PHENIX MuTr STATION 2 NORTH SPIDER INSTALLATION PROCEDURE

procedure name

PHENIX Procedure No. PP-2.5.5.4-19

Revision: A **Date: 4-22-02**

Hand Processed Changes

HPC No.	Date	Page Nos.	Initials

Approvals

4/22/02
PHENIX S E & I Date

4/22/02
Cognizant Scientist/Engineer Date
/Activity Manager

4/22/02
PHENIX Safety Date

CA-D LIAISON Date

INTERNAL PROCEDURE

REVISION CONTROL SHEET

LETTER	DESCRIPTION	DATE	WRITTEN BY	APPROVED BY	CURRENT OVERSIGHT
A	First Issue	04/22/2002	n/a	P. Kroon, D. Lee, W. Lenz	n/a
RETIRED	Installation Complete	3/21/2007	n/a	D. Lynch, P. Giannotti, R. Pisani for PHENIX	D. Lynch

Station 2 North Spider Installation Procedure

1.0 Purpose and Scope

1.1 The purpose of this procedure is to provide direction for the rigging of the station 2 North support "spider". This structure locates all eight station 2 detectors in the North muon magnet. This procedure will provide detailed instructions for the safe installation of the support "spider" onto its mounting location off the back of the "teacup" and flanges on the bottom three lampshade panels.
Note that the weight for each half of the "spider" is 350 pounds.

2.0 Responsibilities

2.1 All operations shall be performed under the direction of the PHENIX experimental hall "person-in-charge", or their designee.

2.2 Due to the delicacy of this structure, and the critical alignment of its assembly in the magnet, this procedure and all relevant BNL safety guidelines must be strictly adhered to. In accordance with BNL policy, any individual may cease operations if they in any way feel unsafe or if they believe unsafe procedures are being followed, such a complaint shall be reviewed by the cognizant engineer, and if necessary, BNL ES&H service.

3.0 Prerequisites

3.1 Training: All personnel involved in this procedure shall have reviewed this procedure, and be fully knowledgeable about the way in which the support "spider" is assembled in the North magnet. A meeting will take place with all participants involved with this installation to review all aspects and answer any questions that any of the personnel may have.

3.2 All personnel involved with in this procedure shall have current BNL safety training requirements met to work in the PHEINX assembly hall, as part of Bldg.1008. The crane operator must have a current BNL crane operation safety training.

3.3 All personnel involved in this procedure shall wear hardhats and safety shoes.

4.0 Precautions

4.1 The area where rigging operations will be performed shall be cordoned-off to all personnel except the "person in charge" and the technicians assigned to perform this procedure.

4.2 Some operations will require personnel to work in close proximity to suspended loads. Do not permit anyone to be positioned under the load.

4.3 Lift half spiders by the swivel eyes attached to the hub, or approved slings attached to the spider framing as required.

5.0 Equipment List

5.1 Appropriate slings for lifting 1000 pounds and shackles

5.2 Two-3/8 lifting swivel eyes (supplied by Kenny Jones) – Jergens part # 23408 rated for 1000 lbs. each.

5.3 Guide ropes.

6.0 Preparation

6.1 Mount 6 aluminum support brackets to top half of spider using 3/8-16 x 1-1/2 inch stainless steel hex head screw, (provided by Kenny Jones). Drawing number 126Y-267806, D2. On the lower half spider attach 6 aluminum brackets as called out on drawing 126Y-267806, D3. On the two splice tube weldments attach 4 aluminum brackets as indicated on drawing 126Y-267806, D6. The drawing of the overall assembly of the support spider is 126Y-267806, D1.

6.2 For each half spider install 3 3/8-16 x 2 inch long set screws where indicated on the hub on drawing 126Y-267806, D4-5.

7.0 Procedure

7.1 Bottom half spider.

7.1.1 The hub flange faces the upstream side of the notch in the piston or in the direction of station 1. Approximate weight 300 pounds.

7.1.2 After lowering the bottom half on to the wooden platform in the bottom of magnet, attach two slings to the junction of the outer radial spokes with the hub. See drawing 126Y-267806, D3. The slings will need to be long enough to go on either side of the magnet piston.

7.1.3 Move spoke portion of the half spider towards the magnet back plate with the hub facing the piston.

7.1.4 The six aluminum mounting blocks should be attached to the half spider using the 3/8-16 x 1.5 inch, hex head, stainless, and bolts. These bolts should not be completely tight. A ½-13 x 1.5 inch, socket head, stainless bolt is placed through the outer support bar and the aluminum block. This will be the fastener that mounts the half spider to the bottom three lampshade panels.

7.1.5 Lift the lower half of the spider into position in the piston notch, attach using the ½-13 socket head bolts, do not completely tighten until the top half of the spider and the splice tubes are attached.

7.2 Top half spider

7.2.1 The hub flange faces the upstream side of the piston notch, or station 1 side. See drawings 126Y-267806, sheets D1,2,3.

7.2.2 Attach two slings, of the proper load rating, to the junction of the outer support bars and central radial spoke (# 3 and 4 on drawing 126Y-267806, D2).

7.2.3 Attach guide ropes to the outer radial spokes to help position. Have all six aluminum mounting blocks attached to the outer support bars. Do not completely tighten.

