Annual Inspection, Maintenance, Repair and Storage Procedure for US DOT, Specification 7A, Type A Transportation Casks

TTS-14-212-002

TAG Technical Solutions, Inc.
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TTS Inc.

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Rev	Prepared By	Signature	Date	Reviewed By	Signature	Date
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1.0 Purpose and Scope

In order to ensure that equipment utilized to transport Type A radioactive materials is in compliance with the requirements of the Department of Transportation (DOT) Title 49 regulations; it is necessary to perform periodic inspections and routine maintenance. This procedure establishes the annual (12 month period) inspection and preventive maintenance requirements for a US Department of Transportation Specification 7A, Type A Transportation Cask. The administrative controls described herein apply to the maintenance activities required to perform the following.

1.1 Repair cask structure, components, or associated parts as necessary to meet the requirements for package compliance.

1.2 Maintain the cask in accordance with Reference 2.1.

1.3 Refurbish the cask.

1.4 This procedure also covers initial shipment and cask storage. This procedure provides the specific instructions, requirements, and documentation needed to ensure that the TAG Technical Solutions, Inc. Model 14-212, DOT Specification 7A, Type A shipping casks are maintained in acceptable operating condition and in compliance with all applicable regulatory requirements.

2.0 References

2.1 DOT 49 CFR 178.350

2.2 TAG Technical Solutions Engineering Document, "Test and Evaluation Document for US DOT Specification 7A, Type A Packaging for 14-212 Transportation Casks" (TTS-ENG-14-212-001).

2.3 Code of Federal Regulations, Title 49

2.4 TTS Procedure No. TTS-QAP-2.1, Personnel Training, Indoctrination and Qualification

2.5 TTS Procedure No. TTS-QAP-9.1, Control of Special Processes

2.6 TTS Procedure No. TTS-QAP-4.1, Procurement Control

2.7 TTS Procedure No. TTS-QAP-12.1, Control of Measuring and Test Equipment

2.8 TTS Procedure No. TTS-QAP-17.1, Quality Records

2.9 TTS Procedure No. TTS-QAP-15.1, Control of Nonconforming Items

2.10 TTS Procedure No. TTS-14-212-003, Soap Bubble Leak Test for US DOT Specification 7A, Type A Transportation Casks

2.11 TTS Procedure No. TTS-14-212-001, Cask Handling Procedure for US DOT Specification 7A, Type A Transportation Casks

2.12 ASME Code Section III, Division 1, Subsection NB, Article NB-5000 and Section V, Article 7.

2.13 American Welding Society, ANSI/AWS D1.1

2.14 SSPC-SP6, NACE Number 3, Surface Preparation Standard

2.15 ASME Code Section V

2.16 TAG Technical Solutions, Inc. Drawing Number TTS-0001A and TTS-0001B

3.0 Definitions

3.1 **DOT Specification 7A, Type A Transportation Cask**: The packaging utilized to contain and transport radioactive materials, which consists of a specific design qualified as meeting the U.S. Department of Transportation DOT 49 CFR Part 178.350 as documented in TAG Technical Solutions, Inc. document "Test and Evaluation Document for US DOT Specification 7A, Type A Packaging for 14-212 Transportation Cask" (TTS-ENG-14-212-001).

3.2 **Transport Trailer**: A dedicated vehicle utilized to transport a DOT, Specification 7A, Type A shipping cask(s).

3.3 **Transport Operator**: A person qualified and designated as the individual(s) responsible for the operation of over-the-road equipment for the conveyance of radioactive materials utilizing DOT, Specification 7A, Type A shipping casks and transport trailers.

3.4 **TTS**: TAG Technical Solutions, Inc.

4.0 Responsibilities

4.1 TTS General Manager, or designee

4.1.1 Responsible for interface with TTS Customers regarding equipment conditions, operations, and utilization. Responsible for implementation of this procedure, for ensuring that personnel performing activities associated with the inspection, maintenance and repair of equipment radwaste transportation casks and transport trailers) have been trained and qualified in accordance with Reference 2.4.

4.1.2 Ensuring that personnel performing leak tests are qualified in accordance with Reference 2.4 and Reference 2.10.

4.1.3 Responsible for the primary customer interface for shipments of radioactive materials for which a DOT, Specification 7A, Type A shipping cask and transport trailer are utilized.

4.1.4 Responsible for ensuring that only equipment (DOT, Specification 7A, Type A shipping casks and transport trailers) which have been properly inspected, maintained, and repaired will be used, or scheduled for use, for the transportation of radioactive materials.

4.1.5 Responsible for tracking the status of annual (12 month) inspections on all shipping casks and for tracking the shelf life status for primary and secondary gaskets utilized on the shipping casks.

