping Cover Cross Hairs Venned	<i>[Signature]</i>	1/27/98
2.	Component Located For Anchor Bolt Marking	<i>[Signature]</i>	1/27/98
		Buyer	<i>[Signature]</i>
3.	Final Component Location Complete	<i>[Signature]</i>	1/27/98
		Buyer	<i>[Signature]</i>

Number  
Rev.

## SPECIFICATION

Number

A

V049-2-174

Rev.

1

## Apollo Concrete Anchor Installation Report

Project: LIGO Vacuum Equipment Installation & Commissioning		Job No.: M-126	
Drawing:	Rev. 4	Date: 1/29/98	
Item Anchored: WATAI <sup>SPool</sup>	No. of Anchors 4	Size:	Type: HVA

Attribute	a. Installer	b. Accepted	c. N/A	d. Date
Anchor Type (HAS <u>Std</u> or Super)			BN	1/29/98
Spacing & Location			BN	1/29/98
Anchor Size & Length			BN	1/29/98
Hole Size			BN	1/29/98
Hole & Core Condition (no voids, etc.)			BN	1/29/98
Embedment (minus 0 plus 1/8")			BN	1/29/98
Angle (90 deg. ± 1deg.)			BN	1/29/98
Floor Scarified			BN	1/29/98
Proper Nut Engagement			BN	1/29/98
Tightening 250 FT. LB			nhw	3-11-98
Torque Device Identification: AP-9				

Open Items				
Item No.	Description	Corrective Action	Accept	Date

Comments:

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Inspection by:	Date
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Title

COMPONENT ALIGNMENT PROCEDURE

ATTACHMENT B

COMPONENT INSTALLATION DATA SHEET

Component Tag Number

WB6C-05

Component Name

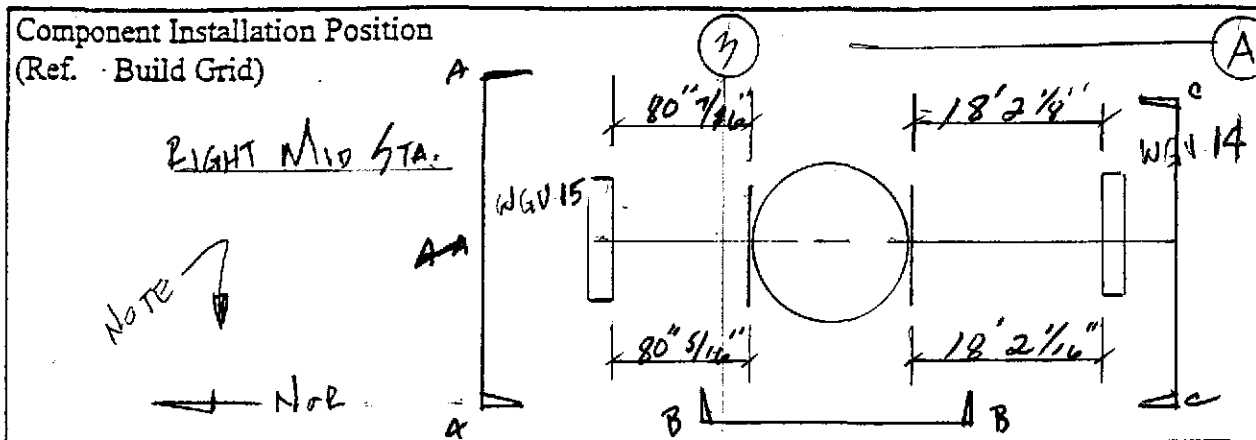
BEAM SPLITTER CHAMBER

Component S/N

SN 04

Component Installation Weight (lb.)

70,000 lb.



Signoffs (Contractor Unless Otherwise Noted)	By	Date
1. Shipping Cover Cross Hairs Verified	ROU OLIVER (oliver)	1/26/98
2. Component Located For Anchor Bolt Marking	John T. Meloy	1/26/98
3. Final Component Location Complete	Buyer <del>WUE</del>	JL STANFORD
	Buyer <del>WUE</del>	1/27/98 JL STANFORD

Number

Rev.