7.2.4 Lift and lower the top half spider into place and attach to the teacup at the outside boundary. Attach upper half of spider to teacup flange using 6 ½-13 x 1.5 inch long socket head screws. These are installed through the outer support bar – through the aluminum support brackets, into the teacup flange. Do not fully tighten until spider is fully assembled.

7.3 Splice tube weldments

7.3.1 Attach the two splice tube weldment assemblies as shown in the overall spider assembly drawing 126Y-267806, D1. The weldment tubes are shown on 126Y-267806, D6. These tubes bolt to the two spider halves; each uses 4 bolts with washers and nuts.

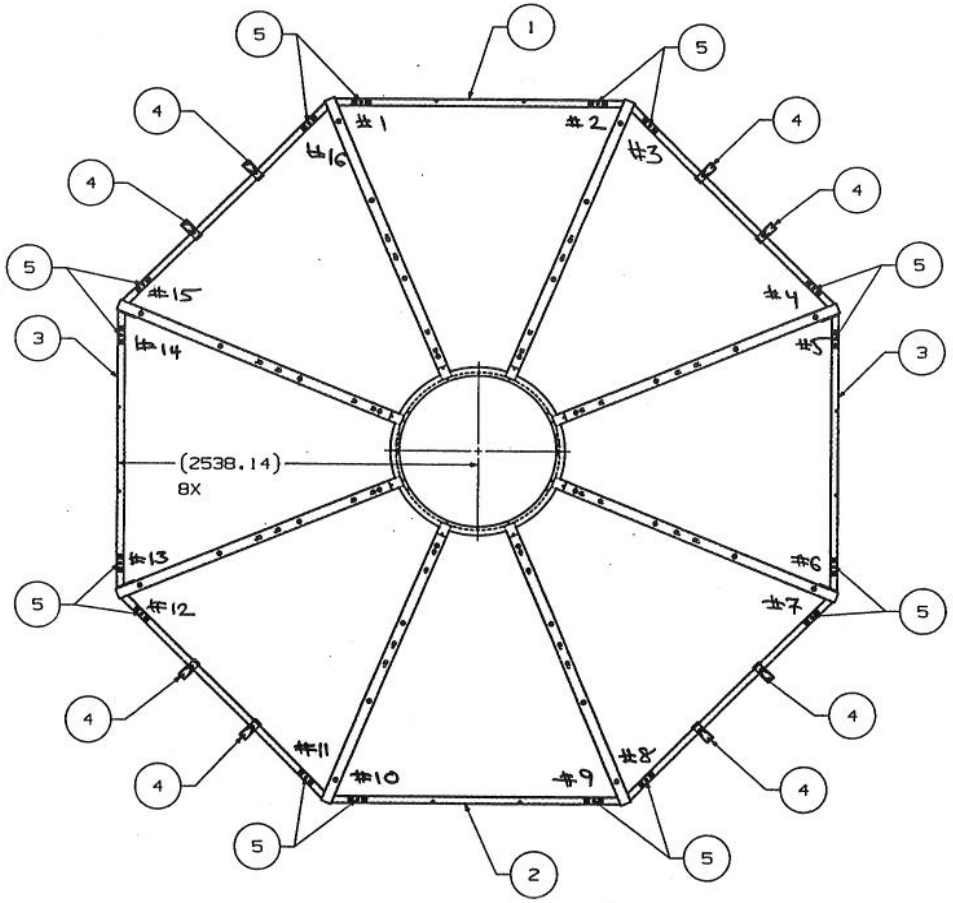
7.3.2 Prior to alignment, it is possible to use the 6 – 3/6-16 x 3 inch long screws that pass through the spider hub, to help fine position the spider assembly to the teacup. Tighten all bolts.

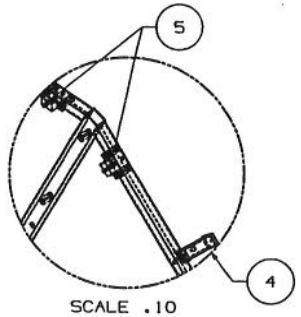
8.0 Alignment

8.1 Survey the spider assembly.

8.1.1 There are 32 paste on targets around the outer support bars and weldment bars, two per aluminum mounting block. They are placed on the stainless inserts that have been machined parallel to the tube. The surfaces of these inserts will set the plane for the spider. There are a couple of paste on targets close to the spider hub. The aluminum spider mounting blocks have been machined to give a designed surface of the back of the teacup at a PHENIX Z value of 3,400 mm from the IP. The plane for the outer 32 targets should be within a plane that is better then 1mm in Z.