4.1.6 Ensuring that unacceptable conditions identified during routine inspection of the transport trailer are corrected and complete prior to the next scheduled shipment date.

4.1.7 Responsible for ensuring that only qualified personnel perform activities associated with the implementation of this procedure.

4.2 TTS Cask Maintenance Technician

4.2.1 Responsible for performing activities associated with the annual inspection, maintenance

and repair of DOT, Specification 7A, Type A shipping casks and transport trailers in accordance with the requirements of this procedure and for providing the results to the TTS General Manager or designate.

4.2.2 Notifying the TTS Transportation Coordinator and the transport company of any required maintenance on transport trailers found unacceptable during the course of implementing inspections in accordance with this procedure.

4.2.3 Notifying the TTS General Manager to provide direction when conditions require input in accordance with this procedure.

4.2.4 Notifying TTS QA personnel when conditions warrant QA involvement in accordance with this procedure.

4.2.5 Responsible for documenting the results of inspections and for the maintenance of records in accordance with this procedure.

4.3 TTS Engineering Department and/or Licensing Department

4.3.1 Responsible for providing direction, instructions, and recommendations for maintenance and repair of equipment that have nonconformances in accordance with this procedure.

4.3.2 Interface with regulatory agencies on matters concerning the DOT, Specification 7A, Type A shipping casks.

4.4 TTS Quality Assurance (QA) Department

Responsible for performing surveillance of activities associated with the annual inspection and maintenance of DOT, Specification 7A, Type A shipping casks and transport trailers as well as inspection of cask repairs. QA inspection and/or hold points are not required during annual inspection and maintenance or activities involving gasket changes or replacement of components unless deemed necessary by nonconformance dispositions.

4.5 Shipper

4.5.1 Responsible for completing all paperwork required for the shipment of radioactive materials utilizing DOT, Specification 7A, Type A shipping casks and associated transport trailers.

4.5.2 Adhering to all DOT requirements regarding the conveyance of radioactive materials utilizing DOT, Specification 7A, Type A shipping casks and associated transport trailers.

4.5.3 Adhering to the applicable requirements in Reference 2.1.

4.5.4 Notifying all pertinent parties, in a timely manner, of unacceptable conditions discovered as a result of implementing a pre-delivery inspection and implementing instructions as provided by TTS.

4.6 User

Responsible for notifying TTS immediately if there is a problem meeting any of the requirements of Reference 2.1.

4.7 Health Physics Department

4.7.1 Responsible for providing incoming and release radiological surveys of DOT, Specification 7A, Type A shipping casks and associated transport trailers.

4.7.2 Providing guidance, direction, and instruction with regard to radiation protection for individuals implementing tasks in accordance with this procedure.

5.0 Safety and Environmental Precautions

5.1 Observe all applicable safety precautions including proper lift, rigging, and handling, as applicable, and site operating procedures.

5.2 Technicians shall use proper radiological procedures and abide by Radiation Work Permits, if required, to minimize radiation exposure and the spread of contamination.

5.3 Technicians shall follow all safety rules in the course of their duties and use proper personnel protective equipment as required by Health and Safety requirements, or equivalent, for the task being performed.

6.0 Prerequisites

6.1 Prior to inspection or repair activities, ensure that a radiological survey of the equipment has been performed. Use proper personnel protective equipment and ALARA practices as required by Health and Safety requirements for the task being performed.

6.2 Prior to the implementation of lifting/handling tasks, ensure that all equipment is properly rated for the loads to be handled.

6.3 Prior to implementing lifting/handling tasks, an inspection of all rigging and components shall be conducted to ensure the components are in good working order and free from defects and damage. Damaged or defective components must be replaced prior to use.

6.4 Ensure the crane being used is rated for the intended load.

7.0 Equipment

7.1 Slings or cables.

7.2 Calibrated torque wrench, calibrated for the lowest and highest value required by this procedure.

7.3 All Measuring and Test Equipment (M&TE) utilized shall be in accordance with Reference 2.7 or applicable site calibrated equipment requirements.

7.4 Components and/or services necessary for equipment repair and maintenance shall be procured in accordance with Reference 2.6.

8.0 Records

All documentation on the cask handling, component replacement and repair are quality records and shall be maintained in accordance with reference 2.8.

9.0 Procedure

9.1 Cask / Trailer Inspection

NOTE: Steps in this procedure may be performed in a non-sequential order at cask maintenance technicians' discretion, except any alteration of sealing surfaces (i.e., gasket repair) will require re-performance of leak test.