SPECIFICATION

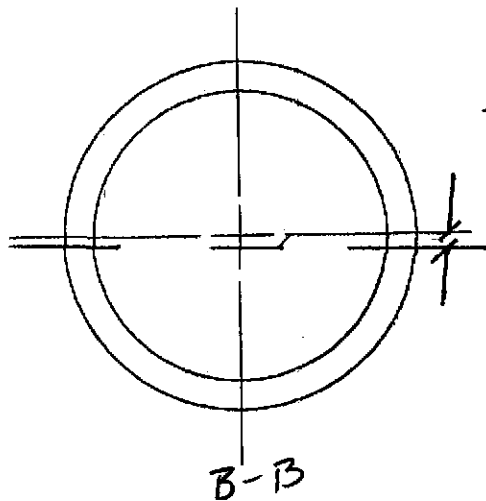
Number

A

V049-2-174

Rev.

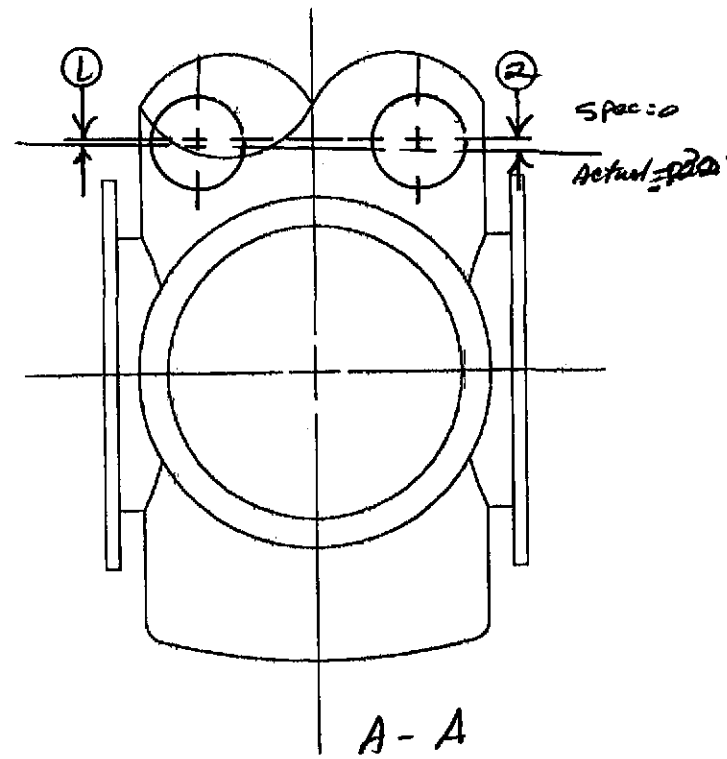
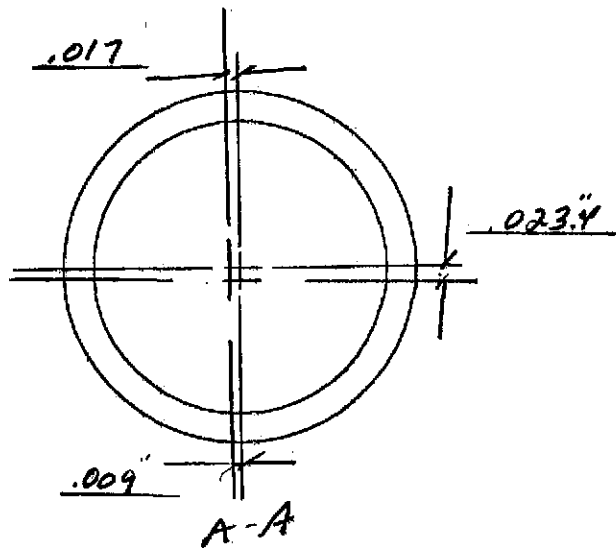
1



Molet = 30.5

shot  
= .040"