LOOKING (PHENIX) NORTH, SPIDER SUPPORT BLOCK #'s





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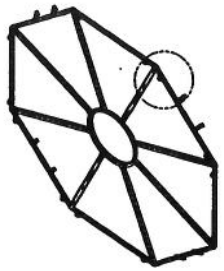

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NOV 09 2001

ALL DIMENSIONS IN MILLIMETERS

PARTS LIST

ITEM NO.	QTY	DWG. NO.	DESCRIPTION
1	1	002-0212-360-02	TOP FRAME SUB-ASSEMBLY
2	1	002-0212-360-03	BOTTOM FRAME SUB-ASSEMBLY
3	2	002-0212-360-06	SPLICE TUBE WELDMENT
4	8	002-0212-360-010	REAR OCTANT STABILIZER
5	16	002-0212-360-011	SUPPORT BRACKET

REVISIONS						
A		INITIAL RELEASE	10/01			WALT
		ORIGINAL ISSUE				

NOTES: UNLESS OTHERWISW SPECIFIED

1. DIMENSIONS AND TOLERANCES PER ANASI Y14.5M-1994
2. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
3. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAX. OF .4
4. ALL INSIDE CORNERS TO BE .4 RADIUS MAX.
5. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
6. COUNTERSINK 82 DEGREES APPROXIMATELY .8 DEEP ALL DRILLED HOLES
7. PARTS TO BE THOROUGHHLY CLEANED TO REMOVE ALL OIL, GREESE, DIRT AND CHIPS

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	SIGNATURE	DATE	GROUP
DESIGNED	WALT	10/01	P-25
DRAWN			
CHECKED			
FULL CHK.			
APPROVED			
RELEASED			

DRAWN UNC
TITLE CHECK UNC

TITLE
STATION 2 NORTH
SPIDER SUPPORT
RING ASSEMBLY

PHENIX DRAWING NO. 002-0212-260-01

TOLERANCE-UNLESS OTHERWISE NOTED:
XX± .25 ANGULAR ± .25°
0.XX± 0.XXX± FINISH 3.2

SCALE	SIZE	DRAWING NO.	REV
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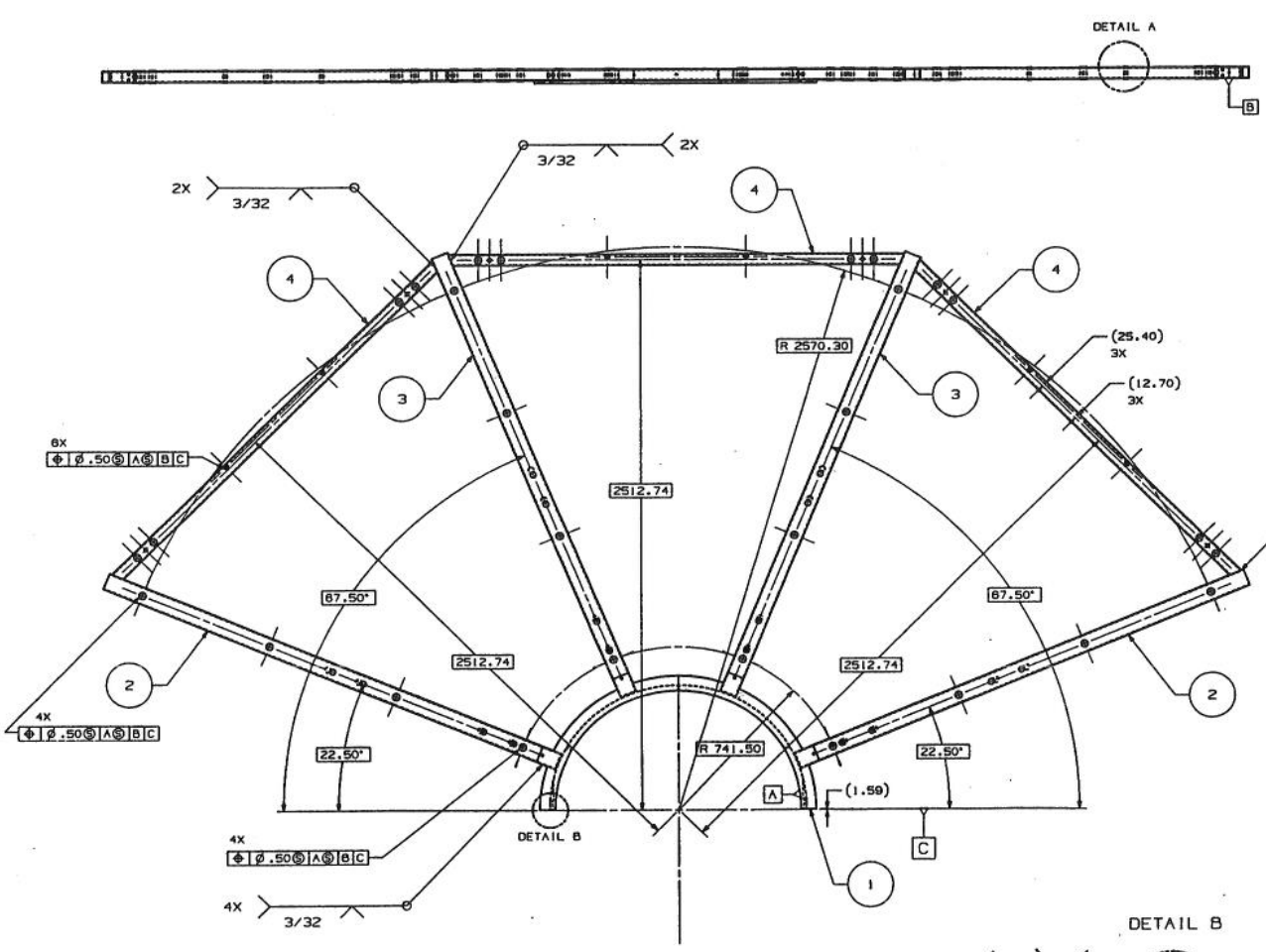