9.1.1 A thorough annual (12 month period) inspection **may** be performed on each cask and its associated transport trailer by a Cask Maintenance Technician. Perform all inspections in accordance with the acceptance criteria provided in this procedure and on the Cask Inspection Report (Attachment A).

Note: An annual (12 month period) inspection may include a gasket change if necessary, however; as an alternative, the gasket may be inspected and recertified if gasket is still resilient (meets manufacturer resiliency recommendations) and is not damaged. Perform all other maintenance per 9.1.6 as necessary.

9.1.2 Report cask defects such as damaged welds, stop rings, seams, damaged or missing name plates, damage to the cask structure or other like findings that constitute a nonconformance with the applicable DOT regulation in accordance with Reference 2.9. Conditions resulting from normal wear and tear need not be reported but will remain correctable in accordance with this procedure.

9.1.3 Document the results of the annual inspection and repairs on Attachment A. Upon completion, Attachment A shall be reviewed for correctness and completeness by the General Manager or designee and a copy shall be routed to other appropriate personnel. The original of Attachment A shall be forwarded to the TTS QA Department.

9.1.4 Repairs made to permanent/structural components of the cask (shell, lids, liner, lugs, etc.) shall be performed only with TTS approval. In-house or subcontracted personnel may be utilized with TTS approval.

9.1.5 Assign an inspection number for the performance of annual inspection and maintenance activities on the Cask Maintenance Log (Attachment C). This number shall be entered on each Attachment. A sequential numbering system will be used.

9.1.6 Perform a detailed gasket inspection of the primary lid gasket and sealing surface to ensure the following.

9.1.6.1 Gasket meets resiliency criteria as specified by manufacturers durometer testing.

9.1.6.2 Gasket has a minimum of 3 year (36 months) shelf life remaining.

9.1.6.3 Gasket is securely glued in-place.

9.1.6.4 Gasket is free of cuts and gouges and has no severe nicks, chips, indentations, permanent deformations or any other defect apparent, which would affect sealing integrity.

9.1.6.5 Gasket is free of debris, dirt, grease and other matter.

9.1.6.6 Sealing surface (i.e., surface area which seats with gasket to form seal) is free of chips, gouges or scratches, which potentially could prevent proper sealing and has no loose paint.

9.1.6.7 Cask passed the soap bubble leak test in accordance with Reference 2.10, or equivalent.

9.1.7 Perform a detailed gasket inspection of the secondary lid gasket and sealing surface to ensure the following.

9.1.7.1 Gasket meets resiliency criteria as specified by manufacturers durometer testing.

9.1.7.2 Gasket has a minimum of 1 year (12 months) shelf life remaining.

9.1.7.3 Gasket is securely glued in-place.

9.1.7.4 Gasket is free of cuts and gouges and has no severe nicks, chips, indentations, permanent deformations or any other defect apparent, which would affect sealing integrity.

9.1.7.5 Gasket is free of debris, dirt, grease and other matter.

9.1.7.6 Sealing surface (i.e., surface area which seats with gasket to form seal) is free of chips, gouges or scratches, which potentially could prevent proper sealing and has no loose paint.

9.1.7.7 Cask passed the soap bubble leak test in accordance with Reference 2.10, or equivalent.

9.1.7.8 If required, repair or replace cask gaskets in accordance with applicable section(s) of this procedure. Conduct a leak test after repair / replacement.

9.1.8 Welds shall be inspected in accordance with Reference 2.12. Weld defects, cask/lug plastic deformation, or other nonconformances shall be reported in accordance with Reference 2.9. Whenever the cask requires total repaint and is sandblasted, all welds shall be visually inspected in accordance with Reference 2.12. Magnetic particle testing (MT) may be performed on suspect welds.

9.1.8.1 Magnetic Particle Testing (MT) is required if the cask has been involved in an accident or has been lifted improperly or been in an overloaded condition. In those cases, MT shall include the following and shall be performed by individuals qualified in accordance with Reference 2.5.

9.1.8.1.1 Drop or accident: All accessible cask body lug welds and primary lid ratchet binder lug welds. MT may be performed with the painted finish in place, if required.

9.1.8.1.2 Improper or overloaded lift: All welds on the cask lid(s) in use at the time of the improper or overloaded lift.

9.1.9 All fasteners (nuts, bolts, stud, and associated washers) shall be inspected. Any fastener exhibiting any of the following conditions shall be replaced.