WBSC 05	①	②	△
Model	0	0	0
shot	.008	.030	.022



Component ID: WBSC-05

Serial No.: S/N-04

**Apollo**

1207 W. Columbia Dr. Kennewick, Wa 99336

Title: C Ryo Pump  
INSTALLED POSITION

Job No.: M-126

Project: LIGO Equipment Set

Scale: None

Dwn By: *Meroy*

0

### Apollo Expansion Anchor Installation Report

Project: LIGO Vacuum Equipment Installation & Commissioning		Job No.: M-126	
Drawing: <u>V049-5-004</u>	Rev. <u>4</u>	Date: <u>1/27/98</u>	
Item Anchored: <u>W956-5</u>	No. of Anchors <u>16</u>	Size: <u>1"</u>	Type: <u>HVA</u>

Attribute	a. Installer	b. Accepted	c. N/A	d. Date
Anchor Type (HAS <del>Std</del> or Super)		<i>nmj</i>		<u>1/27/98</u>
Spacing & Location		<i>nmj</i>		<u>1/27/98</u>
Anchor Size & Length		<i>nmj</i>		<u>1/27/98</u>
Hole Size		<i>nmj</i>		<u>1/27/98</u>
Hole & Core Condition (no voids, etc.)		<i>nmj</i>		<u>1/27/98</u>
Embedment (minus 0 plus 1/8")		<i>nmj</i>		<u>1/27/98</u>
Angle (90 deg. ± 1deg.)		<i>nmj</i>		<u>1/27/98</u>
Floor Scarified (if required)		<i>nmj</i>		<u>1/27/98</u>
Proper Nut Engagement		<i>nmj</i>		<u>3-11-98</u>
Tightening <u>250 Ft LB</u>		<i>nmj</i>		<u>3-11-98</u>

Torque Device Identification: AP-9

Open Items				
Item No.	Description	Corrective Action	Accept	Date

Comments:

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Inspection by:	Date
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COMPONENT CLOSE-OUT DATA SHEET

Component Tag Number:

WCP 8 / WBE4H

Component Name:

Cryo Pump / spot

Component S/N:

S/N 03 / SN 08

Vacuum Sealing Surfaces Inspection

By:

(Signature) 2/4/98

Buyer:

(Signature) 4 FEB 98

Cleanliness Inspection

By:

(Signature) 2/4/98

Buyer:

(Signature) 4 FEB 98

O-Rings Installed

By:

(Signature) 2/4/98

Buyer:

(Signature) 4 FEB 98

Comments:

Rework Required:

12.0

Title

# COMPONENT ALIGNMENT PROCEDURE

## ATTACHMENT B

### COMPONENT INSTALLATION DATA SHEET

Component Tag Number

WCP 8 / WBE4H

Component Name

Crk Pump / Spool

Component S/N

SN 03 / SN 08

Component Installation Weight (lb.)

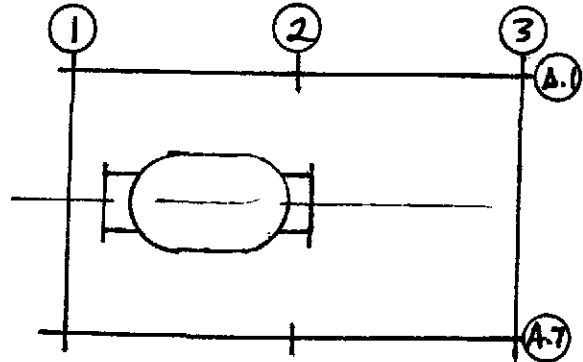
9000 Lbs

Component Installation Position

(Ref. Build Grid)

→  
Bldg North

Right END  
At



Signoffs (Contractor Unless Otherwise Noted)	By	Date
1. Snipping Cover Cross Hairs verified	<i>[Signature]</i> PON OLIVET	1-29-98
2. Component Located For Anchor Bolt Marking	<i>[Signature]</i>	1-29-98
3. Final Component Location Complete	Buyer <i>[Signature]</i>	39JAUSF
	Buyer <i>[Signature]</i>	2-4-98
	<i>[Signature]</i>	39JAUSF

