2

5

AUG 23 1994 dta: 4

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT 157699

2. To: (Receiving Organization)	3. From: (Originating Organization)	4. Related EDT No.:
Cesium Return Program	Cesium Return Program	N/A
5. Proj./Prog./Dept./Div.:	6. Cog. Engr.:	7. Purchase Order No.:
Cesium Return Program	P. T. Saueressig	N/A
8. Originator Remarks: Transmittal and release of the supporting document which compiles the documentation for the first annual testing and inspections of Benificial Uses Shipping System (BUSS) Cask.		9. Equip./Component No.: N/A
		10. System/Bldg./Facility: N/A
11. Receiver Remarks: Comments have been incorporated.		12. Major Assm. Dwg. No.: N/A
		13. Permit/Permit Application No.: N/A
		14. Required Response Date: 22 August, 1994

15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Impact Level	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	WHC-SD-WM-TI-659	-	0	Documentation for first annual testing of BUSS Cask.	N/A	1,2	1	1

16. KEY

Impact Level (F)	Reason for Transmittal (G)	Disposition (H) & (I)
1, 2, 3, or 4 (see MRP 5.43)	1. Approval 4. Review 2. Release 5. Post-Review 3. Information 6. Dist. (Receipt Acknow. Required)	1. Approved 4. Reviewed no/comment 2. Approved w/comment 5. Reviewed w/comment 3. Disapproved w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Impact Level for required signatures)

(G) Reason	(H) Disp.	(J) Name (K) Signature (L) Date (M) MSIN	(J) Name (K) Signature (L) Date (M) MSIN	(G) Reason	(H) Disp.
1,2		Cog. Eng. (P.T. Saueressig) Paul T Saueressig 8/17/94 S6-65	Central Files L8-04	3	
1,2		Cog. Mgr. (E.D. Robbins) E.D. Robbins 8/17/94 S6-65	O.S.T.I. (2) R1-08	3	
		QA N/A			
		Safety N/A			
		Env. N/A			
1,2		Packaging Safety Engineering (W.A. McCormick) W.A. McCormick 8/18/94 G2-02			

18.	19.	20.	21. DOE APPROVAL (if required) Ltr. No.
P.E. Linden 8-17-94	E.D. Robbins 8/17/94	E.D. Robbins 8/17/94	[] Approved [] Approved w/comments [] Disapproved w/comments
Signature of EDT Originator Date	Authorized Representative for Receiving Organization Date	Cognizant/Project Engineer's Manager Date	

BD-7400-172-2 (07/91) GEF097

BD-7400-172-1 (02/89)

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

RELEASE AUTHORIZATION

Document Number:	DOCUMENTATION FOR FIRST ANNUAL TESTING AND INSPECTIONS OF BENIFICIAL USES SHIPPING SYSTEM (BUSS) CASK.
Document Title:	WHC-SD-WM-TI-659 REVISION 0
Release Date:	08-22-94

* * * * * * * * * * * * * *

This document was reviewed following the procedures described in WHC-CM-3-4 and is:

APPROVED FOR PUBLIC RELEASE

* * * * * * * * * * * * * *

WHC Information Release Administration Specialist:

Kara Broz — 08-23-94

(Signature) **(Date)**

SUPPORTING DOCUMENT	1. Total Pages 48

2. Title	3. Number	4. Rev No.
Documentation for first annual testing and inspections of Benificial Uses Shipping System (BUSS) Cask.	WHC-SD-WM-TI-659	0

5. Key Words	6. Author
Cesium chloride capsule, Waste Encapsulation and Storage Facility (WESF), Benificial Uses Shipping System (BUSS) Cask. APPROVED FOR PUBLIC RELEASE KMB 8/22/94	Name: J. E. Lundeen James E. Lundeen 8-17-94 Signature Organization/Charge Code 16800/KB51B

7. Abstract

The purpose of this report is to compile data generated during the first annual tests and inspections of the Benificial Uses Shipping System (BUSS) Cask. In addition, this report will verify that the testing criteria identified in chapter 8 of the BUSS Cask Safety Analysis Report for Packaging (SARP) was met.

Section 8.2 "Maintenance and Periodic Inspection Program" of the BUSS Cask SARP requires that the following tests and inspections be performed on an annual basis:

- Hydrostatic pressure test
- Helium leak test
- Dye penetrant test on the trunnions and lifting lugs
- Torque test on all bolts
- Impact limiter inspection and weight test

The first annual inspections and testing of the BUSS Cask were completed on May 5, 1994, and met the SARP criteria.

8. PURPOSE AND USE OF DOCUMENT - This document was prepared for use within the U.S. Department of Energy and its contractors. It is to be used only to perform, direct, or integrate work under U.S. Department of Energy contracts. This document is not approved for public release until reviewed.

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9. Impact Level N/A

10. RELEASE STAMP

OFFICIAL RELEASE BY WHC 5
DATE AUG 23 1994

MASTER

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Appendix C: Dye penetrant test on the trunnions and lifting lugs Ci

Appendix D: Torque test on all bolts . . . . . Di

Appendix E: Impact limiter inspection and weight test . . . . . Ei

1.0 Introduction

The purpose of this report is to compile data generated during the first annual tests and inspections of the Beneficial Uses Shipping System (BUSS) Cask. In addition, this report will verify that the testing criteria identified in section 8.2 of the BUSS Cask Safety Analysis Report for Packaging (SARP), Reference 4.1, was met.

The BUSS Cask Model R-1 is a type B shipping container used for shipment of radioactive cesium-137 and strontium-90 capsules to Waste Encapsulation and Storage Facility (WESF). The BUSS Cask body and lid are each one-piece forgings fabricated from ASTM A473, Type 304 stainless steel. The primary purpose of the BUSS Cask is to provide shielding and confinement as well as impact, puncture, and thermal protection for the capsules under both normal and accident conditions.

Section 8.2 "Maintenance and Periodic Inspection Program" of the BUSS Cask SARP requires that the following tests and inspections be performed on an annual basis:

- Hydrostatic pressure test
- Helium leak test
- Dye penetrant test on the trunnions and lifting lugs
- Torque test on all bolts
- Impact limiter inspection and weight test

Attached is a table naming the test or inspection, the frequency the test must be performed, the completion date, and the next due date. All testing was performed by Westinghouse Hanford Company (WHC).

2.0 Discussion/Summary

The BUSS Cask hydrostatic testing was completed on October 29, 1993. Appendix A consists of the results of this testing. Included in Appendix A are Engineering Work Instruction EWI-2C-93-014 "BUSS Cask Annual Hydrostatic Testing" and a WHC Inspection Plan for verifying calibration on the instruments used for testing.

SARP Requirements:	There shall be no visible leakage. In addition, WHC used the criteria from Section 8.1.3 of the initial testing of the cask: There shall be no pressure decrease greater than 1/2 psig.
Test Results:	The cask cavity was pressurized for 30 minutes. The pressure decay over that time was -0.75 psig. The results of this test met the SARP criteria.

The leak testing was completed on October 26, 1993. Appendix B consists of the results of this testing. Included in Appendix B is the Non Destructive Examination (NDE) Leak Test Procedure and Test Report.

SARP Requirements: The cask assembly shall have a leak rate of less than 1.0E-5 atm-cm^3/s.

Test Results: The containment boundary, lid seal, upper port cover, and lower port cover were tested and no detectable leaks were found within the sensitivity of the leak detector (8.1E-11). The results of this test met the SARP criteria.

The dye penetrant test of the trunnions and lifting lugs was completed on January 6, 1994. Appendix C consists of the results of this testing. Included in Appendix C is the NDE Penetrant Procedure and Test Report. Also included are the J-7 Work Change Notice and WHC Inspection Plan which provide support for the testing.

SARP Requirements: There shall be no cracks detected on the trunnions or lifting lugs.

Test Results: There were no cracks detected on the trunnions or lifting lugs. The results of this test met the SARP requirements.

The bolt torque testing was completed on May 5, 1994. Appendix D consists of the results of this testing. Appendix D includes a list of torquing requirements based on the bolt design values and the Work Plan "BUSS Cask Annual Torque Verification."

SARP Requirements: All permanent bolts shall be torqued to their design values.

Test Results: All the bolts were torqued to their design values.

The impact limiter inspection and weight test was completed on December 28, 1993. Appendix E consists of the results of this testing. Appendix E includes the J-4 for the BUSS Cask Impact Limiter Annual Inspection.

SARP Requirements: The impact limiters shall pass a visual inspection and the weight of each limiter shall not change from its original value more than -1% or +3% of the foam weight.

Test Results: No damage was found during the visual inspection. Impact limiter S48929-001 weighed 3045 lbs, which is 1.3% more than its original weight of 3006 lbs. Impact limiter S48929-002 weighed 3035 lbs, which is 1.4% more than its original weight of 2994 lbs. The results of this testing met the SARP criteria.

In conlcusion, the results of the first annual testing of the BUSS Cask met the SARP criteria defined in Section 8.2.

4.0 References

4.1 SAND83-0698 TTC-0430, Rev. 4, May 1993, Benificial Uses Shipping System (BUSS) Cask Safety Analysis Report for Packaging (SARP), D.R. Bronowski et. all, Sandia National Laboratories.

Periodic Inspection and Testing Data			
Test or Inspection	Frequency	Completion Date	Due Date
1. Hydrostatic test	Annual	October 29, 1993	October 1994
2. Helium leak test	Annual	October 26, 1993	October 1994
3. Dye penetrant of trunnions and lift lugs	Annual	January 6, 1994	January 1995
4. Bolt torque test	Annual	May 5, 1994	May 1995
5. Impact limiter inspection and weight test	Annual	December 28, 1993	December 1994

Appendix A: Hydrostatic pressure test

ENGINEERING WORK INSTRUCTIONS # EWI-2C-93-014

Activity: Buss Cask Annual Hydrostatic Testing

Issue Date: October 27. 1993 Issue Time: 10:00 am

Expiration Date: January 1. 1994

Engineering Instructions:

The engineering work instructions are to be initiated after the Millwrights have removed the BUSS cask lid per the PTP-E-995-00011 in work package 2S-93-00697. The basket should not be installed during this test.

1. Record date of test and the BUSS cask serial number on attached data sheet.

2. Add approximately 35 gallons of demineralized water to the BUSS cask cavity. Fill the level of demineralized water to the middle of the upper port. Record on attached data sheet the cavity was filled with water.

The notes below are addressed in the J-7 to the work package and are added for clarity of the operational steps:

NOTE: Allow the millwrights to install and torque the lid to the required limits per work package 2S-93-00697.

NOTE: Blow water out of the closure area on the cask lid and body grooves with the gas (nitrogen or helium) used to pressurize the water in the BUSS cask.

NOTE: Allow the pipefitters to install the hydrostatic test fixture and connect the gas bottle to the fixture. Pressurize the regulator to approximately 50 psig.

3. Open the valve on the hydrostatic test fixture to pressurize system to 50 psig. Look for leaks around the lid, upper port and lower port quick disconnect valve.

NOTE: Slowly increase pressure from the regulator until pressure reaches 70 psig on the indicator.

4. Allow cask to set for 2 hours to allow water temperature to stabilize. Record on attached data sheet that water set for two hours.