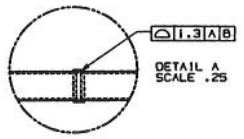

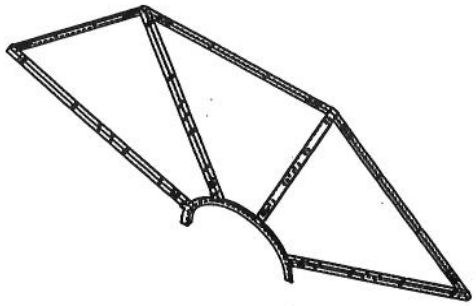

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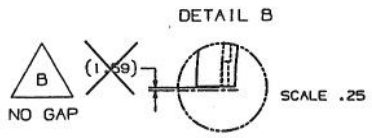

US DEC 07 2001

ALL DIMENSIONS IN MILLIMETERS

PARTS LIST

ITEM NO.	QTY.	DWG. NO.	DESCRIPTION
1	1	002-0212-360-D4	UPPER SUPPORT RING
2	2	002-0212-360-D7	OUTER RADIAL SPOKE
3	2	002-0212-360-D8	CENTRAL RADIAL SPKE
4	3	002-0212-360-D9	OUTER SUPPORT BARS

B		1/16" GAP REMOVED	12/01	WALT		WALT
A		INITIAL RELEASE	10/01			WALT
		ORIGINAL ISSUE				

NOTES: UNLESS OTHERWISW SPECIFIED

1. DIMENSIONS AND TOLERANCES PER ANASI Y14.5M-1994
2. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
3. REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAX. OF .4
4. ALL INSIDE CORNERS TO BE .4 RADIUS MAX.
5. COUNTERSINK 82 DEGREES ALL TAPPED HOLES TO MAJOR DIAMETER
6. COUNTERSINK 82 DEGREES APPROXIMATELY .8 DEEP ALL DRILLED HOLES
7. PARTS TO BE THOROUGHLY CLEANED TO REMOVE ALL OIL, GREESE, DIRT AND CHIPS

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	SIGNATURE	DATE	GROUP
DRAWN	WALT	10/01	P-25
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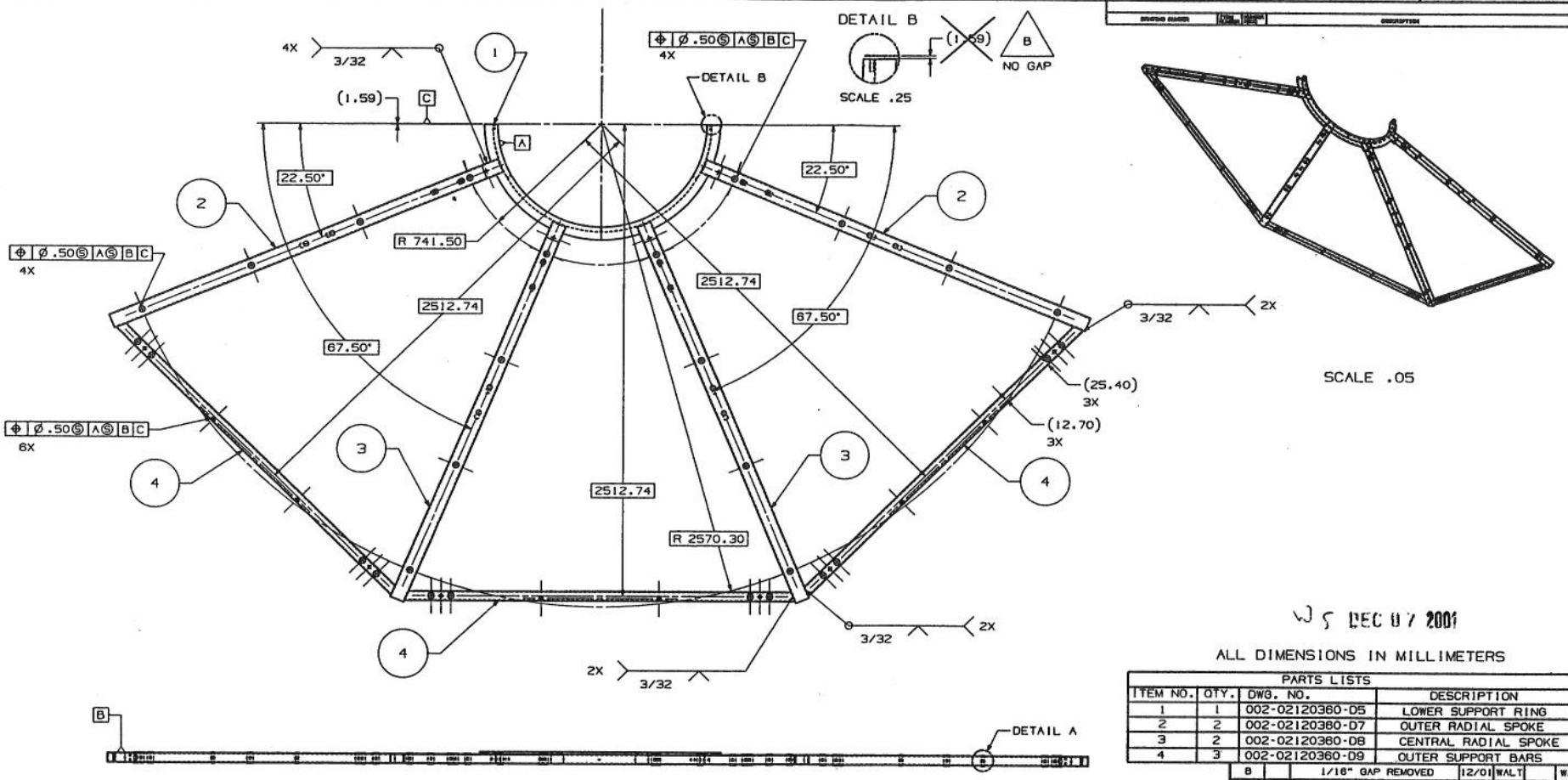
APPROVED			