## SPECIFICATION

Number

A

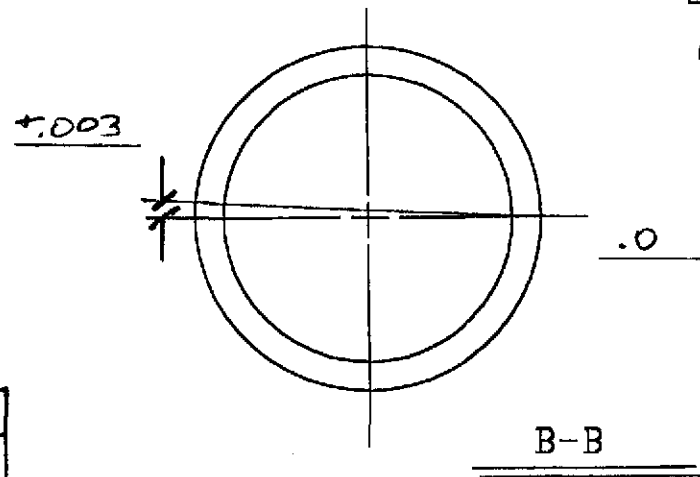
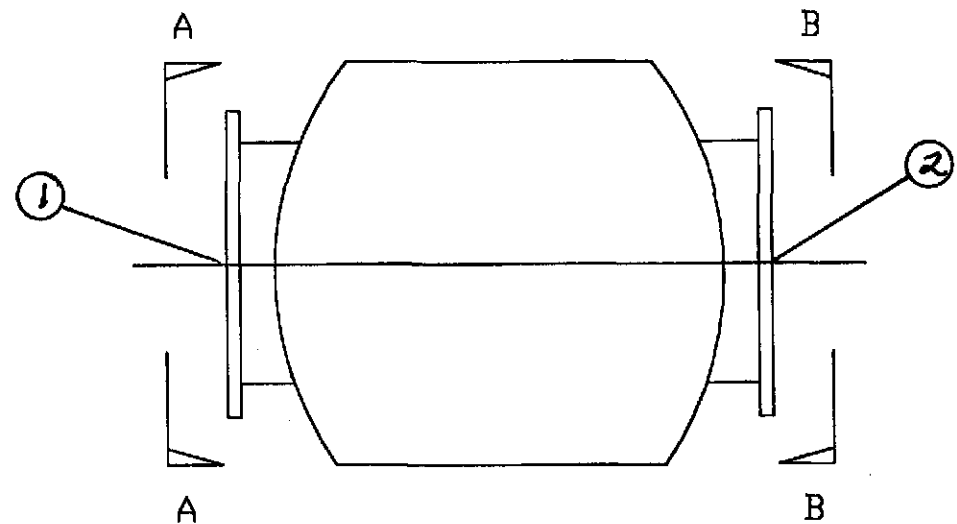
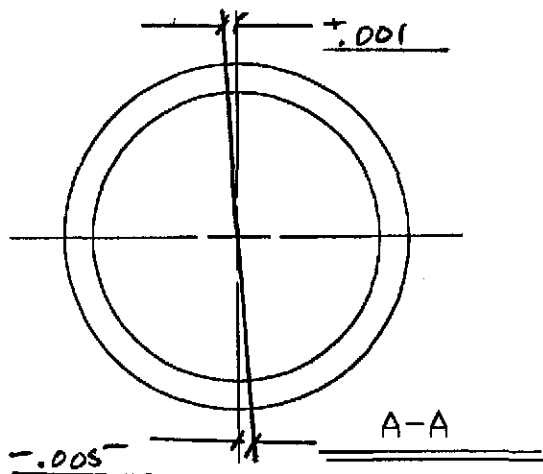
V049-2-174

Rev.

1

Number

Rev.