9.1.9.1 Deformed or stripped threads

9.1.9.2 Cracked or deformed hex on bolt heads or nuts

9.1.9.3 Elongated or scored grip length area on bolts or studs

9.1.9.4 Severe/excessive rusting or corrosion pitting

9.1.9.5 Difficulty in operation (May require lubrication only. See below.)

NOTE: All fasteners must be inspected for the presence of lubricant and thread cleanliness. Any fastener with insufficient or without lubricant shall be re-lubricated using approved lubricants.

NOTE: Replacement frequency should be established by the user utilizing maintenance history and inspection results

9.1.10 The ratchet binders are designed for long use with minimal maintenance. Inspect for the following and correct, as necessary.

9.1.10.1 Cracks in the jaws or joining bolt.

9.1.10.2 Deformation of the jaws or joining bolt.

9.1.10.3 Severe/excessive rust or corrosion pitting in the threads of the jaw or joining bolt.

9.1.10.4 Difficulty in operation (May require lubrication only. See below.).

NOTE: Lubrication is required very frequently and can be achieved by 1 to 3 cycles of a standard automotive grease gun loaded with standard chassis lubricant. A good indication of the need to lubricate the ratchet binder will be dry thread on the joining bolt or hard operation.

9.1.11 The only other area requiring lubrication is the ratchet handle mechanism. A small amount of standard automotive chassis lubricant should be placed on the teeth whenever needed.

9.1.12 Any ratchet binder, which received impact in an accident or suspected overloading due to an accident or lifting, must be completely disassembled and inspected or replaced. Cause for rejection during a damage inspection shall include all bulleted items listed above.

9.1.13 If necessary, perform ratchet binder repair or replacement in accordance with applicable section(s) of this procedure.

9.1.14 If cask is provided with vent and/or drain plugs and they are not seal welded. Remove the vent plug or drain plug. Inspect for rust and remove old sealant. Correct any deficiencies. Ensure proper thread tracking occurs; sufficient sealant is applied, and torque the plug.

9.1.15 Inspect lid guide marks for paint flaking, fading, and functionality. Repaint guide marks as necessary in accordance with Section 9.7.

9.1.16 If lid guide pins are provided, inspect them for proper engagement and excessive wear. Repair or replace secondary lid guide pins as necessary.

9.1.17 Inspect cask to transport trailer tie-down cables for broken or frayed wire. Inspect tie-down ratchet binders for security and, if needed, lubricate. Inspect transport trailer cask tie-down lugs for obvious cracks. Inspect transport trailer: body for cracks, tire wear, mechanical component condition, leaking fluids, damaged or missing placards or plated, damage to body structure or like findings.

9.1.18 Inspect Cask trailer welds can be classified into two groups: critical and non-critical. Those related to the structural integrity of the trailer are regarded as critical welds with all other welds regarded as non-critical.

9.1.18.1 Non-critical welds include but are not limited to the following.

9.1.18.2 Welds to signposts/placards

9.1.18.3 Decking to decking or decking to trailer frame weld

9.1.18.4 Fender to decking or to trailer frame welds

9.1.18.5 Tool box to decking welds

9.1.18.6 Ladder support welds

9.1.18.7 Other obvious non-structural welds

NOTE: Non-critical welds, for the purpose of inspection, can have any number of anomalies such as cracks, porosity, undercut, inclusions, undersize welds, etc. without being cause for rejection.

9.1.18.8 Critical welds are those related to the structural integrity of the trailer.

9.1.19 Whenever inspecting or servicing cask tie-downs, if option is available to install shackle pins vertically, always install pin from top down. Shackle pin should be secured by use of tie-rap, tie-wire or other positive securing device.

9.1.20 The General Manager or designee shall be notified immediately if a discrepancy is found during the course of inspecting the transport trailer. Discrepancies will be documented on the Cask Trailer Maintenance Notification Form. A copy of this form shall be forwarded to the General Manager and to the Transport Company. All conditions that may have a potential impact on DOT requirements shall be corrected and/or resolved prior to next shipment.

9.1.21 The General Manager or designee is responsible for ensuring a copy of Attachment D has been provided to the Trucking Company, obtaining acknowledgment of receipt and following up with the Transport Company to ensure that any unacceptable condition found during inspection has been addressed and corrected and Attachment D is returned, acknowledging the required maintenance has been completed.

9.1.22 The repair or replacement of any cask component which provides a seal for (e.g., gasket, vent/drain plug sealant) or is part of (e.g., primary lid ratchet binders, secondary lid nuts) the sealing of the payload cavity shall require, as a final step once all such repairs and replacements are completed, a leak test in accordance with Reference 10, or equivalent.

9.1.23 All exterior surfaces shall be thoroughly cleaned and free from rust, scale, lubricants, oxidized paint and other foreign material in accordance with Reference 2.14.