NOTE: Slowing increase pressure from the regulator until pressure reaches 75 psig on the indicator.

5. Close the valve on the hydrostatic test fixture. Record the start pressure and time on the attached data sheet. Request QC to verify the start time and pressure. Wait 30 minutes and record the end time and pressure. Request QC to verify the end time and pressure.

NOTE: The pressure can not drop more than 1.0 psig in the 30 minute time period.

6. Contact engineering if the cask fails the hydrostatic testing.

7. Review and complete the information on the attached data sheet.

NOTE: Relieve the pressure from the system and drain the water to the ground.

Operations Comments/Results of Work: _____

_____

_____

_____

_____

_____

_____

Issuance Approvals:

Engineer: P. T. Sameshima Home Phone 946-9778
Work Phone 372-5071

Engineering Management: [signature] 10-26-93

Operations Supervisor: R. C. Barton

Work Completion Approvals:

Work Performed By: N/A

Date/Shift 01/11/94

Engineer Verification: P. T. Sameshima

EWI-2C-93-014

HYDROSTATIC TEST DATA SHEET

Test Date: 10/29/93

Cask Serial Number: USA/9511/B(U). Model # R1

Hydro Pump Type: X Manual N/A Power Operated

Hydro pump Mfg. Henderson Model #15

Pressure Indicator (PI) Identification Number: 2B0763

PI Calibration Date: 10/28/93

PI Resolution: 0-100

Cavity filled with demineralized water: DTS (Initials)

Lid Bolts properly torqued: DTS

Water at thermal equilibrium (min 2 hour holding period): DTS

Cavity pressure start of test: 1:58:46 (min test pressure. 75 psig.

QC verify start pressure: 75 psig

Test start time: 1:58:46 QC verify: C.E. Hall

Test pressure held for 30 minutes: DTS

Test end time: 2:28:46 QC verify: C.F. Hall

Cavity pressure at end of test: 75.75 psig

QC verify end pressure: C.F. Hall

Pressure decay (start pressure minus end pressure): -0.75 psig

Final disposition (pressure decay less than 0.5 psig):

Accepted: X Rejected: _____

Conducted by: Paul T Sanderson Engineering 10/29/93 Date

Witnessed by: C.F. Hall Quality Control 11-22-93 Date

WHC INSPECTION PLAN	JCS NO. 2B-93-00697	PAGE 1 of 1
	IMPACT LEVEL ☐ 1 ☐ 2 ☒ 3 ☐ 4	SAFETY CLASS N/A

ITEM/DESCRIPTION	DWG/SPEC NO.	REV	ECN NO.

Location	Initiated by:	Date	Cog. Engineer	Date
WESF Crane Pad	D.D. McAfee	10/26/93	P. T. Saueressig	10/26/93

NOTE: Notify QC prior to start of work for each HOLD or WITNESS point !

No.	Inspection Step	H/W/V	NCR	QC Sign/Stamp
1	Verify the BUSS cask pressure indicator identification number on the hydrostatic test fixture. Id. No: 23C763	V		
2	Verify the calibration date for the BUSS cask pressure indicator on the hydrostatic test fixture. Expiration date: 12/1/93	V		
3	Verify that the resolution of the pressure indicator on the hydrostatic test fixture is at least 1.0 psig increments.	V		
4	Verify that the BUSS cask lid bolts are torqued to a final torquing value of 1250 ft-lbs and that the upper port cover is bolted to a final torquing value of 60 ft-lbs.	V		10-28-93
5	QC Inspector shall verify the serial number and the expiration date of the torque wrench used to torque the lid and upper port cover bolts.	V		10-28-93
	Torque Wrench Serial Number (lid bolts): 776-88-01-229			10-28-93
	Expiration Date: 3-22-94			
	Torque Wrench Serial Number (upper port bolts): 815-88-01-022			10-28-93
	Expiration Date: 6-29-94			

MES-010.005X
RAFT INSTRUMEMT TECH
FACILITY

DATA SHEET
OVERALL CAL

INSTR #: [illegible] APPL CODE: DUE:
LOOP #: BLDG: MAKER: LAST DONE: SEQ
#: ROOM: MODEL: [illegible] PROC: SYS #:
LOCN: SERIAL:
FREQ #: DS KEY: LIN CODE: STATUS:
FUNCTION DESC:
DWG/SHT/COORD#:
RANGE INPUT: TO +/-
RANGE OUTPUT: TO +/-
STANDARDS USED: INPUT [illegible] CAL. EXPIRATION DATE: [illegible]
(TRACEABLE TO NATIONALLY
RECOGNIZED STANDARDS) OUTPUT [illegible] CAL. EXPIRATION DATE: [illegible]

CALIBRATION DATA

CK PT	INPUT/OUTPUT REQUIREMENTS				OUTPUT CONDITION		
	SPECIFI INPUT VALUE	SPECIFI OUTPUT VALUE	-LIMIT OF TOL	+LIMIT OF TOL	AS FOUND VALUE	AS FOUND TOL IN OUT	AS LEFT VALUE
1.	[illegible]				[illegible]		
2.	[illegible]	[illegible]			[illegible]		
3.	[illegible]	[illegible]			[illegible]		
4.	[illegible]	[illegible]			[illegible]		
5.	[illegible]	[illegible]			[illegible]		

Appendix A
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WORK RELEASED [illegible signature] 10/[illegible]/93 PLEASE CIRCLE ACCEPT OR REJECT
REMARKS

PREVIOUS REMARKS:
INSTRUCTIONS:

REVISION REQUIRED (Y/N) CAL/PROCEDURE DATA SHEET

BD-6400-135 (5/90) (EF) SEF041
PISCES Input Form

Appendix B: Helium leak test

Westinghouse Hanford Company

NDE LEAK TEST PROCEDURE AND TEST REPORT

NON DESTRUCTIVE EXAMINATION
306 BLDG., 300 AREA - TEL. 376-5401

Job No. 93-204

Requestor: P T SAUERESSIG	Company: WHC
MSIN: S6-65 / Bldg.: 225B / Area: 200E	Project/System/Work Package/Traveler No.: BUSS CASK ANNUAL LEAK TEST; MODEL # R-1 WC-45110; ID #USA/9511/B(U) DOE

Acceptance Std.: 1.0x10^-5 Atm/cc/sec; 1.0x10^-4 Atm/cc/sec — Section: Containment Boundary; Lid, upper Port + Lower Port Seals — Para. — Date [ ] NA

Dwg. No. [X] NA SAND92-0967 SECT. 7 — NCR [X] NA — Cleaning [X] NA

TEST CONDITIONS

- Temperature AMB — Device ID ____ [X] NA
- Barometric Pressure AMB [ ] NA
- Test Pressure 14.54 PSIA. ΔP/ATM [ ] NA
- Gas HELIUM [ ] NA
- Concentration 100% [ ] NA
- Other ____ [X] NA
- Bubble Solution ____ [X] NA
- Batch No. ____ (WDP 10-28-93)
- Gage 1 584-~~40~~31-03- 006 [ ] NA
- Range 0-30 PSIA
- Calib. Exp. 5-10-94
- Gage 2 584-40-03- ____ [X] NA
- Calib. Exp. ____
- Relief Valve ____ [X] NA

TEST EQUIPMENT [ ] NA

- Manufacturer VIC MD-180
- Ident. No. WB-96068
- Fine Range 6.0×10^{-11} Atmcc/sec/Div [ ] NA
- Std. No. 584-40-03- 017
- Std. Leak 2.4×10^{-8} Atmcc/sec
- Calib. Exp. 06-24-94
- Medium Range ____ x 10 Atmcc/sec/Div [X] NA
- Std. No. 584-40-03- ____
- Std. Leak ____ x 10 Atmcc/sec
- Calib. Exp. ____
- Gross Range ____ x 10 Atmcc/sec/Div [X] NA
- Std. No. 584-40-03- ____
- Std. Leak ____ x 10 Atmcc/sec
- Calib. Exp. ____

WHC PROCEDURE NO. [ ] NA

- [X] NDT-LT-6000 Rev. 2
- Appendix A Rev. 2
- [ ] Special Tech. No. ____

WORK INST. [X] NA

- [ ] NDT-LT-601 Rev. ____
- [ ] Other ____

SYSTEM SENSITIVITY

- [ ] Same as MSLD Calib. or
- Fine Range 8.1×10^{-11} Atmcc/sec.Div
- Med. Range ____ x 10 Atmcc/sec.Div
- Gross Range ____ x 10 Atmcc/sec.Div

TEST TIME

- He Response Time INSTANT [ ] NA
- He Accum. Time ____ [X] NA
- Soak Time ____ [X] NA

Weld No., Part No., or Serial No.	Acc.	Rej.	No Rel. Ind.	Comments
CONTAINMENT BOUNDARY	X		X	NO DETECTABLE LEAKS FOUND
LID SEAL TEST	X		X	NO DETECTABLE LEAKS FOUND
UPPER PORT COVER	X		X	NO DETECTABLE LEAKS FOUND
LOWER PORT COVER	X		X	NO DETECTABLE LEAKS FOUND
				See Attached for Method set-up

Appendix B
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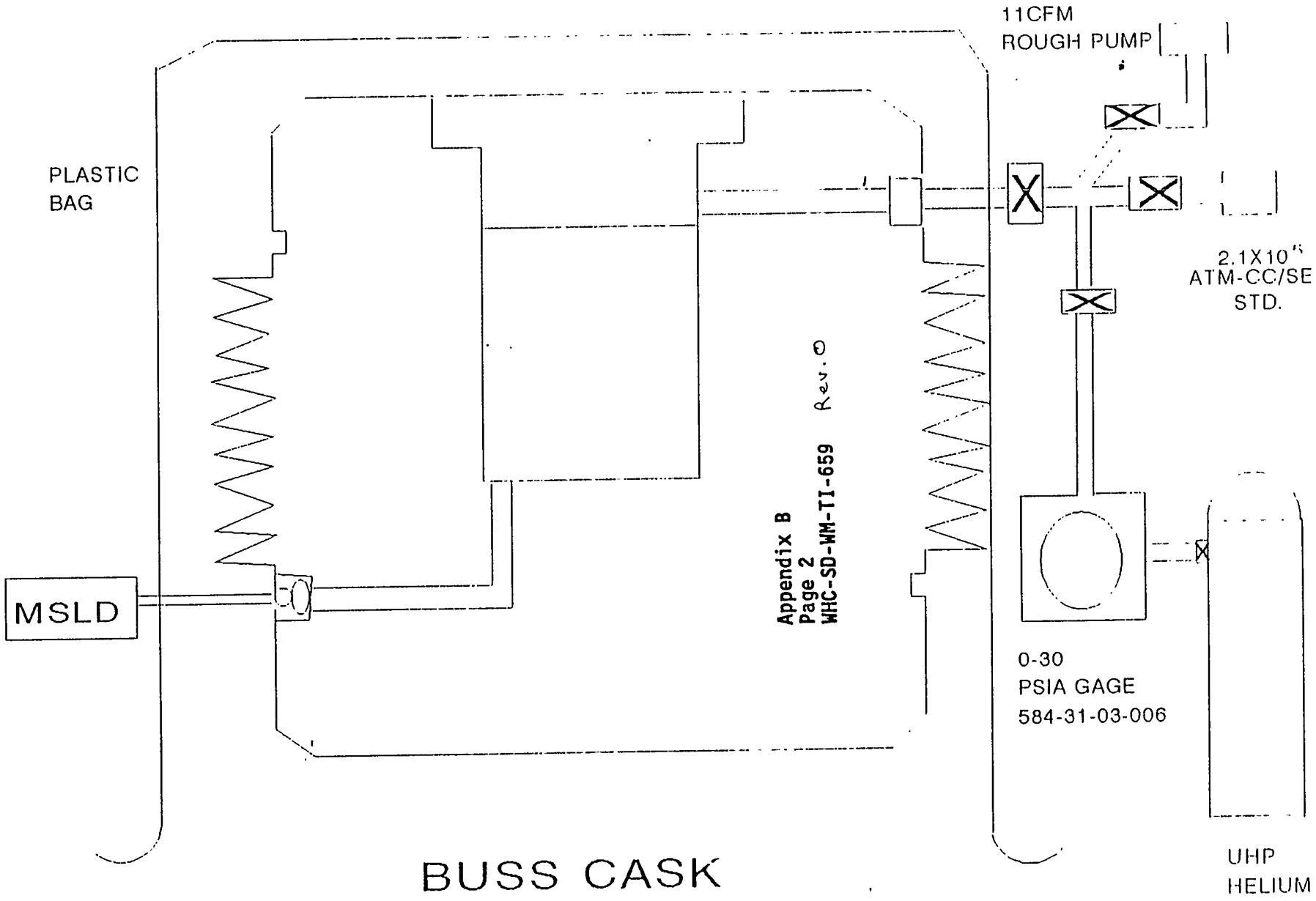
Technique Pre Approval		LT Level/Date		
Technician: W D PURDY (signature)	Level: II	Interpreted by: W D PURDY (signature)	LT Level II: II	LT Level III Review: (signature)
Date of Examination: 10-26-93		Date: 10-25-93		Date: 11-1-93