	①	②	△
CALE	0	0	0
Shot	.001	.003	.002

Component ID: WCP-8  
 Serial No.: SN 03

**Apollo**

1207 W. Columbia Dr. Kennewick, Wa 99336

Title: CRYO PUMP  
INSTALLED POSITION

Job No.: M-126

Project: LIGN Equipment Set

Scale:  
None

Dwn By:

## Apollo Concrete Anchor Installation Report

Project: LIGO Vacuum Equipment Installation & Commissioning		Job No.: M-126	
Drawing:	Rev. 4	Date: 2/2/98	
Item Anchored: <i>Cryo Pump wcp8</i>	No. of Anchors: 16	Size:	Type: HVA

Attribute	a. Installer	b. Accepted	c. N/A	d. Date
Anchor Type (HAS Std or Super)		<i>BN</i>		<i>2/2/98</i>
Spacing & Location		<i>BN</i>		<i>2/2/98</i>
Anchor Size & Length		<i>BN</i>		<i>2/2/98</i>
Hole Size		<i>BN</i>		<i>2/2/98</i>
Hole & Core Condition (no voids, etc.)		<i>BN</i>		<i>2/2/98</i>
Embedment (minus 0 plus 1/8")		<i>BN</i>		<i>2/2/98</i>
Angle (90 deg. + 1deg.)		<i>BN</i>		<i>2/2/98</i>
Floor Scarified		<i>BN</i>		<i>2/4/98</i>
Proper Nut Engagement		<i>BN</i>		<i>2/4/98</i>
Tightening <i>400 FT LB</i>		<i>BN</i>		<i>3-11-98</i>

Torque Device Identification: *UNGI #10*

### Open Items

Item No.	Description	Corrective Action	Accept	Date

Comments:

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Inspection by: <i>Bill D. Williams</i>	Date: <i>2/4/98</i>
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COMPONENT CLOSE-OUT DATA SHEET

Component Tag Number:

LGU 10 / WAIF

Component Name:

44" Gate Valve / spool

Component S/N:

SN/29

Vacuum Sealing Surfaces Inspection

By:

[Signature] 2/10/98

Buyer:

[Signature] 10 FEB 98

Cleanliness Inspection

By:

[Signature] 2/10/98

Buyer:

[Signature] 10 FEB 98

O-Rings Installed

By:

[Signature] 2/10/98

Buyer:

[Signature] 10 FEB 98

Comments:

LGU 10 Replaces WGU 20

Rework Required:

Title

# COMPONENT ALIGNMENT PROCEDURE

## ATTACHMENT B

### COMPONENT INSTALLATION DATA SHEET

Component Tag Number

LGV 010 / WAIF

Component Name

44" Gate Valve / Spool

Component S/N

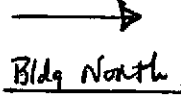
SN 29 / SN 06

Component Installation Weight (lb.)

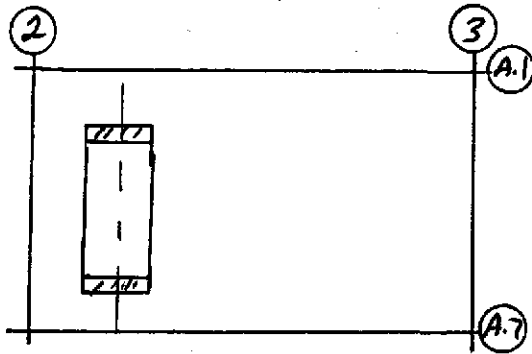
7200 Lbs

Component Installation Position

(Ref. Build Grid)



Right End



	Signoffs (Contractor Unless Otherwise Noted)	By	Date
1.	Shipping Cover Cross Hairs Verified	<i>[Signature]</i> RON OLIVER	2/4/98
2.	Component Located For Anchor Bolt Marking	<i>[Signature]</i>	2/4/98
		Buyer	4 FEB 1998
3.	Final Component Location Complete	<i>[Signature]</i>	2/10/98
		Buyer	4 FEB 1998

Number  
Rev.