9.2 Gasket Repair

Gaskets that are intact but are not properly adhering to the applicable surface shall be reattached as follows:

9.2.1 Gently pull gasket away from its normally secured location until it cannot be removed further without damaging the gasket.

9.2.2 Using a solvent approved for use at the location being used (i.e., facility, site, nuclear plant) remove residual adhesive from the lid surface, as applicable. Examples of solvents that may possibly be used are: EPA 2000, Citoclean, SELIG, Acetone, etc.

9.2.3 Reapply approved gasket adhesive compatible with gasket neoprene rubber or silicon material to the gasket surface and/or primary/secondary lid surface (as applicable), and re-join (re-glue) gasket in accordance with the adhesive manufacturer's instructions. Press gasket into adhesive with hand pressure and allow time recommended on the adhesive directions for the adhesive to set up. Make butt joints using adhesive between the two gasket surfaces. Compress to fit. The gasket may be adhered directly to an unpainted surface; however, all exposed surfaces which are not painted or clad with stainless steel shall be painted per Section 9.7.

9.3 Gasket Replacement and Leak Test

9.3.1 Replace cask lid gaskets (primary and secondary) if the remaining gasket shelf life is less than 1 year (12 months) or if during the course of inspection and repair activities, gasket damage is noted or condition is such that the gasket will fail the leak test.

9.3.2 Gaskets that do not meet the Detailed Gasket Inspection criteria (e.g., cannot be sealed, fail resiliency testing) are obviously damaged and must be replaced. Regardless of apparent condition or cask usage, all gaskets (primary lid and secondary lid) shall be replaced if the remaining gasket shelf life is less than 1 year (12 months).

NOTE: Under special circumstances, TTS Engineering/Licensing may grant extension of shelf life and or use as long as all other requirements are met. Extension must be documented and resolved in accordance with Reference 2.9.

9.3.3 Removal of the gasket, preparation of the lid surfaces, adhesive use and gasket installation shall be performed per Section 9.2. For lids that have studs passing through the gasket, prior to gluing, place gasket on surface and mark bolt holes. Punch appropriately sized holes in gasket at marked spots.

9.3.4 Discard old gasket material using proper radiological procedures.

9.3.5 Replacement gaskets shall be new and conform to the requirements of approved drawings and specifications applicable to the specific cask. Procurement shall be in accordance with Reference 2.6.

9.3.6 Any painted surface in contact with the gasket must be maintained in good condition. Inspect all seating surfaces for foreign material or nicks which would prevent proper seating and sealing. Any loose, chipped, or scratched painted surface which spans 50% of

the gasket seating surface cross section must be repaired in accordance with Section 9.7 prior to further cask use.

9.3.7 To verify the integrity of each primary and/or secondary lid gasket, perform the leak test in accordance with Reference 2.10, or equivalent.

9.3.8 Document the cask leak tests on the Reference 10 leak test procedure form, if provided, and attach to Enclosure 1. Document the Leak Test Procedure Number, revision used and the results (i.e., accept, reject) on Attachment A.

9.3.9 Affix a tag to the cask lid or the body of the cask utilizing a tamper proof method, which indicates data relevant to the annual gasket replacement and the implementation of applicable leak tests. As a minimum, the tag shall incorporate the following information (see Attachment B):

9.3.9.1 Package number - cask model and serial number.

9.3.9.2 Date(s) of most recent annual gasket replacement.

9.3.9.3 Dates(s) of most recent annual leak test performance.

9.4 Replacement of Cask Components

Replacement components shall conform to the requirements of approved drawings and specifications applicable to the specific cask. Procurement of replacement components shall be in accordance with Reference 2.6.

9.5 Cask Body Repairs

9.5.1 Perform repair activities involving welding of cask components in accordance with applicable references. For stainless steel liner repair refer to Section 9.9.

9.5.2 All structural and/or welding repairs of US DOT Specification 7A, Type A casks shall be performed by qualified personnel.

9.5.3 Perform all painted surface repairs in accordance with section "Painted Surface Repair."

9.6 Prior to First Use

9.6.1 Acceptance Tests

Prior to the first use of the cask, the tests and evaluations called out on the cask's General Arrangement Drawing will be performed. Seal integrity will be demonstrated by Soap Bubble Leak Test in accordance with Reference 2.10.

9.6.2 The cask shall be mounted to the transportation trailer as follows:

9.6.2.1 If the transportation trailer is the permanent unit, the cask shall be secured in accordance with Reference 2.1.

9.6.2.2 If the transportation trailer is for initial delivery only, the cask shall be secured, utilizing standard chain and chain binders normally utilized for heavy loads. The chains shall be secured to the cask hold down lugs and attached to the

normal tie down location on the trailer provided by the transportation company.