STATION 2 NORTH
SUPPORT SPIDER
UPPER ASSEMBLY

PHENIX DRAWING NO. 002-0212-360-D2

SCALE 1/10

126Y-267806 D 2



WJ S DEC 07 2001

ALL DIMENSIONS IN MILLIMETERS

PARTS LISTS

ITEM NO.	QTY.	DWG. NO.	DESCRIPTION
1	1	002-02120360-D5	LOWER SUPPORT RING
2	2	002-02120360-D7	OUTER RADIAL SPOKE
3	2	002-02120360-D8	CENTRAL RADIAL SPOKE
4	3	002-02120360-D9	OUTER SUPPORT BARS

B		1/16" GAP REMOVED	12/01	WALT	WALT
A		INITIAL RELEASE	10/01		WALT
		ORIGINAL ISSUE			

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	SIGNATURE	DATE	GROUP
DRAWN	WALT	10/01	P-25
CHKD			
ENGR			
PROJ ENGR			
APPROVED			
RELEASED			

TITLE: STATION 2 NORTH SUPPORT SPIDER LOWER ASSEMBLY

PHENIX DRAWING NO. 002-0212-360 D3

TOLERANCE UNLESS OTHERWISE NOTED: XXX ±.25 ANGULAR ±.25

SCALE 1/10 | SIZE D | 126Y-267806 D 3

NOTES: UNLESS OTHERWISW SPECIFIED

1. DIMENSIONS AND TOLERANCES PER ANASI Y14.5M-1994
2. SURFACE TEXTURE PER ANI/ASME B 46.1-1985
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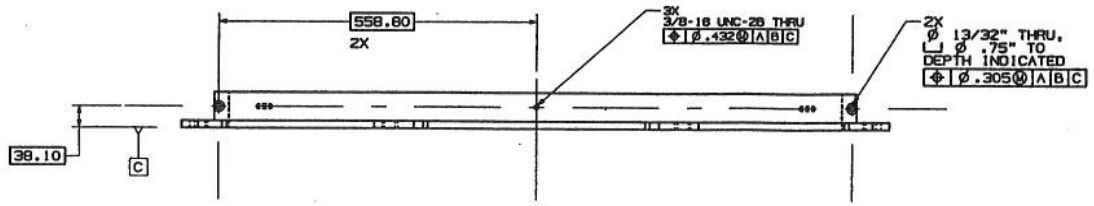
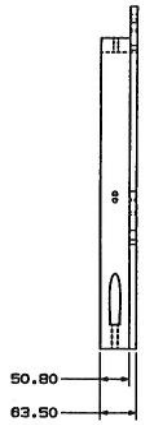
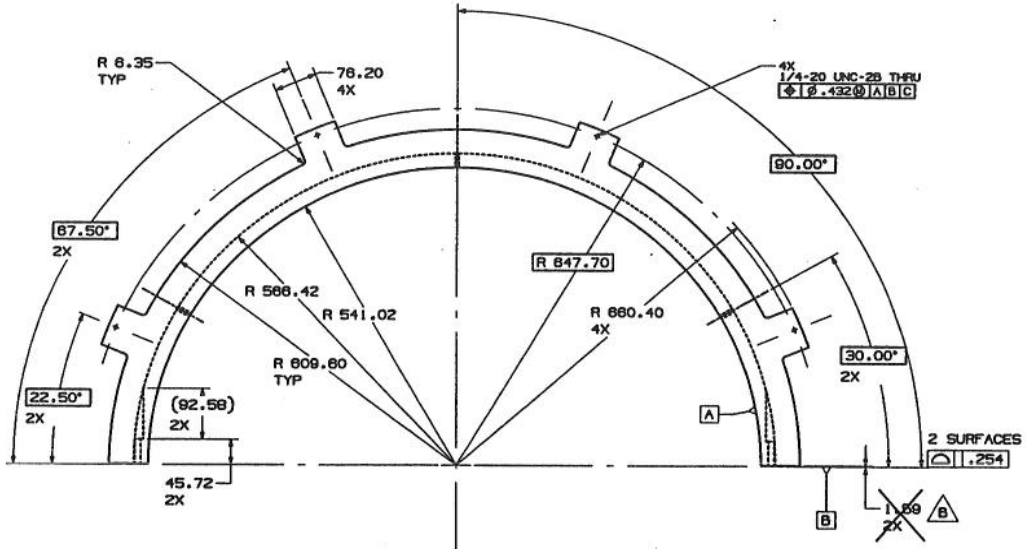
DETAIL A
SCALE .25