## SPECIFICATION

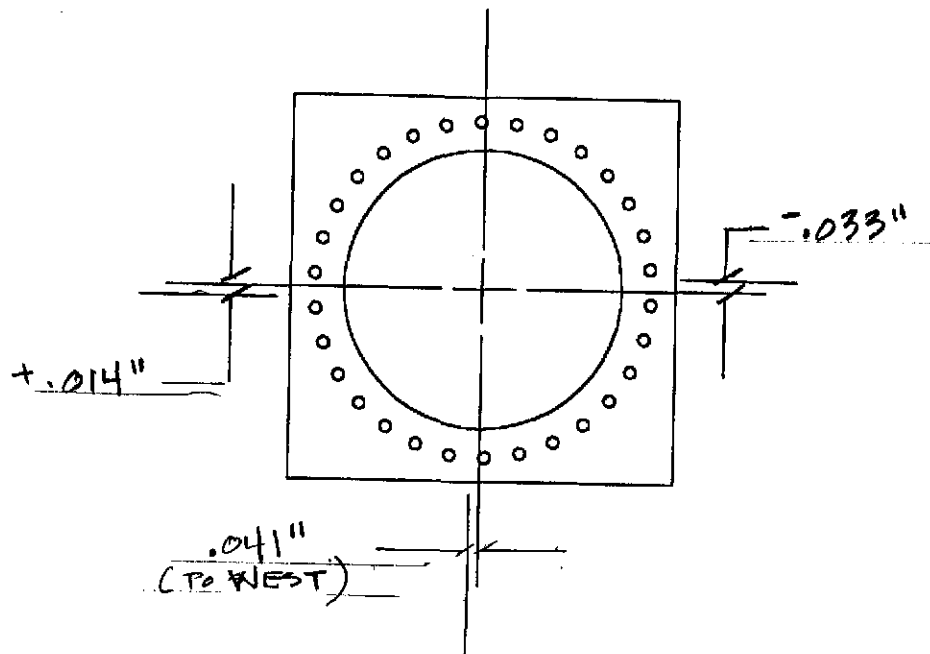
Number

**A**

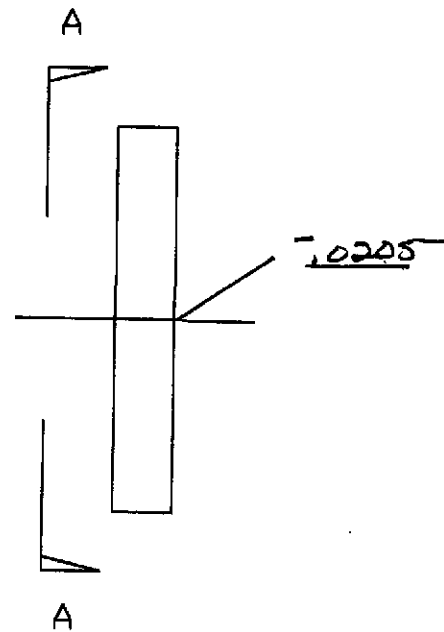
V049-2-174

Rev.

**1**



A-A  
(LKG SOUTH)



Component ID: LGV-10  
 Serial No.: SN 29

**Apollo**

1207 W. Columbia Dr. Kennewick, Wa 99336

Title: GATE VALVE INSTALLED POSITION	Job No.: M-126	
	Scale: None	Dwn By:
Project: LIGO Equipment Set		

## Apollo Concrete Anchor Installation Report

Project: LIGO Vacuum Equipment Installation & Commissioning		Job No.: M-126		
Drawing:	Rev. 4	Date: 2/2/98		
Item Anchored: LGV 10 44" GATE VALVE	No. of Anchors 4	Size:	Type: HVA	
Attribute	a. Installer	b. Accepted	c. N/A	d. Date
Anchor Type (HAS Std or Super)		BW		2/5/98
Spacing & Location		BW		2/5/98
Anchor Size & Length		BW		2/5/98
Hole Size		BW		2/5/98
Hole & Core Condition (no voids, etc.)		BW		2/5/98
Embedment (minus 0 plus 1/8")		BW		2/5/98
Angle (90 deg. + 1deg.)		BW		2/5/98
Floor Scarified		BW		2/10/98
Proper Nut Engagement		BW		2/10/98
Tightening				
Torque Device Identification:				