9.7 Painted Surface Repair

9.7.1 Painted surfaces may be steam or pressurized hot water cleaned using standard commercial equipment, chemical solutions [approved for use at the location being used (i.e., facility, site, nuclear plant, etc.) and procedures. Appropriate ALARA precautions and waste collections are to be used if contaminated surfaces are involved.

9.7.2 Chipped or scratched surfaces shall be repainted as follows:

9.7.2.1 Remove any rust or loose coatings and sand (smooth) edges so they fair into sound coating.

NOTE: Paint chips and scratches are expected from normal use, wear and tear, and operation.

9.7.2.2 Prime bare surfaces with a good, commercial quality, red oxide primer.

NOTE: If using a self-priming epoxy a primer coat is not necessary.

9.7.2.3 Re-coat with Mobil Chem 89W9 or Tenemec 66-11, or equivalent.

NOTE: These coating numbers designate a white color and paint brands, which are the standard TTS color and paint system. If a user has ordered another color or paint system, the same shall be used for the re-coat as appropriate.

9.7.2.4 Dulled or oxidized finishes may be restored via the use of normal automotive finish polishes and waxes if desired.

9.7.2.5 Guide stripes shall be repainted when they are excessively chipped, peeled off or faded to the point of not being legible. Standard commercial bright orange machinery enamel is used to paint these stripes. Only local sanding and cleaning is required prior to repainting of the guide strip.

NOTE: Paint chips and scratches are to be expected from normal use, wear and tear and operation.

9.8 Ratchet Binder Repair or Replacement

9.8.1 For ratchet binder binding perform the following:

9.8.1.1 Extend ratchet binder far enough to remove spring pin and thread-less bolt.

9.8.1.2 Lean ratchet binder outward away from cask and extend out to full length. Be careful not to spin lug ends totally out of binder.

9.8.1.3 Clean old lubricant and contaminates from threads using a steel brush.

9.8.1.4 Install approved lubricant on threads and rotate binder ends all the way into the binder.

9.8.1.5 Extend binder ends back to the length necessary to reinstall the thread-less bolt and spring pin.

9.8.1.6 Re-tighten primary lid using ratchet binder.

9.8.1.7 The ratchet binder should operate smoothly. If it does not, proceed to Step 9.8.2

9.8.2 If the above steps did not repair ratchet binder, then perform the following:

9.8.2.1 Loosen binder enough to remove the spring pin and thread-less bolt.

9.8.2.2 Remove the cotter pin, nut, and bolt on the lower end of the binder.

9.8.2.3 Remove the ratchet binder for additional maintenance.

9.8.2.4 Install new or repaired ratchet binder on cask by installing bolt through lower end of binder.

9.8.2.5 Reinstall nut on bolt using a new cotter pin.

9.8.2.6 Reconnect upper end of ratchet and tighten

9.9 Stainless Steel Liner Repair

9.9.1 Define all cracks using Liquid Penetrant Testing (PT) in accordance with Article 1 and 6 of Reference 2.15. PT shall be performed by individuals qualified in accordance with Reference 2.5. PT acceptance criteria shall be qualified in accordance with Reference 2.13. Allow the indications so located to remain while all cracks are conformed and fully marked.

9.9.2 Drill stop all cracks using a 1/8-inch drill bit.

9.9.3 Verify by liquid penetrate inspection that all cracks have been drill stopped.

9.9.4 For repairs of cracks in weld seams joining a stainless steel to a stainless steel surface:

9.9.4.1 Grind out all cracks between the drill stops to provide a groove into the steel for a depth of 1/8-inch.

9.9.4.2 Welding the stainless steel to stainless steel surfaces shall be performed by qualified personnel.

9.9.5 For repair of cracks in weld seams joining a stainless steel to a carbon steel surface:

9.9.5.1 Grind out the crack between the drill stops to provide a groove into the steel for a depth of 1/8-inch.

9.9.5.2 Butter weld stainless steel weld material into the 1/8-inch deep groove until it is filled to the level or the parent carbon steel surface.

9.9.5.3 Join the stainless steel liner to the stainless steel weld material deposited in Step 9.9.5.2

9.9.6 After the welding is complete, a visual weld inspection shall be performed in accordance with Reference 2.13 by personnel that are qualified in accordance with TTS Quality Assurance Program.

9.9.7 Welds must present a completely smooth surface to provide a surface that is easily decontaminated.

9.9.7.1 Welds that are completely smooth and meet the Reference 2.13 weld inspection requirements as deposited need no additional grinding or dressing.