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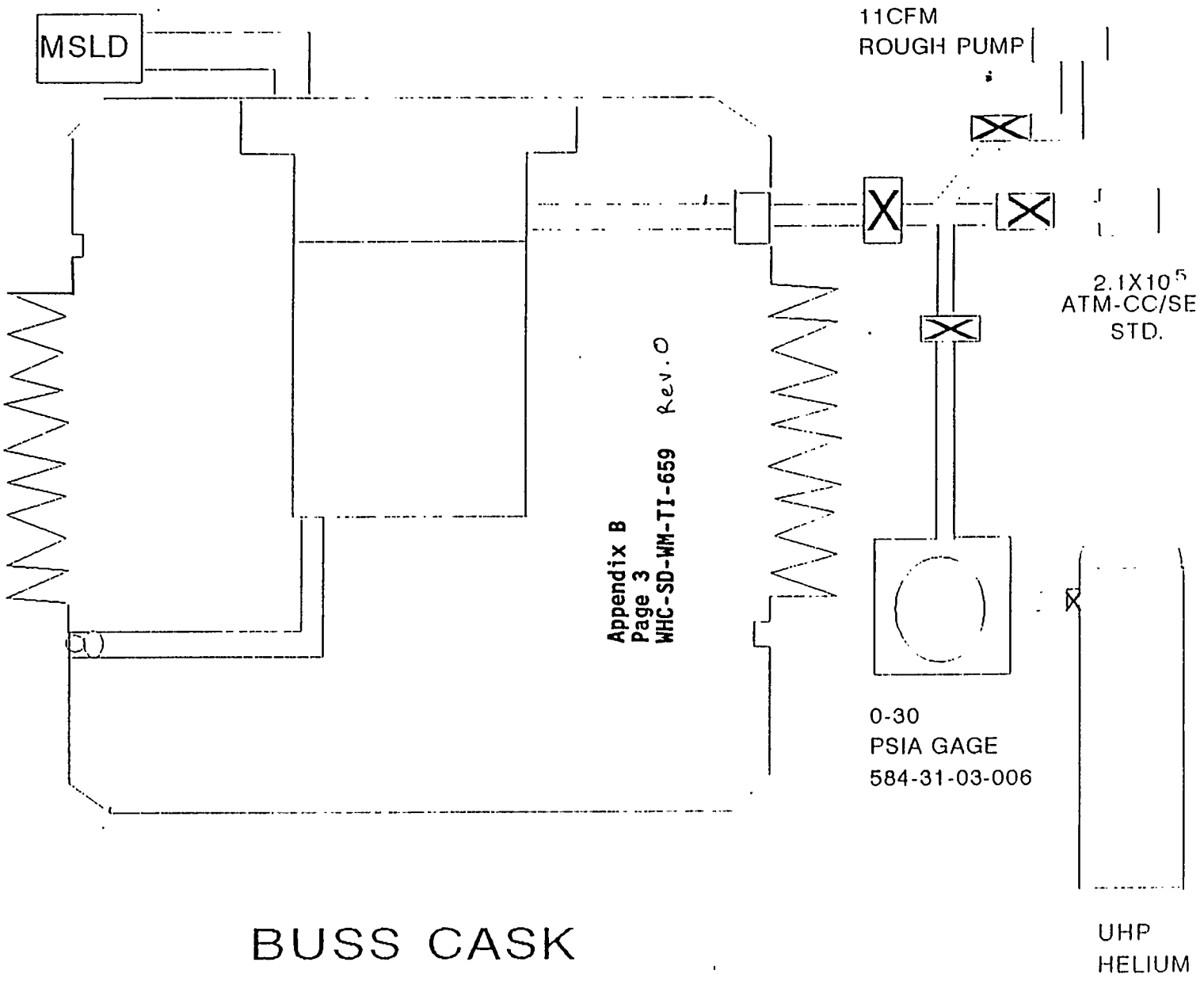
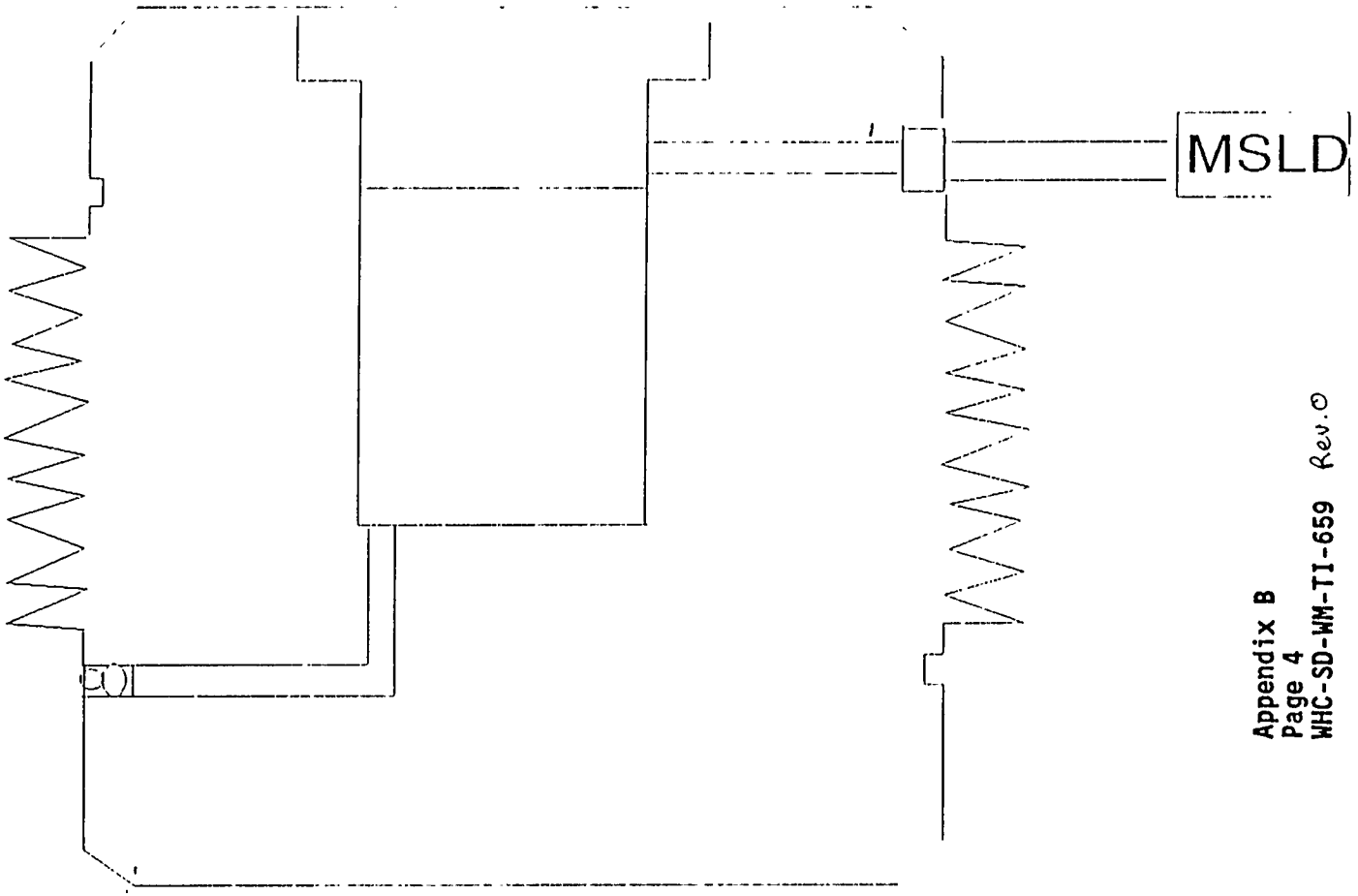
BUSS CASK

CONTAINMENT BOUNDRY TEST
(EVACUATED C^VITY)



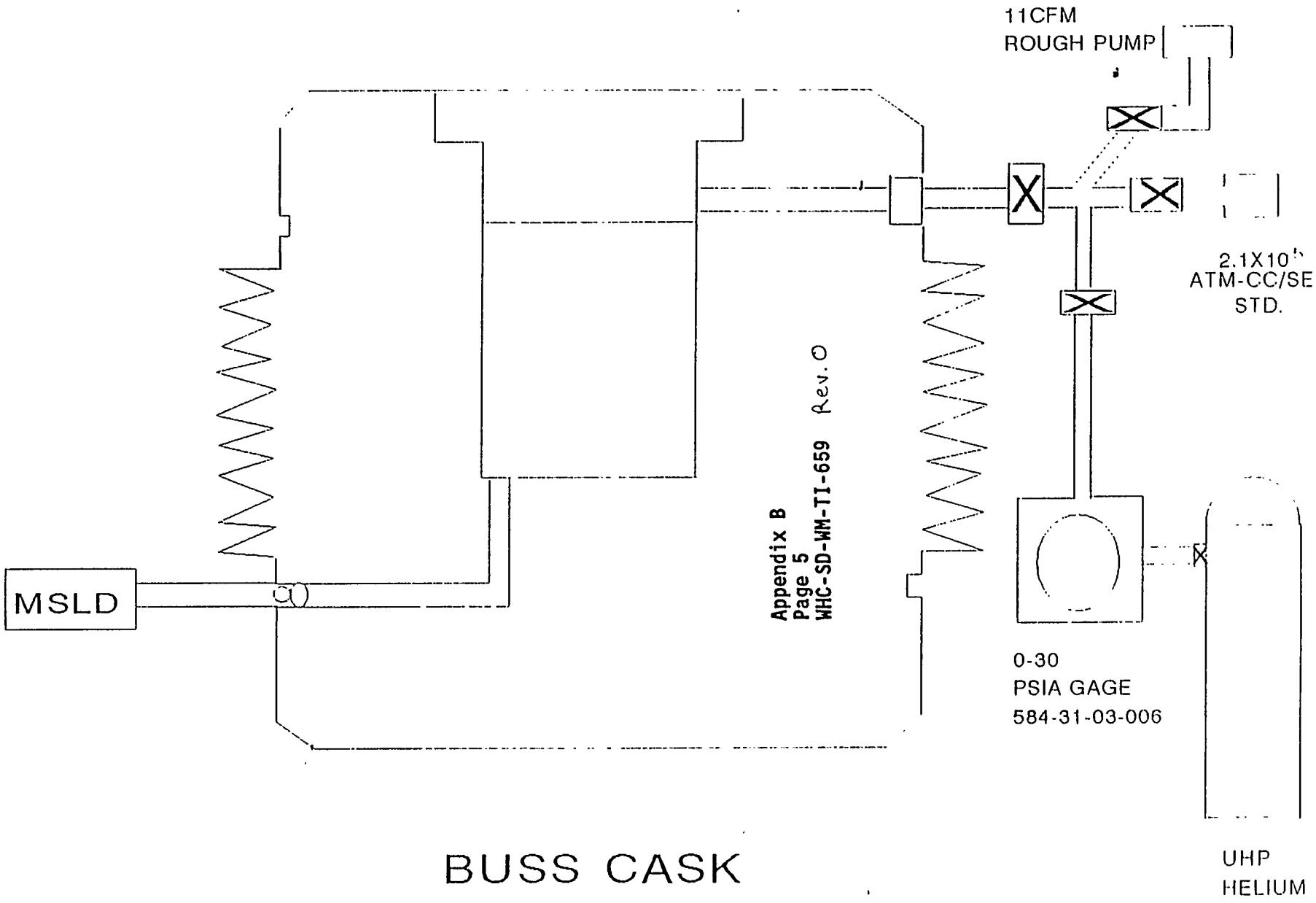
BUSS CASK

LID SEAL
(HELIUM BACKFILLED)



BUSS CASK

UPPER PORT SEAL (HELIUM BACKFILLED)



BUSS CASK

LOWER PORT SEAL (HELIUM BACKFILLED)

Appendix C: Dye penetrant test on the trunnions and lifting lugs

Westinghouse Hanford Company

NDE PENETRANT PROCEDURE AND TEST REPORT

NON DESTRUCTIVE EXAMINATION
306 BLDG., 300 AREA - TEL. 376-5401

Job No. 93-204

Requestor (client)	Company	Project/System/Work Package/Traveler No.
...ke W. Pawlak	WHC	BENIFICIAL USES SHIPPING SYSTEM (BUSS) CASK , USA/9511/B(U). (Work Order No. KB01N)

MSIN	Bldg.	Area
S6-65	225-B	200-E

Acceptance Std.	Section	Para.	Date	Dwg. No.	Material	NCR
DOE-RL 92-36	11		1-1993	T83109 S51171	SST	[X] NA

PRODUCT OR STAGE OF MANUFACTURING

- [ ] As Cast
- [ ] As Forged
- [X] As Machined
- [X] As Assembled
- [X] As Welded
- [ ] Weld Prep
- [ ] Root Pass
- [X] Final
- [ ] Other
- [ ] Repair No.

WHC PROCEDURE NO.

- [ ] NA
- [X] NDT-PT-4000 Rev. 1
- Appendix A Rev. 1

AREA TO BE INSPECTED

- [X] Full inspection: 100% of Area Requested
- [ ] Other (Explain below)

MANUFACTURER

- [X] Sherwin
- [ ] Magnaflux
- [ ] Other

DYE

- [X] Color Contrast
- [ ] Fluorescent

Special PT Technique No.

- [X] NA

CLEANING

	Pre	Post
Alconol	[X]	[X]
Cleaner/Remover	[ ]	[ ]
Other	[ ]	[ ]

	Type	Batch No.	Time (min.)
Penetrant	DP-40	015-F1	10
Cleaner [ ] NA	DR-60	14-FL	5
Emulsifier [X] NA	------	----------	----
Developer	D-100	216G6	7

Developer Application

- [X] Spray
- [ ] Dip
- [ ] Brush
- [ ] Powder

Light Level

- [ ] µW/cm²
- [X] Foot Candles
- > 100

Technique Pre Approval Level/Date

- [X] NA

Weld No., Part No., or Serial No.	Acc.	Rej.	No Rel. Ind.	Indications/Comments
Lug #T83109-000-01	X			One rounded indication. 1/32" in diameter.
Lug #T83109-000-02	X		X	
Trunnion No.S51171- 000-1	X		X	
Trunnion No.S51171- 000-2	X		X	

Appendix C
Page 1
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Technician	PT Level	Interpreted	PT Level	Level III Review
Walter C. Milliron	II	Walter C. Milliron	II	1-7-94
Date of Examination		Date of Examination		Date
Jan.6.1994		Jan.6.1994		1-7-94

A-7000-843 (11-93)

Record Copy 1/4/94

~~*** INFORMATION ONLY ***~~

==========J-7 WORK CHANGE NOTICE - Detail (W175)==========

Page: 1 13:34:20 05 JAN 1994

1. Document Number 2B-93-00697/W *GENERIC WORK ITEM*
   Work Item Title SUPPORT FOR BUSS CASK DRY RUNS AND TESTING

==========

	Signature	Date	Telephone No.
2. Originator	SAUERESSIG,PT	01/02/94	372-0071

3. WCN Number 05 Non-ADP WCN Number N/A

4. Change Instructions

Page Step/Para Description

PURPOSE:

THE PURPOSE OF THIS CHANGE IS TO INCORPORATE THE REMOVAL AND INSTALLATION OF THE BENEFICIAL USES SHIPPING SYSTEM (BUSS) CASK TRUNNIONS AND LIFTING LUGS. THE TRUNNIONS AND LIFTING LUGS MUST BE REMOVED FOR NON-DESTRUCTIVE EVALUATION (NDE). UPON COMPLETION OF INSPECTION BY NDE THE TRUNNIONS AND LIFT LUGS WILL BE REINSTALLED AND THE TORQUED TO PRESCRIBED VALUES (QC VERIFIED).

1. LOOSEN THE FOUR SCREWS HOLDING THE TRUNNION AND BRASS RING IN PLACE. REMOVE THE TRUNNION, SCREWS AND BRASS RING FROM THE CASK. PLACE IN DESIGNATED STORAGE AREA. REPEAT FOR SECOND TRUNNION.

ENGINEERING WILL PROVIDE DIRECTION FOR PERFORMING STEPS 2 AND 3 BECAUSE ONLY A PORTION OR ALL OF THE STEPS MAY BE REQUIRED.

2. LOOSEN THE SIXTEEN BOLTS ON THE SOUTH SIDE OF THE BUSS CASK. REMOVE THIRTEEN BOLTS AND LEAVE THREE EVENLY SPACED BOLTS THAT ARE HAND TIGHT. STORE THE REMOVED TRUNNION BOLTS IN THE DESIGNATED AREA UNTIL REINSTALLATION IS REQUIRED.

3. LOOSEN THE SIXTEEN BOLTS ON THE NORTH SIDE OF THE BUSS CASK. REMOVE THIRTEEN BOLTS AND LEAVE THREE EVENLY SPACED BOLTS THAT ARE HAND TIGHT. STORE THE REMOVED TRUNNION BOLTS IN THE DESIGNATE AREA UNTIL REINSTALLATION IS REQUIRED.

NOTE: CARE MUST BE TAKEN WHEN REMOVING THE BOLTS FROM THE LIFT LUGS, SO THAT THE LIFT LUGS ARE NOT DROPPED AND DAMAGED WHEN DISENGAGED FROM THE BUSS CASK.

4. LOOSEN AND REMOVE THE EIGHT BOLTS FROM THE BUSS CASK LIFT LUGS. STORE THE EIGHT LIFT LUG BOLTS IN A DESIGNATED AREA UNTIL REINSTALLATION IS REQUIRED.

5. REMOVE TORQUE PAINT AND NEOLUBE FROM TRUNNION AND LIFT LUG

Record Copy 1/5/94

~~*** INFORMATION ONLY ***~~

1. Document Number 2B-93-00697/W *GENERIC WORK ITEM*
Work Item Title SUPPORT FOR BUSS CASK DRY RUNS AND TESTING

==========

BOLTS AND SCREWS(IF NECESSARY). RELUBE BOLTS/SCREWS UPON REINSTALLATION.

6. REQUEST QC TO WITNESS AND VERIFY AS DEFINED IN THE ATTACHED INSPECTION PLAN.

STEPS 7 AND 8 MAY BE REVERSED BY ENGINEERING.

QC HOLD

7. INSTALL THE FOUR SCREWS, BRASS RING AND TRUNNION. TORQUE THE FOUR SCREWS TO 20 FT-LBS. REPEAT FOR SECOND TRUNNION.

QC HOLD

8. REINSTALL ONE SET OF THE TRUNNION BOLTS HAND TIGHT. TORQUE THE TRUNNION BOLTS IN A CROSSING PATTERN TO 250 FT-LBS USING A CERTIFIED TORQUE WRENCH. WHEN THE TORQUE VALUE IS ACHIEVED BACK THE BOLTS OFF A QUARTER TURN THEN RE-TORQUE. REPEAT FOR THE SECOND TRUNNION.

QC HOLD

9. INSTALL THE 8 LIFT LUG BOLTS AND TORQUE USING A CALIBRATED TORQUE WRENCH. TORQUE BOLTS USING A CROSSING PATTERN. WHEN A 250 FT-LB TORQUE IS ACHIEVED, BACK THE BOLTS OFF A QUARTER TURN AND RETORQUE TO 250 FT-LBS.

QC HOLD

10. INSTALL THE UPPER PORT SHIELD PLUG. REMOVE THE UPPER PORT THERMAL SHIELD AND PORT COVER. INSERT THE UPPER PORT SHIELD PLUG AND TORQUE IN PLACE TO 30 FT-LBS. REPLACE THE UPPER PORT COVER AND THERMAL SHIELD AS DEFINED IN PTP-E-995-00010.

5. Reason for Change
ANNUAL REQUIREMENT TO NDE THE TRUNNIONS AND LIFT LUGS.

6. Impact Level of Change/Approval Requirements 3-0

7. Approval Signatures

	Signature	Date
Cognizant Engineer	SAUERESSIG.PT Paul T Sauressig	01/05/94

Record Copy 84 1-5-94

~~*** INFORMATION ONLY ***~~

==========J-7 WORK CHANGE NOTICE - Detail (W175)==========

Page: 3 09:35:33 05 JAN 1994

1. Document Number 2B-93-00697/W *GENERIC WORK ITEM*
   Work Item Title SUPPORT FOR BUSS CASK DRY RUNS AND TESTING

Cognizant Manager	ROBBINS,ED	01/05/94
Environmental Assurance	N/A	
Health/Safety Assurance	N/A	
Quality Assurance	MCAFEE,DD	1/5/94
Operations	BURTON,KA	1-5-94
PIC	N/A	
Other		

8. Incorporated By Signature: _____ Date 1/6/94 Telephone No. 372-0323

Appendix C
Page 4
WHC-SD-WM-TI-659 Rev.0

==========J-7 WORK CHANGE NOTICE - Detail (W175)==========

*** INFORMATION ONLY ***

WHC INSPECTION PLAN	JCS NO. 2B-93-00697	PAGE 1 of 2
	IMPACT LEVEL ☐ 1 ☐ 2 ☒ 3 ☐ 4	SAFETY CLASS N/A

ITEM/DESCRIPTION	DWG/SPEC NO.	REV	ECN NO.
BUSS Cask Maintenance Manual	SAND 92-0967 (TTC-1210)	1	N/A

Location	Initiated by:	Date	Cog. Engineer	Date
WESF Crane Pad	D.D. McAfee	11/3/94	P. T. Saueressig	11/2/94

NOTE: Notify QC prior to start of work for each HOLD or WITNESS point

No.	Inspection Step	H/W/Y	NCR	QC Sign/Stamp
1	Quality Control (QC) Inspector shall verify the serial number and expiration date of the torque wrench used to install the trunnion bolts/screws. Serial Number: 813-88-01-017 Expiration Date: 10-29-94	Y		11-2-94
2	QC Inspector shall verify the serial number and expiration date of the multiplier used to install the trunnion and/or lift lug bolts. Serial Number: N/A Expiration Date: _____	Y		
3	QC shall witness the installation of the trunnion bolts and the final torquing value 250 ft-lbs.	W		11-16-94
4	QC Inspector shall verify the serial number and the expiration date of the torque wrench used to install the cask lift lug bolts. Serial Number: 813-88-01-017 Expiration Date: 10-29-94	Y		11-2-94

NOTE: QC will place N/A if data is not required.

WHC INSPECTION PLAN	JCS NO. 2B-93-00697	PAGE 2 of 2
	IMPACT LEVEL ☐ 1 ☐ 2 ☒ 3 ☐ 4	SAFETY CLASS N/A

NOTE: Notify QC prior to start of work for each HOLD or WITNESS point !

No.	Inspection Step	H/W/V	NCR	QC Sign/Stamp
5	QC shall witness the installation of the four trunnion screws and the final torquing value of 20 ft-lbs. TORQUE WRENCH ID: 776-88-01-176 DATE Calibrated: 4-8-93 EXPERATION DATE 4-8-94	W		1-6-94
6	QC shall witness the installation of the lift lug bolts and the final torquing value of 250 ft-lbs.	W		1-6-94
7	QC shall witness the installation of the upper port shield plug and the final torquing value of 30 ft-lbs.	W	N/A, New plug WASN't received in time prior to mid installation. Plug installation shall be done by RUST Federal Services at the ITCH Facility.	1/11/94
8	QC shall witness and/or install the torque paint on the lift lug and trunnion bolts.	W		1-6-94

NOTE: QC will place N/A if data is not required.

Appendix D: Torque test on all bolts

PERMANENT BOLTS IDENTIFIED IN TABLE 8.2-1

	BUSS CASK BOLT TORQUING REQUIREMENTS	
x	Trunnion to cask body bolts (16 each)	250 ft-lbs
x	Cask body trunnion washer (brass ring) (4 each)	20 ft-lbs
x	Lift lug to cask body bolts (4 each)	250 ft-lbs
x	Drain plug handle to drain plug cover (2 each)	5 ft-lbs
x	Impact limiter key to cask body screws (2 each)	30 ft-lbs

	BASKET BOLT TORQUING REQUIREMENTS	
x	Basket handle to basket bolts (4 each)	25 ft-lbs

	IMPACT LIMITER (MISCELLANEOUS) BOLT TORQUING REQUIREMENTS	
x	Foam fill port to impact limiter screws (4 each)	5 ft-lbs
	Impact limiter outer end lifting bolts (3 each)	20 ft-lbs

	TRANSPORTATION SKID (ASSEMBLY) TORQUING REQUIREMENTS	
x	Wear strip to mounting block screws (10 total)	50 ft-lbs
	Hexagonal base to skid (2 total)	10 ft-lbs
	Personnel barrier to skid (18 total)	20 ft-lbs
	Skid to trailer bolts (8 total)	290 ft-lbs

NOTE: x indicates items identified in the BUSS cask Safety Analysis Report for Packaging (SARP) requiring torque verification.

Post-it™ brand fax transmittal memo 7671	# of pages ▸ 2
To Paul	From Mario
Co. Spec/MARK	Co.
Dept.	Phone # 303 254-1379
Fax # 509 372-0232	Fax #

WORK PLAN

BENEFICIAL USES SHIPPING SYTEM (BUSS) CASK

Annual Torque Verification

Impact Level: Q

Paul T Saueressig 4/18/94
Cognizant Engineer (P. T. Saueressig)/Date

4/18/94
Cognizant Engineer Manager (E. D. Robbins)/Date

C A Colvin 4/18/94
Quality Assurance (C. A. Colvin)/Date

WORK PLAN

Activity: BUSS Cask Annual Torque Verification

Issue Date: April 15, 1994

1.0 Purpose:

This plan provides the instructions for the initial verification of design torque values on BUSS Cask bolts. The items requiring annual torque verification are identified in the BUSS Cask Safety Analysis Report For Packaging (SARP), per Chapter 8 Table 8.2-1. Design torque values were obtained from the BUSS Cask Maintenance Manual, Ref; CVI # 22542. The bracketed numbers in each step refer to the applicable section within the Maintenance Manual where required torque values are specified.

NOTE: Unless otherwise specified torque values are ±5% of the specified value. In all cases bolts shall be completely loosened prior to torquing.

2.0 BASKET HANDLE [2.6.5]

Remove basket from BUSS Cask cavity and place it in the designated area. Using a calibrated torque wrench, torque the (4) basket handle bolts to 25 ft-lbs. See attachment, Figure 2.5 for basket handle bolt locations. QC shall witness and record the following information.

TORQUED TO 25 FT-LBS _____ 4/21/94
QC STAMP Date

WHC 03-5576 _____ Done 2/2/94 _____ Due 2/2/95
Wrench ID. / Serial No. Calibration Date

J.W. Thomas _____ 4-21-94 _____ _____ 4-21-94
WHC QC. Signature Date WHC Engineer Date

3.0 BUSS CASK BORE PLUG INSTALLATION & TORQUE

Comply with written instructions per the attached letter from Sandia National Laboratories (SNL) Dated January 5, 1994. The letter provides detailed instructions as to the correct orientation of the plug and required torque value. QC shall witness and record the following information.

TORQUED TO 35 FT-LBS _____ 4/21/94
QC STAMP Date

039300-40032 #5576 _____ Done 2/2/94 _____ Due 2/2/95
Wrench ID. / Serial No. Calibration Date

T.W. Thomas _____ 4/21/94 _____ _____ 4-21-94
WHC QC. Signature Date WHC Engineer Date

4.0 TRUNNION BOLTS
[2.3.4]

Remove all existing torque seal prior to torque verification. Using a calibrated torque wrench and multiplier if required, torque the (32) trunnion bolts to 250 ft-lbs in a crossing pattern. QC shall witness, apply new torque seal, and record the following information.

TORQUED TO 250 FT-LBS _____ 4/21/94
QC STAMP Date

0-600 ft-lbs

WHC02 5617/60046DFN-1 Dwg 2/15/94 Due 2/15/95
Wrench ID. / Serial No. Calibration Date

N/A N/A /
Multiplier ID. / Serial No. Calibration Date

J.W. Thompson 4/21/94 4-21-94
WHC QC. Signature Date WHC Engineer Date

5.0 TRUNNION BRASS WASHER
[2.3.4]

Using a calibrated torque wrench, torque the (8) trunnion brass washer screws to 20 ft-lbs in a crossing pattern. QC shall witness and record the following information.

TORQUED TO 20 FT-LBS _____ 4/21/94
QC STAMP Date

WHC03 - 5576 Dwg 2/2/94 Due 2/2/95
Wrench ID. / Serial No. Calibration Date

J.W. Thompson 4/21/94 4-21-94
WHC QC. Signature Date WHC Engineer Date

6.0 LIFTING LUGS
[2.3.3]

Remove all existing torque seal prior to torque verification. Using a calibrated torque wrench and multiplier if required, torque the (8) lifting lug bolts to 250 ft-lbs in a crossing pattern. QC shall witness, apply new torque seal, and record the following information.

TORQUED TO 250 FT-LBS _____ 4/21/94
QC STAMP Date

0-600 ft lbs

WHC02 5617/60046DFN-1 Dwg 2/15/94 Due 2/15/95
Wrench ID. / Serial No. Calibration Date

N/A N/A /
Multiplier ID. / Serial No. Calibration Date

J.W. Thompson 4/21/94 4-21-94
WHC QC. Signature Date

7.0 UPPER/LOWER PORT COVER HANDLE Pg.3

[TORQUE REQUIREMENT TO BE INCORPORATED INTO THE MAINTENANCE MANUAL BY SNL UPON NEXT REVISION]

Remove both upper and lower port covers from the BUSS Cask body. Using a calibrated torque wrench, torque the (4) handle screws to 5 ft-lbs. Store the upper and lower port covers in the designated tool box. QC shall witness and record the following information.

TORQUED TO 5 FT-LBS _____ / 4/21/94
QC STAMP Date

WHC 03 - 5576 / Done 2/2/94 / Due 2/2/95
Wrench ID. / Serial No. Calibration Date

J.W. Thompson / 4/21/94 / _____ / 4-21-94
WHC QC. Signature Date WHC Engineer Date

8.0 KEYS TO CASK BODY
[2.2.19]

Using a calibrated torque wrench, torque the (4) Key mounting screws to 30 ft-lbs. QC shall witness and record the following information.

TORQUED TO 30 FT-LBS _____ / 4/21/94
QC STAMP Date

WHC-03 5576 / Done 2/2/94 / Due 2/2/95
Wrench ID. / Serial No. Calibration Date

J.W. Thompson / 4/21/94 / _____ / 4-21-94
WHC QC. Signature Date WHC Engineer Date

9.0 LOWER IMPACT LIMITER FILL COVERS
[6.4.3]

Using a calibrated torque wrench, torque the (16) fill cover screws to 5 ft-lbs in a crossing pattern. QC shall witness and record the following information.

TORQUED TO 5 FT-LBS _____ / 4/21/94
QC STAMP Date

WHC 03 - 5576 / Done 2/2/94 / Due 2/2/95
Wrench ID. / Serial No. Calibration Date

J.W. Thompson / 4/21/94 / _____ / 4-21-94
WHC QC. Signature Date WHC Engineer Date

10.0 LOWER IMPACT LIMITER OUTER END SCREWS [OPERATIONS MANUAL 6.4.7] Pg.4

Using a calibrated torque wrench, torque the (3) outer end cap screws to 20 ft-lbs. Bolts are located on the side of the Impact Limiter. QC shall witness and record the following information.

TORQUED TO 20 FT-LBS _____ / 4/21/94
QC STAMP Date

WHC 03-5576 _____ Done 2/2/94 / Due 2/2/95
Wrench ID. / Serial No. Calibration Date

J.W. Thompson / 4/21/94
WHC QC. Signature Date

_____ / 4-21-94
WHC Engineer Date

11.0 UPPER IMPACT LIMITER FILL COVERS [6.4.3]

could not perform QC inspection

NOTE: This step will be performed only if the crane is available. WHC will authorize continuence onto the next step.

Using a calibrated torque wrench, torque the (16) fill cover screws to 5 ft-lbs in a crossing pattern. QC shall witness and record the following information.

TORQUED TO 5 FT-LBS _____ / _____
QC STAMP Date

_____ _____ / _____
Wrench ID. / Serial No. Calibration Date

See page 4a (ft)

_____ / _____ _____ / _____
WHC QC. Signature Date WHC Engineer Date

12.0 UPPER IMPACT LIMITER OUTER END SCREWS

[OPERATIONS MANUAL 6.4.7]

Using a calibrated torque wrench, torque the (3) outer end cap screws to 20 ft-lbs. Bolts are located on the side of the Impact Limiter. QC shall witness and record the following information.

TORQUED TO 20 FT-LBS _____ / 4/21/94
QC STAMP Date

x WHC 03-5576 _____ Done 2/2/94 / Due 2/2/95
Wrench ID. / Serial No. Calibration Date

J.W. Thompson / 4/21/94
WHC QC. Signature Date

_____ / 4-21-94 MP
WHC Engineer Date

Pg.4a ✓

10.0 LOWER IMPACT LIMITER OUTER END SCREWS
[OPERATIONS MANUAL 6.4.7]

Using a calibrated torque wrench, torque the (3) outer end cap screws to 20 ft-lbs. Bolts are located on the side of the Impact Limiter. QC shall witness and record the following information.

TORQUED TO 20 FT-LBS _____ 4/21/94
QC STAMP Date

WHC 03-5576 Done 2/2/94 Due 2/2/95
Wrench ID. / Serial No. Calibration Date

J.W. Thompson 4/21/94 4-21-94
WHC QC. Signature Date WHC Engineer Date

11.0 UPPER IMPACT LIMITER FILL COVERS
[6.4.3]

NOTE: This step will be performed only if the crane is available. WHC will authorize continuence onto the next step.

Using a calibrated torque wrench, torque the (16) fill cover screws to 5 ft-lbs in a crossing pattern. QC shall witness and record the following information.

TORQUED TO 5 FT-LBS _____ 5/5/94
QC STAMP Date

WHC-9-24-91-5576 Done 2/2/94 Due 2/2/95
Wrench ID. / Serial No. Calibration Date

J.W. Thompson 5/5/94 Paul J Saueressig 5/5/94
WHC QC. Signature Date WHC Engineer Date

12.0 UPPER IMPACT LIMITER OUTER END SCREWS

[OPERATIONS MANUAL 6.4.7]

Using a calibrated torque wrench, torque the (3) outer end cap screws to 20 ft-lbs. Bolts are located on the side of the Impact Limiter. QC shall witness and record the following information.

TORQUED TO 20 FT-LBS _____ 4/21/94
QC STAMP Date

WHC 03 5576 Done 2/2/94 Due 2/2/95
Wrench ID. / Serial No. Calibration Date

J.W. Thompson 4/21/94 4-21-94
WHC QC. Signature Date

13.0 TRANSPORTATION SKID
BRASS WEAR STRIPS MOUNTED TO HEXAGONAL BASE

[3.2.6]

Using a calibrated torque wrench, torque the (10) wear strip mounting screws to 50 ft-lbs. QC shall witness and record the following information.

TORQUED TO 50 FT-LBS _____ 4/22/94
QC STAMP Date

039300
40932 5576
Wrench ID. / Serial No.

Done 2/2/94 IDue 2/2/95
Calibration Date

T.W. Thompson 4/22/94
WHC QC. Signature Date

4-22-94
WHC Engineer Date

14.0 HEXAGONAL BASE TO SKID MOUNT
[3.2.9]

Using a calibrated torque wrench, torque the (2) base to skid retaining screws to 10 ft-lbs. See attachment, Figure 3.1 for attachment screw location. QC shall witness and record the following information.

TORQUED TO 10 FT-LBS _____ 4/22/94
QC STAMP Date

WHC-03 5576
Wrench ID. / Serial No.

Done 2/2/94 IDue 2/2/95
Calibration Date

T.W. Thompson 4/22/94 94 TWT
WHC QC. Signature Date

4-22-94
WHC Engineer Date

15.0 PERSONNEL BARRIER TO SKID

[3.4.7]

Using a calibrated torque wrench, torque the (18) barrier to skid assembly screws to 20 ft-lbs. QC shall witness and record the following information.

TORQUED TO 20 FT-LBS _____ 4/22/94
QC STAMP Date

WHC-03 5576
Wrench ID. / Serial No.

Done 2/2/94 IDue 2/2/95
Calibration Date

T.W. Thompson 4/22/94
WHC QC. Signature Date

4-24-94
WHC Engineer Date.

16.0 SKID-TO-TRAILER TIEDOWN

[TORQUE CALC. LETTER ATTACHED # 84100-94-WAM-065]

Remove all existing torque seal prior to torque verification. Using a calibrated torque wrench and multiplier if required, torque the (8) Skid-To-Trailer tiedown bolts to 290 ft-lbs. QC shall witness, apply new torque seal, and record the following information.

TORQUED TO 290 FT-LBS _____ 4/22/94
QC STAMP Date

0-600 ft lb
6004L1)F-N-1
WHC-02 5617
Wrench ID. / Serial No.

Done 2/15/94 | Due 2/15/95
Calibration Date

N/A
Multiplier ID. / Serial No.

N/A |
Calibration Date

J. W. Thompson 4/22/94
WHC QC. Signature Date

4-22-94
WHC Engineer Date

Appendix E: Impact limiter inspection and weight test

1. Document Number 2B-93-01426/W *GENERIC WORK ITEM*
   Work Item Title BUSS CASK IMPACT LIMITER ANNUAL INSPECTION

2. Essential Systems
3. Resolution
   SEE ATTACHED J-4A FOR RESOLUTION.

4. Impact Level/Approval Requirements 3-S Q

5. Tech Spec/OSR Requirements/Reference
   MAINTENANCE MANUAL FROM SANDIA NATIONAL LABORATORIES.
   CVI # 22542

6. Reference Documents

	Type
22542	CVI
SAND 92-0967	MAIN

7. Comments- Utilized the same requirements for lifting the upper limiter into the vertical position in accordance with section A.3. 1/7/94

8. Retest Requirement N
9. Mode N/A
10. Retest

11. QC Involvement in Retest NONE

12. PIC SAUERESSIG,PT

13. PIC Org. ENGINEERING

14. Resolution By — Signature: PAWLAK,MW — Date: 12/17/93

15. Plant Forces Work Review Required N Number N/A

16. Approvals

	Signature	Date
Cognizant Engineer	SAUERESSIG,PT PTS	12-21-93
Cognizant Manager	ROBBINS,ED	12-21-93
Environmental Assurance	N/A	12/21/93
Health/Safety Assurance		12/21/93
Quality Assurance		12/21/93
Additional Approval (QA)		12/21/93

17. Resources Required

Res Code	Description	No.	Est Hrs	Act Hrs
23	MILLWRIGHT	2	16	20
35	IRONWORKER/RIGGER	2	16	12
ENG	B PLANT ENGINEERING	1	8	8
QC	QUALITY CONTROL	1	8	8

1. Document Number 2B-93-01426/W *GENERIC WORK ITEM*
Work Item Title BUSS CASK IMPACT LIMITER ANNUAL INSPECTION

3. Resolution

ACTIVITY: IMPACT LIMITERS ANNUAL INSPECTION & TESTING

1.0 Purpose:

THIS PLAN PROVIDES THE INSTRUCTIONS FOR ANNUAL INSPECTION AND TESTING OF THE BUSS CASK IMPACT LIMITERS AND ASSOCIATED HARDWARE, LIMITER S/N: S48929-001 AND S/N: S48929-002. THE REQUIRED INSPECTION POINTS AND ACCEPTANCE CRITERIA WERE DEVELOPED IN ACCORDANCE WITH THE BUSS CASK MAINTENANCE MANUAL SECTIONS 2.7.5 THRU 2.7.11, 2.8.4 THRU 2.8.8, AND SECTION 9.2. THE BRACKETED NUMBERS IN EACH STEP REFER TO THE VENDOR INFORMATION INSPECTION POINTS REF.(VI # 22542 SHT. 147-310).

2.0 STATUS AND DESCRIPTION:

THE BUSS CASK IMPACT LIMITERS ARE LOCATED ON THE 225-B CRANE PAD. ONE IMPACT LIMITER IS LOCATED ON THE BUSS CASK HANDLING FRAME WITH THE INTERFACE AREA OF THE IMPACT LIMITER FACING SKYWARD. THE OTHER IMPACT LIMITER IS LOCATED ON THE CONCRETE SECTION OF THE 225-B CRANE PAD WITH THE CASK INTERFACE AREA FACING DOWNWARD.

GENERAL RIGGING PROCEDURES FOR LIFTS REQUIRED TO COMPLETE THE LISTED INSPECTIONS ARE ATTACHED IN THE APPENDIX.

3.0 INSPECTIONS/TEST

3.1 INSPECT 6 LIFTING HOLES (3 ON OUTER END AND 3 ON CIRCUMFERENCE OF EACH IMPACT LIMITER FOR SIGNS OF THREAD WEAR OR DAMAGE. EXAMINE AREAS IMMEDIATELY ADJACENT TO HOLES FOR SIGNS OF DISTORTION. THESE HOLES ARE THREADED INSERTS; INSPECT THEM FOR LOOSENESS. [2.7.8]

MILLWRIGHT SIGNATURE 12-22-93 DATE

ENGINEERING SIGNATURE 12/28/93 DATE

NOTE: Inspected all Lifting holes with exception of three on the bottom side of Impact Limiter S/N: S48929-000 MS. 12/28/93

Inspected the remaining three Lifting holes on the bottom side of Impact Limiter S/N: S48929-001. MS. 01/10/94

1. Document Number 2B-93-01426/W *GENERIC WORK ITEM*
   Work Item Title BUSS CASK IMPACT LIMITER ANNUAL INSPECTION

===

3.2 WEIGH IMPACT LIMITERS

QC.HOLD POINT

WEIGH EACH LIMITER UTILIZING A CALIBRATED DYNAMOMETER AND COMPARE MEASURED WEIGHT TO THE ORIGINAL WEIGHT (MARKED ON THE ATTACHED ID PLATES). THE WEIGHT OF EACH LIMITER SHOULD NOT DEVIATE MORE THAN -1 % OR +3 % FROM ITS ORIGINAL VALUE. IF AN OUT-OF-LIMIT CONDITION IS NOTED, CONTACT WESF ENGINEERING [2.7.5]

LIMITER WEIGHED; CRITERIA MEET

Serial No. S48929-001   Original weight 3006lbs.

Present weight 3045 lbs. JV 12/21/93   Net % change

Note: Net % change= New weight- Original Weight x 100 %

LIMITER WEIGHED; CRITERIA MEET

SERIAL NO.S48929-002   ORIGINAL WEIGHT 2994LBS.

PRESENT WEIGHT ~~3065 lbs~~ 3035 JV 12/24/93   NET % CHANGE

815-29-06-033 12/24/93
Dynamometer Serial No.

8/03/93
Date Calibrated

8/03/94
Calibration Due Date

L. Sims 12-28-93
QC. Signature/Stamp/Date

3.3 EXTERIOR SURFACE INSPECTIONS

INSPECT EXTERIOR SURFACE OF LIMITER SKIN FOR DENTS, GOUGES, OR TEARS. SMALL DENTS ARE PERMISSIBLE. REPAINT AREAS OF MISSING PAINT DUE TO DINGS OR SCRAPES. [2.7.6]

INSPECTED FOR MECHANICAL DAMAGE; NOTE LOCATIONS

_______________ / 12-27-93
Millwright Signature   Date

Mike Pawlak / 12/28/93
Engineering Signature   Date

Document Number 2B-93-01426/W *GENERIC WORK ITEM*
Work Item Title BUSS CASK IMPACT LIMITER ANNUAL INSPECTION

3.4 LIMITER/CASK INTERFACE INSPECTION

QC.HOLD POINT

Inspect limiter-to-cask interface structure, especially tape joint groove. Look for signs of wear, galling, or damage. (QC) Visually inspect welds around the interface structure for cracks. Check that air flow holes are not obstructed. See Figure 2.6, attached, for inspection points. [2.7.7]

Millwright Signature / 12-28-93 Date

QC Signature / Stamp / 12-28-93 Date

3.5 LIMITER FILL-COVER INSPECTIONS

REPLACE THE FOUR FILL-COVER GASKETS OF EACH LIMITER BY REMOVING 4 FOUR SCREWS SECURING EACH COVER. LOOK FOR SIGNS OF GASKET DETERIORATION. REMOVE ANY LOOSE MATERIAL ADHERED TO THE COVER OR LIMITER USING A PUTTY KNIFE. WIPE OFF DEBRIS OR DIRT WITH A DRY RAG. PLACE A NEW GASKET OVER EACH FILL HOLE, ORIENTING OVER THE SCREW HOLES. REINSTALL COVERS AND ATTACH WITH THE SCREWS. TIGHTEN SCREWS TO APPROXIMATELY 5 FT-LB. [2.7.9]

Millwright Signature / 12-28-93 Date

Engineering Signature / 12/28/93 Date

3.6 TURNBUCKLE ATTACHMENT LUGS

QC.HOLD POINT

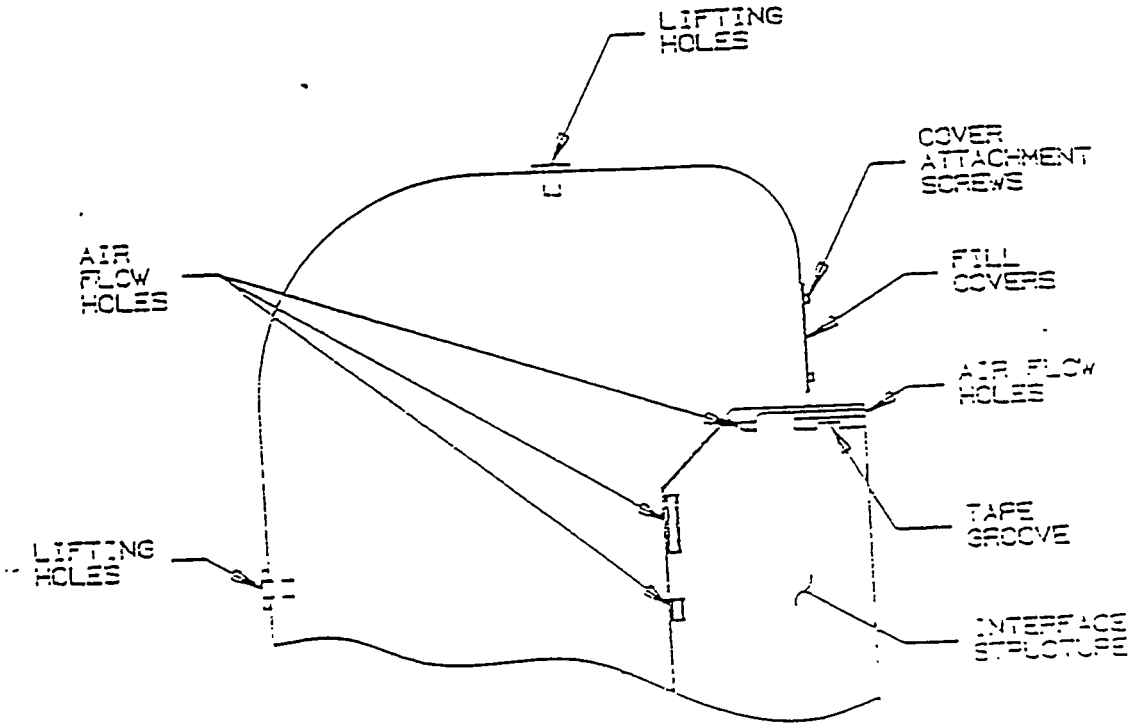
EXAMINE 4 TURNBUCKLE ATTACHMENT LUGS OF EACH LIMITER LOOK FOR SIGNS OF WEAR OR DAMAGE. ALSO INSPECT AREA AROUND EACH FITTING FOR SIGNS OF DISTORTION OF THE LIMITER SKIN OR CRACKS IN THE WELDS. REMOVE PAINT FOR FURTHER INSPECTION ONLY IF OBVIOUS CRACKS ARE OBSERVED THROUGH THE PAINT [2.7.10]

Inspected lugs on Impact Limiter S/N: S48929-003 1/7/94 L-1-94

Millwright Signature / 12-28-93 Date

QC Signature / Stamp / 12-28-93 Date

Note: Inspected lugs on Impact limiter S/N: S48929-001 ONLY. 12/28/93



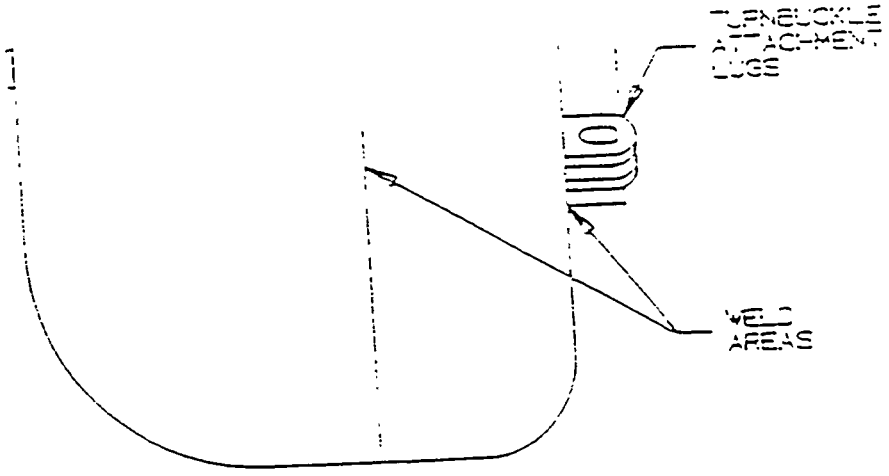


Figure 2.6
Impact Limiter

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3.7 NON-STRUCTURAL WELD INSPECTION

QC.HOLD POINT

(QC) VISUALLY INSPECT WELD AROUND CIRCUMFERENCE OF LIMITER FOR CRACKS. REMOVE PAINT FOR FURTHER INSPECTION ONLY IF OBVIOUS CRACKS ARE OBSERVED THROUGH THE PAINT. [2.7.11]

Millwright Signature / Date 12-23-93

QC Signature / Stamp / Date 12-28-93

3.8 TAPE INSPECTION

VISUALLY INSPECT EACH OF THE FOUR IMPACT LIMITER TAPES. LOOK FORINDICATIONS OF DAMAGE, GALLING OR CRACKING, PARTICULARLY AT THE THIN SECTION OF EACH SLOT. IF NECESSARY, CLEAN TAPES USING RAGS DAMPENED WITH BIODEGRADABLE DETERGENT TO REMOVE DIRT AND ACCUMULATED LUBRICANT PRIOR TO INSPECTION. DO NOT USE SOLVENTS. [2.8.4]

INSPECTED FOR MECHANICAL DAMAGE; NOTE LOCATIONS

Millwright Signature / Date 12-23-93

Engineering Signature / Date 12/28/93

INSPECT BONDED LUBRICANT ON THE TAPES. IF LUBRICANT IS EXCESSIVELY WORN, REMOVE EXISTING LUBRICANT AND RECOAT WITH NEOLUBE [2.8.5]

Millwright Signature / Date 12-23-93

Engineering Signature / Date 12/28/93

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CHECK TAPE-LOCKING PLUG AND ATTACHMENT EYEBOLT FOR DAMAGE OR GOUGES [2.8.8]

Millwright Signature — Date 12-22-93

Engineering Signature — Date 12/28/93

3.9 TURNBUCKLE INSPECTIONS

INSPECT 4 LIMITER TURNBUCKLES. ACTUATE EACH AND CHECK FOR SMOOTH OPERATION. IF THREAD DAMAGE IS NOTED, REPAIR THE COMPONENT PER SECTION 9.2 BELOW. LUBRICATE THREADS WITH NEVERSEEZ OR EQUIVALENT BEFORE INSTALLATION. LUBRICATE ROD ENDS WITH LITHIUM GREASE IN THE GREASE FITTINGS. ADJUST ROD ENDS OF EACH ASSEMBLY SUCH THAT APPROXIMATELY 1.50 INCHES OF SHANK IS THREADED INTO THE TURNBUCKLE BODY. [2.8.6]

Millwright Signature — Date 12-22-93

Engineering Signature — Date 12/28/93

INSPECT 8 QUICK-RELEASE PINS FOR DAMAGE. ACTUATE EACH AND CHECK FOR SMOOTH OPERATION AND POSITIVE LOCKING UPON RELEASE. CHECK SPACER WASHER AND LANYARD FOR SECURE ATTACHMENT TO PIN. [2.8.7]

Millwright Signature — Date 12-22-93

Engineering Signature — Date 12/28/93

DISASSEMBLE THE DIRTY/DAMAGED ROD END FROM THE TURNBUCKLE BODY.
CLEAN ANY DIRT AND EXCESS LUBRICANT FROM BOTH INTERNAL AND EXTERNAL THREADS AND INSPECT CLOSELY FOR SIGNS OF NICKS, WEAR, OR GALLING. IF THE THREADS ARE GALLED, I.E, SHOWING SIGNS OF SEIZING, ONE OR BOTH COMPONENTS WILL HAVE TO BE REPLACE. [9.2]

USE A TAP (FOR TURNBUCKLE BODIES) OR DIE (FOR ROD

ENDS) TO CHASE THE THREADS. ALL COMPONENTS HAVE A 1.50-12UNF THREADS IN EITHER RIGHT- OR LEFT-HAND THREADS. LUBRICATE THREADS DURING CHASING OPERATION WITH A CUTTING FLUID APPROPRIATE FOR THE MATERIAL. (NOTE: ALL COMPONENTS ARE 4130 OR 4140 ALLOY STEEL WITH THE EXCEPTION OF IMPACT LIMITER TURNBUCKLE BODIES WHICH ARE NITRONIC 60 STAINLESS STEEL.)

CLEAN CUTTING FLUID FROM COMPONENTS AND LUBRICATE THREADS WITH NEVERSEEZ OR EQUIVALENT, REASSEMBLE COMPONENT.

INSPECTED FOR MECHANICAL DAMAGE; NOTE LOCATIONS AND REPAIRS

NA / _____
MILLWRIGHT SIGNATURE / DATE

NA MB. 12/28/93

NA / _____
ENGINEERING SIGNATURE DATE

APPENDIX
GENERAL RIGGING PROCEDURES

GENERAL INFORMATION

IMPACT LIMITER WEIGHT IS APPROXIMATELY 3000 LBS
EACH OF THE 6 LIFTING POINTS IS INDIVIDUALLY CAPABLE OF LIFTING THE LOAD. THE LIFTING POINTS ARE USUALLY USED TWO OR THREE AT A TIME.
THESE LIFTS ARE NOT CONSIDERED CRITICAL LIFTS
LIFTING BRIDAL HAS BEEN TAGGED FOR 3.1 T CAPACITY THROUGH 10/94. THE RIGGING SPECIALIST MAY SUBSTITUTE SIMILARY RATED EQUIPMENT.
SAFETY SHOES AND HARD HATS ARE REQUIRED ON THE CRANE PAD

A.1 VERTICAL LIFT OF IMPACT LIMITER (CASK INTERFACE AREA DOWN) FOR WEIGHING

1. ENGAGE IMPACT LIMITER LIFTING BRIDAL. ZERO DYNAMOMETER OR NOTE WEIGHT OF BRIDAL.

2. INSTALL SWIVEL EYES INTO EACH OF THREE LIFT POINTS AT THE END OF THE IMPACT LIMITER TORQUE EACH LIFTING EYE TO 100 FT-LBS.

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3. APPLY MINIMUM TENSION. INSPECT AND ADJUST RIGGING AS REQUIRED. STAND CLEAR AND RAISE IMPACT LIMITERS A APPROXIMATELY (2") AND OBTAIN REQUIRED WEIGHT DATA.

4. SLOWLY LOWER IMPACT LIMITER ONTO CRANE PAD SURFACE. DISENGAGE SWIVEL EYES AND STORE BRIDAL IN BUSS CASK GANG BOX.

A.2 VERTICAL LIFT OF IMPACT LIMITER (CASK INTERFACE AREA UP) F WEIGHING

NOTE: THIS IS APPLICABLE TO THE IMPACT LIMITER LOCATED ON THE BUSS CASK HANDLING FRAME. THE HANDLING FRAME HAS A KEYED FLOATING PAD WHICH INTERLOCKS WITH THE IMPACT LIMITER. THIS PAD NEEDS TO BE RE-ALIGN TO ASSURE THE BUSS CASK CAN BE EASILY REASSEMBLE.

1. ENGAGE IMPACT LIMITER LIFTING BRIDAL. ZERO DYNAMOMETER OR NOTE WEIGHT OF BRIDAL.

2. INSTALL SWIVEL EYES INTO EACH OF THREE LIFT POINTS ON THE OUTER CIRCUMFERENCE OF THE IMPACT LIMITER. TORQUE EACH LIFTING EYE TO 100 FT-LBS.

3. USE SOFTENERS TO PREVENT SLINGS FROM SCRATCHING THE IMPACT LIMITERS WHEN TENSION IS APPLIED

4. APPLY MINIMUM TENSION. INSPECT AND ADJUST RIGGING AS REQUIRED. STAND CLEAR AND RAISE IMPACT LIMITERS APPROXIMATELY (2") AND OBTAIN REQUIRED WEIGHT DATA.

5. SLOWLY LOWER IMPACT LIMITER ONTO HANDLING FRAME PAD SURFACE. VISUALLY ENSURE THAT THE IMPACT LIMITER ENGAGES THE RAISED KEYED AREA OF THE HANDLING FRAME PAD. DISENGAGE SWIVEL EYES AND STORE BRIDAL IN BUSS CASK GANG BOX.

A.3 LIFTING IMPACT LIMITER FOR CASK INTERFACE INSPECTION

NOTE: THIS APPLIES TO A IMPACT LIMITER WITH THE INITIAL POSITION OF THE CASK INTERFACE AREA DOWN. THE IMPACT LIMITER IS RAISED TURNED IN A POSITION IN THE SAME ORIENTATION AS IT IS TRANSPORTED EXPOSING THE CASK INTERFACE SURFACE.

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1. PREPARE AREA TO ROTATE IMPACT BY LIFTING VERTICALLY (SEE NOTE ABOVE) PLACING CARDBOARD OR RUBBER MATTING TO PROTECT THE PAINTED SURFACE OF THE CASK FROM THE ABRASIVE SURFACE OF THE CONCRETE CRANE PAD.

2. INSTALL BRIDAL ON TWO OF THE SIDE LIFTING POINTS AND TORQUE THE SWIVEL EYES TO 100 FT-LBS (SEE FIGURE FOR LIFTING LOCATIONS). ENSURE THAT THIRD UNUSED SLING ON THE BRIDAL IS IN BETWEEN THE OTHER TWO SLINGS.

3. APPLY MINIMUM TENSION. INSPECT AND ADJUST RIGGING AS REQUIRED. STAND CLEAR AND SLOWLY RAISE IMPACT LIMITER, ALLOWING THE BOTTOM END OF THE IMPACT LIMITER TO ROTATE BENEATH THE POINT OF RIGGING.

4. MAINTAIN MINIMUM TENSION ON THE TWO POINTS TO PREVENT THE LIMITER FROM ROLLING. CHOCK THE LIMITER ON TWO SIDES.

5. INSPECT CASK INTERFACE AREA AS DESCRIBED IN TEST PROCEDURE.

6. LOWER THE CRANE BLOCK SUFFICIENTLY TO ALLOW THE THIRD UNUSED BRIDAL SLING TO BE INSTALLED INTO LIFTING POINT ON THE END OF THE IMPACT LIMITER (SEE FIGURE).

7. STAND CLEAR AND SLOWLY LIFT THE IMPACT LIMITER THE BRIDAL SLING INSTALLED IN THE END OF THE IMPACT LIMITER WILL ENGAGE FIRST. CONTINUE LIFTING UNTIL THE CENTER OF GRAVITY OF THE IMPACT LIMITER ROTATES BELOW THE RIGGING POINT.

8. SLOWLY LOWER THE IMPACT LIMITER, LANDING IT CASK INTERFACE SIDE DOWN, AS IT WAS ORIGINALLY POSITIONED.

9 PERFORM VERTICAL LIFT (SEE A.1) AS NECESSARY TO REPOSITION IMPACT LIMITER TO THE CENTERLINE OF THE CRANE PAD.

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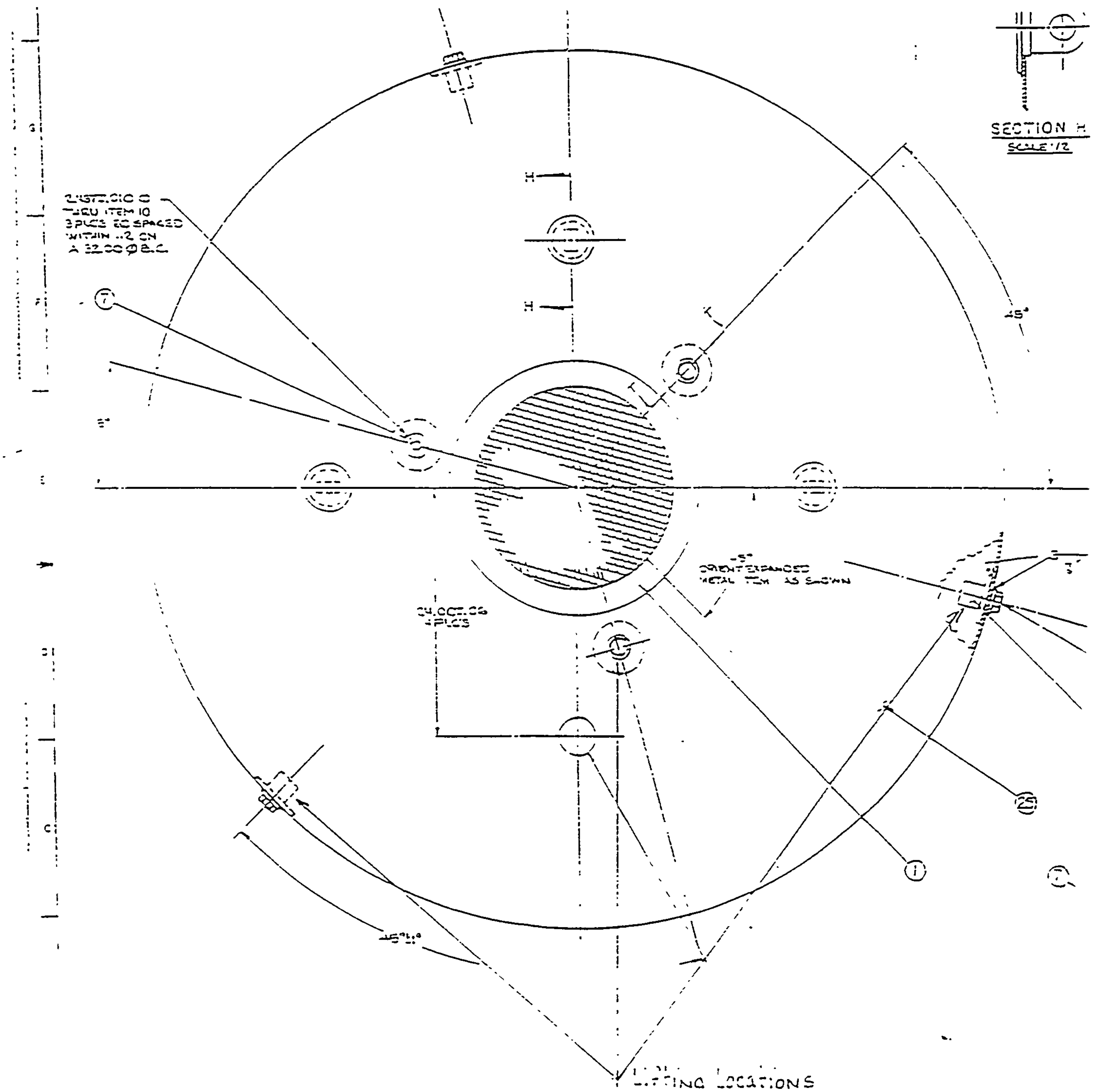
	Signature	Date
18. Field Work Complete	_____	_____
19. Retest Satisfactory	N/A	_____
20. QC Verify Retest (If Required)	N/A	_____



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LIFTING LOCATIONS