Open Items				
Item No.	Description	Corrective Action	Accept	Date

Comments:

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Inspection by:	Date
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COMPONENT CLOSE-OUT DATA SHEET

Component Tag Number: WBSC 09 / WA-7A2

Component Name: Beam Splitter / SPOOL

Component S/N: SN / 10 / SN 02

Vacuum Sealing Surfaces Inspection

By: [Signature] 2/11/98

Buyer: [Signature] 11 FEB 98

Cleanliness Inspection

By: [Signature] 2/11/98

Buyer: [Signature] 11 FEB 98

O-Rings Installed

By: [Signature] 2/11/98

Buyer: [Signature] 11 FEB 98

Comments:

Rework Required:

Title

# COMPONENT ALIGNMENT PROCEDURE

## ATTACHMENT B

### COMPONENT INSTALLATION DATA SHEET

Component Tag Number

WBSC 09

Component Name

Beam Splitter

Component S/N

SN 10

Component Installation Weight (lb.)

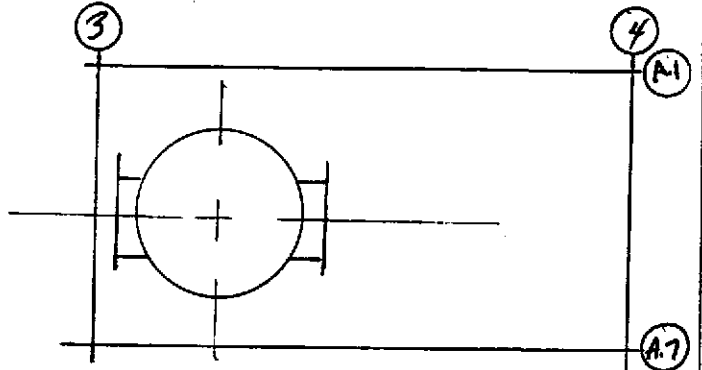
20,000 lbs

Component Installation Position

(Ref. Build Grid)

Bldg North

Right End



	Signoffs (Contractor Unless Otherwise Noted)	By	Date
1.	Shipping Cover Cross Hairs Verified	<i>[Signature]</i>	2/2/98
2.	Component Located For Anchor Bolt Marking	<i>[Signature]</i>	2/9/98
		<i>[Signature]</i>	2/2/98
3.	Final Component Location Complete	Buyer: <i>[Signature]</i>	9 FEB 98
		Buyer: <i>[Signature]</i>	2/11/98
		Buyer: <i>[Signature]</i>	9 FEB 98

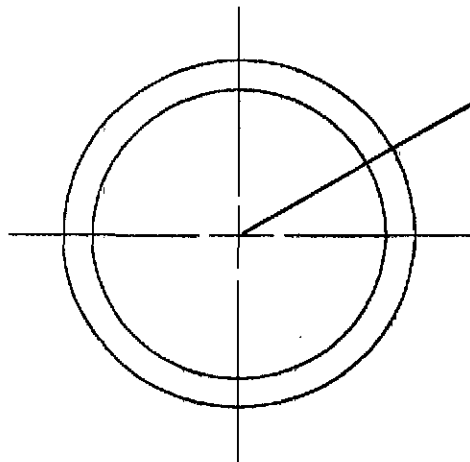
Number

Rev.