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ALL DIMENSIONS IN MILLIMETERS

B		MACHINE WITH OUT GAP	11/01	WALT		WALT
A		INITIAL RELEASE	11/01			WALT
		ORIGINAL ISSUE				
REVISION LETTER	ALPHA AUTH	REVISIONS	DATE	Originator ID	Originator ID	Approved ID

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CLASSIFICATION BY: UNC
PARTS: UNC
TITLE BLOCK: UNC

TITLE
STATION 2 NORTH
SUPPORT SPIDER
UPPER SUPPORT RING

	SIGNATURE	DATE	GROUP
ORIGINATED	WALT	11/01	P-25
DRAWN			
CHECKED			
PROJ. ENG.			
APPROVED			
RELEASED			

PHENIX DRAWING NO. 002-0212-360-D4
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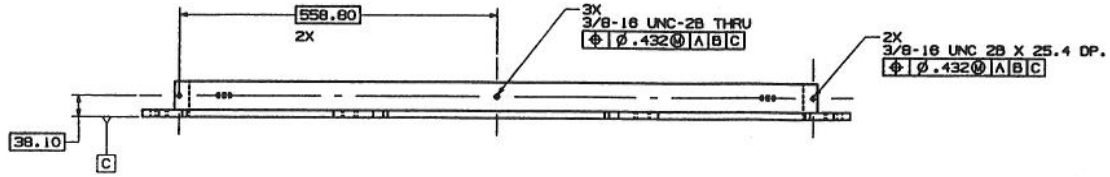
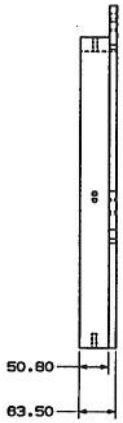
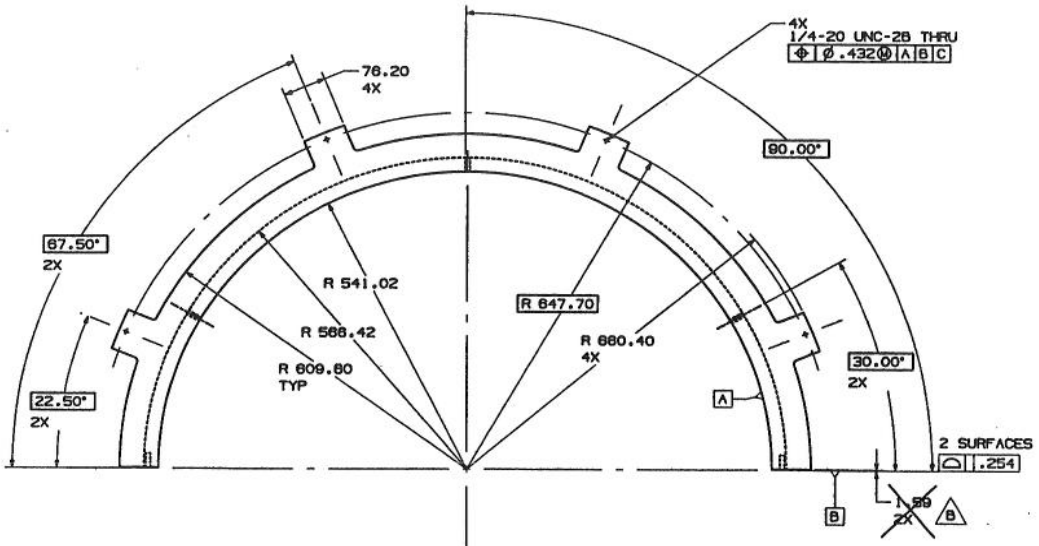
DRAWING NO. 126Y-267806
SHEET NO. 4
SIZE D







NOTES: UNLESS OTHERWISW SPECIFIED

1. DIMENSIONS AND TOLERANCES PER ANASI Y14.5M-1994
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ALL DIMENSIONS IN MILLIMETERS

B		MACHINE WITH OUT GAP	11/01	WALT		WALT
A		INITIAL RELEASE	11/01			WALT
		ORIGINAL ISSUE				
REVISION LETTER	REVISION NOTICE	REVISIONS	DATE	Designed BY	Checked BY	Approved BY

