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(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN
1	1	Design Authority PA Titzer	PA Titzer	03-10-97	R1-56	1	1	MWTS WS Josephson		3/10/97	H6-06
1	1	Design Agent EM Veith		3/6/97	R1-56	1	1	~~Operations~~ ME McKinney			S2-48
1	1	Cog. Eng. WM McCormick		3/5/97	H1-15			DST PROJECTS			
1	1	Cog. Mgr. JG Field		3/6/97	H1-15						
1	1	QA CR Hoover		3/7/97	H1-15						
1	1	Safety DW McNally		3/6/97	G1-15						
		Env.									

18.	19.	20.	21. DOE APPROVAL (if required) Ctrl. No.
W. A. McCormick 3/5/97		J. G. Field 3/6/97	[ ] Approved [ ] Approved w/comments [ ] Disapproved w/comments
Signature of EDT Originator / Date	Authorized Representative for Receiving Organization / Date	Design Authority/ Cognizant Manager / Date	

BD-7400-172-2 (05/96) GEF097

Long-Length Contaminated Equipment Burial Containers Fabrication Process Procedures

W. A. McCormick
Project Hanford Management Contractor, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-96RL13200

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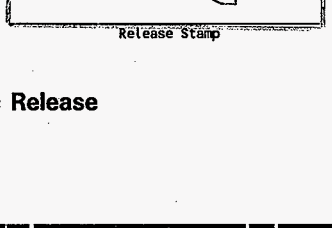
Key Words: LLCE, leak test, inspection, body butt weld, end cap, test procedure

Abstract: These special process procedures cover the detailed step-by-step procedures required by the supplier who will manufacture the Long-Length Contaminated Equipment (LLCE) Burial Container design. Also included are detailed step-by-step procedures required by the disposal process for completion of the LLCE Burial Containers at Hanford.



Release Approval — Date — Release Stamp

Approved for Public Release

CONTENTS

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LONG-LENGTH CONTAMINATED EQUIPMENT BURIAL CONTAINERS FABRICATION PROCESS PROCEDURES

These special process procedures cover the detailed step-by-step procedures required by the supplier who will manufacture the Long-Length Contaminted Equipment (LLCE) Burial Container design. Also included are detailed step-by-step procedures required by the disposal process for completion of the LLCE Burial Containers at Hanford. The applicability matrix identifies which procedure is required for either offsite fabrication of the containers or onsite processing of the LLCE Burial Container. In some cases one procedure will apply to both the LLCE Burial Container manufacturer and the Buyer or Buyer's subcontractor.

APPENDIX APPLICABILITY MATRIX

Procedure	Title	Required for Procurement of Containers	Required for Disposal at Hanford/Other Contractors
Appendix A AS/LLCE-001	Vacuum Box Bubble Leak Test for the Body Butt Weld	X	
Appendix B AS/LLCE-002	Bubble Leak Test for End Cap Macroencapsulation Weld	X	X
Appendix C AS/LLCE-003	Vacuum Box Bubble Leak Test for End Cap Penetration Seals of the LLCE Burial Containers	X	X
Appendix D AS/LLCE-004	End Cap Installation Procedure	X	X
Appendix E AS/LLCE-005	Void Fill and Test Procedure		X
Appendix F AS/LLCE-006	Storage and Handling Procedure	X	X
Appendix G AS/LLCE-007	Vent-Fill and Leak Port Sealing Procedure	X (Leak test fittings only)	X
Appendix H AS/LLCE-008	Lifting and Handling Procedure	X (Empty container only)	X
Appendix I AS/LLCE-009	Load Test Procedure (certification only)		X
Appendix J AS/LLCE-010	Detent Pin Removal Force Test Procedure		X
Appendix K AS/LLCE-011	Remote Rigging Failure Recovery Test Procedure		X
Appendix L AS/LLCE-012	Body Butt Weld Fusion Procedure	X	
Appendix M AS/LLCE-015	Scratch and Gouge Inspection and Repair Procedure	X	X
Appendix N AS/LLCE-016	Powercore Installation Procedure	X	
Appendix O AS/LLCE-017	Ultrasonic Test Examination for the Body Butt Weld	X	

APPENDIX A

AS/LLCE-001

VACUUM BOX BUBBLE LEAK TEST FOR THE BODY BUTT WELD

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CONTENTS

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1.0 PURPOSE AND SCOPE

The purpose of this procedure is to establish the minimum requirements for conducting Vacuum Box Bubble Leak Testing on the LLCE Burial Containers for the Butt Weld Fusion Zone.

2.0 REFERENCES

2.1 ANSI N14.5, Leakage Tests on Packages for Shipment, Radioactive Materials.

2.2 ASME/ASTM SE-432, Recommended Guide for the selection of a Leak Detection Method.

2.3 ASME/ASTM SE-479, *Recommended Guide for Preparation* of Leak Testing Specification

2.4 ASNT Document SNT-TC-1A, Recommended Practice for Personnel Qualification and Certification.

2.5 Quality Assurance (QA) records corrective action and certification per the approved QA manual.

3.0 DEFINITIONS

3.1 *Leak* - An opening through a containment system that permits the escape of contents.

3.2 *Atmospheric Pressure* - Pressure of the atmosphere at a specified place and time.

3.3 *Gauge Pressure* - The difference between absolute pressure and atmospheric pressure.

3.4 *Bubble* - Evidence of the location of a leak.

3.5 *Vacuum* - space filled with gas below atmospheric pressure.

4.0 RESPONSIBILITIES

4.1 Quality Assurance (QA) Management is responsible for ensuring that personnel are available to perform all Bubble Leak Testing.

4.2 Quality Assurance (QA) Management shall ensure that Leak Test Personnel are qualified in accordance with Reference 2.5 (above).

4.3 Leak Test Personnel performing this procedure shall comply with the requirements of this procedure.

5.0 PROCEDURE

5.1 Primary Leak Test Equipment authorized for use by this procedure is as follows:

5.1.1 Miscellaneous hardware and test connections

5.1.2 Calibrated temperature measuring device

5.1.3 Calibrated Vacuum Gauge

5.1.4 Vacuum Box with evacuation system

5.1.5 Bubble Leak Test Solution, "Sure Chek" P/N 32852

5.1.6 Calibrated White Light Meter

5.2 Preparation

5.2.1 Prior to the performance of the leak test, the Leak Test Examiner shall verify that the surface to be tested is free of contaminates that might mask a leak. The interior and exterior surfaces shall be dry. The test shall not be conducted in direct sunlight.

5.2.2 Prior to the performance of the leak test, the Leak Test Examiner shall verify that the area to be tested has a minimum white light intensity of 100 foot candles at all exterior surfaces. White light intensity shall be recorded on Form AS/LLCE-001-1.

5.2.3 Prior to the performance of the leak test, the Leak Test Examiner shall verify that the area to be tested is free of any free flowing air drafts that could adversely disperse the leak test solution. If necessary, appropriate wind breaks shall be implemented.

5.3 Butt Weld Fusion Zone Leak Test

5.3.1 The LLCE Burial Container shall be placed on an appropriate test fixture to allow for complete access to the entire fusion zone.

5.3.2 The leak test examiner shall place a temperature measuring device on the cask, within 6" of the weld zone. The temperature measuring device shall be permitted a 5 minute stabilization time prior to start of the test. The acceptable test temperature range is -55 to 200 degrees Fahrenheit.

5.3.3 The leak test examiner shall visually inspect the surface to be tested and the gasket on the vacuum box to verify that no foreign material that could induce a leak across the seal surface is present. Record the time at start of test and temperature on the report form.

5.3.4 Apply the bubble leak test solution to the surface (weld zone and 1/2" on both sides) by the use of a fine orifice pump type spray can. Application shall be performed in a manner to minimize the formation of bubbles in the solution during application. No more than 30 seconds shall elapse from the application of the bubble leak test solution to placement of the required vacuum box for the test.

5.3.5 After application of the bubble leak test solution to the surface, place the vacuum box over the weld zone to be tested (ensure that the vacuum gauge is completely visible to the inspector). No more than 18 linear inches of the weld zone shall be inspected at a time. Ensure that a minimum of 2 inch overlap from the previous area of inspection is achieved. Open the valve to the vacuum pump and observe the area of interest during the evacuation time. During this evacuation period the inspector should be cognizant of large leaks that tend to blow the solution away from the surface.

5.3.6 The pressure inside the vacuum box shall achieve a pressure differential of 6 to 10 inches of mercury within 30 seconds. After achieving the required pressure differential, the inspector shall observe the area for a minimum of 30 seconds for the formation of bubbles (Note: the inspector shall mark any area

where bubbles are formed by marking the location with a marker of contrasting color).

5.3.7 The solution shall be applied to no more than 18 linear inches of the test surface at a time. Application of the test solution and sequence of inspection shall be from the 6 O'Clock position on the pipe and progressing to the 12 O'Clock position. After reaching the 12 O'Clock position of the pipe, repeat the previous inspection sequence on the remaining side of the pipe. *Note: If a turning apparatus is used in the fixturing device, the inspection sequence will be performed using an upward progression in a singular rotation of the pipe. The start and stops of each placement of the vacuum box will be marked.*

5.3.8 *All areas identified as leaks shall be reinspected using the method described* above, after appropriately cleaning and drying the area of interest.

5.3.9 If after reinspection of the suspected area, formation of bubbles are observed, initiate a condition report in accordance with Reference 2.4.

5.3.10 If after the completion of the test sequence for the container, no bubbles are detected, the test is complete and the container is considered to have an acceptable leak rate.

5.3.11 Complete the test report for the container.

6.0 RECORDS

6.1 *The following records shall be maintained in accordance with approved QA manual.*

6.1.1 Bubble Leak Test Report Form, AS/LLCE-001-1

7.0 ENCLOSURES

7.1 Bubble Leak Test Report Form, AS/LLCE-001-1

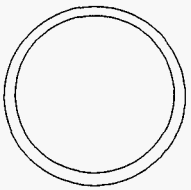
ENCLOSURE 7.1
Bubble Leak Test Report Form
AS/LLCE-001-1

Vacuum Box Bubble Leak Test Report Form

LLCE Burial Container

Customer/Jobs/Traveler_____ Report:_____
Procedure/Rev._____
Item Description_____ S/N:_____ Date:_____
Pressure Guage S/N:_____ Cal. Due Date:_____
Temp. Meas. Device S/N:_____ Cal. Due Date:_____
Light Meter S/N:_____ Light Intensity:_____ Cal. Due Date:_____
Temp. at Start of Test:_____ Temp. at End of Test:_____ Time at Start of Test:_____

12 O'Clock



6 O'Clock
LLCE Burial Container

Identify the location (numerically) on the figure above that corresponds to the area of a leak. Document the physical location in the corresponding line below (e.g. #1 - 15" up from 6 O'Clock position, right side of pipe):

Ind.#	Location of Indication	Ind. #	Location of Indication

Inspector/Level:_____ Date:_____

APPENDIX B

AS/LLCE-002

BUBBLE LEAK TEST FOR END CAP MACROENCAPSULATION WELD

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CONTENTS

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1.0 PURPOSE AND SCOPE

The purpose of this procedure is to establish the minimum requirements for conducting Bubble Leak Testing to verify the integrity of the End Cap Installation process on the LLCE Burial Containers.

2.0 REFERENCES

2.1 ANSI N14.5, Leakage Tests on Packages for Shipment, Radioactive Materials.

2.2 ASME/ASTM SE-432, Recommended Guide for the selection of a Leak Detection Method.

2.3 ASME/ASTM SE-479, Recommended Guide for Preparation of Leak Testing Specification.

2.4 *Deficiency and Corrective Action Reporting according to approved QA program.*

2.5 Qualification and Certification of NonDestructive Examination Personnel according to approved QA program.

2.6 ASNT Document SNT-TC-1A, Recommended Practice for Personnel Qualification and Certification.

3.0 DEFINITIONS

3.1 *Leak* - An opening through a containment system that permits the escape of contents.

3.2 *Atmospheric Pressure* - Pressure of the atmosphere at a specified place and time.

3.3 *Gauge Pressure* - The difference between absolute pressure and atmospheric pressure.

3.4 *Bubble* - Evidence of the location of a leak.

4.0 RESPONSIBILITIES

4.1 Quality Assurance (QA) Management is responsible for ensuring that personnel are available to perform all Bubble Leak Testing.

4.2 Quality Assurance (QA) Management shall ensure that Leak Test Personnel are qualified in accordance with Reference 2.5 (above).

4.3 Leak Test Personnel performing this procedure shall comply with the requirements of this procedure.

5.0 PROCEDURE

5.1 Primary Leak Test Equipment authorized for use by this procedure is as follows:

5.1.1 Miscellaneous hardware and test connections

5.1.2 Calibrated temperature measuring device

5.1.3 Calibrated Pressure Gauge

5.1.4 Regulated Dry Nitrogen supply

5.1.5 Bubble Leak Test Solution, "Sure Chek" P/N 32852

5.1.6 Calibrated White Light Meter

5.2 Preparation

5.2.1 Prior to the performance of the leak test, the Leak Test Examiner shall verify that the surface to be tested is free of contaminates that might mask a leak. The interior and exterior surfaces shall be dry. The test shall not be conducted in direct sunlight.

5.2.2 Prior to the performance of the leak test, the Leak Test Examiner shall verify that the area to be tested has a minimum white light intensity of 100 foot candles at all exterior surfaces. White light intensity shall be recorded on Form AS/LLCE-002-1.

5.2.3 Prior to the performance of the leak test, the Leak Test Examiner shall verify that the area to be tested is free of any free flowing air drafts that could adversely disperse the leak test solution. If necessary, appropriate wind breaks shall be implemented.

5.3 End Cap Verification Leak Test

5.3.1 With the LLCE Burial Container with at least one end cap in place, attach the pressure gauge and dry nitrogen supply line to the leak test port located on the End Cap to be tested.

5.3.2 The leak test examiner shall place a temperature measuring device on the cask, within 6" of the location of the pressure gauge. The temperature measuring device shall be permitted a 5 minute stabilization time prior to start of the test.

5.3.3 Connect the dry nitrogen supply line and pressure gauge to the applicable fitting on the end cap to be tested.

5.3.4 Slowly open the valve on the nitrogen supply line to allow for a gradual increase in the pressure. Continue increasing pressure to achieve a pressure of 1.5 to 2.5 PSIG, hold this pressure for a minimum of 3 minutes. Continue pressurizing the test area at a rate not to exceed 1 PSIG every five minutes, until the final test pressure of 3 to 5 PSIG is achieved. This test pressure shall be maintained throughout the duration of the test.

5.3.5 After reaching the test pressure range of 3 to 5 PSIG, allow a 15 minute soak time to elapse prior to application of bubble leak test solution.

5.3.6 Record the test pressure, time at start of test and temperature on the report form.

5.3.7 Apply the bubble leak test solution to the surface (interface of End Cap to pipe body and 1/2" on both sides) by the use of a fine orifice pump type spray can (Ensure that leak test solution thoroughly coats interface of End Cap to Pipe Body). Application shall be performed in a manner to minimize the formation of bubbles in the solution during application.

5.3.8 The solution shall be applied to no more than 12 linear inches of the test surface at a time. Application of the test solution and sequence of inspection shall be from the 6 O'Clock position on the test surface and progressing to the 12 O'Clock position. After reaching the 12 O'Clock position of the test surface, repeat the previous inspection sequence on the remaining side of the test surface.

5.3.9 After each application of the solution to the area of interest, the inspector shall observe the area for a minimum of 30 seconds for the formation of bubbles (Note: the inspector shall mark any area where bubbles are formed by marking the pipe at the location with a marker of contrasting color).

5.3.10 All areas identified as leaks shall be reinspected using the method described above, after appropriately cleaning and drying the area of interest. The cleaning process used shall be performed while the container is still pressurized.

5.3.11 If after reinspection of the suspected area, formation of bubbles are observed, initiate a condition report in accordance with reference 2.4.

5.3.12 If after the completion of the test sequence, no areas of leakage are observed, the test is complete and the End Cap fusion zone is considered to have a leak rate less than 1×10^{-3} atm. cc/sec.

5.3.13 Complete the test report for the container, isolate the nitrogen supply line and slowly relieve the pressure inside the test area.

6.0 RECORDS

6.1 The following records shall be maintained in accordance with approved QA manual.

6.1.1 Bubble Leak Test Report Form, AS/LLCE-002-1

7.0 ENCLOSURES

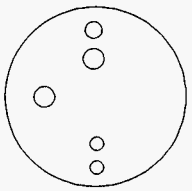
7.1 Bubble Leak Test Report Form, AS/LLCE-002-1

ENCLOSURE 7.1
Bubble Leak Test Report Form

LLCE Burial Container End Cap Penetrations
AS/LLCE-002-01

Customer/Jobs/Traveler_____ Report:_____
Procedure/Rev._____
Item Description_____ S/N:_____ Date:_____
Pressure Guage S/N:_____ Cal. Due Date:_____
Temp. Meas. Device S/N:_____ Cal. Due Date:_____
Light Meter S/N:_____ Light Intensity:_____ Cal. Due Date:_____
Temp. at Start of Test:_____ Temp. at End of Test:_____ Time at Start of Test:_____

12 O'Clock



6 O'Clock
LLCE End Cap Penetration Seals

Identify the Penetration Seal (numerically) on the figure above that corresponds to the area of a leak. Document the physical location int he corresponding line below (e.g. #1 at the 6 o"Clock position, on the penetration);

Ind.#	Location of Indication	Ind. #	Location of Indication

Inspector/Level:_____ Date:_____

APPENDIX C

AS/LLCE-003

VACUUM BOX BUBBLE LEAK TEST FOR END CAP PENETRATION SEALS OF THE LLCE BURIAL CONTAINERS

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CONTENTS

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1.0 PURPOSE AND SCOPE

The purpose of this procedure is to establish the minimum requirements for conducting Vacuum Box Bubble Leak Testing to verify the integrity of the End Cap Penetration seals on the LLCE Burial Containers. This procedure applies to the leak detection penetrations on both end caps. The testing of the void fill and vent connections as the Hanford installed end cap are also covered by this procedure.

2.0 REFERENCES

2.1 ANSI N14.5, Leakage Tests on Packages for Shipment, Radioactive Materials.

2.2 ASME/ASTM SE-432, Recommended Guide for the selection of a Leak Detection Method.

2.3 ASME/ASTM SE-479, Recommended Guide for Preparation of Leak Testing Specification.

2.4 Deficiency and Corrective Action Reporting per approved QA program.

2.5 Qualification and Certification of NonDestructive Examination Personnel per approved QA program.

2.6 ASNT Document SNT-TC-1A, Recommended Practice for Personnel Qualification and Certification.

3.0 DEFINITIONS

3.1 *Leak* - An opening through a containment system that permits the escape of contents.

3.2 *Atmospheric Pressure* - Pressure of the atmosphere at a specified place and time.

3.3 *Gauge Pressure* - The difference between absolute pressure and atmospheric pressure.

3.4 *Bubble* - Evidence of the location of a leak.

3.5 *Vacuum* - Space filled with gas below atmospheric pressure.

4.0 RESPONSIBILITIES

4.1 Quality Assurance (QA) Management is responsible for ensuring that personnel are available to perform all Bubble Leak Testing.

4.2 Quality Assurance (QA) Management shall ensure that Leak Test Personnel are qualified in accordance with Reference 2.5 (above).

4.3 Leak Test Personnel performing this procedure shall comply with the requirements of this procedure.

5.0 PROCEDURE

5.1 Primary Leak Test Equipment authorized for use by this procedure is as follows:

5.1.1 Miscellaneous hardware and test connections

5.1.2 Calibrated temperature measuring device

5.1.3 Calibrated Vacuum Gauge

5.1.4 Clear Vacuum Box with evacuation system

5.1.5 Bubble Leak Test Solution, "Sure Chek" P/N 32852

5.1.6 Calibrated White Light Meter

5.2 Preparation

5.2.1 Prior to the performance of the leak test, the Leak Test Examiner shall verify that the surface to be tested is free of contaminates that might mask a leak. The interior and exterior surfaces shall be dry. The test shall not be conducted in direct sunlight.

5.2.2 Prior to the performance of the leak test, the Leak Test Examiner shall verify that the area to be tested has a minimum white light intensity of 100 foot candles at all exterior surfaces. White light intensity shall be recorded on Form AS/LLCE-003-1 (Note: White light intensity shall be measured with the vacuum box in place on the examination surface).

5.2.3 Prior to the performance of the leak test, the Leak Test Examiner shall verify that the area to be tested is free of any free flowing air drafts that could adversely disperse the leak test solution. If necessary, appropriate wind breaks shall be implemented.

5.3 End Cap Penetration Seals Leak Test

5.3.1 With the LLCE Burial Container and the void fill end cap in place, the leak test examiner shall place a temperature measuring device on the cask, within 6" of the location of the pressure gauge. The temperature measuring device shall be permitted a 5 minute stabilization time prior to start of the test. The acceptance test temperature range is -55 to 200 degrees Fahrenheit.

5.3.2 The leak test examiner shall visually inspect the surface to be tested and the gasket on the vacuum box to verify that no foreign material that could induce a leak across the seal surface is present.

5.3.3 Record the time at start of test and temperature on the report form.

5.3.4 Apply the bubble leak test solution to the surface (interface of penetration seal and end cap and 1/2" on both sides) by the use of a fine orifice pump type spray can. Application shall be performed in a manner to minimize the formation of bubbles in the solution during application. No more than 30 seconds shall elapse from the application of the bubble leak test solution until placement of the required vacuum box for the test.

5.3.5 After application of the bubble leak test solution to the surface, place the vacuum box over the penetration seal to be tested (ensure that the vacuum gauge is completely visible to the inspector). Open the valve to the vacuum pump and observe the area of interest during the evacuation time.During this evacuation period the inspector should be cognizant of large leaks that tend to blow the solution away from the surface.

5.3.6 The pressure inside the vacuum box shall achieve a pressure differential of 6 to 10 inches of mercury within 30 seconds. After achieving the required pressure

differential, the inspector shall observe the area for a minimum of 30 seconds for the formation of bubbles (Note: the inspector shall mark any area where bubbles are formed by marking the location with a marker of contrasting color).

5.3.7 Application of the test solution and sequence of inspection shall be from the penetration seals at the lowest position on the End Cap and progressing up to the next highest penetration seal.

5.3.8 All areas identified as leaks shall be reinspected using the method described above, after appropriately cleaning and drying the area of interest.

5.3.9 If after reinspection of the suspected area, formation of bubbles are observed, initiate a condition report in accordance with Reference 2.4.

5.3.10 If after the completion of the test sequence for the End Cap Penetration Seals, no bubbles are detected, the test is complete and the End Cap Penetration Seals are considered to have an acceptable leak rate.

5.3.11 Complete the test report for the container.

6.0 RECORDS

6.1 The following records shall be maintained in accordance with approved QA manual.

6.1.1 Bubble Leak Test Report Form, AS/LLCE-003-1

7.0 ENCLOSURES

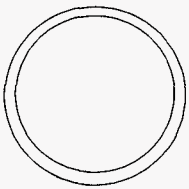
7.1 Bubble Leak Test Report Form, AS/LLCE-003-1

ENCLOSURE 7.1
Bubble Leak Test Report Form

LLCE Burial Container
AS/LLCE-003-01

Customer/Jobs/Traveler_____ Report:_____
Procedure/Rev._____
Item Description_____ S/N:_____ Date:_____
Pressure Guage S/N:_____ Cal. Due Date:_____
Temp. Meas. Device S/N:_____ Cal. Due Date:_____
Light Meter S/N:_____ Light Intensity:_____ Cal. Due Date:_____
Temp. at Start of Test:_____ Temp. at End of Test:_____ Time at Start of Test:_____

12 O'Clock



6 O'Clock
LLCE Burial Container

Identify the location (numerically) on the figure above that corresponds to the area of a leak. Document the physical location in the corresponding line below(e.g. #1 - 15" up from 6 O'Clock position, right side of pipe);

Ind.#	Location of Indication	Ind. #	Location of Indication

Inspector/Level:_____ Date:_____

APPENDIX D

AS/LLCE-004

END CAP INSTALLATION PROCEDURE

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CONTENTS

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1.0 PURPOSE AND SCOPE

This procedure defines the installation, inspection, and test requirements to attach the end caps of the Long Length Contaminated Equipment Containers (LLCE).

2.0 REFERENCES

2.1 AS/LLCE-002, Bubble Leak Test for Cap Installation

2.2 Drawing H-2-827807, LLCE C1 and C2 Field Assembly

2.3 Drawing H-2-827810, LLCE C3 and C4 Field Assembly

2.4 Drawing H-2-827813, LLCE C5 and C9 Field Assembly

2.5 Drawing H-2-827816, LLCE C6 and C7 Field Assembly

2.6 Drawing H-2-827808, LLCE C1 and C2 Shop Assembly

2.7 Drawing H-2-827811, LLCE C3 and C4 Shop Assembly

2.8 Drawing H-2-827814, LLCE C5 and C9 Shop Assembly

2.9 Drawing H-2-827817, LLCE C6 and C7 Shop Assembly

2.10 Drawing H-2-827809, End Cap C1-C2 Assembly

2.11 Drawing H-2-827812, End Cap C3-C4 Assembly

2.12 Drawing H-2-827815, End Cap C5-C9 Assembly

2.13 Drawing H-2-827818, End Cap C6-C7 Assembly

2.14 Drawing H-2-827819, Weldring C1-C2 Assembly

2.15 Drawing H-2-827820, Weldring C3-C4 Assembly

2.16 Drawing H-2-827821, Weldring C5-C9 Assembly

2.17 Drawing H-2-827822, Weldring C6-C7 Assembly

2.18 Drawing H-2-827841, LLCE C1-C2 Weld Clamp

2.19 Drawing H-2-827825, LLCE C3-C4 Weld Clamp

2.20 Drawing H-2-827826, LLCE C5-C9 Weld Clamp

2.21 Drawing H-2-827827, LLCE C6-C7 Weld Clamp

3.0 DEFINITIONS

3.1 *Powercore* - 0.197" diameter pipe grade high density polyethylene rod with 16 helically-embedded stainless steel wires used in an ohmic-heating process to weld plastics together.

3.2 *Hot end cap* - term designating a LLCE end cap that will be installed at the SEG manufacturing facility.

3.3 *Cold end cap* - term designating a LLCE end cap that will be installed in the field.

3.4 *Junction Box Assembly* - A 6" X 6" junction box with two 6 AWG wires entering the box terminated at a power block which supplies power in series to the power core leads. The number of exiting leads is determined by the size of the endcap.

4.0 RESPONSIBILITIES

4.1 Seller personnel shall be responsible for installing one of the two end caps and the weldring, weld clamp, and performing the macrocapsulation weld.

4.2 Buyer personnel shall be responsible for the other end cap and installing the weldring, weld clamp, and performing the macrocapsulation weld.

4.3 Seller quality control personnel shall be responsible for verifying and documenting applicable installation attributes.

5.0 PROCEDURE

5.1 The following equipment is required for this procedure.

5.1.1 A currently calibrated hand held thermocouple measurement device with type K thermocouple attached.

5.1.2 A currently calibrated torque wrench measuring from 0 - 75 ft-lbs and a 6" deep well socket.

5.1.3 97% isopropyl alcohol and a clean lint free cloth.

5.1.4 180 grit sandpaper.

5.1.5 Junction box assembly.

5.1.6 Currently calibrated power supply (min 170V @ 70 amp variable output DC).

5.1.7 Weld clamp per References 2.18, 2.19, 2.20, & 2.21.

5.1.8 Currently calibrated pressure gage capable of accurately measuring 5psi.

5.2 Installation of the end cap

5.2.1 Document the end cap installation by completing a checklist provided by Enclosure 7.2 as the end cap is installed.

5.2.2 Loosen the hex nut on the jaw end fitting and both level knobs located on the bottom of the weldring. Refer to References 2.14 through 2.17.

5.2.3 Lift weldring over the open end of the container using the anchor shackle and bridle sling provided, assuring clamp straps are fully retracted. Refer to References 2.14 through 2.17.

5.2.4 Position outer edge of the weldring swing assembly approximately 0.25" +0.25" -0.00" from the container body seal surface. Refer to References 2.2 through 2.5 and 2.14 through 2.17.

5.2.5 Tighten weldring against container using the hex nut on the jaw end fitting and torque to 35 ft-lbs. Refer to References 2.14 through 2.17.

5.2.6 Measure and record the temperature at the body seal surface. If the temperature of the surface is less than 60°F, then a preheating stage will be needed. (See step 5.2.23)

5.2.7 Scuff the body seal surface with 180 grit sandpaper and clean with a lint free rag and 97% isopropyl alcohol.

5.2.8 Attach the lifting fixture to the end cap, torquing the screws to 10 ft-lbs. Refer to References 2.2 through 2.5.

5.2.9 Pick up and position the end cap in line with the container body using the lifting fixture, leaving adequate space to clean the end cap seal surface. Refer to References 2.2 through 2.5.

5.2.10 Scuff the end cap seal surface with 180 grit sandpaper and clean with lint free rag and 97% isopropyl alcohol.

5.2.11 Insert end cap into the body of the container.

5.2.12 Slide the clamp straps inward and adjust the clamp stud and screw to apply even pressure on the end cap.

5.2.13 Connect air lines and calibrated pressure gage to the fitting of the inflatable seal and pressurize to 5 psi to center the end cap. Refer to References 2.2 through 2.5.

5.2.14 Hand tighten the two level knobs located at the bottom of the weldring, centering endcap if necessary. Refer to References 2.14 through 2.17.

5.2.15 Torque hex nuts on the clamp stud to 10 ft-lbs. Refer to References 2.14 through 2.17.

5.2.16 Deflate seal leaving air lines attached to end cap.

5.2.17 Connect the positive, common, and the ground wires of the power supply to the terminal block of the generator.

5.2.18 Connect the positive, common, and the ground wires of the power supply to the terminal block of the junction box.

5.2.19 Attach the weld block around the exiting leads of the end cap. Refer to References 2.18 through 2.21.

5.2.20 Connect the junction box output wires to the connectors exiting end cap, matching the red wires to the connections marked 'Pos' and connecting the black wires to the connections marked 'Neg'.

5.2.21 Evacuate all unnecessary personnel from the vicinity of the end cap and the general welding area.

5.2.22 Turn on power supply.

5.2.23 If the recorded surface temperature of the container seal surface is less than 60°F, then preheat the seal surfaces by applying the following amperages for 15 minutes. If the temperature is greater than 60°F, go directly to 5.2.24.

5.2.23.1 C1 and C2 containers: The preheat amperage is 7.6 amps.

5.2.23.2 C3 and C4 containers: The preheat amperage is 9.5 amps.

5.2.23.3 C5 and C9 containers: The preheat amperage is 13.3 amps.

5.2.23.4 C6 and C7 containers: The preheat amperage is 13.3 amps.

5.2.24 Set timer on the power supply to 16 minutes and amperage to appropriate setting for each size container listed below.

5.2.24.1 C1 and C2 containers: The welding amperage is 24 amps.

5.2.24.2 C3 and C4 containers: The welding amperage is 30 amps.

5.2.24.3 C5 and C9 containers: The welding amperage is 42 amps.

5.2.24.4 C6 and C7 containers: The welding amperage is 42 amps.

5.2.25 Perform the weld.

5.2.26 Turn off the power supply.

5.2.27 Wait approximately 45 minutes giving the weld area sufficient time to cool to 125°F.

5.2.28 Repressurize the seal.

5.2.29 Perform the leak test procedure AS/LLCE-002. If the weld passes the leak test, proceed to 5.2.30. If the weld does not pass the leak test, then the weld needs to be performed again, proceed to 5.2.20.

5.2.30 Unplug the wires of the junction box from the connections at the end cap and remove the weld clamp surrounding the exiting powercore.

5.2.31 Cut exiting powercore flush +0.25" - 0.00" with the surface of the end cap.

5.2.32 Deflate seal and remove air fittings

5.2.33 Remove the weldring.

5.2.34 Remove end cap lifting fixture. Refer to References 2.2 through 2.5.

6.0 RECORDS

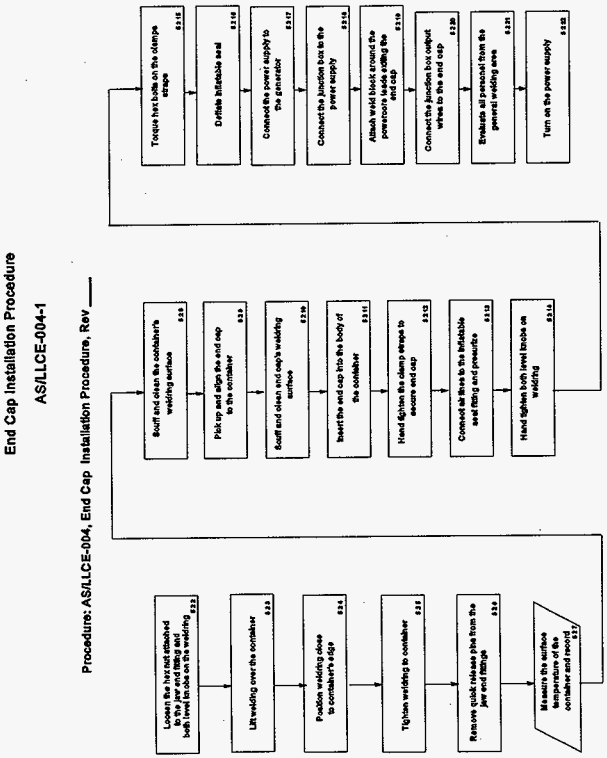
6.1 AS/LLCE-004-2, End Cap Processing Record

7.0 ENCLOSURES

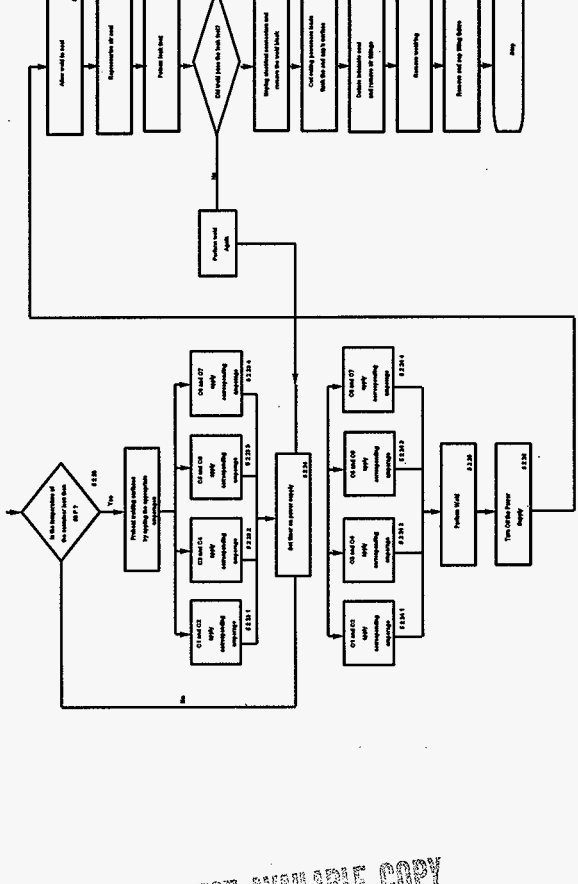
7.1 AS/LLCE-004-1, End Cap Installation Flow Chart

7.2 AS/LLCE-004-2, End Cap Processing Record

ENCLOSURE 7.1
End Cap Installation Flow Chart



ENCLOSURE 7.1
End Cap Installation Flow Chart



ENCLOSURE 7.2
End Cap Processing Record

Procedure: AS/LLCE-004, End Cap Installation Procedure, Rev____
Container ID#_____

Size of Container
[] C1 [] C2 [] C3 [] C4
[] C5 [] C6 [] C8 [] C9

Type of End Cap Installation	
[] Hot (Snap)	[] Cold (Snap)

No.	Description	Remarks
1.	Attach weldring to the container and torque to the proper value Step 5.2.5	[] Check
2.	Measure the surface temperature of the container and record Step 5.2.6	F
3.	Scuff and clean both the end cap and the container's welding surface Step 5.2.7	[] Check
4.	Insert end cap and hand tighten the clamp straps to secure end cap to welding Step 5.2.11	[] Check
5.	Connect air lines to fitting for inflatable seal and pressurize Step 5.2.13	[] Check
6.	Hand tighten the two level knobs on weldring to keep end cap centered Step 5.2.14	[] Check
7.	Torque hex bolts on the clamp straps Step 5.2.15	[] Check
8.	Deflate seal leaving air lines attached Step 5.2.16	[] Check
9.	Connect power supply to generator Step 5.2.17	[] Check
10.	Connect junction box to end cap Step 5.2.18	[] Check
11.	Attach the weld block around the powercore leads exiting the end cap Step 5.2.19	[] Check
12.	Connect the junction box output wires to the powercore leads exiting the end cap Step 5.2.20	[] Check
13.	Turn on the power supply and check its working condition Step 5.2.22	[] Check
14.	Record the amperage used to preheat the welding surface (If applicable) Step 5.2.23	Amps
15.	Record the amperage used during the welding process Step 5.2.24	Amps
16.	After performing the weld confirm power supply is off Step 5.2.26	[] Check
17.	Repressurize the inflatable seal Step 5.2.28	[] Check
18.	Perform Leak Test Ref. 2.1 AS/LLCE-002 Step 5.2.29 Leak Test Report#	
19.	Deflate the seal and remove its air lines Step 5.2.32	[] Check
20.	Remove the end cap lifting fixture, weldring, the weld block for the exiting powercore, and clip leads flush Step 5.2.34	[] Check

_____ _____
Authorized QC Signature Date

APPENDIX E

AS/LLCE-005

VOID FILL AND TEST PROCEDURE

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CONTENTS

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1.0 PURPOSE AND SCOPE

This procedure defines the steps the Buyer or Buyer's Subcontractor will conduct to fill the Long Length Contaminated Equipment container (LLCE) with perlite concrete during qualification testing and to verify adequate filling of the container to satisfy minimum void fill requirements.

2.0 REFERENCES

2.1 Drawing H-2-827836, LLCE C1 - C2 Void Fill Components

2.2 Drawing H-2-827837, LLCE C3 - C4 Void Fill Components

2.3 Drawing H-2-827838, LLCE C5 - C9 Void Fill Components

2.4 Drawing H-2-827839, LLCE C6 - C7 Void Fill Components

2.5 Drawing H-2-827807, LLCE C1 and C2 Field Assembly

2.6 Drawing H-2-827816, LLCE C3 and C4 Field Assembly

2.7 Drawing H-2-827813, LLCE C5 and C9 Field Assembly

2.8 Drawing H-2-827816, LLCE C6 and C7 Field Assembly

2.9 ASTM C31-91, Making/Curing Concrete Test Specimens in the Field

2.10 ASTM C138-92, Test Method for Unit Weight, Yield, and Air Content of Concrete

2.11 ASTM C172-90, Practice for Sampling Freshly Mixed Concrete

2.12 ASTM C495-91, Test Method for Compressive Strength of Lightweight Insulating Concrete

3.0 DEFINITIONS

3.1 Chord Length - The linear distance between two points that lie on the radius of a circular segment. (i.e. the linear distance between points defined by the intersection of the container inside radius void fill material, and a void).

4.0 RESPONSIBILITIES

4.1 The Buyer or Buyer's Subcontractor concrete vendor shall perform all void fill operations.

4.2 The Buyer or Buyer's Subcontractor quality control personnel shall witness and document the test.

5.0 PROCEDURE

5.1 Void fill procedure

5.1.1 Document the void fill operation by completing a checklist provided by Enclosure 7.1 as the void fill is performed. Be aware testing per Section 5.2 is to be performed as the void fill is performed.

5.1.2 Raise end of container with void fill ports one degree.

5.1.3 Insert the vent port assembly into the container and thread the NPT connection to the end cap. Refer to References 2.1 through 2.4.

5.1.4 Insert the fill port assembly into the container and thread the NPT connection to the end cap. Refer to References 2.1 through 2.4.

5.1.5 Insert the temporary fill port plug into the container and thread into end cap until flush with surface. Refer to References 2.5 through 2.8.

5.1.6 Connect the HEPA filter hose to the vent port camlock fitting. Refer to References 2.1 through 2.4.

5.1.7 Connect the hose from the void fill pumping equipment to the fill port camlock fitting. Refer to References 2.1 through 2.4.

5.1.8 Make sure both ball valves for the vent and fill ports are open.

5.1.9 Pump the perlite concrete into the container at the specified flowrates.

5.1.9.1 C1 and C2 containers: The flowrate is 2.7 ft^3/min.

5.1.9.2 C3 and C4 containers: The flowrate is 4.0 ft^3/min.

5.1.9.3 C5 container: The flowrate is 10.0 ft^3/min.

5.1.9.4 C9 container: The flowrate is 7.5 ft^3/min.

5.1.9.5 C6 container: The flowrate is 10.0 ft^3/min.

5.1.9.6 C7 container: The flowrate is 13.0 ft^3/min.

5.1.10 When the container is full with perlite a sensor will be triggered at the vent port stopping the filling process.

5.1.11 Close the ball valve on the fill port.

5.1.12 Close the ball valve on the vent port.

5.1.13 Disconnect the hose to the pumping equipment at the fill port's camlock connection.

5.1.14 Disconnect the hose to the HEPA filter at the vent port's camlock connection.

5.1.15 Wait one hour to allow the perlite to set up before removing the vent and fill port connections.

5.2 Void fill test procedure

5.2.1 A field test shall be performed to determine the properties of concrete filling the container. The field test shall be documented on a Void Fill Testing Record (Enclosure 7.2).

5.2.1.1 At the beginning of every tenth batch during the filling of the container, a 5 gallon bucket shall be filled to provide concrete for that set of samples. The bucket shall be used to fill two cylinders that will be tested for their

wet density and compressive strength properties according to References 2.9 and 2.12.

5.2.1.2 Number and record the empty weight of the containers that will be used to hold the samples.

5.2.1.3 Immediately weigh the cylinders after filling with concrete according to Reference 2.10. Record the results. The weight will then be used along with the container volume to assure its wet density is less than 35 lb/ft^3.

5.2.1.4 Store cylinders in a safe place for 28 days to allow the perlite to completely cure. The samples shall then be tested to confirm their compressive strength is greater than 60 psi. in accordance with Reference 2.12.

5.2.2 A feature test shall be performed on a container that will allow both a visual and dimensional concrete inspection. The feature test shall be documented on a Void Fill Test Record (Enclosure 7.2).

5.2.2.1 A C7 container will be void filled following the above procedure.

5.2.2.2 The container will be allowed to cure for 12 hours.

5.2.2.3 The container will then be cut into four cross sections to be examined.

5.2.2.4 The cross sections will then be examined to assure a minimum of 95% void fill inside the container and the measurement of the longest unsupported cord length at the container body.

5.2.2.5 Maximum Unsupported Chord Length Requirements

Name	Chord Length
C1 and C2	6.91
C3 and C4	9.57
C5 and C9	14.33
C6 and C7	16.12

6.0 RECORDS

6.1 AS/LLCE-005-1, Void Fill Processing Record

6.2 AS/LLCE-005-2, Void Fill Testing Record

7.0 ENCLOSURES

7.1 AS/LLCE-005-1, Void Fill Processing Record

7.2 AS/LLCE-005-2, Void Fill Testing Record

7. 1 ENCLOSURE
Void Fill Processing Record
AS/LLCE-005-01

Procedure: AS/LLCE-005, Void Fill and Test Procedure

Size of Container
[] C1 [] C2 [] C3 [] C4
[] C5 [] C6 [] C8 [] C9

No.	Description	Remarks
1.	Raise end of container with void fill assemblies attached to end cap.	
2.	Attach vent port to end cap.	
3.	Attach fill port to end cap	
4.	Attach secondary fill port to end of cap	
5.	Connect HEPA filter to vent port camlock fitting	
6.	Connect pumping equipment to fill port camlock fitting	
7.	Open both bail valves	
8.	Record flowrate of penite pumped into container	
9.	Assure the proper amount of samples are taken	
10.	Shut down pumping equipment	
11.	Close both bail valves	
12.	Disconnect hose connecting the pumping equipment to the fill port fitting	
13.	Disconnect hose connecting the HEPA filter to the vent port fitting	
14.	Wait one hour to allow pertite to set up	
15.	Remove vent and fill port connections	

Authorized QC Signature _____ Date _____

7.2 ENCLOSURE
Void Fill Testing Record
AS/LLCE-005-02

Procedure: AS/LLCE-010, Void Fill and Test Procedure

Field Test Data:

Sample Number				
Sample #1				
Sample #2				
Sample #3				
Sample #4				
Sample #5				

Sample #1				
Sample #2				
Sample #3				
Sample #4				
Sample #5				

Feature Test Data:

Record measurement of the longest unsupported cord	
Record the percentage of container full with void material	
Visual inspection of pertite concrete after the void filling of the container Comments: _____ _____ _____ _____ _____	

[ ] Accept [ ] Reject

_____ _____
Authorized QC Signature Date

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APPENDIX F

AS/LLCE-006

STORAGE AND HANDLING PROCEDURE

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CONTENTS

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1.0 PURPOSE AND SCOPE

This procedure defines the proper steps required to ship, handle, and store the Long Length Contaminated Equipment (LLCE) containers and its major components.

2.0 REFERENCES

2.1 Drawing H-2-827842, C1, C2 Shipping and Storage Cradle

2.2 Drawing H-2-827843, C3, C4 Shipping and Storage Cradle

2.3 Drawing H-2-827844, C5, C9 Shipping and Storage Cradle

2.4 Drawing H-2-827845, C6, C7 Shipping and Storage Cradle

2.5 Drawing H-2-827828, C1, C2 Shipping and Storage Pallet

2.6 Drawing H-2-827830, C3, C4 Shipping and Storage Pallet

2.7 Drawing H-2-827832, C5, C9 Shipping and Storage Pallet

2.8 Drawing H-2-827834, C6, C7 Shipping and Storage Pallet

2.9 Drawing H-2-827829, C1, C2 Shipping and Storage Spider

2.10 Drawing H-2-827831, C3, C4 Shipping and Storage Spider

2.11 Drawing H-2-827833, C5, C9 Shipping and Storage Spider

2.12 Drawing H-2-827835, C6, C7 Shipping and Storage Spider

2.13 Drawing H-2-827846, LLCE Long Lift Beam Field Assembly

2.14 Drawing H-2-827848, LLCE Short Lift Beam Field Assembly

2.15 Drawing H-2-827847, LLCE Long Lift Beam

2.16 Drawing H-2-827849, LLCE Short Lift Beam

2.17 Drawing H-2-827840, LLCE Lift Beam Components

3.0 DEFINITIONS

None

4.0 RESPONSIBILITIES

4.1 The Seller is also responsible to prepare the container for shipment in accordance with this procedure.

4.2 The buyer is responsible for the handling and storage of the Long Length Contaminated Equipment (LLCE) containers at its facility.

5.0 PROCEDURE

5.1 Handling

5.1.1 The following equipment is required for handling the LLCE container and its components.

a. Two LBB-1-924 (2' W x 35' L) nylon lifting slings or approved equivalent.

b. Two overhead hoists each with a 1/2 ton lifting capacity or greater (for the handling of the LLCE containers indoors).

c. Eight appropriate sized shipping and storage cradles.

d. Eight rachet tightening tie down straps.

e. A common fork lift with padded rails.

5.1.2 LLCE Container Indoor Handling Procedure

a. Place two slings under the container approximately 30 feet apart centering them along the container's transverse centerline.

b. Attach the eyes of each sling to the lifting hook of the lifting mechanism; i.e., each of two overhead hoists or crane.

c. Raise the hook of the lifting equipment until the container is lifted off the ground approximately 6 inches. If the container appears to be off horizontal, lower container and readjust the position of the slings accordingly.

d. Slowly raise the container to proper level making sure an operator is positioned at each end to assure the ends of the container are not damaged during lifting.

e. Move container to desired location and raise the container at least 4 feet off the ground.

f. Position the container's eight shipping and storage cradles under the container. Cradles shall be placed evenly along the length of the container with the end cradles two feet from its edge.

g. Lower container onto the shipping and storage cradles.

h. Lower the lifting hook until the slings can be unhooked.

i. Remove the lifting slings.

j. Secure the containers to each of its eight shipping and storage cradles by placing a tie down strap over the body of the container and attaching its ends to an eye bolt on either side of the cradle and tightening the straps accordingly.

5.1.3 LLCE Container Outdoor Handling Procedure

a. Place forklift's padded rails under container centering them along the container's transverse centerline.

b. Slowly raise the container to proper level making sure a worker is positioned at each end to assure the ends of the container are not damaged during lifting.

c. Move container to desired location.

5.1.4 LLCE End Cap Handling Procedure

a. LLCE end caps shall be protected using a plastic bag and placed into their specially designed shipping and storage pallets upon assembly.

b. The end caps in their pallets may be transported using a common forklift. Lift points were provided under the pallets for forklift rails.

c. At no time should the end caps be left outside unattended even when inside their pallets. Please refer to Section 5.3 Storage.

5.2 Shipping

5.2.1 Install the storage and shipping spider into the open end of the container, until all feet of the spider are flush with the edge of the container.

5.2.2 Tighten the six expander studs on the storage and shipping spider, turning each nut one full turn after the foot of the spider contacts the inner wall of the container.

5.2.3 Secure the containers to each of its eight shipping and storage cradles by placing a tie down strap over the body of the container and attaching its end to an eye bolt on either side of the cradle and tightening the straps accordingly.

5.2.4 Containers that are secured to their supportive cradles may be placed on the bed of the transportation trailer according to Section 5.2 Handling.

5.2.5 Care must be taken to assure containers are centered on the transport bed.

5.2.6 The containers will be secured to the transport bed by their supportive cradles. At no time should straps, chains, etc., secure the containers directly to the transportation bed, tightening the straps would produce unnecessary strain on the containers.

5.2.7 End caps will be stretch wrapped and transported in their protective pallets. The pallets will be constructed in a manner so that they may be secured to the transportation bed directly.

5.3 Storage

5.3.1 Polyethylene containers may be stored indoors or outdoors in marked and designated areas that are easily accessible to lifting equipment. Such areas

shall be reasonably removed from production activities, including excessive traffic. The possibility of damage and inadvertent handling should be minimized.

5.3.2 The end caps shall be stored indoors in marked and designated areas that are easily accessible to fork lift equipment. Such areas shall be reasonably removed from production activities, including excessive traffic. The possibility of damage and inadvertent handling should again be minimized.

5.3.3 Once the cold end cap is fused to the body, the shipping and storage spider shall be inserted and tightened in the open end of the container before being placed outside until its shipping date.

5.3.4 The open end of the container should be covered to prevent dirt, water, or debris to enter the container.

6.0 RECORDS

None

7.0 ENCLOSURES

None

APPENDIX G

AS/LLCE-007

VENT-FILL AND LEAK PORT SEALING PROCEDURE

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CONTENTS

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1.0 PURPOSE AND SCOPE

This procedure provides the manufacturing process requirements for Hanford to seal the vent-fill and leak ports on the cold end cap of the Long Length Contaminated Equipment (LLCE) Burial Containers. In addition the Seller is required to perform the leak detection post sealing in accordance with this procedure.

2.0 REFERENCES

2.1 Quality Management Plan, Quality Records per approved QA program.

2.2 AS/LLCE-008, Lifting and Handling Procedure

3.0 DEFINITIONS

3.1 *MQPT* - Manufacturing Quality Planning Traveler Sheet

3.2 *LLCE* - Long Length Contaminated Equipment

3.3 *HDPE* - High Density Polyethylene

4.0 RESPONSIBILITIES

4.1 The Buyer or Buyer's Subcontractor Project Manager has the overall responsibility for the implementation of this procedure.

4.2 The Buyer or Buyer's Subcontractor Quality Assurance personnel is responsible for supporting all project-related matters involving quality assurance and quality control. Quality Assurance is assigned the responsibility and the authority to ensure that the requirements of this procedure are fully and effectively implemented during the production phase of the project.

4.3 All company and subcontractor personnel performing container manufacturing, inspection, and testing activities are responsible for compliance with the requirements of this procedure.

5.0 PROCEDURE

5.1 All personnel performing container manufacturing, inspection and testing activities shall be trained and qualified in accordance with approved QA program.

5.2 Qualification records will be maintained by the appropriate department.

5.3 All components and materials utilized in the manufacture of the LLCE Burial Containers shall be receipt inspected and accepted by qualified personnel.

5.4 The Vacuum Box Leak Test Report will be generated during the Vent-Fill and/or Leak Port sealing process of the LLCE Burial Containers.

5.5 Handling of all container components shall be performed using the methods and devices identified in procedure AS/LLCE-008, Lifting and Handling Procedure.

5.6 Seal Welding Process

5.6.1 After the vent-fill and/or leak ports have been plugged with the HDPE plugs, use a lint free cotton rag and denatured alcohol to clean the welding surfaces.

5.6.2 Using a Wagner hot air extrusion gun and HDPE filler rod, set the extrusion gun heat control switch on the opposite setting and let it preheat to the predetermined temperature.

5.6.3 To start the welding process on the sealing port, run a fusion bead around the entire diameter of the plug.

NOTE: The operator is responsible to make sure that proper fusion has taken place.

5.7 Leak Test

5.7.1 After the fusion weld has cooled to 80° ± 5°, QC will perform the vacuum box bubble leak test. Any leaks determined shall be marked and reworked to pass the inspection testing.

5.7.2 After the fusion weld has passed the vacuum box bubble leak test, the container is ready for the next step.

6.0 RECORDS

6.1 Refer to documentation listed in Paragraph 5.4. These documents are maintained approved QA program.

7.0 ENCLOSURES

None

APPENDIX H

AS/LLCE-008

LIFTING AND HANDLING PROCEDURE

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CONTENTS

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1.0 PURPOSE AND SCOPE

This procedure describes the tools, methods, and precautions required for the safe lifting and handling of an empty Long Length Contaminated Equipment Container (LLCE).

2.0 REFERENCES

2.1 H-2-827846, LLCE Long Lift Beam Field Assembly

2.2 H-2-827848, LLCE Short Lift Beam Field Assembly

2.3 H-2-827840, LLCE Lift Beam Components

2.4 AS/LLCE-011, Remote Rigging Failure Recovery Procedure

3.0 DEFINITIONS

3.1 *Detent Pin Tag Line* - A predetermined amount of detent pins that have been daisy chained together with nylon cord for remote removal of the lifting slings.

4.0 RESPONSIBILITIES

4.1 The Buyer is responsible for assuring, through engineering evaluation, that the actual load distribution of each container does not violate the as-designed capabilities of the lifting beam and its components.

4.2 Appropriate managers/supervisors are responsible for ensuring this procedure is followed during the lifting and handling of empty or loaded LLCE containers.

5.0 PROCEDURE

5.1 Equipment Required for Lifting the LLCE Container

5.1.1 LLCE Short Lift Beam

a. LBB-1-924, Nylon Lifting Slings

The quantity shall be determined based on the customer engineering evaluation on the actual load distribution for each container. If no evaluation is done, use the "Default Sling Requirement Table" found on reference 2.3 of this procedure.

b. 7-1/2" x 7/8" dia., Detent Pins

The quantity shall be the same as for the slings

c. 2 ea. - 1" x 8.75 ft., 2-leg wire rope bridle slings

d. 4 ea. - Crosby 2" G213, Shackles

e. 2 ea. - 45 ton, minimum, cranes

5.1.2 LLCE Long Lift Beam

a. LBB-1-924 Nylon Lifting Slings

The quantity shall be determined based on the customer engineering evaluation on the actual load distribution for each container. If no evaluation is done, use the "Default Sling Requirement Table" found on Reference 2.1 of this procedure.

b. 7-1/2" x 7/8' dia., Detent Pins

The quantity shall be the same as for the slings

c. 2 ea. - 1-1/4" x 17 ft., 2-leg wire rope bridle slings

d. 4 ea. - Crosby 2" G213, Shackles

e. 2 ea. - 45 ton, minimum, cranes

5.2 Empty Container Loading Procedure For 63" and 54" Container

5.2.1 Slip a shackle onto each leg of one of the 2-leg bridle slings, and starting with either end of the lift beam place each shackle over one of the beam lifting lugs, insert the shackle pin, and tighten. To prevent binding of the shackle pin, thread the pin all the way up to the shoulder of the shackle then back off 1/2 turn. Repeat this process for the other end of the lifting beam.

5.2.2 Attach each of the 2-leg bridle slings to different cranes and raise the beam approximately 6 feet in the air with the beam offset toward the operator from the centerline axis of the pipe for easy access to the sling lifting lugs. The beam should be approximately centered lengthwise (left to right) with the pipe.

5.2.3 Prepare the detent pin tag line by laying it out and making sure the line is not twisted and that it is securely tied to each detent pin removal ring.

NOTE: Refer to zone A-7 on drawing H-2-827846 for the proper orientation of the sling eye when installed on the sling lifting lug.

5.2.4 Install one eye of each sling in the half of the sling lifting lug that is farthest away from the pipe. Insert the detent pin (starting with the first pin and moving sequentially down the line) only far enough to clear the center hole of the lifting lug.

5.2.5 Starting at either end of the beam, tie a tag line onto the detached eye of the sling, hand the tag line under the pipe to a second operator. The second operator will retrieve the line and throw it back over the pipe. The first operator can then pull the tag line and hoist the sling over the pipe.

5.2.6 Retrieve the sling end and remove the tag line.

5.2.7 Attach the second eye of the sling to the sling lifting lug by continuing to insert the detent pin through the sling eye until the detent ball has cleared the third hole of the lifting lug. Repeat this process for all of the remaining slings.

5.2.8 After each sling has been installed, inspect the setup for twisted slings and inspect each lug of the lifting beam to assure that each eye of the sling is securely attached and that the detent ball has cleared the third hole of the lifting lug. If any adverse conditions exist, they must be corrected before proceeding.

5.2.9 Raise the lifting beam until it is above the pipe and approximately parallel with the centerline axis of the pipe, hold the tag line so it does not get twisted, tangled, or caught under the container or the trailer.

5.2.10 Lift the burial container and position it over the trailer.

5.2.11 Lower the container onto the trailer support chocks at the appropriate orientation left to right, then continue to lower the lifting beam until it is seated on the lifting beam support chocks located on the trailer.

5.2.12 Lower the crane so the operator can remove the bridle slings. Lay both of the bridle sling D-rings and the detent pin tag line on the same side of the container for easy access at the burial site.

5.3 Empty Container Loading Procedure For 26" and 36" Containers

5.3.1 Slip a shackle onto each leg of one of the 2-leg bridle slings, and starting with either end of the lift beam place each shackle over one of the beam lifting lugs, insert the shackle pin, and tighten. To prevent binding of the shackle pin, thread the pin all the way up to the shoulder of the shackle then back off 1/2 turn. Repeat this process for the other end of the lifting beam.

5.3.2 Attach each of the 2-leg bridle slings to different cranes and position the lifting beam approximately 1 foot over the container to be lifted. The lifting beam should be approximately centered over the pipe lengthwise (left to right).

5.3.3 Prepare the detent pin tag line by laying it out and making sure the line is not twisted and that it is securely tied to each detent pin removal ring.

NOTE: Refer to zone A-7 on drawing H-2-827848 for the proper orientation of the sling eye when installed on the sling lifting lug.

5.3.4 Slide one end of the sling under the pipe and gather the two eyes over the pipe at the sling lifting lug.

5.3.5 Insert the detent pin (starting with the first pin and moving sequentially down the line) in the sling lifting lugs with the eyes of the sling captured as shown on drawing H-2-827848. Make sure the detent pin is all the way through the lifting lug and that the detent ball can be seen on the opposite side of the lifting lug.

5.3.6 After each sling has been installed, inspect the setup for twisted slings and inspect each lug of the lifting beam to assure that each eye of the sling is securely attached and that the detent ball has cleared the third hole of the lifting lug. If any adverse conditions exist, they must be corrected before proceeding.

5.3.7 Raise the lifting beam until it is above the pipe and approximately parallel with the centerline axis of the pipe, hold the tag line so it does not get twisted, tangled, or caught under the container or the trailer.

5.3.8 Lift the burial container and position it over the trailer.

5.3.9 Lower the container onto the trailer support chocks at the appropriate orientation left to right, then continue to lower the lifting beam until it is seated on the lifting beam support chocks located on the trailer.

5.3.10 Lower the crane so the operator can remove the bridle slings. Lay both of the bridle sling D-rings and the detent pin tag line on the same side of the container for easy access at the burial site.

5.4 Void Filled Container Unloading Procedure

5.4.1 Attach the bridle sling D-rings to each of the crane hooks and take the free end of the detent pin tag line to the designated distance from the container to assure proper shielding by distance.

5.4.2 Raise the container with the two cranes, swing it off of the trailer and lower it into the designated burial area for that container.

5.4.3 With plenty of slack in the slings, swing the lifting beam off center from the pipe (in the direction of the operator holding the detent pin tag line) and lower to approximately 5 feet.

5.4.4 Detach the slings from the lifting beam by pulling the detent pins out of the lifting lugs using the detent pin tag line.

5.4.5 Raise the lifting beam high enough to clear the trailer, swing it over the trailer and lower it back onto the lifting beam support chocks.

NOTE: In the event that any or all of the detent pins cannot be removed using the detent pin tag line, refer to procedure AS/LLCE-011, Remote Rigging Failure Recovery Procedure, for further instruction.

5.4.6 Lower the crane hooks and remove the bridle sling D-rings.

6.0 RECORDS

None

7.0 ENCLOSURES

None

APPENDIX I

AS/LLCE-009

LOAD TEST PROCEDURE

This procedure is for certification of the lifting and handling beams only (52' and 71' beams)

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1.0 PURPOSE AND SCOPE

1.1 Load test or proof load test shall be conducted on the Long Length Contaminated Equipment (LLCE) burial container nominal 50 foot and 70 foot lifting beams. These tests are being performed to ensure compliance with ANSI N14.6, Special Lifting Devices for Shipping Containers Weighing 10,000 Pounds (4500 kg) or More, in conjunction with ASME/ANSI Slings B 30.9c-1994, Below-the-Hook Lifting Devices B30.20-1993. Testing of the lifting beam shall confirm the rated load by subjecting the device to forces equal to 150% of the required performance standards.

1.2 Testing of the lifting beam shall confirm calculations which support the design objective of the lift beam drawings, H-2-827846 and H-2-827848 Certification of the lifting beam shall be done using three different tests:

1.2.1 Lift Beam Test

1.2.2 Lifting Lug Test

1.2.3 Sling Lug Test

1.3 The lifting beam assembly test shall include the following components:

1.3.1 Structural Beam

1.3.2 Synthetic Lifting Slings

1.3.3 Welded Apertures, including Lug connection points

1.3.4 Attachment hardware including shackles and lifting pins

2.0 REFERENCES

2.1 ASME/ANSI - Slings B 30.9 - 1990

2.2 ASME/ANSI - Below the Hook Lifting Devices B 30.20 - 1993

2.3 Drawing H-2-827846, LLCE Long Lift Beam Field Assembly

2.4 Drawing H-2-827848, LLCE Short Lift Beam Field Assembly

2.5 ANSI N14.6, Special Lifting Devices for Shipping Containers Weighing 10,000 Pounds (4500 kg) or More.

3.0 DEFINITIONS

3.1 *Proof Load* - The specific load applied in performance of the proof test.

3.2 *Lifting Device* - All components of the assembly from the bearing point of the crane hook to the bearing point of the material to be handled.

3.3 *Dynamometer/Load Cell* - Tension measuring devices that transmits a signal to a readout or visual scale.

3.4 *Readout* - Electronic device with LCD display interpreting information from the load cell

3.5 *Rated Load or Working Load Limit* - The maximum allowable working load established by the designer of the lifting device.

3.6 *Performance Standard* - The minimum specifications required to facilitate the objectives of the customer. These standards are set by the design engineer and the ultimate end user.

3.7 *Test Weights* - 12" x 40" x 8" (approximate) ingots of kersite materials weighing on average 1700 lbs. each used to add resistance in the lifting force.

3.8 *Load Test Fixture* - The device used to simulate the actual material that the lifting device was designed to handle. The load test fixture shall support test weights.

3.9 *Lift Beam Test* - This test will subject each lifting beam to 150% of its working load limit. The long beam will be tested at 150,000 pounds, and the short beam will be tested at 105,000 pounds.

3.10 *Lifting Lug Test* - This test will subject each of the four lifting lugs on the long and short lifting beams to 90,000 pounds each.

3.11 *Sling Lug Test* - This test will subject each of the sling lugs on the long and short beam to 15,000 pounds each.

4.0 RESPONSIBILITIES

4.1 Responsibilities to be established if recertification is required.

4.2 The Seller is responsible for certification of the two lifting beams in accordance with this procedure. Also, American Sling shall prepare and affixing a tag to each beam stating the test date, the approved working load limit, the manufacturers name, the drawing number, the serial number and certification per ANSI N14.6.

5.0 PROCEDURE

5.1 Equipment

5.1.1 Two Hydraulic Truck Cranes or equivalent.

5.1.2 70 ft. long Load Text Fixture.

5.1.3 Tension Load Cell.

5.1.4 Dynamometers.

5.2 Personnel Requirements

5.2.1 Two crane operators with current crane operator certification

5.2.2 Two riggers to set up sling assemblies and to provide hand signals to crane operators.

5.2.3 One load cell technician to operate readout indicator

5.2.4 One load test supervisor to supervise test, assure contract compliance for test objectives, ensure safety compliance, and log significant events during test.

5.3 Lifting Beam Test for H-2-82746 Long Beam - See Enclosure 7.8

5.3.1 Set up testing area free of all obstructions and hazards.

5.3.2 Support Testing Fixture with sufficient blocking material to prevent shifting or movement during loading of test weights.

5.3.3 Load test fixture with kersite weights to achieve a total weight of 150,000 +1,000 -00 lb. Weights shall be loaded to balance weight evenly over the length of the 70 ft. fixture. Individual test weights shall be weighed and logged into a weight calculation log. (Enclosure 7.7)

5.3.3.1 Rig crane with wire rope bridle slings and load cell. Check rigging for broken wire or other damage. Attach wire rope bridle slings to all four lifting lugs of the long lift beam (H-2-827846), then lift and position beam over test fixture.

5.3.4 Rig nylon slings around the test fixture and attach to sling lug attachment points. Care shall be taken to protect nylon slings from sharp contact points on the load fixture. Inspect nylon slings per ASME B30.9c Section 9-5.8.

5.3.5 Nylon slings shall be attached to the following sling lug connection points:

H-2-827844 Sling Lug # 1, 3, 5, 7, 9, 11, 12, 13, 15, 17, 19, 21, 22, 23, 25, 27, 29, 31, 33

5.3.6 Load Test Supervisor shall ensure that all slings and rigging are secure. With coordination between operators and other test personnel, supervisor shall give signal to operators to lift the load.

5.3.7 The test fixture should be lifted one foot from the blocking material or until the load cell reads 150,000 lb.

5.3.8 Hold the load for a minimum of ten (10) minutes, then lower the test fixture until the load is removed from the beam.

5.4 Lifting Lug Test For H-2-827846 Long Beam

NOTE: This test continues from step 5.3.9.

5.4.1 Lift Lug #1 - See Enclosure 7.9

5.4.1.1 Lower the lifting beam, remove one leg of the wire rope bridle from lift lug #2 and reattach to lift lug #1. Locate the load cell in line with the wire rope attached to lift lug #1.

5.4.1.2 Load the test fixture with an additional 40,000 +1000 -00 lb. Locate the center of gravity of the additional weight directly below lift lug #1.

5.4.1.3 Relocate nylon slings to the following sling lug connection points:

H-2-827846 Sling Lug #:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19

5.4.1.4 Raise the lifting beam at both crane pick points until approximately 0.5 in. of slack remains in the nylon slings.

5.4.1.5 While keeping the crane connected to lift lugs #3 and #4 stationary, slowly raise the crane connected to lift lug #1 until the load cell reads 90,000 lb.

5.4.1.6 After a minimum of ten (10) minutes, lower the test fixture until the load is removed from the lug.

5.4.2 Lift Lug #2 - See Enclosure 7.10

5.4.2.1 Lower the lifting beam, remove both legs of the wire rope bridle from lift lug #1 and reattach to lift lug #2. Locate the load cell in line with the wire rope attached to lift lug #2.

5.4.2.2 Remove the weight added in step 5.4.1.2 and load the test fixture with an additional 30,000 +1000 -00 lb. Locate the center of gravity of the additional weight directly below lift lug #2.

5.4.2.3 Relocate nylon slings to the following sling lug connection points:

H-2-827846 Sling Lug #:	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21

5.4.2.4 Raise the lifting beam at both crane pick points until approximately 0.5 in. of slack remains in the nylon slings.

5.4.2.5 While keeping the crane connected to lift lugs #3 and #4 stationary, slowly raise the crane connected to lift lug #2 until the load cell reads 90,000 lb.

5.4.2.6 After a minimum of ten (10) minutes, lower the test fixture until the load is removed from the lug.

5.4.3 Lift Lug #3

5.4.3.1 Lower the lifting beam, remove one leg of the wire rope bridle from lift lug #2 and reattach to lift lug #1. Remove one leg of the wire rope bridle from lift lug #4 and reattach to lift lug #3. Locate the load cell in line with the wire rope attached to lift lug #3.

5.4.3.2 Remove the weight added in step 5.4.2.2 and load the test fixture with an additional 30,000 +1000 -00 lb. Locate the center of gravity of the additional weight directly below lift lug #3.

5.4.3.3 Relocate nylon slings to the following sling lug connection points:

H-2-827846 Sling Lug #: 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31

5.4.3.4 Raise the lifting beam at both crane pick points until approximately 0.5 in. of slack remains in the nylon slings.

5.4.3.5 While keeping the crane connected to lift lugs #1 and #2 stationary, slowly raise the crane connected to lift lug #3 until the load cell reads 90,000 lb.

5.4.3.6 After a minimum of ten (10) minutes, lower the test fixture until the load is removed from the lug.

5.4.4 Lift Lug #4

5.4.4.1 Lower the lifting beam, remove both legs of the wire rope bridle from lift lug #3 and reattach to lift lug #4. Locate the load cell in line with the wire rope attached to lift lug #4.

5.4.4.2 Remove the weight added in step 5.4.3.2 and load the test fixture with an additional 40,000 +1000 -00 lb. Locate the center of gravity of the additional weight directly below lift lug #4.

5.4.4.3 Relocate nylon slings to the following sling lug connection points:

H-2-827846 Sling Lug #: 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33

5.4.4.4 Raise the lifting beam at both crane pick points until approximately 0.5 in. of slack remains in the nylon slings.

5.4.4.5 While keeping the crane connected to lift lugs #1 and #2 stationary, slowly raise the crane connected to lift lug #4 until the load cell reads 90,000 lb.

5.4.4.6 After a minimum of ten (10) minutes, lower the test fixture until the load is removed from the lug.

5.5 Sling Lug Test for the H-2-827846 Long Beam - See Enclosure 7.11

NOTE: This test continues from step 5.4.4.6

5.5.1 Remove one leg of the wire rope bridle from lift lug #4 and reattach to lift lug #3

5.5.2 Remove the weight added in step 5.4.4.2.

5.5.3 Remove all nylon slings.

5.5.4 Attach a nylon sling to one sling lug.

5.5.5 Locate the load cell on one half of the sling lug (in line with the nylon slings). A load cell reading of 7500 lb. would indicate a total load of 15,000 lb.

5.5.6 Lift the beam at each pick point evenly until the load cell reads 7500 lb.

5.5.7 As soon as the load cell readout has stabilized, lower the lifting beam until the load is removed from the lug and move the attached sling to the next sling lug location.

5.5.8 Repeat steps 5.5.5 - 5.5.7 until each sling lug has been tested.

5.6 Lifting Beam Test for H-2-827848 Short Beam

5.6.1 Set up testing area free of all obstructions and hazards.

5.6.2 Support Testing Fixture with sufficient blocking material to prevent shifting or movement during loading of test weights.

5.6.3 Load test fixture with kersite weights to achieve a total weight of 105,000 +1,000 -00 lb. Weights shall be loaded to balance weight evenly over the length of the 70 ft. fixture. Individual test weights shall be weighed and logged into a weight calculation log. (Enclosure 7.7)

5.6.4 Rig crane with wire rope bridle slings and load cell. Check rigging for broken wire or other damage. Attach wire rope bridle slings to all four lifting lugs of the long lift beam (H-2-827848), then lift and position beam over test fixture.

5.6.5 Rig nylon slings between blocking material and attach to sling lug attachment points. Care shall be taken to protect nylon slings from sharp contact points on the load fixture. Inspect nylon slings per ASME B30.9c Section 9-5.8.

5.6.6 Nylon slings shall be attached to the following sling lug connection points:

H-2-827848 Sling Lug # 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25

5.6.7 Load Test Supervisor shall ensure that all slings and rigging are secure. With coordination between operators and other test personnel, supervisor shall give signal to operators to lift the load.

5.6.8 The test fixture should be lifted one foot from the blocking material or until the load cell reads 105,000 lb.

5.6.9 Hold the load for a minimum of ten (10) minutes, then lower the test fixture until the load is removed from the beam.

5.7 Lifting Lug Test For H-2-827848 Short Beam

NOTE: This test continues from step 5.6.9.

5.7.1 Lift Lug #1

5.7.1.1 Lower the lifting beam, remove one leg of the wire rope bridle from lift lug #2 and reattach to lift lug #1. Locate the load cell in line with the wire rope attached to lift lug #1.

5.7.1.2 Load the test fixture with an additional 40,000 +1000 -00 lb. Locate the center of gravity of the additional weight directly below lift lug #1.

5.7.1.3 Relocate nylon slings to the following sling lug connection points:

H-2-827848 Sling Lug #: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

5.7.1.4 Raise the lifting beam at both crane pick points until approximately 0.5 in. of slack remains in the nylon slings.

5.7.1.5 While keeping the crane connected to lift lugs #3 and #4 stationary, slowly raise the crane connected to lift lug #1 until the load cell reads 90,000 lb.

5.7.1.6 After a minimum of ten (10) minutes, lower the test fixture until the load is removed from the lug.

5.7.2 Lift Lug #2

5.7.2.1 Lower the lifting beam, remove both legs of the wire rope bridle from lift lug #1 and reattach to lift lug #2. Locate the load cell in line with the wire rope attached to lift lug #2.

5.7.2.2 Remove the weight added in step 5.7.1.2 and load the test fixture with an additional 30,000 +1000 -00 lb. Locate the center of gravity of the additional weight directly below lift lug #2.

5.7.2.3 Relocate nylon slings to the following sling lug connection points:

H-2-827848 Sling Lug #: 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14

5.7.2.4 Raise the lifting beam at both crane pick points until approximately 0.5 in. of slack remains in the nylon slings.

5.7.2.5 While keeping the crane connected to lift lugs #3 and #4 stationary, slowly raise the crane connected to lift lug #2 until the load cell reads 90,000 lb.

5.7.2.6 After a minimum of ten (10) minutes, lower the test fixture until the load is removed from the lug.

5.7.3 Lift Lug #3

5.7.3.1 Lower the lifting beam, remove one leg of the wire rope bridle from lift lug #2 and reattach to lift lug #1. Remove one leg of the wire rope bridle from lift lug #4 and reattach to lift lug #3. Locate the load cell in line with the wire rope attached to lift lug #3.

5.7.3.2 Remove the weight added in step 5.7.2.2 and load the test fixture with an additional 30,000 +1000 -00 lb. Locate the center of gravity of the additional weight directly below lift lug #3.

5.7.3.3 Relocate nylon slings to the following sling lug connection points:

H-2-827846 Sling Lug #: 12, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24

5.7.3.4 Raise the lifting beam at both crane pick points until approximately 0.5 in. of slack remains in the nylon slings.

5.7.3.5 While keeping the crane connected to lift lugs #1 and #2 stationary, slowly raise the crane connected to lift lug #3 until the load cell reads 90,000 lb.

5.7.3.6 After a minimum of ten (10) minutes, lower the test fixture until the load is removed from the lug.

5.7.4 Lift Lug #4

5.7.4.1 Lower the lifting beam, remove both legs of the wire rope bridle from lift lug #3 and reattach to lift lug #4. Locate the load cell in line with the wire rope attached to lift lug #4.

5.7.4.2 Remove the weight added in step 5.7.3.2 and load the test fixture with an additional 40,000 +1000 -00 lb. Locate the center of gravity of the additional weight directly below lift lug #4.

5.7.4.3 Relocate nylon slings to the following sling lug connection points:

H-2-827846 Sling Lug #: 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25

5.7.4.4 Raise the lifting beam at both crane pick points until approximately 0.5 in. of slack remains in the nylon slings.

5.7.4.5 While keeping the crane connected to lift lugs #1 and #2 stationary, slowly raise the crane connected to lift lug #4 until the load cell reads 90,000 lb.

5.7.4.6 After a minimum of ten (10) minutes, lower the test fixture until the load is removed from the lug.

5.8 Sling Lug Test for the H-2-827848 Short Beam

NOTE: This test continues from step 5.7.4.6

5.8.1 Remove one leg of the wire rope bridle from lift lug #4 and reattach to lift lug #3

5.8.2 Remove the weight added in step 5.7.4.2.

5.8.3 Remove all nylon slings.

5.8.4 Attach a nylon sling to one sling lug.

5.8.5 Locate the load cell on one half of the sling lug (in line with the nylon slings). A load cell reading of 7500 lb. would indicate a total load of 15,000 lb.

5.8.6 Lift the beam at each pick point evenly until the load cell reads 7500 lb.

5.8.7 As soon as the load cell readout has stabilized, lower the lifting beam until the load is removed from the lug and move the attached sling to the next sling lug location.

5.8.8 Repeat steps 5.8.5 - 5.8.7 until each sling lug has been tested.

5.9 Conclusion

5.9.1 At the conclusion of the tests, all rigging shall be inspected for damage. Upon satisfactory inspection, the rigging shall be packaged and prepared for shipment. The load test supervisor and SEG representatives shall perform inspections on all lifting points of the lifting beam.

5.9.2 Records shall be completed after each test showing actual applied loads and test conclusions/inspections.

5.9.3 Test reports, certificates of test and all documentation shall be forwarded to SEG seven days after the tests.

6.0 RECORDS

6.1 All test data, documentation and copies of certifications shall be kept on file at American Sling Co., Inc. for a period of five years.

6.1.1 Lift Test #1 -

H-2-827846 70' Beam - Test 70' Lift Beam to 150,000 lbs.
H-2-827848 50' Beam - Test 50' Lift Beam to 105,000 lbs.

6.2 Lift Test #2 -

H-2-827846 70' Beam - Test Lift Lugs to 90,000 lbs.
H-2-827848 50' Beam - Test Lift Lugs to 90,000 lbs.

6.3 Lift Test #3 -

H-2-827846 70' Beam - Test Sling Lugs to 15,000 lbs.
H-2-827848 50' Beam - Test Sling Lugs to 15,000 lbs.

6.4 Load test reports.

6.5 NDE Reports.

6.6 Video of test.

6.7 Calibration Certification for all load test equipment.

7.0 ENCLOSURES

7.1 Lift Test #1 - 70' Lift Beam Test

7.2 Lift Test #2 - 70' Beam Lift Lug Test

7.3 Lift Test #3 - 70' Beam Sling Lug Test

7.4 Lift Test #4 - 50' Lift Beam Test

7.5 Lift Test #5 - 50' Beam Lift Lug Test

7.6 Lift Test #6 - 50' Beam Sling Lug Test

7.7 Weight Calculation Log

7.8 Figure 1

7.9 Figure 2

7.10 Figure 3

7.11 Figure 4

ENCLOSURE 7.1
Lift Test #1
H-2-82746 70' Lift Beam Test

Objective	Actual	Inspection/Conclusions
Test Lift Beam to 150,000 lb.		

Lift Test #2
H-2-827846 70' Beam Lift Lug Test

Objective	Actual	Inspection/Conclusions
Test Lift Lug #1 to 90,000 lb.		
Test Lift Lug #2 to 90,000 lb.		
Test Lift Lug #3 to 90,000 lb.		
Test Lift Lug #4 to 90,000 lb.		

ENCLOSURE 7.3
Lift Test #3
H-2-827846 70' Beam Sling Lug Test

	Actual	Inspection/Conclusions
Test Sling Lug #1 to 15,000 lb.		
" #2 "		
" #3 "		
" #4 "		
" #5 "		
" #6 "		
" #7 "		
" #8 "		
" #9 "		
" #10 "		
" #11 "		
" #12 "		
" #13 "		
" #14 "		
" #15 "		
" #16 "		Objective
" #17 "		
" #18 "		
" #19 "		
" #20 "		
" #21 "		
" #22 "		
" #23 "		
" #24 "		
" #25 "		
" #26 "		
" #27 "		
" #28 "		
" #29 "		
" #30 "		
" #31 "		
" #32 "		
" #33 "		

ENCLOSURE 7.4
Lift Test #4
H-2-827848 50' Lift Beam Test

Objective	Actual	Inspection/Conclusions
Test Lift Beam to 105,000 lb.		

ENCLOSURE 7.5
Lift Test #5
H-2-827848 50' Beam Lift Lug Test

Objective	Actual	Inspection/Conclusions
Test Lift Lug #1 to 90,000 lb.		
Test Lift Lug #2 to 90,000 lb.		
Test Lift Lug #3 to 90,000 lb.		
Test Lift Lug #4 to 90,000 lb.		

ENCLOSURE 7.6
Lift Test #6
H-2-827848 50' Beam Sling Lug Test

Objective	Actual	Inspection/Conclusions
Test Sling Lug #1 to 15,000 lb.		
" #2 "		
" #3 "		
" #4 "		
" #5 "		
" #6 "		
" #7 "		
" #8 "		
" #9 "		
" #10 "		
" #11 "		
" #12 "		
" #13 "		
" #14 "		
" #15 "		
" #16 "		
" #17 "		
" #18 "		
" #19 "		
" #20 "		
" #21 "		
" #22 "		
" #23 "		
" #24 "		
" #25 "		

ENCLOSURE 7.7
Weight Calculation Log

Weight Serial No.	Date Weighed and Logged	Actual Weight

ENCLOSURE 7.8

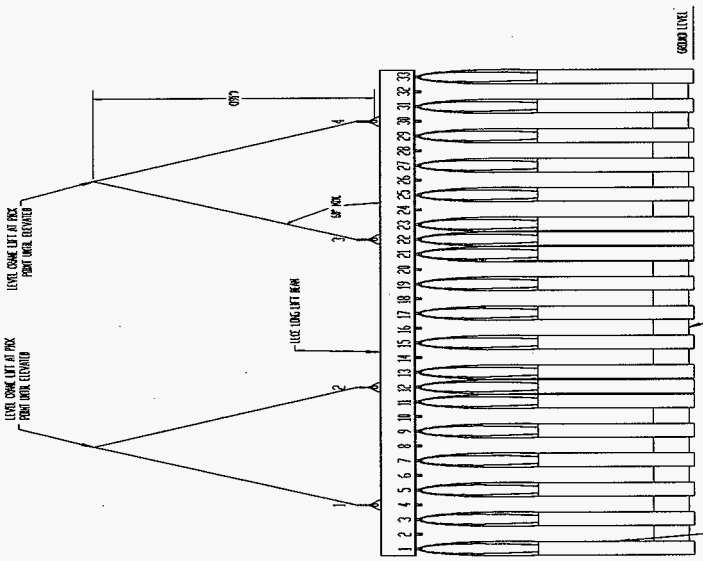

Figure 1

ENCLOSURE 7.9

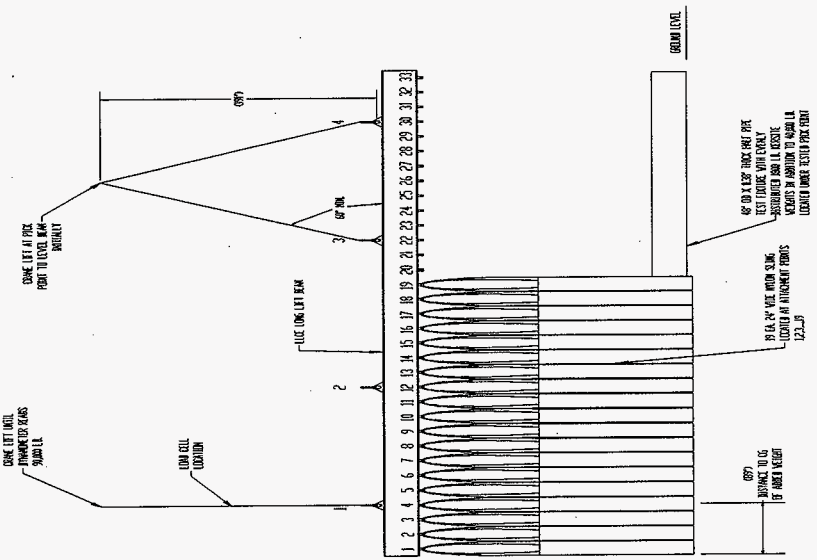

Figure 2

ENCLOSURE 7.10

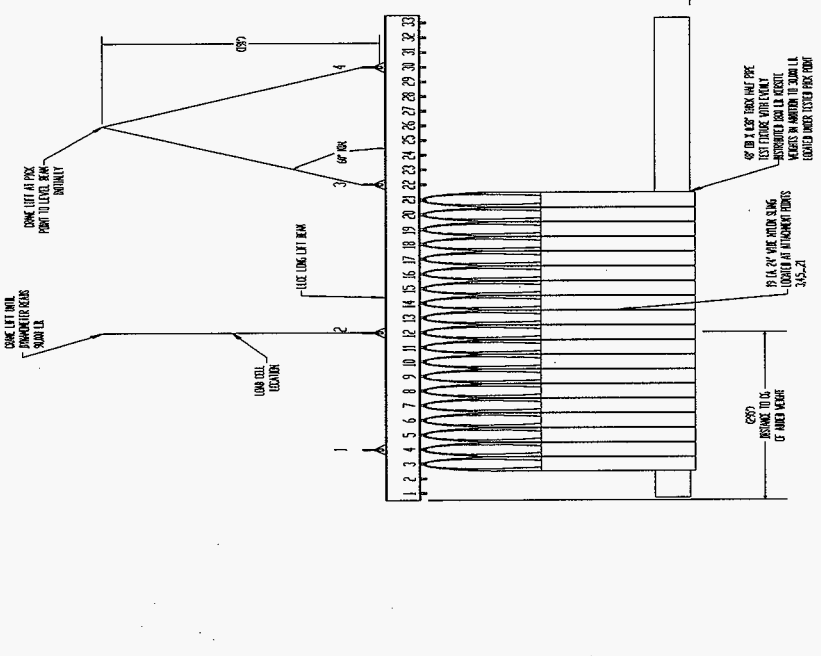

Figure 3

ENCLOSURE 7.11

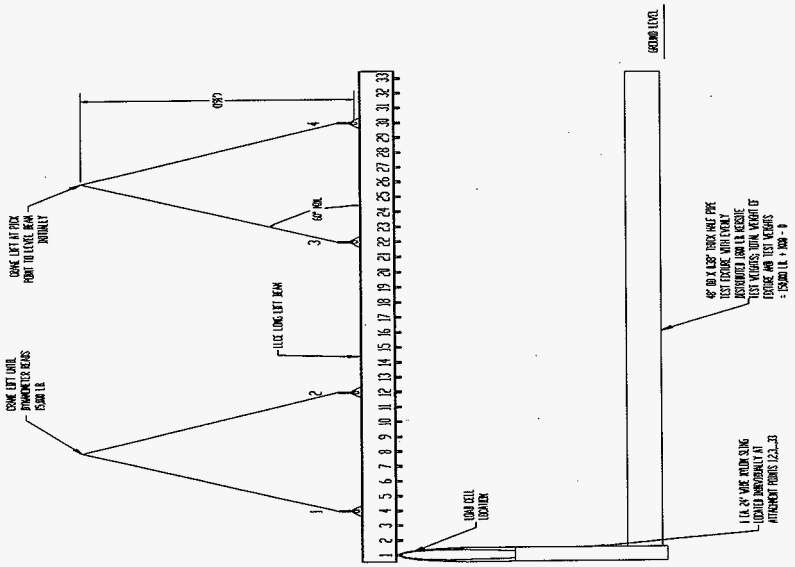

Figure 4

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APPENDIX J

AS/LLCE-010

DETENT PIN REMOVAL FORCE TEST PROCEDURE

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CONTENTS

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1.0 PURPOSE AND SCOPE

This procedure defines the proper steps required to perform the test to assure that no more than 50 lbs. of force is necessary to remove the detent pins that secure the lifting slings to the lifting beam for the Long Length Contaminated Equipment Container (LLCE). This test shall be conducted on at least 10 locations along the beam before each use. If corrosion or other blockage of detent pins is determined, then all 10 locations shall be cleaned and retested as required.

2.0 REFERENCES

2.1 Drawing H-2-827846, LLCE Long Lift Beam Field Assembly

2.2 Drawing H-2-827848, LLCE Short Lift Beam Field Assembly

3.0 DEFINITIONS

None

4.0 RESPONSIBILITIES

4.1 QA personnel shall witness and document the test, to be performed by Crane and Rigging personnel.

5.0 PROCEDURE

5.1 The following equipment is required for this procedure:

5.1.1 A step ladder.

5.1.2 A dynamometer with a minimum range of 0 lbs - 50 lbs.

5.1.3 A nylon cord.

5.1.4 LLCE Long Lift Beam.

5.1.5 LLCE Short Lift Beam.

5.1.6 Four saw horses.

5.1.7 Appropriate number of detent pins. Refer to References 2.1 and 2.2.

5.1.8 Appropriate number of lifting slings. (2' by 35'). Refer to References 2.1 and 2.2.

5.2 Detent Pin Removal Test

NOTE: THE ACCEPTANCE CRITERIA FOR THIS TEST REQUIRES THAT THE PIN BE REMOVED USING FORCE OF 50 LBS. OR LESS.

5.2.1 Position LLCE long lifting beam approximately 5' above ground level supported by four equally spaced saw horses.

5.2.2 Attach lifting slings to the lifting beam by inserting the detent pins. Refer to References 2.1 and 2.2.

5.2.3 Tie a nylon cord to the ring of a detent pin.

5.2.4 Tie opposite end of the nylon cord to the dynamometer.

5.2.5 Pull the detent pin from the lifting beam, making sure force is applied horizontally.

5.2.6 Measure and record the maximum force indicated on the dynamometer.

5.2.7 Repeat steps 5.2.3 through 5.2.6 for any ten random detent pins.

5.2.8 Repeat steps 5.2.1 through 5.2.7 using the LLCE short lifting beam.

5.2.9 Document the test results on Enclosure 7.1.

6.0 RECORDS

6.1 AS/LLCE-010-1, Detent Pin Removal Test Record

7.0 ENCLOSURES

7.1 AS/LLCE-010-1, Detent Pin Removal Test Record

ENCLOSURE 7.1
Detent Pin Removal Test Record

AS/LLCE-010-1

Procedure: AS/LLCE-010, Detent Pin Removal Force Test Procedure, Rev.___

Type of Lifting Beam
[ ] Short [ ] Long

No.	Description	Removal Force
1.	Detent Removal Pin #1	
2.	Detent Removal Pin #2	
3.	Detent Removal Pin #3	
4.	Detent Removal Pin #4	
5.	Detent Removal Pin #5	
6.	Detent Removal Pin #6	
7.	Detent Removal Pin #7	
8.	Detent Removal Pin #8	
9.	Detent Removal Pin #9	
10.	Detent Removal Pin #10	

Maximum Removal Force Allowed 35 lbs	
Maximum Removal Force Indicated	[ ]
Average Removal Force	[ ]

[ ] Accepted [ ] Rejected

_____ _____
Authorized QC Signature Date

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APPENDIX K

AS/LLCE-011

REMOTE RIGGING FAILURE RECOVERY TEST PROCEDURE

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CONTENTS

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1.0 PURPOSE AND SCOPE

The purpose of this procedure is to test the capability of an alternate method of detaching the slings from the Long Length Contaminated Equipment Container (LLCE) lifting beam, in the event the remote rigging removal system fails.

2.0 REFERENCES

2.1 Drawing H-2-827846, LLCE Long Lift Beam Field Assembly

2.2 Drawing H-2-827848, LLCE Long Lift Beam Field Assembly

3.0 DEFINITIONS

None

4.0 RESPONSIBILITIES

4.1 Responsibilities for recovery of the lifting and handling beam is to be determined.

5.0 PROCEDURE

5.1 The following equipment is required for this procedure.

5.1.1 The LLCE remote rigging recovery tool.

5.2 Test Procedure

5.2.1 Lower the lifting and handling beam to access the strap.

5.2.2 Position test operator approximately 10' from the vertically hanging strap.

5.2.3 With the LLCE remote rigging recovery tool, cut strap into two, making the bisection approximately at chest level.

5.2.4 Repeat the process as required to free the lifting beam.

6.0 RECORDS

None

7.0 ENCLOSURES

None

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APPENDIX L

AS/LLCE-012

BODY BUTT WELD FUSION PROCEDURE

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CONTENTS

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1.0 PURPOSE AND SCOPE

This procedure describes the methods, equipment, and manufacturing processes required to fuse high density polyethylene pipe. This fusion process will be used to fabricate Long Length Contaminated Equipment Burial Containers (LLCE).

2.0 REFERENCES

2.1 AS/LLCE-008, Lifting and Handling Procedure.

2.2 Quality Records according to approved QA plan.

2.4 AS/LLCE-017, Ultrasonic Test Examination Procedure for the Body Butt Weld

3.0 DEFINITIONS

3.1 *LLCE* - Long Length Contaminated Equipment

3.2 *HDPE* - High Density Polyethylene

4.0 RESPONSIBILITIES

4.1 The Seller's Project Manager has the overall responsibility for the implementation of this procedure.

4.2 The Seller's Quality Assurance is responsible for supporting all project-related matters involving quality assurance and quality control. Quality Assurance is assigned the responsibility and the authority to ensure that the requirements of this procedure are fully and effectively implemented during the production phase of the project.

4.3 All company and subcontractor personnel performing container manufacturing, inspection, and testing activities are responsible for compliance with the requirements of this procedure.

4.4 Quality Control is responsible for receipt inspection of all components and materials used in the fusion process.

4.5 The Seller's Department Managers are responsible for assuring that personnel designated for manufacturing, inspection, and testing activities are trained and qualified in accordance with Reference 2.1, and that appropriate qualification records are available.

5.0 PROCEDURE

5.1 Prerequisites

5.1.1 Handling of all container components shall be performed using the methods and devices identified in Reference 2.2. Lifting and handling requirements will be enforced by the LLCE Production Manager and floor supervisor. In the event that any component or assembly sustains damage during processing, the operator/handler shall notify his/her supervisor.

NOTE: **DO NOT** stress relieve the pipe ends that will be fused together to make the container body.

5.2 Container Body Fusion Procedure

5.2.1 Retrieve HDPE pipe from inventory and move pipe to the fusion station.

5.2.2 Using methods described in Reference 2.2, lift the two sections of pipe to be fused and place them on the fusion unit.

5.2.3 Using methods prescribed by the fusion technician(s), match the ends of the pipe sections to within the following limits:

Container/Pipe	Maximum Wall Mismatch (in.)
C1-C2, 26" SDR 32.5	0.063
C3-C4, 36" SDR 32.5	0.063
C5-C9, 54" SDR 32.5	0.125
C6-C7, 63" SDR 32.5	0.125

5.2.4 Using methods prescribed by the fusion technician(s) assure that the pipe sections are level with each other and parallel with the sciving blade within 1".

5.2.5 Scive the ends of the pipe.

NOTE: During the fusion process, QC and production personnel will be performing in-process monitoring.

NOTE: Prior to any fusion welds, all temperatures and pressures must be verified by QC personnel.

5.2.6 Fuse the pipe ends using heating temperatures and fusion pressures as follows:

Container/Pipe/ Resin	Heater Temperature (°F)	Interfacial Pressure (psi)	Guage Pressure (psi)*
C1-C2, 26" SDR 32.5, Driscopipe 1000 TR-480	400 ± 15	75	181 ± 15
C3-C4, 36" SDR 32.5, Driscopipe 1000 TR-480	400 ± 15	75	320 ± 15
C5-C9, 54" SDR 32.5, Driscopipe 1000 TR-480	400 ± 15	75	682 ± 15
C6-C7, 63" SDR 32.5, KWH Petromont	415 ± 15	25	313 ± 15

* based on McElroy 2063 with 31.42 in^2 total effective piston area and 30 psi drag

5.2.7 Allow the pipe to cool until the temperature is less than 100° F.

5.2.8 Remove the internal and external weld beads.

5.2.9 Perform ultrasonic testing on the weld per Reference 2.4.

6.0 RECORDS

6.1 Manufacturing Travelers, Dimensional Data Sheets, and test records are maintained per approved QA program.

7.0 ENCLOSURES

None

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APPENDIX M

AS/LLCE-015

SCRATCH AND GOUGE INSPECTION AND REPAIR PROCEDURE

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CONTENTS

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1.0 PURPOSE AND SCOPE

This procedure defines the inspection methodology, acceptance criteria, and process used to identify and repair surface defects on the Long Length Contaminated Equipment Container (LLCE).

2.0 REFERENCES

None

3.0 DEFINITIONS

None

4.0 RESPONSIBILITIES

4.1 The Seller's quality assurance personnel shall examine the containers for scratches and gouges prior to hot end cap welding per 5.2.2.3 and prior to shipment per 5.2.2.1. If a surface defect is found, operations personnel shall repair the defect according to this procedure.

4.2 Buyer Quality Assurance personnel shall examine the containers for scratches and gouges prior to cold end cap welding per 5.2.2.3 and prior to burial per 5.2.2.2. If a surface defect is found, the defect shall be repaired according to this procedure.

5.0 PROCEDURE

5.1 The following equipment is required for this procedure.

5.1.1 A metal rule measuring in 1/32".

5.1.2 Dial indicating depth gage.

5.1.3 97% isopropyl alcohol and a clean lint free cloth.

5.1.4 180 grit sandpaper.

5.1.5 A Wegener WEG-08 Hand Welder with pipe grade HPDE filler rod. (Phillips TR-480 Pipe Grade Resin or approved equivalent)

5.1.6 A hand held thermocouple measurement device with a type K thermocouple attached.

5.2 Scratch and gouge inspection.

5.2.1 Visually inspect all surfaces of the container for flaws in accordance with the following acceptance criteria - employ inspection measuring instruments where necessary.

5.2.2 Acceptance criteria.

5.2.2.1 General Requirement
Applies to all surfaces of the container body and end cap.

Max. scratch: 20" long by 0.038" deep

Max. gouge: 10" long by 0.125" deep

Defects shall be at least 1.500" apart

5.2.2.2 Creep Requirement
Applies to outside top surface of the container body within 15 degrees of the container vertical centerline.

Max. scratch: 20" long by 0.038" deep

Max. gouge: 0.250" long by 0.100" deep

Defects shall be at least 1.500" apart.

5.2.2.3 Weld Requirement
Applies to all surfaces at the container body and end cap within 4.00" of the macrocapsulation seal.

Max. scratch: 20" long by 0.038" deep

Max. gouge: 0.250" long by 0.100" deep

5.2.3 Mark all defects on container if they exceed the criteria above.

5.2.4 If the results are satisfactory and all flaws meet acceptance criteria the container has met its surface standards.

5.2.5 If any surface flaws do not meet the acceptance criteria, proceed to the following repair procedure.

5.3 Scratch and gouge repair.

5.3.1 Turn on the hand welder allowing it to preheat to a desired working temperature of 470°F $\pm$ 10°F.

5.3.2 Deburr scratch or gouge.

5.3.3 Scuff defect with 180 grit sandpaper.

5.3.4 Clean area with isopropyl alcohol and dry with a lint free cloth.

5.3.5 Insert the pipe grade filler rod into the hand welder.

5.3.6 Allow the filler rod to melt.

5.3.7 Heat the surface of the defect to a temperature of 280°F.

5.3.8 Apply melted filler material to defect until filler material exceeds the container surface height, being sensitive not to allow air voids under the repair surface.

5.3.9 Remove excess filler material until the weld is flush with the container surface.

5.3.10 Visually inspect repaired area for lack of adhesion of filler material.

5.3.11 Repeat repair procedure if necessary.

6.0 RECORDS

None

7.0 ENCLOSURES

7.1 Scratch and Gouge Repair Record

ENCLOSURES 7.1
Scratch and Gouge Repair Record

AS/LLCE-015-1

Procedure: AS/LLCE-015, Scratch and Gouge Inspection and Repair Procedure, Rev.

Size of LLCE Container	
LLCE Serial Number	
Number of Repairs Made	
Repairs Acceptable	

Observations:
Comments:

Authorized QC Signature: _____ Date _____

APPENDIX N

AS/LLCE-016

POWERCORE INSTALLATION PROCEDURE

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CONTENTS

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1.0 PURPOSE AND SCOPE

This procedure defines the proper steps required to attach the powercore to the Long Length Contaminated Equipment Container (LLCE) End Caps.

2.0 REFERENCES

2.1 Drawing H-2-827809, End Cap C1 - C2 Assembly

2.2 Drawing H-2-827812, End Cap C3 - C4 Assembly

2.3 Drawing H-2-827815, End Cap C5 - C9 Assembly

2.4 Drawing H-2-827818, End Cap C6 - C7 Assembly

3.0 DEFINITIONS

3.1 *Powercore* - 0.197" diameter pipe grade high density polyethylene rod with 16 helically-embedded stainless steel wired in an ohmic-heating process to force weld plastics together.

4.0 RESPONSIBILITIES

4.1 The Seller's personnel shall attach the power core to both end caps.

5.0 PROCEDURE

5.1 The following equipment is required for this procedure.

5.1.1 A hand held thermocouple measurement device with a type K thermocouple attached.

5.1.2 97% isopropyl alcohol and a clean lint free cloth.

5.1.3 Appropriate length of powercore.

5.1.4 Appropriate number of 0.75" long hollow brass pins.

5.1.5 Appropriate number of Ilsco female bullet connectors.

5.1.6 Powercore stripping iron.

5.1.7 Powercore pinning iron.

5.1.8 Power supply and an electrical source.
(Seller/Buyer to agree on supply this for Seller's beneficial use).

5.1.9 Powercore rolling device.

5.1.10 Wire stripping tool and cutters.

5.1.11 Junction box assembly.

5.1.12 Rubber mallet.

5.1.13 Electronic label maker with labels.

5.1.14 Hot air gun.

5.1.15 Multimeter with resistance measuring capability.

5.1.16 Plastic gloves.

5.1.17 Crimping tool.

5.1.18 Pipe grade HPDE filler rod. (Phillips TR-480 Pipe Grade Resin or approved equivalent.)

5.2 Installation of the powercore

5.2.1 Place the machined LLCE end cap on two sawhorses or equivalent workbench with its interior side facing upward. Refer to References 2.1 through 2.4.

5.2.2 All personnel responsible for installing the powercore must wear clean plastic gloves to ensure oil from their hands does not contaminate the weld surfaces or powercore.

5.2.3 Clean the microcapsulation seal area with isopropyl alcohol, assuring the series of parallel grooves to contain the powercore are free of debris and oil.

5.2.4 Wipe powercore with alcohol to remove dust and oil.

5.2.5 Starting with the innermost powercore groove, insert end of powercore through the end cap 4", using the leftmost exit hole of the pair for that groove. Refer to Reference 2.1 through 2.4.

5.2.6 Start tapping the powercore in its machined groove with a rubber mallet, working around the end cap clockwise until reaching the other paired exit hole.

5.2.7 Cut the powercore from its roll assuring the length is sufficient to run through the remaining exiting hole and extend 4" through end cap.

5.2.8 Insert the end of the powercore through its exiting hole.

5.2.9 Tap the remaining section of powercore into place working towards the second exit hole.

5.2.10 Run the powercore rolling device along the length of powercore applying sufficient pressure to ensure it is secure to the end cap.

5.2.12 Fill the void area between each exiting powercore as follows:

5.2.12.1 Turn on the hot air gun allowing it to preheat for approximately 3 minutes.

5.2.12.2 Clean area with isopropyl alcohol and dry with a lint free cloth.

5.2.12.3 Cut a section of filler rod material equal to the area requiring material.

5.2.12.4 Clean the filler rod insert with isopropyl alcohol and dry with a lint free cloth.

5.2.12.5 Insert the filler rod insert in the void area.

5.2.12.6 Heat the localized area with the hot air gun and fill void area.

5.2.13 Repeat steps 5.2.3 through 5.2.12 for each machined powercore groove.

5.2.14 Turn end cap over with its exterior side facing upward, be sensitive not to have the microcapsulation seal area contact the workbench.

5.2.15 Heat the powercore stripping and pinning irons to 350 F.

5.2.16 Cut exiting powercore 1.5" above the surface of the end cap.

5.2.17 Insert 1/2" of powercore into the stripping iron until the polyethylene surrounding the internal wires appears melted and can be stripped away. (time required approximately 25 seconds) Refer to References 2.1 through 2.4.

5.2.18 Quickly remove the iron from the powercore and strip the polyethylene away from its internal wires, assuring the integrity of the wires is not compromised.

5.2.19 Twist wires into one.

5.2.20 Place brass pin over wires. Refer to References 2.1 through 2.4.

5.2.21 Insert pin into the powercore pinning iron and firmly press pin 1/8" into the start of the unstripped plastic. Refer to References 2.1 through 2.4.

5.2.22 Remove the powercore pinning iron.

5.2.23 Using the crimping tool, crimp the brass pin against the wires inside.

5.2.24 Insert the pin of the powercore into the female bullet connector until the base of the connector touches the end of the unstripped polyethylene. Refer to References 2.1 through 2.4.

5.2.25 Crimp the connector against the brass pin inside using the wire crimping tool.

5.2.26 Repeat steps 5.2.16 through 5.2.25 for *each exiting powercore lead.*

5.2.27 Label the leftmost connector of each powercore pair "pos" and the rightmost connector "neg".

5.2.28 Using a heat gun, heat the shrink wrap connected to each connector.

5.2.29 Check the resistance of each powercore pair to assure powercore is not damaged and the connectors have been installed properly.

6.0 RECORDS

None

7.0 ENCLOSURES

None

APPENDIX O

AS/LLCE-017

ULTRASONIC TEST EXAMINATION FOR THE BODY BUTT WELD

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CONTENTS

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1.0 PURPOSE AND SCOPE

1.1 This procedure describes the methods by which ultrasonic straight beam examinations will be performed on the body butt weld for the Long Length Contaminated Equipment Burial Container (LLCE), to verify the integrity of the fusion weld.

1.2 The requirements of this procedure shall be mandatory for modified straight beam ultrasonic examination of the fusion zone for each of the different LLCE body diameters fabricated.

2.0 REFERENCES

2.1 ASTM E 500-86b, Standard Terminology Relating to Ultrasonic Examination.

2.2 ASTM E 804-81, Standard Practice for Calibration of the Ultrasonic Test System by Extrapolation Between Flat Bottom Hole Sizes.

2.3 ASTM E 1001-84, Standard Practice for Detection and Evaluation of Discontinuities by the Immersed Pulse-Echo Ultrasonic Method Using Longitudinal Waves.

2.4 Qualification and Certification of Nondestructive Examination Personnel according to approved QA program.

3.0 DEFINITIONS

3.1 Reference Level - The decibel reading attained from reference responses from a standard. Used to size and evaluate indications for acceptance with respect to code requirements.

3.2 Distance Amplitude Correction Curve (DAC) - A curve used to correct for both near field affects and sound attenuation with respect to a reference reflector. Used to size and evaluate indications for acceptance with respect to code requirements.

3.3 Modified Straight Beam Inspection - An inspection conducted utilizing pulsed longitudinal waves of sound channeled through a column of water.

4.0 RESPONSIBILITIES

4.1 Quality Assurance

4.1.1 Shall be responsible for authorization and conformance of this procedure.

4.1.2 Shall be responsible for ensuring that personnel performing ultrasonic examinations are certified to UT Level II (as a minimum) in accordance with Reference 2.4.

4.1.3 Shall ensure that examination materials and equipment that meet the minimum requirements of this procedure are available.

4.2 Ultrasonic Examiner

4.2.1 Shall perform ultrasonic examinations in accordance with this procedure and the attached applicable Ultrasonic Parameter Report (form AS/LLCE - 017 -01,02 or 03).

4.2.2 Shall perform required calibrations in accordance with this procedure.

4.2.3 Shall document calibration and examination data on the Ultrasonic Examination Report form (AS/LLCE-017-01, -02, or -03).

5.0 PROCEDURE

5.1 Safety Precautions

5.1.1 Ultrasonic examiners wear safety glasses or goggles while performing test.

5.2 Equipment

The ultrasonic test equipment shall consist of the following, or equivalent:

5.2.1 Ultrasonic test instrument - Krautkramer USN-50. The instrument shall have a linear vertical presentation within ± 5% of the full screen height for 20 to 80% of the calibrated screen height. The instrument shall have an amplitude control accurate over its useful range to ±20% of the nominal amplitude ratio.

5.2.2 Squirter assembly - Staveley HAX-608 for ZI Transducers.

5.2.3 Ultrasonic transducers - Staveley 13-0208S 1/2" diameter @ 2.25 Mhz.

5.2.4 Ultrasonic search tube - Staveley 12" special wand type for UNF & BNC connectors.

5.2.5 Couplant - Demineralized / deairated water with a wetting agent.

5.2.6 Rotation system - Motorized with variable speed.

5.3 Standards

5.3.1 Shall be fabricated from the same material as the LLCE Containers.

5.3.2 Shall incorporate three 1/8" diameter flat bottom holes drilled at 1/4 thickness, 1/2 thickness and 3/4 thickness.

5.3.3 The temperature of the part to be tested and the surface of the calibration standard shall be within 25 °F.

5.4 Calibration - Sweep Range

5.4.1 See the applicable Ultrasonic Parameter Report (form AS/LLCE-017-01, -02, or -03).

5.5 Distance Amplitude Correction (DAC)

5.5.1 See the applicable Ultrasonic Parameter Report (form AS/LLCE-017-01, -02, or -03).

5.6 Fusion Area Scan

5.6.1 See the applicable Ultrasonic Parameter Report (form AS/LLCE-017-01, -02, or -03).

5.6.2 *Rejectable indications shall be mapped to identify location.*

5.7 Calibration Confirmation

5.7.1 Upon completion of the examination or after 2 hours of examination, perform a calibration confirmation as described in Steps 5.4 and 5.5 above.

5.7.2 If the DAC curve has moved on the sweep line more than 10% of the sweep reading or more than 5% of the full sweep, whichever is greater, void all examinations and recordings since the previous calibration, recalibrate and rescan in accordance with this procedure.

5.7.3 If the DAC curve has either increased or decreased more than 20% or 2 decibels, void all examinations and recordings since the previous calibration, recalibrate and rescan in accordance with this procedure.

6.0 RECORDS

6.1 Ultrasonic examination results are recorded on form AS/LLCE-017-01,02 or 03 (as applicable) and retained in the job file. The reports are referenced by number to the component part or assembly examined.

6.2 Examination reports are maintained for a minimum of one year after completion of *fusion welding or contract requirements.*

7.0 ENCLOSURES

7.1 Ultrasonic Parameter Report for C2 Body Butt Weld.

7.2 Ultrasonic Parameter Report for C5 Body Butt Weld.

7.3 Ultrasonic Parameter Report for C7 Body Butt Weld.

ENCLOSURE 7.1
Ultrasonic Parameter Report

To be provided by vendor.

ENCLOSURE 7.2
Ultrasonic Parameter Report

To be provided by vendor.

ENCLOSURE 7.3
Ultrasonic Parameter Report

To be provided by vendor.

DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	Packaging Engineering	Date Mar. 5, 1997
Project Title/Work Order		EDT No. 619555
Long-Length Contaminated Equipment Burial Containers Fabrication Process Procedures (HNF-SD-WM-SPP-002, Rev. 0)		ECN No. N/A

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
D. W. Crass	H5-68	X			
W. S. Josephson	H6-06	X			
J. G. Field	H1-15	X			
C. R. Hoover	H1-15	X			
W. A. McCormick	H1-15	X			
M. E. McKinney	S2-48	X			
D. W. McNally	G1-15	X			
P. A. Titzer	R1-56	X			
E. M. Veith	R1-56	X			
Central Files	A3-88	X			
HNF-SD-WM-SPP-002 File	H1-15	X			
P97-067	H1-15				X