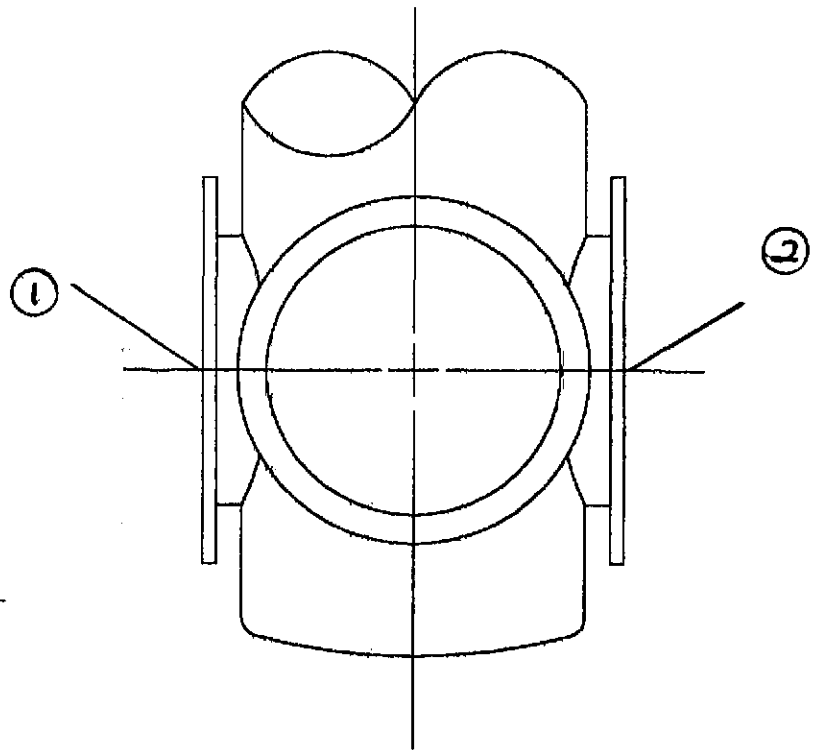
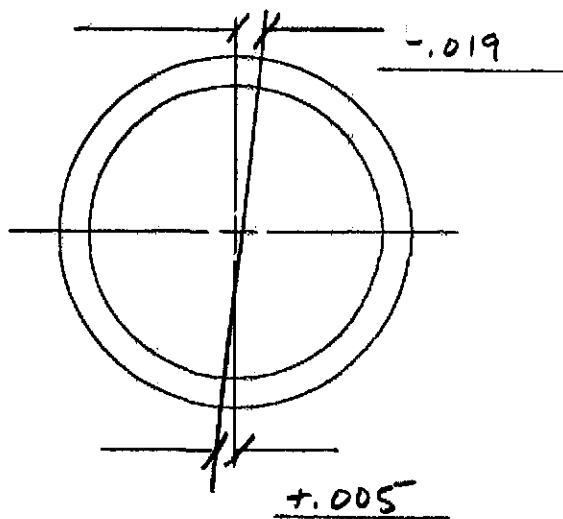
## SPECIFICATION

Number

Rev.



Bore N $\Rightarrow$ S = -0.013



	①	②	△
CAK	0	0	0
shot	.022	.002	.024

Component ID:

WBSC-09

Serial No.:

SN 10

**Apollo**

1207 W. Columbia Dr. Kennewick, Wa 99336

Title:

CRYO Pump  
INSTALLED POSITION

Job No.:

M-126

Project:

LIGO Equipment Set

Scale:

None

Dwn By:

## Apollo Concrete Anchor Installation Report

Project: LIGO Vacuum Equipment Installation & Commissioning		Job No.: M-126		
Drawing:	Rev. 4	Date: 2/9/98		
Item Anchored: WBSC 09	No. of Anchors	Size:	Type: HVA	
Attribute	a. Installer	b. Accepted	c. N/A	d. Date
Anchor Type (HAS Std or Super)		BN		2/9/98
Spacing & Location		BN		2/9/98
Anchor Size & Length		BN		2/9/98
Hole Size		BN		2/9/98
Hole & Core Condition (no voids, etc.)		BN		2/9/98
Embedment (minus Ø plus 1/8")		BN		2/9/98
Angle (90 deg. + 1deg.)		BN		2/9/98
Floor Scarified		BN		2/9/98
Proper Nut Engagement		BN		2/11/98
Tightening 400 FT LB / 250 FT/LB		BN		3/11/98
Torque Device Identification: UNSE # 10. / AP-9				

Open Items				
Item No.	Description	Corrective Action	Accept	Date

Comments:

250 FT-LB. TORQUE APPLIES TO GPOOL WATER VALVE

3-11-98

Inspection by:	Date
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