9.9.7.2 Welds that are rough or exhibit an irregular profile or spatter must be dressed to present a completely smooth surface.

9.9.8 After all weld repairs are complete, a Liquid Penetrant Test shall be performed to assure that all cracks have been located and repaired.

9.10. Long Term Storage

9.10.1. The casks can be stored for extended periods (1 to 3 years) with minimal special preservation. The following precautions should be taken:

9.10.1.1. Ratchet binders and all fasteners should be fully coated with good quality automotive chassis grease.

9.10.1.2. To maintain original finish gloss, the entire cask painted surface may be coated with 2 to 3 layers of any good quality automotive finish wax. The last coat should be allowed to dry without being polished.

9.10.1.3. If required, the cask finish can be further protected from harsh aerosols or chemicals by covering with tarps or storing under other suitable cover.

9.10.2 The cask can be prepared for use by standard steam cleaning methods after storage. Ratchet binder threads should be re-greased with good grade automotive chassis lubricant after steam cleaning. A complete annual inspection, as described in this procedure, shall be performed on the cask prior to its use.

End of Procedure

CASK / TRAILER INSPECTION REPORT			
Inspection Number:		Start Date:	
Cask Model Number:		Completed Date:	
Cask Serial Number:		Trailer ID Number:	
Inspecting Personnel (Print):			
CAUTION: Do not begin inspection / maintenance until the incoming radiological survey is complete and conditions determined.			
Indicate condition of items using the following. **Initials =Acceptable NR = Needs Repair NC = Non-compliance NA = Not Applicable X = See Comments**			

1.0	**GASKET REPLACEMENT AND LEAK TEST**			
	Item	**Date**	**Criteria**	**Finding**
1.1	Primary Lid Gasket Changed.			
1.2	Date Last Performed:			
1.3	Primary Lid Gasket Shelf Expiration Date:		Minimum: 36 Months Remaining	
1.4	Copy of QA tag attached to this document.			
1.5	Secondary Lid Gasket Changed.		Minimum: Annually	
1.6	Date Last Performed:			
1.7	Secondary Lid Gasket Shelf Expiration Date:		Minimum: 36 Months Remaining	
1.8	Copy of QA tag attached to this document.			
1.9	Cask Leak Test Performed.			
1.10	Date Last Performed:			
1.11	Leak Test Procedure Number & Revision			
1.12	Leak Test Results			
1.13	Leak Test Performed By: (Signature & Date)			

1.14	**LEAK TEST INSTRUMENTATION & TESTING EQUIPMENT**				
	Description	Serial Number	Range	Calibration Due Date	

2.0	CASK / TRANSPORT TRAILER IDENTIFICATION AND APPEARANCE		
	Item	**Criteria**	**Finding**
2.1	Cask Body ID Plates & Labels	Must be legible	
2.2	Main Lid ID Plates & Labels	Must be legible	
2.3	Secondary Lid ID Plates & Labels	Must be legible	
2.4	Cask Flip Charts	Must operate properly and must be legible	
2.5	Cask Type (US DOT, Specification 7A, Type A) Stencil	At least ½" high and must be legible	
2.6	Cask Information	Must be legible	
2.7	Cask Gross Weight	Must be legible	
2.8	Trailer Vehicle ID Plate	Must be legible	
2.9	Trailer Registration	Matches VIN & Trailer Number and is Current	
2.10	Trailer Placards	Must be 3" from any other signs, marking, etc.	
2.11	Trailer Number	On both side of gooseneck and rear	
2.12	TN-010 State Permit Number	Both sides of trailer and rear of trailer	
2.13	Internals	Clean, free of moisture, obstructions, debris.	
2.14	Paint	Must be free of rust. Guide/alignment strip markings and cask stenciling/labeling must be clear and not severely chipped or faded. Touch up as necessary.	
2.15	General Cleanliness	Wash unit, if needed.	

3.0	CASK CLOSURE SYSTEM(S)		
	Item	**Criteria**	**Finding**
3.1	Main Lid Gasket	Gaskets are free of cuts, gouges, and adhered properly. Small blemishes are acceptable if they do not affect sealing integrity of the cask. Gasket meets resiliency criteria specified by manufacturers durometer testing. Gasket has a minimum of 1 year (12 months) shelf life remaining.	
3.2	Secondary Lid Gasket		
3.3	Hardware	Clean & lubricate, if necessary	
3.4	Torque	Ensure proper torque of all lid hardware	
3.5	Security Seal Wire	Install after gasket inspection	
3.6	Lift Lug & Cover	Verify installed & secure	
3.7	Visual exam of welds	Look for possible weld cracks	
3.8	Alignment Marks	Visible on both lid & cask body	
3.9	Alignment Pins	Not bent or deformed (if so equipped)	
3.10	Data Tag	Affixed securely to cask lid or body	