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CLASSIFICATION OF: DIVISION: UNC
PARTS: UNC TITLE CLASS: UNC

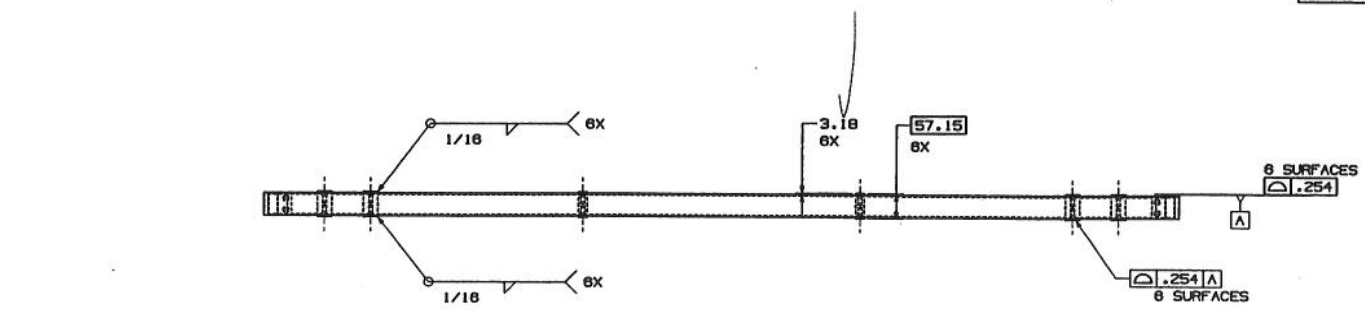
TITLE
STATION 2 NORTH
SUPPORT SPIDER
LOWER SUPPORT RING

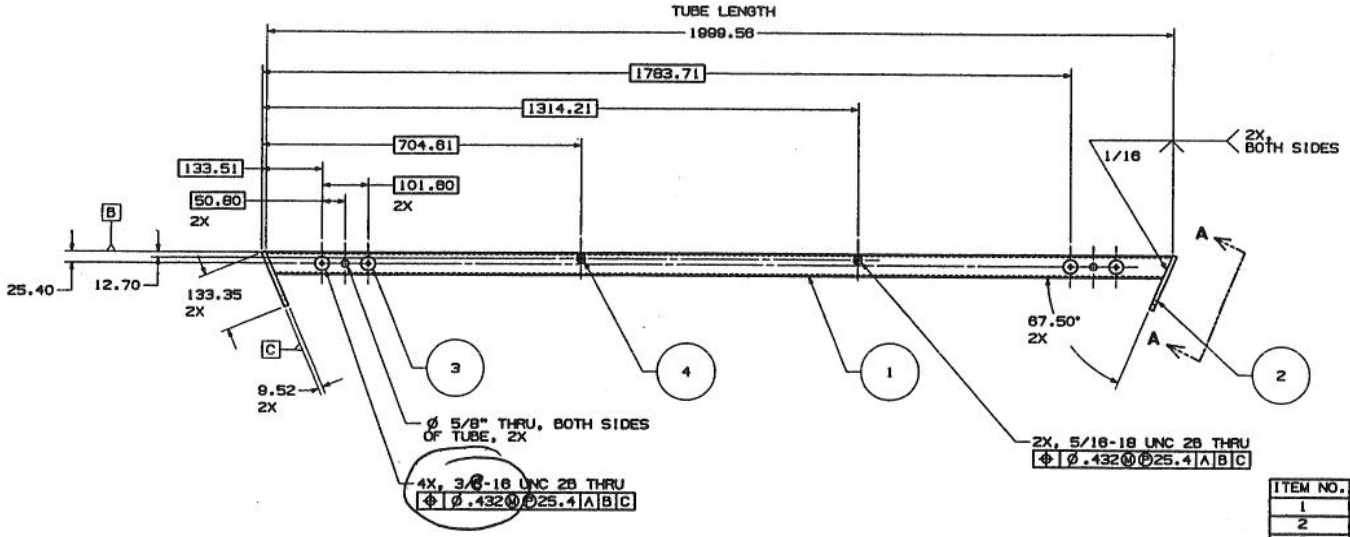
	SIGNATURE	DATE	GROUP
ORIGINATED	WALT	11/01	P-25
DRAWN			
DESIGNED			
PROJ. ENGR.			
APPROVED			
RELEASED			

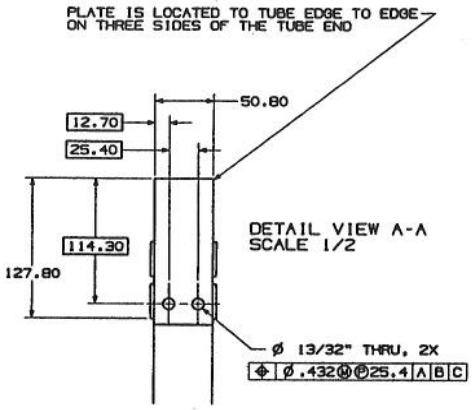
PHENIX DRAWING NO. 002-0212-380-05

TOLERANCE - UNLESS OTHERWISE NOTED:
XX± ____ 0.XX ± .25 ANGULAR ± .25
X ± ____ 0.X ± ____ FINISH 3.2

SCALE .25 | SIZE D | DRAWING NO. 126Y-267806 | SHEET 5 OF 5







WS NOV 29 2001

ALL DIMENSIONS IN MILLIMETERS

ITEM NO.	QTY.	DESCRIPTION	MATERIAL
1	2	RECT. TUBING 2" X 2" X .120" WALL	SST-304
2	2	END MOUNTING PLATE, SEE SHEET 86A	SST-304
3	4	ROUND PLUG 1.25" DIA.	SST-304
4	2	ROUND PLUG .75" DIA.	SST-304

NOTES: UNLESS OTHERWISW SPECIFIED

1. DIMENSIONS AND TOLERANCES PER ANASI Y14.5M-1994
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REV		DESCRIPTION	DATE			
A		INITIAL RELEASE	11/01			WALT
		ORIGINAL ISSUE				

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Los Alamos, New Mexico 87545

	SIGNATURE	DATE	GROUP
DESIGNED	WALT	11/01	
DRAWN			
CHECKED			
ENGR APPR.			
APPROVED			
RELEASED			

CLASSIFICATION # — DIVISION: UNC
PROJ: UNC — TITLE CLASS: UNC

TITLE
STATION 2 NORTH
SUPPORT SPIDER
SPLICE TUBE WELDMENT

PHENIX DRAWING NO. 002-0212-808-06

TOLERANCE- UNLESS OTHERWISE NOTED
X= ____ .XX= ±.25 ANGULAR= ±.25
.XXX= ____ FINISH= 125

SCALE .2 — DRAWING NO. 128Y-267806 — SHEET NO. D 6

ITEM NUMBER	NUMBER REQD	DESCRIPTION

DETAIL OF END MOUNT PLATE, FROM SHEET D6

NOTES: UNLESS OTHERWISW SPECIFIED

1, DIMENSIONS AND TOLERANCES PER ANASI Y14.5M-1994
2, SURFACE TEXTURE PER ANI/ASME B 46.1-1985
3, REMOVE ALL BURRS AND BREAK SHARP EDGES TO A MAX. OF .4
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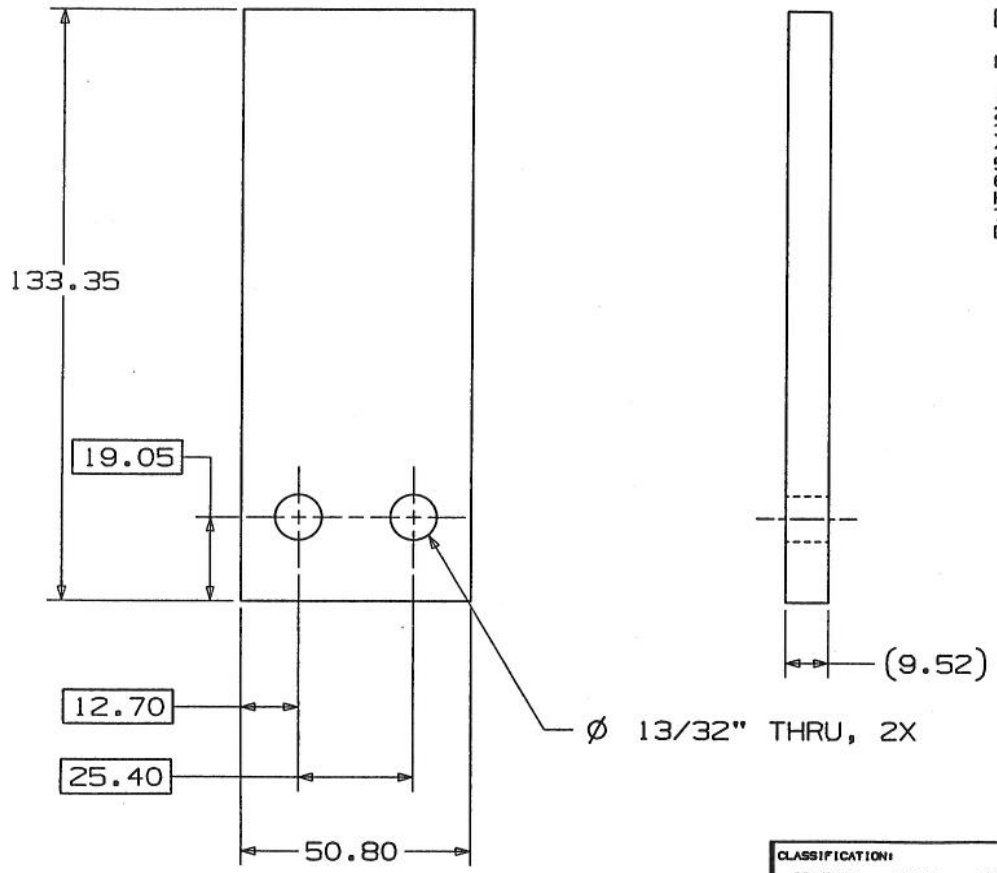

NOV 09 2001

ALL DIMENSIONS IN MILLIMETERS

MAT'L: SST 304, MAKE 2

REV	CLASS REVIEW	REVISIONS	DATE	CHANGED BY	CHECKED BY	APPROVED BY
		INITIAL RELEASE	11/01			WALT
A		ORIGINAL ISSUE				

CLASSIFICATION: DRAWING: PART: TITLE BLOCK:

	SIGNATURE	DATE	GROUP
ORIG	WALT	11/01	P-25
DRAWN			
CHECKED			
PROJ ENGR			
APPROVED			
RELEASED			

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LOS ALAMOS NATIONAL LABORATORY
LOS ALAMOS, NEW MEXICO, 87545

TOLERANCE- (UNLESS OTHERWISE NOTED)
X=± 0.XX =± .25 ANG=± .25
.X=± 0.XXX=± FIN= 3.2

TITLE
STATION 2 NORTH
SUPPORT SPIDER
SPLICE TUBE END PLATE

PHENIX DRAWING NO. 002-0212-806-B6A

SCALE	TOTAL SHEETS	DRAWING NO.	SIZE	NO.
1:1		126Y-267806	B	6A