3.0	CASK CLOSURE SYSTEM(S) continued		
	Item	**Criteria**	**Finding**
	RATCHET BINDERS		

3.11	Ball Lock Pins	Verify proper operation	
3.12	Handle and Body	No excessive rust or deformation	
3.13	Gear, Flip Block & Bolt	Operate properly in both directions	
3.14	Forked Ends	Not deformed	
3.15	Threads	No deformed threads, no cross threading. Must spin freely. Clean & lubricant, if necessary.	
3.16	Thrust Collar(s)	Tight against ratchet binder handle.	
3.17	Closure Pin	No excessive rust or deformation	
3.18	Handle Strap & Brackets	Not torn, brittle or cracked.	
3.19	Lugs (Lid and Cask Body)	No visible lug deformation or weld cracks	
3.20	Lanyards and/or Braces	All secure, good appearance.	
	NUTS, STUDS, WASHERS		
3.21	Body	No excessive rust or deformation	
3.22	Threads	No deformed threads, no cross threading. Must spin freely. Clean & lubricant, if necessary.	
	VENT PLUG / DRAIN PLUG		
3.23	Body	No excessive rust or deformation	
3.24	Threads	No deformed threads, no cross threading. Must spin freely. Clean & lubricant, if necessary.	
3.25	Security Seal Wire	Verify all security seal(s) are installed and intact.	
4.0	**CASK TIE-DOWN SYSTEM (Cask and Trailer)**		
	Item	**Criteria**	**Finding**
4.1	**FRAME**	No weld or material cracking is acceptable	
4.2	Main Beams	Check for cracks and holes	
4.3	Cross Members	Check for cracks and holes	
4.4	Decking	Check for cracks and holes	
4.5	**LANDING GEAR**	No weld or material cracking is acceptable	
4.6	Operation	Should operate smoothly in both gears	
4.7	Tie Bar	Check for broken welds	
4.8	Pads	Present, not deformed	
4.9	Braces / Supports	Not excessively bent / deformed	

NOTE:
Any discrepancies on transport trailer will be documented on Attachment 4 and forwarded to the Transportation Company for disposition. A copy will be forwarded to the Transportation Coordinator.

5.0	**TRANSPORT TRAILER TOOLBOX INVENTORY (if trailer is so equipped)**		
	Item	**Criteria**	**Finding**
5.1	Torque Tool: One (1)	Present in tool box	
5.2	Trailer Placards: Two (2)	Present in tool box	
5.3	Lights and Reflectors	Two (2) of each type as required for trailer	
5.4	Cask Cover	Present in tool box, if required	

6.0	COMMENTS AND CORRECTIVE ACTION		
Checklist Number	**Item**	**Comments / Corrective Action**	**Finding**

7.0	CASK INSPECTION: APPROVAL AND REVIEW				
Inspection Number:		Cask Number:		Trailer Number:	
Cask and Cask Trailer have been inspected and are acceptable for operation.					
Inspected By (Print):			Title		
Inspected By (Signature):			Date:		
QA Verified By (Print):			Title:		
QA Verified (Signature):			Date:		
NOTE: QA verification required ONLY if repairs are made to CASK.					
Reviewed By (Print)			Title:		
Reviewed By (Signature)			Date:		

Example Only

Cask Model Number:	
Cask Serial Number:	
Date Primary Lid Gasket Changed:	
Date Secondary Lid Gasket Changed:	
Date Annual Leak Test Performed:	

Each gasket change / leak test tag will be completed as follows:

1. Packaging: enter cask model and serial number (e.g. 14-212-001)
2. Primary lid gasket changed on: enter date (e.g., month/day/year)
3. Secondary lid gasket changed on: enter date (e.g., month/day/year)
4. Leak test performed on: enter date (e.g., month/day/year)

NOTE: If use of gaskets **is**/are extended beyond one (1) year, tag shall identify original annual installation dates and latest annual leak test date.

Cask Maintenance Log

Item	Date	Inspection Number	Cask Model No. Cask Serial No.	Task Performed	Personnel	Summary

Cask Trailer Maintenance Notification Form

Listed below are items identified by TTS or: _____ that need to be repaired.

Trailer ID Number: _____ Inspection Number: _____

Repair / Maintenance Tasks:

TTS Representative: _____ / _____
Signature Date

TTS, Inc. Fax Number: _____

Transport Company Representative: _____ / _____
Signature Date

Summary of Maintenance Tasks: