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November 10, 2010

Mr. Jonathan P. Walsh, Physical Scientist  
Office of Radiation and Indoor Air  
U.S. Environmental Protection Agency  
1310 L Street NW  
Room 513F  
Washington, DC 20005

Subject: Response to the Environmental Protection Agency Regarding the Type A Testing of the Shielded Containers

Reference: E-mail from Mr. Jonathan Walsh, Environmental Protection Agency (EPA), to Mr. Steve Kouba, Washington Regulatory and Environmental Services, dated September 24, 2010, Subject: Shielded Container Update

Dear Mr. Walsh:

The purpose of this letter is to transmit the responses regarding the Type A testing of the Shielded Container. The response consists of the following enclosures:

- Response to the EPA questions
- Shielded Container Assembly Handling and Operation Manual
- Shielded Container Assembly drawings

If you have any questions, please call me at (575) 234-7457.

Sincerely,

Russell L. Patterson  
Compliance Certification Manager

Enclosure(s)

cc: w/enclosures  
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## **SHIELDED CONTAINER COMPLETENESS COMMENTS**

**July 13, 2010**

### **EPA Comment 1**

DOE described studies conducted to demonstrate that shielded containers comply with Class A requirements in the June 2008 Type A Evaluation Report (TAER) (WTS 2008). The TAER identifies the analyses, tests, and evaluations performed on the shielded container to demonstrate compliance of the packaging design with the applicable requirements of 49 CFR 178.350.

According to Section 3.1 of the TAER:

*Determination of the response of a point radiation source subject to movement within the package and any associated effects on radiation levels are not provided in this document. Drop test damage information is provided in Section 4.2.2 for use by the shipper in determining whether a significant change in radiation level would result for a specific payload.*

This raises the question as to how the shipper would determine whether a significant change in radiation could result for a specific payload. We presume that, if no significant damage occurs during drop testing and no tracers or other materials are released, significant changes in radiation levels would not result. If this is the intent, why is it not so stated? What is the burden imposed on the shipper? The TAER would benefit if this ambiguous statement were clarified.

This excerpt also raises the question as to where movement of point sources of radiation is addressed and what actions must be taken to prevent such movement.

Similarly in Section 3.2, the authors note that:

*Damage information is provided to assist the shipper in evaluating the possible dose rate changes at the surface of the package for the intended payloads to be shipped.*

The same concerns as outlined above apply here.

### **Reference**

WTS 2008. *Shielded Container Type A Evaluation Report*, ECO No.: 11834, Rev. 0, Washington TRU Solutions LLC, Carlsbad, New Mexico, June 2008.

### **DOE Response**

Changes in radiation levels at the surface of the container are dependent on two factors during transportation. One is damage to the packaging, which is addressed in the SCA (Shielded Container Assembly) TAER with testing performed before and after the 4 foot drop tests, and discussed in Section 4.2.2.4, Shielding. There was no significant reduction of shielding

effectiveness as a result of the drop tests. The other factor is the location of a point gamma radiation source within the SCA. It is the responsibility of the shipper to ensure that there is adequate bracing within the 30-gallon internal payload container such that the point radiation source doesn't move during transportation to cause a significant increase (20%) in the external radiation levels. This is addressed in Sections 2.4, 5.1 and Appendix A, Section 4.6.3. Specific loading instructions are not addressed in the SCA TAER, as that is not the intent of the document. The SCA TAER references the SCA Handling and Operation Manual, WP 08-PT.16 which does provide specific loading instructions, in Sections 2.4, on page 4-11 and on section 5.1. WP 08-PT.16 is also referenced on WTS drawing, 165-F-026. These references are provided to inform the shipper that the SCA must be loaded and closed in accordance with those specific instructions in order for a loaded SCA to be certified as a Type A Packaging. While changes to the SCA TAER are not deemed necessary, the Handling and Operation Manual will be revised to further instruct the shipper to securely fasten and position contents within the 30-gallon internal payload container in a manner to prevent a significant increase in the level of radiation at the external surface of the SCA as a result of movement during transport.

## References

SCA Handling and Operation Manual, WP 08-PT.16

WTS drawing, 165-F-026

## EPA Comment 2

With regard to vibration testing, DOE asserts that because of the robust nature of the shielded container, it would meet the vibration testing requirement of 49 CFR 178.608. This requirement specifies that the waste package be tested on a vibrating table for one hour at a frequency that causes the shielded container to be raised above the table by about 0.063 in. DOE did not subject a shielded container to vibration testing and, instead, based its compliance opinion on the following reasoning (WTS 2008, Section 4.2.5):

*The stiffness of the 3 in. thick lid and base, and the greater than 1 in. thick steel/lead/steel body sidewall is such that resonant frequencies would not be encountered during normal condition transport. The 15 closure bolts, when preloaded to the torque requirements referenced herein, would not loosen or otherwise be significantly affected by vibration conditions. Other miscellaneous components are either welded, press-fit, or otherwise secured in place and not significantly affected by vibration conditions and/or not critical components serving a containment or shielding function in the package.*

This quotation contains several unsupported statements including:

- resonant frequencies would not be generated
- properly torqued bolts would not be loosened by vibration
- press fit items would not be significantly affected by vibration

DOE needs to provide the technical basis for these suppositions.

### **DOE Response**

- 1) Generally a resonant frequency of 500Hz or more is considered inconsequential to normal transport conditions. A simplified calculation as well as a finite element analysis (FEA) model both show that the lid has a resonant frequency of approximately 1300Hz which is therefore out of this range.
- 2) A calculation of the worst case clamping load of the 15 closure bolts shows a force of 88,000 lbs. This corresponds to 262 Gs of acceleration required to lift the lid.
- 3) The only two press fit items are protective plugs used to keep water from collecting in two areas, the filter port and the threaded lift interface holes. During transport the SCA is required to have a DOT Type A compliant filter vent installed, therefore the filter port plug is not used and is of no concern. The threaded lift interface holes are still plugged during transport, but only to prevent the collection of water or debris since they are not part of the containment boundary (reference WTS drawing, 165-F-026-W1, see section C-C). It should also be noted that for our intended use of the SCA, inside of a Type B package during transport, the container will not be exposed to the elements either.

### **Reference**

WTS drawing, 165-F-026

### **EPA Comment 3**

In lieu of the physical stacking test required under § 173.465(d), DOE performed an analytical calculation assuming that six containers were stacked on top of the target container, thereby increasing the axial load by 20% above that specified in § 173.465(d). This axial load of 13,560 lbs was assumed to be borne solely by the inner cylindrical shell of the shielded container. Using procedures documented in ASME Boiler and Pressure Vessel Code Case N-284-1, DOE calculated that the axial load would not cause buckling of the inner shell. However, NRC's current position on Code Case N-284-1 (NRC 2007) is that use of this case by licensees to evaluate canisters and transportation casks is permissible only if it has been reviewed and approved by NRC. Given NRC's concerns about the Case, DOE should demonstrate that the errata, misprints, recommendations, and errors identified in NRC 2007 do not unfavorably affect the TAER calculations.

### **Reference**

NRC (U.S. Nuclear Regulatory Commission) 2007. *ASME Code Cases Not Approved for Use*. Regulatory Guide 1.193, Rev. 2. October 2007.

## **DOE Response**

When analyzed by calculating the slenderness ratio ( $L_e/r$ ) of the geometry, the SCA has a ratio of 9.36, which is well below the limit for a geometry to be considered short and wide ( $L_e/r < 30$ ). Therefore this geometry would be bounded by a normal axial stress calculation, which shows a safety factor to yield when loaded to 13,560lbs of 19:1 against the outer shell, which has the smaller cross sectional area of the two shells. Therefore it is more than reasonable to assume that the design of the SCA is not affected by the regulatory stacking test by a large margin.

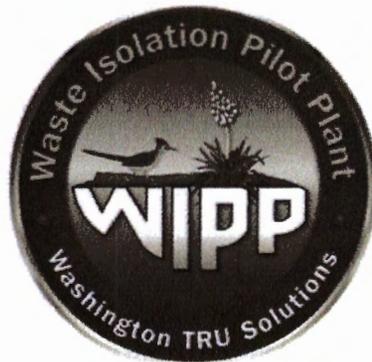
It should also be noted that NRC Regulatory Guide 1.193 is specific to 10CFR50, which governs NRC licensed "Nuclear Power Plants". Also, in the HalfPACT SAR, section 2.6.7, ASME Code Case N-284 is specifically used and cited for the buckling calculations of the containment boundary of the HalfPACT, which is a NRC approved and licensed Type B package.

WP 08-PT.16  
Revision 0

# Shielded Container Assembly Handling and Operation Manual

Cognizant Department Packaging Integration

Approved by: Todd Sellmer



**Shielded Container Assembly Handling and Operation Manual**  
**WP 08-PT.16, Rev. 0**

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### 1.0 SCOPE <sup>1,2,3</sup>

This document provides an outline of recommended procedures for the safe handling, effective operation, and proper maintenance of the Shielded Container Assembly (SCA). The SCA is not currently authorized for use at the Waste Isolation Pilot Plant (WIPP).

### 2.0 GENERAL DESCRIPTION

The SCA was developed to package and transport transuranic waste with gamma-emitting radiation as contact-handled (CH-TRU) waste to the WIPP utilizing the HalfPACT (Type B) shipping packaging, or to be used as a stand-alone U.S. Department of Transportation (DOT) 7A, TYPE A, packaging.

The SCA is approximately the size of a 55-gallon drum and consists of a twin-shelled carbon steel cylindrical structure and a lid. Nominally, 1-inch of lead shielding is contained between the 7-gauge inner shell and 11-gauge outer shell. The shells are welded to an upper flange and a 3-inch thick solid steel bottom. The 3-inch thick solid steel lid integrates a silicone rubber gasket, fifteen 1/2-inch alloy steel closure bolts (flange hex head cap screw), two alignment pins to facilitate remote assembly, and a lead-shielded filter port. The lead-shielded filter port is comprised of a 7/8-inch thick lead filter shield plug and a 7-gauge carbon steel filter shield cap. Three threaded holes in the lid are available to interface with a lifting fixture for lifting and handling the SCA. One threaded hole in the bottom (base) is available for lifting and handling the SCA during fabrication but is subsequently plugged with a 1/2-inch alloy steel socket set screw. The lid, body, inner shell, body flange, body base, closure bolts, gasket and user-supplied, gasketed vent filter form the confinement boundary. The SCA is designed to carry one 30-gallon vented payload drum, in which all contents shall be contained. In addition to the various payload forms allowed within the drum, the SCA may optionally contain a mesh bag to facilitate remote loading of the drum into the SCA. The SCA has an approximate empty weight of 1,726 lb., and is designed for a maximum gross shipping weight of 2,260 lb. The maximum content weight is 450 lb.

Material content forms authorized for transport in the SCA are:

- Material Form No. 1: Direct load: Solids, any particle size (e.g., fine powder or inorganic particulate)
- Material Form No. 2: Direct load: Solids, large particle size (e.g., sand, concrete, or debris)
- Material Form No. 3: Direct load: Solids, large objects (e.g., metal cans containing waste)

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### **3.0 REFERENCE DOCUMENTS**

The following documents apply to performing various handling and operational activities. These documents shall be referred to during the applicable operations of this procedure.

#### **3.1 WTS/WIPP Construction Drawings and Specifications**

- WTS Drawing 165-F-026: Shielded Container Assembly
- WTS Drawing 163-L-024: Shielded Container Lift Assembly
- WTS specification E-I-478, Specification for Fabrication of the Shielded Container Assembly
- WTS Specification E-I 474, Specification for RH-TRU Drum Handling Bag

#### **3.2 U.S. DOT 7A Compliance Documents**

- Title 49 of the *Code of Federal Regulations (CFR)*, Part 173, Section 173.474 (49 CFR §173.474), *Quality Control for Construction of Packaging*
- Title 49 of the *Code of Federal Regulations (CFR)*, Part 178, Section 178.3 (49 CFR §178.3), *Marking of Packagings*
- Title 49 of the *Code of Federal Regulations (CFR)*, Part 178, Section 178.350 (49 CFR §178.350), *Specification 7A; General Packaging, Type A*

#### **3.3 WIPP Shipment Compliance Documents**

- Certificate of Compliance 71-9279 for Model No. HalfPACT Shipping Package
- Safety Analysis Report for the HalfPACT Shipping Package
- 163-008, *Shielded Container SAR Drawing*
- DOE/WIPP 90-45, *Remote-Handled Transuranic Content Codes (RH-TRUCON)*
- Contact-Handled Transuranic Waste Authorized Methods for Payload Control (CH-TRAMPAC)
- DOE/WIPP 02-3122, *Contact-Handled Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant*
- PE-08-0001, *Q-List and Quality Category Assessments for Shielded Container Components*

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- Shielded Container Type A Evaluation Report, Washington TRU Solutions, ECO 11834
- DOE/WIPP 08-3384 Waste Isolation Pilot Plant Approved Filter Vents

### 4.0 SAFETY PRECAUTIONS

#### 4.1 General Safety Precautions

Only approved payloads, as defined in Section 2.0, are to be transported in the SCA when used as a DOT 7A, Type A packaging. During use and handling of the packaging, safety precautions in accordance with this manual as dictated by individual site procedures must be observed. Precautions include, but are not limited to the following:

- Structural modifications shall not be made to the SCA.
- If hardware replacement is required, replacement hardware shall meet the requirements of the assembly/manufacturing drawing.
- Procedures and recommendations in this document shall be followed when lifting and handling the SCA. The user shall assume the responsibility for safely performing all hoisting and rigging operations. Only qualified personnel shall be permitted to handle, rig, transport, or otherwise use the packaging. The user shall be responsible for determining qualifications of personnel.
- Observers shall be kept at a safe distance from the SCA while it is being lifted or moved.
- The SCA shall not be used to store, contain, or transport contents other than the contents for which the packaging was designed.
- Use only recommended solvents and adhesives, or as approved by the Type A Packaging Engineer. Ensure the products are site-approved. Follow product manufacturer's health and safety guidelines for the use of their product, as well as site-specific health and safety guidelines.
- SCAs should be stored indoors whenever possible. If outdoor storage is unavoidable, then the SCAs shall be covered and stored on blocks to prevent rusting and the ingress of water. In addition, the filter port shall be vented in a way which precludes the ingress of water and debris.

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## 4.2 Warnings

Detailed safety warnings are used to promote personnel safety and are denoted by the prefix **WARNING**. Such warning statements and procedures shall be followed. A **WARNING** means **FAILURE TO HEED SUCH PROCEDURES COULD RESULT IN SERIOUS INJURY TO PERSONNEL**.

## 4.3 Cautions

Cautions before a step are denoted by the prefix **CAUTION**. Cautions alert personnel that a failure to comply with the caution **COULD RESULT IN DAMAGE TO CONTENTS OR PACKAGING**.

## 5.0 PRELOADING TOOLS, SUPPLIES AND SPARE PARTS

The following items may be either manual tools or service powered devices. The user shall verify, or show evidence, that the items used meet the capability and stated certification requirements as applicable in accordance with site-specific procedures.

### 5.1 Required Tools

- 3/4-inch socket (for closure bolts)
- 6 or 12-point socket (appropriate size for filter installation)
- Ratchet drive wrench
- Calibrated torque wrench
- SCA Lift Assembly (WTS Drawing 163-L-024)
- RH-TRU Drum Handling Bags

### 5.2 Recommended Spare Parts (Available from Seller, referenced drawing 165-F-026)

- Closure bolts (1/2-13UNC hex head cap screw, Item 15)
- Lid seal (gasket, Item 7)
- Protective plugs (Items 14 & 16)
- Touch-up paint (aerosol enamel, gloss white)

### 5.3 Recommended Supplies (Commercially Available)

- Denatured alcohol
- General purpose adhesive remover containing a mixture of Naphtha and Xylene (commonly available at automotive parts stores)

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**5.4 Approved Filters**

The SCA shall be equipped with one user-supplied filter vent per DOE/WIPP 08-3384 in accordance with Section 2.5 of the Contact-Handled Transuranic Waste Authorized Methods for Payload Control (CH-TRAMPAC)<sup>5</sup>.

**6.0 HANDLING PREREQUISITES**

**6.1 Initial Inspection**

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**NOTE**

New SCAs shall be shipped from the fabricator assembled on a shipping pallet with six (6) of the closure bolts installed wrench-tight in the lid, one on either side of the three lift interface points on the lid. The balance of the closure bolts and the gasket are bagged separately and shipped inside the SCA.

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**NOTE**

Additional inspection guidance is provided in Subsection 9.1. Pre-use inspection of the SCA (See Subsection 6.3) may take place at any time and in any sequence prior to using the SCA, providing all applicable inspection criteria are met. Handling of empty SCAs shall be performed in accordance with Subsection 7.1.

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6.1.1 Ensure both lid and body serial numbers match and are traceable to the fabricator's Certificate of Conformance required by specification E-I-478. If the lid and body serial numbers do not match, or are not traceable to the fabricator's Certificate of Conformance, tag or label the unit as unusable and segregate away from conforming units. Refer to Section 10.0 for disposition.

6.1.2 Inspect the SCA for signs of damage, distortion or corrosion. If such conditions exist to the extent that confinement or shielding could be compromised, tag or label the unit as unusable and segregate away from conforming units. Refer to Section 10.0 for disposition.

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**6.2 Lid Removal**

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**NOTE**

The SCA is designed to be lifted only with the SCA Lift Assembly, including when removing the SCA from the shipping pallet. The user shall be responsible for ensuring all other rigging is properly rated for lifting a fully loaded SCA.

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**NOTE**

Removal of the SCA Lift Assembly from the SCA is the reverse of Steps 6.2.3 and 6.2.4, and may be performed as needed.

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- 6.2.1 With the SCA staged within an overhead crane envelope, remove all closure bolts from the lid, and store the closure bolts in a manner that will preclude damage or loss.
- 6.2.2 Remove the protective plugs from each of the three lifting point threaded holes on the SCA lid, and inspect the condition of the threads. If any threads have minor deformation or discontinuity (foreign material, burrs, cross thread, weld spatter, etc.), the user may correct the condition by using a 1/2-13 UNC-2B bottoming tap, or plug tap to a minimum depth of 3/4-inch.
- 6.2.3 Attach the SCA Lift Assembly to the lid by inserting each of the three lift studs into each of the threaded lift interface points on the SCA lid.
- 6.2.4 Rotate each lift stud handle in the clockwise direction until hand-tight.
- 6.2.5 Attach the crane hook, or suitable rigging to the SCA Lift Assembly.

**WARNING**

Pinch points are present between lid and body. In order to avoid injury, hands and fingers must be kept clear of these areas.

- 6.2.6 Raise the crane to lift the SCA lid straight up from the SCA body.
- 6.2.7 Stage the lid in a manner that will preclude damage to the lid.

**6.3 Pre-use Inspection**

- 6.3.1 Ensure all assembly components are present: Body assembly (1 each), lid assembly (1 each), gasket assembly (1 each), closure bolts (15 each), protective plugs for lifting points (3 each), and protective plug for vent port.

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- 6.3.2 Retrieve the gasket and the closure bolts from the interior of the SCA. The gasket is supplied as a continuous circular ring. Inspect the lid gasket. Replace it with a new gasket if the gasket is damaged or shows signs of deformation or deterioration.
- 6.3.3 Inspect the condition of the threads in each of the 15 closure bolt holes in the body flange. If any threads have minor deformation or discontinuity (foreign material, burrs, cross thread, weld spatter, etc.), the user may correct the condition by using a ½-13 UNC-2B bottoming tap, or plug tap to full depth.
- 6.3.4 Inspect the condition of the threads in each of the 3 lifting points on the SCA lid. If any threads have minor deformation or discontinuity (foreign material, burrs, cross thread, weld spatter, etc.), the user may correct the condition by using a ½-13 UNC-2B bottoming tap, or plug tap to a minimum depth of ¾-inch.
- 6.3.5 Inspect all interior and exterior surfaces of the SCA for signs of damage, distortion or corrosion. If such conditions exist to the extent that confinement or shielding could be compromised, tag or label the unit as unusable and segregate away from conforming units. Refer to Section 10.0 for disposition.

## **7.0 LIFTING, HANDLING AND PREPARATION**

### **7.1 Handling Empty SCAs**

- 7.1.1 An empty SCA shall remain on the shipping pallet during storage, and while being transported to the area of intended use. The SCA shall be lifted using the SCA Lift Assembly only. A minimum of six (6) closure bolts shall be installed in the lid, one bolt on either side of the three lift points. The closure bolts shall be wrench tight at a minimum.

### **7.2 Handling and Storage of Loaded SCAs**

- 7.2.1 Loaded SCAs shall be lifted only with the SCA Lift Assembly and shall be stored only in the vertical position in accordance with site-specific procedures.

### **7.3 Overhead Lifting**

The SCA is designed to be lifted only with the SCA Lift Assembly. The user shall be responsible for ensuring all other rigging is properly rated for lifting a fully loaded SCA.

- 7.3.1 With the SCA lid installed in accordance with Subsection 7.7, attach the SCA Lift Assembly to the lid by inserting each of the three lift studs into each of the threaded lift interface points on the SCA lid.
- 7.3.2 Rotate each lift stud handle in the clockwise direction until hand-tight.

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7.3.3 Attach the crane hook, or suitable rigging to the SCA Lift Assembly.

**WARNING**

Failure to perform a short test lift to verify all rigging and attachments are adequate before lifting the SCA to the intended lift height could result in serious personnel injury.

**WARNING**

Failure to keep all personnel a safe distance from the suspended load could result in serious personnel injury.

**CAUTION**

Abrupt stops or starts while lowering or raising the SCA MUST be avoided to prevent damage to the SCA or SCA Lift Assembly.

7.3.4 Lift the SCA a few inches to ensure all rigging connections and/or attachments are satisfactory.

7.3.5 After verifying that all rigging is secure, lift the SCA to the required height.

**7.4 Forklifts**

The SCA is not designed to interface with a forklift, and should only be lifted or transported by forklift when on a shipping pallet.

**7.5 Lid Gasket Installation**

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**NOTE**

Prior to gasket installation, it must be verified that the gasket shelf life has not expired.

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7.5.1 Invert the SCA lid, or place the lid on a suitably configured lid stand to gain access to the gasket recess.

7.5.2 Verify the gasket recess is clean, and free of foreign material. Refer to Subsection 9.2.3 (b) if the use of a solvent is necessary to obtain a clean surface.

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- 7.5.3 Place the gasket in the gasket recess in the SCA lid with the protective tape side of the gasket against the lid.
  - 7.5.4 Peel approximately four to six inches of the protective backing away from the gasket adhesive.
  - 7.5.5 Tear the protective backing in two, and fold back in either direction away from the exposed adhesive.
  - 7.5.6 Place the gasket (exposed adhesive side toward the lid) into the gasket recess in the lid. DO NOT stretch the gasket during installation.
  - 7.5.7 Continue to peel the protective backing away from the gasket adhesive while guiding the gasket into the gasket recess until gasket installation is complete.
  - 7.5.8 Once installed, ensure the gasket is in full contact with, and adhered to the lid with no detrimental buckling or creasing of the gasket that limits full adhesion.
- 7.6 Installation of Filter Vent**
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**NOTE**

The SCA requires a single filter vent. The filter vent shall meet the requirements of Subsection 5.4. Prior to filter installation, the protective plug in the vent port must be removed.

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**NOTE**

Prior to filter vent installation, the condition of the filter gasket shall be inspected to verify the absence of cracking, checking or other signs of degradation. Thread sealant is not required for filter installation.

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- 7.6.1 Install the filter into the threaded port of the lid. Hand-tighten until the filter is securely seated.
- 7.6.2 Torque the filter as recommended by the filter manufacturer using the appropriate socket and a calibrated torque wrench.

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## **7.7 Lid Installation**

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**NOTE**

The SCA is designed to be lifted only with the SCA Lift Assembly. The user shall be responsible for ensuring all other rigging is properly rated for lifting a fully loaded SCA. All contents must be inside the SCA and below the body flange prior to lid installation.

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**NOTE**

The SCA is designed with two alignment pins installed in the lid, with corresponding alignment marks on the lid and body. Corresponding alignment marks are identified on the lid and body such that the lid can be installed in one orientation only.

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- 7.7.1 With the SCA Lift Assembly and crane/rigging attached to the lid (Subsections 6.2.3 through 6.2.5), lift the SCA lid and begin lowering it on to the SCA body.
- 7.7.2 Position the lid so that the alignment marks on the lid line up with the alignment marks on the body.

**WARNING**

Pinch points are present between lid and body flange. In order to avoid injury, hands and fingers must be kept clear of these areas.

- 7.7.3 Lower the lid onto the SCA body while maintaining alignment of the marks, until lid is fully seated on the body.
- 7.7.4 Install each of the 15 closure bolts in the lid, and tighten until wrench-tight.
- 7.7.5 Using a calibrated torque wrench torque the closure bolts to 85 +/- 10 lb-ft.
- 7.7.6 Apply a tamper indicating seal between the lid and body flanges, when the use of a tamper indicator is required.

## **7.8 Securing SCA to a Conveyance Vehicle**

The SCA, when used as a stand-alone package, works well with most conveyance vehicles. The following steps describe how the package may be loaded and secured to a conveyance vehicle. The user shall be responsible for ensuring the methods and equipment are fit for the intended purpose and meet applicable DOT requirements for over-the-road transport.

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- 7.8.1 Lift the SCA into position onto the conveyance vehicle according to Subsection 7.3, Overhead Lifting.
- 7.8.2 Use blocking and bracing as necessary to prevent longitudinal or lateral movement of the SCA.
- 7.8.3 Secure the SCA to the vehicle with webbing or other suitable tiedowns. The shipper is responsible for ensuring the tiedown and securement of the SCA.
- 7.8.4 Verify that all rigging and equipment are secure before shipment.

### 8.0 PAYLOAD HANDLING/LOADING

The 30-gallon payload drum shall be loaded, closed and vented in accordance with site operating procedures. The following steps shall be followed in loading the SCA. The lid removal of the SCA is done as stated in Subsection 6.2, Lid Removal. Unless the SCA is intended to be used as a standalone DOT 7A Type A packaging, all payload configurations must comply with Section 2.9.10 of the Contact-Handled Transuranic Waste Authorized Methods for Payload Control (CH-TRAMPAC).

#### 8.1 Loading 30-Gallon Drums

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**NOTE**

The use of drum handling bags is a recommended option to facilitate loading operations. Drum handling bags are an approved payload item.

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- 8.1.1 Ensure Pre-Use Inspection (Subsection 6.3) has been performed prior to transferring the SCA into the material loading area. General inspection and maintenance guidance is provided in Section 9.0.
- 8.1.2 Protect the sealing surfaces of the SCA from damage during loading.
- 8.1.3 Stage a drum handling bag designed for 30-gallon drums in a suitable drum bag rack, or equivalent apparatus that will hold the bag open, support rigging and keep it clear of the bag opening.
- 8.1.4 Lower the loaded 30-gallon drum into the drum handling bag.
- 8.1.5 Lift the drum handling bag containing the drum to the appropriate working height.
- 8.1.6 Lower the drum handling bag and drum into the SCA.

**Shielded Container Assembly Handling and Operation Manual**  
**WP 08-PT.16, Rev. 0**

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8.1.7 Release the rigging from the drum handling bag straps once the payload is fully lowered into the SCA. All contents must be inside the SCA and below the body flange prior to lid installation.

8.1.8 Refer to Subsection 7.7 for lid installation.

## **9.0 MAINTENANCE, INSPECTION AND REPAIR**

Subsection 9.1, Maintenance and Inspection, shall be performed prior to loading the SCA.

### **9.1 Maintenance and Inspection**

During the inspection of the SCA, if defective parts or components are found, they shall be dispositioned in accordance with Section 10.0. Replacement components shall meet original specification requirements to maintain DOT-7A certification. Replacement components are available from the fabricator.

9.1.1 Inspect the lid gasket. Replace it with a new gasket if the gasket is damaged or shows signs of deformation or deterioration. Before loading the contents into the container, either verify that the gasket shelf-life has not expired or replace gasket. (See Subsection 9.2.)

9.1.2 Verify the body flange gasket sealing surface is clean, and free of foreign material. Clean if needed. Refer to Subsection 9.2.3(b) if the use of a solvent is necessary to obtain a clean surface.

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#### **NOTE**

Touch-up paint (aerosol enamel, gloss white) may be applied to external, non-sealing areas with minor surface corrosion that have been determined as NOT having an effect on the integrity of the packaging. The fabricator should be contacted for recommended procedures.

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9.1.3 Inspect all interior and exterior surfaces of the SCA for signs of damage, distortion or corrosion. If such conditions exist to the extent that confinement or shielding could be compromised, tag or label the unit as unusable and segregate away from conforming units. Refer to Section 10.0 for disposition.

9.1.4 Verify the serial number on both lid and body are in place and in good condition. If the condition is not legible, tag or label the unit as unusable and segregate away from conforming units. Refer to Section 10.0 for disposition.

**Shielded Container Assembly Handling and Operation Manual**  
**WP 08-PT.16, Rev. 0**

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## **9.2 Lid Gasket Replacement**

- 9.2.1 Remove the lid according to Subsection 6.2. Invert the SCA lid, or place the lid on a suitably configured lid stand to gain access to the gasket recess.
- 9.2.2 Remove the existing gasket, if present, by manually stripping the gasket from the lid flange.
- 9.2.3 If necessary, clean the gasket seating area as follows:
- a. Remove any residual gasket components or adhesive using a flexible spatula, putty knife, or similar tool, taking care not to scratch the sealing surface.
  - b. Apply a liberal amount of low intensity cleaning solvent, such as denatured alcohol or a general purpose adhesive remover containing a mixture of Naphtha and Xylene. Use of acetone or other strong solvents should be avoided as they will remove the paint/coating.

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**NOTE**

Prior to gasket installation, it must be verified that the gasket shelf life has not expired.

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- 9.2.4 Place the gasket in the gasket recess in the SCA lid with the protective tape side of the gasket against the lid.
- 9.2.5 Peel approximately four to six inches of the protective backing away from the gasket adhesive.
- 9.2.6 Tear the protective backing in two, and fold back in either direction away from the exposed adhesive.
- 9.2.7 Place the gasket (exposed adhesive side toward lid) into the gasket recess in the lid. DO NOT stretch the gasket during installation.
- 9.2.8 Continue to peel the protective backing away from the adhesive while guiding the gasket into the gasket recess until gasket installation is complete.
- 9.2.9 Once installed, ensure the gasket is in full contact with, and adhered to the lid with no detrimental buckling or creasing of the gasket that limits full adhesion.

**Shielded Container Assembly Handling and Operation Manual  
WP 08-PT.16, Rev. 0**

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**10.0 USER QUALITY ACCEPTANCE CRITERIA**

If the requirements/criteria of Subsections 6.3 and 9.1 are **NOT** met, the user shall perform the corrective action(s) below following the user's Quality Assurance procedures.

**10.1 Nonconformance Report**

A nonconformance report (NCR) is a document that identifies and records a nonconforming condition and the action taken for the disposition of the nonconformance. Disposition of nonconforming items includes, accept, reject, rework, use-as-is, or repair using approved instructions.

**10.2 Uncorrectable Conditions**

Conditions found during visual inspection of the SCA in Subsections 6.3 and 9.1 that are **NOT** readily correctable shall be documented on a Nonconformance Report (NCR) and dispositioned following user's NCR procedures.

Information Only

LIST OF MATERIAL						
TYPE/LEVEL	QTY	ITEM NO.	NAME/DESCRIPTION	NOTE NO.	DRAWING NUMBER OR PART ID. NUMBER	MATERIAL SPECIFICATION
ASM	1	1	SHIELDED CONTAINER ASSEMBLY		165-F-026-W1	
PRT	1	2	BASE		165-F-026-W5	CS SEE NOTE 2
PRT	1	3	OUTER SHELL		165-F-026-W5	CS SEE NOTE 4
PRT	1	4	INNER SHELL		165-F-026-W5	CS SEE NOTE 4
PRT	1	5	FLANGE		165-F-026-W5	CS SEE NOTE 2
PRT	1	6	LID		165-F-026-W2	CS SEE NOTE 2
PRT	1	7	SEAL	B	165-F-026-W3	SEE NOTE 3 SEE NOTE 3
PRT	1	8	LEAD SHIELD		165-F-026-W1	LEAD SEE NOTE 21
PRT	1	9	FILTER SHIELD PLUG		165-F-026-W2	LEAD SEE NOTE 21
PRT	1	10	FILTER SHIELD CAP		165-F-026-W2	CS SEE NOTE 4
PRT	3	11	PLUG		165-F-026-W3	CS SEE NOTE 4
PRT	2	12	SLOTTED SPRING PIN, (Ø3/8 X 1-1/4 LG.)	A	98298A948	CS ASME B18.8.2
PRT	1	13	SOCKET SET SCREW, Ø1/2-13UNC X 1 LG.	A	91303A712	BLK AS ASTM F912
PRT	1	14	PROTECTIVE PLUG, 3/4 PIPE PRESS-FIT	A	449184T	BLK AS
PRT	15	15	FLANGE HEX HD CAP SCREW, 1/2-13UNC X 1-1/2 LG.	A	449184T	BLK AS SAE J429, GR. 8
PRT	3	16	PROTECTIVE PLUG, 1/2 PIPE PRESS-FIT	A	449184Z	LOPE

NOMINAL ASSEMBLY WEIGHT: 1726 LB.

SUPPLIERS

- A. McMASTER CARR OR APPROVED EQUIVALENT
- B. IPOTEC INC. (ISS21) OR APPROVED EQUIVALENT

NOTES CONTINUES ON SHEET 2

- ALL WELDS SHALL CONFORM TO AND BE VISUALLY INSPECTED TO THE REQUIREMENTS OF AWS D1.1. SHELL MATERIALS MAY BE JOINED FROM ONE OR MORE PIECES UTILIZING COMPLETE JOINT PENETRATION (CJP) WELDS AND SHALL BE MADE AND VISUALLY INSPECTED PER THE ABOVE REQUIREMENTS.
- MATERIAL: ASTM A516, GR 70 (PLATE) NORMALIZED TO FINE GRAIN PRACTICE OR ASTM A286, GR 2 (FORGING) NORMALIZED TO FINE GRAIN PRACTICE.
- MATERIAL: SILICONE (SPONGE, ADHESIVE) ONE SIDE, CLOSED-CELL, MEDIUM-DENSITY.
- MATERIAL: ASTM A181, GR 45, SS (STRUCTURAL STEEL), OPTIONAL FOR TYPES 3 & 4; ASTM A333, GR 3; ASTM A387, GR B; ASTM A714, CL 2, GR 1.
- INSTALL USING A CLASS FR2 FORCE FIT PER ANSI B4.1. OR OPTIONALLY, LEAD WOOL MAY BE USED AS REQUIRED FOR TIGHT FIT.
- RECOMMENDED FOR LIFTING - UTILIZE A 1/2 HEAVY-DUTY SAFETY HOISTY RING, McMASTER CARR, P/N 305218) OR ENGINEER APPROVED EQUAL.
- BODY ASSEMBLY INVERTED FOR LEAD POUR CONFIGURATION.
- CONTAINER SHALL BE EQUIPPED WITH ONE USER-SUPPLIED FILTER VENT PER DOE/WIPP 98-338A IN ACCORDANCE WITH SECTION 2.3 OF THE CH-TRAMPAC.
- AFTER LEAD POUR, CUT RISERS OFF BASE, FLUSH.
- STENCIL AFTER PAINTING WITH 1/4 IN. MIN HIGH CONTRASTING CHARACTERS: (WHERE SHOWN)
  - ALIGNMENT PIN MARKS (AS SHOWN)
  - "CAUTION: WHEN LOADED, USE SPREADER TO ENSURE VERTICAL LIFT"
  - "ALIGNMENT PIN" (2X)
  - "LIFT INTERFAC" (3X)
  - ARROW MARKS (AS OPTIONAL)
  - 1,726 LB. NOMINAL TARE
  - 2,260 LB. MAXIMUM GROSS\* (AS SHOWN)
- UP TO 1/32 WELD REINFORCEMENT ALLOWED.
- BLAST AND PAINT/COAT ALL EXPOSED EXTERIOR SURFACES, EXCLUDING INTERFACING/THREADED HOLES AND ASSOCIATED COUNTERBORES.
- MACHINED FROM LEAD PLATE.
- FABRICATE IN ACCORDANCE WITH WASHINGTON TRU-SOLUTIONS SPECIFICATION E-1-478. USE IN ACCORDANCE WITH WP 98-PT-16.

REV	ISSUE DESCRIPTION	DATE	DATE	DATE	DATE	ECO	PRD
B	REVISED PER ADD. 02	JUN 04	06/12/00	07/12/00	07/12/00	11804	N/A
A	REVISED PER ADD. 01	JUN 04	06/12/00	07/12/00	07/12/00	11804	N/A

THIS DRAWING CREATED BY ENGINEERING CHANGE ORDER (ECO): 11804 PRR: N/A

SFTY: J.H. NEVAREZ 7/18/97

CHDR: B.DAT FOR RAJ 8/5/97

COE: ANTHONY DOMNER 8/9/97

CR: TODD SELLNER 8/13/97

DR: BRUCE G. FABLE 8/13/97

U.S. DEPARTMENT OF ENERGY

Washington TRU Solutions LLC

SHIELDED CONTAINER ASSEMBLY

SIZE: 1/4

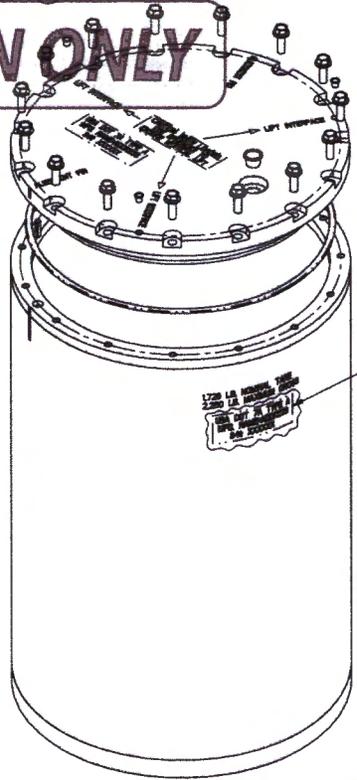
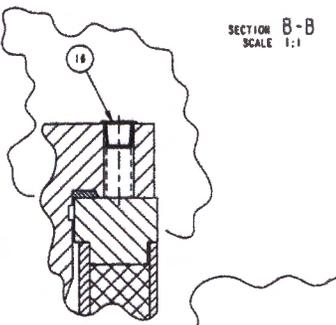
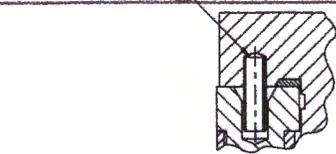
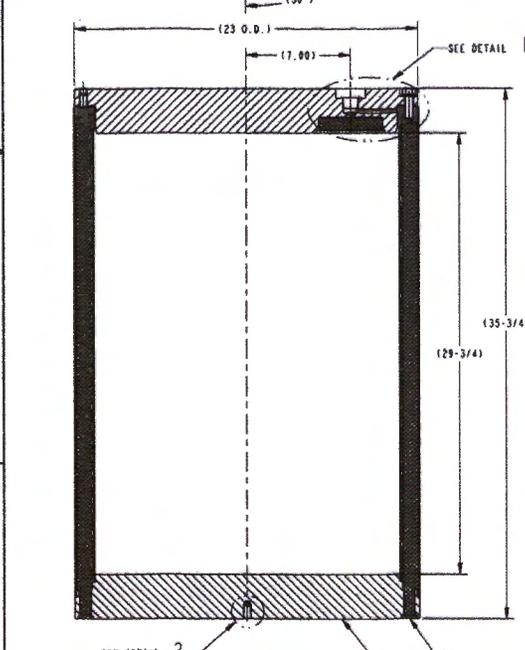
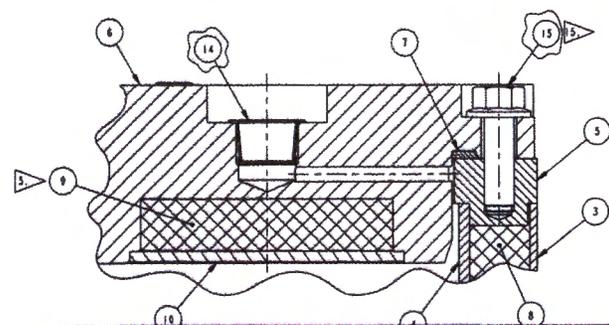
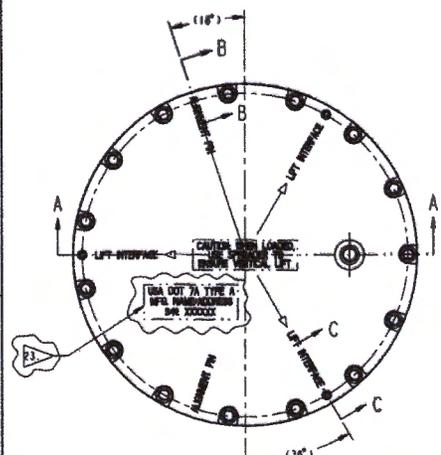
PT03

165-F-026-W1

DATE TAKEN FROM: N/A

VENOR: N/A

INFORMATION ONLY

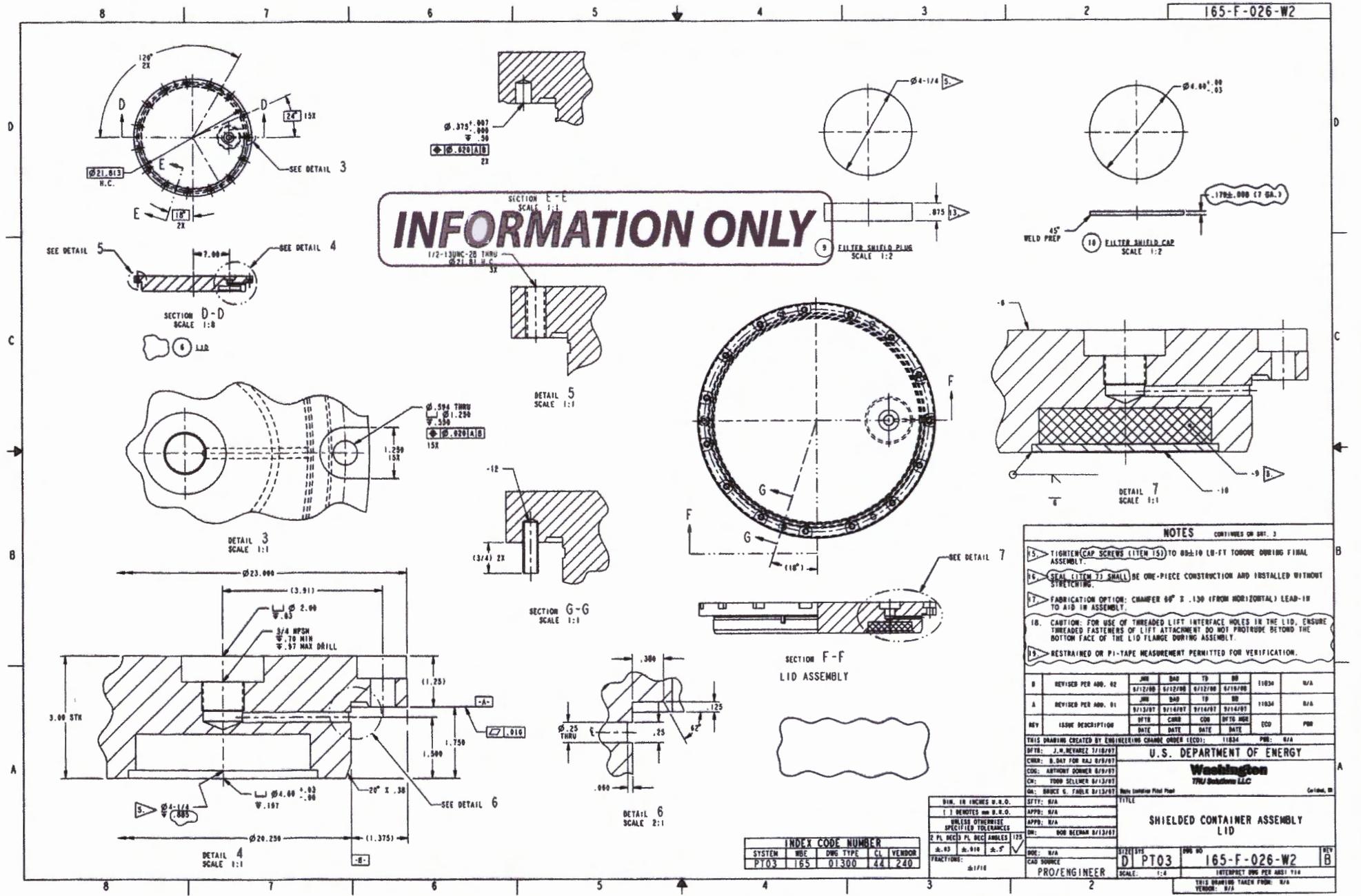


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UNLESS OTHERWISE SPECIFIED TOLERANCES	APP: N/A
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±.03 ±.010 ±.5	PR: N/A
FRACTIONS: 1/16	PR: N/A
	PRO/ENGINEER

TITLE	SIZE	DWG NO	REV
SHIELDED CONTAINER ASSEMBLY	1/4	165-F-026-W1	B
DATE TAKEN FROM: N/A	VENOR: N/A		

**INFORMATION ONLY**



- NOTES** CONTINUES ON DRG. 3
- TIGHTEN CAP SCREWS (ITEM 15) TO 88±10 LB-FT TORQUE DURING FINAL ASSEMBLY.
  - SEAL (ITEM 7) SHALL BE ONE-PIECE CONSTRUCTION AND INSTALLED WITHOUT STRETCHING.
  - FABRICATION OPTION: CHAMFER  $90^\circ \pm .130$  (FROM HORIZONTAL) LEAD-IN TO AID IN ASSEMBLY.
  - CANTON: FOR USE OF THREADED LIFT INTERFACE HOLES IN THE LID, ENSURE THREADED FASTENERS OF LIFT ATTACHMENT DO NOT PROTRUDE BEYOND THE BOTTOM FACE OF THE LID FLANGE DURING ASSEMBLY.
  - RESTRAINED OR PI-TAPE MEASUREMENT PERMITTED FOR VERIFICATION.

REV	ISSUE DESCRIPTION	DATE	CHKD	DATE	DATE	DATE	CD	BY	FOR
1	REVISED PER ADD. 02	8/12/98	JMB	8/12/98	8/12/98	8/12/98	11034	N/A	
2	REVISED PER ADD. 01	9/13/97	JMB	9/14/97	9/14/97	9/14/97	11034	N/A	

THIS DRAWING CREATED BY ENGINEERING CHANGE ORDER (ECO): 11034 PWB: N/A

**U.S. DEPARTMENT OF ENERGY**

**Washington**

**TNU Solutions LLC**

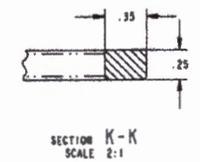
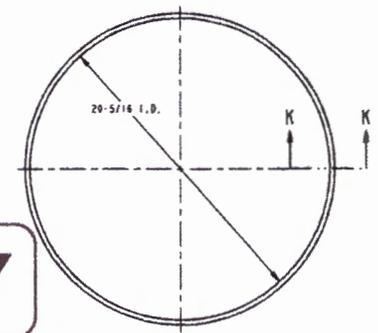
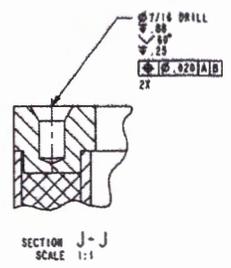
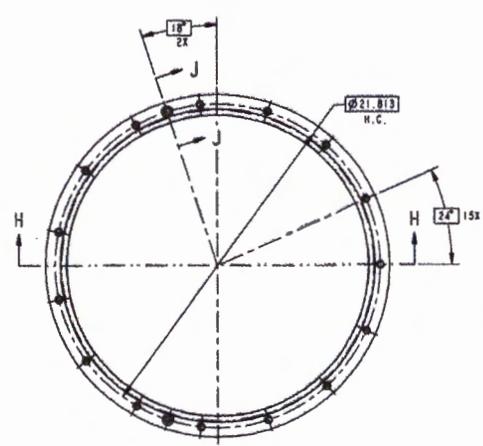
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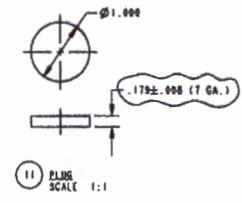
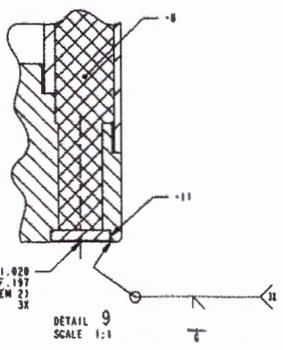
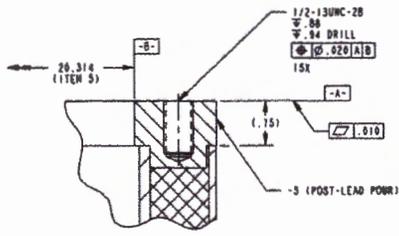
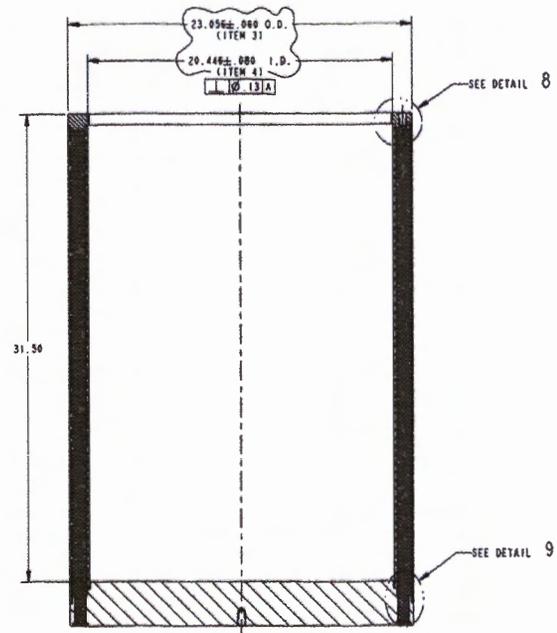
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 FRACTIONS: 1/16  
 DATE: 8/17/98  
 PRO/ENGINEER

**SHIELDED CONTAINER ASSEMBLY LID**

SIZE: 1:2  
 SCALE: 1:2  
 165-F-026-W2  
 INTERPRET DWG PER ANSI Y14  
 THIS DRAWING TAKEN FROM: N/A  
 VENDOR: 873



**INFORMATION ONLY**



- NOTES**
- 20 SEAM WELD APPLICABLE TO ROLLED AND WELDED PLATE ONLY.
  - 21. ASTM B29. OPTIONALLY UTILIZE RADIOACTIVELY-CONTAMINATED (RECYCLED) LEAD MEETING THE MINIMUM STRUCTURAL REQUIREMENTS OF ASTM B29.
  - 22. OPTIONAL: CONICAL TAPER CUP DESIGN OR USE OF BELL REDUCERS) ARE ALLOWED IN LIEU OF CYLINDRICAL CUP CONFIGURATION AS SHOWN.
  - 23. MARK AS SHOWN USING 1/2 IN. MIN. HIGH CHARACTERS, RAISED OR INDENTED BY FORGING OR DIE-STAMPING INTO THE SURFACE. UNIQUE 4-DIGIT SERIAL NUMBER SHALL BE MATCHED TO BODY AND LID ASSEMBLY. BODY OPTION: WELD-ON STAMPED TAG OR STENCIL WITH HIGH VISIBILITY PAINT.

REV	ISSUE DESCRIPTION	DATE	CHKD	DATE	APP'D	DATE	ECO	PROJ
B	REVISED PER ADD. 02	JUN 04 09	TD	00	11034			
A	REVISED PER ADD. 01	JUN 04 09	TD	00	11034			

THIS DRAWING CREATED BY ENGINEERING CHANGE ORDER (ECO): 11034 PNO: 4/24  
 DFTD: J. H. REYER 7/18/07  
 CMR: B. DAY FOR RAJ 8/18/07  
 CD: ANTHONY SOMER 8/19/07  
 CN: TONY SELLNER 8/13/07

U.S. DEPARTMENT OF ENERGY

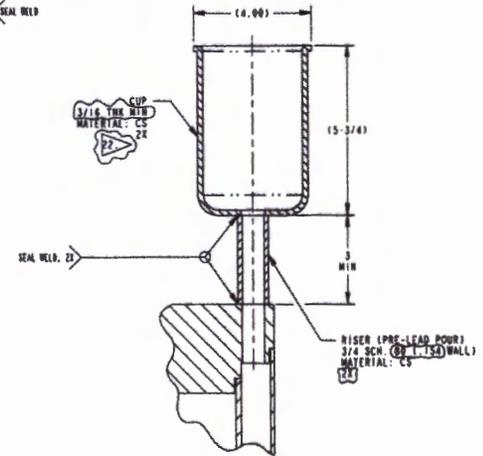
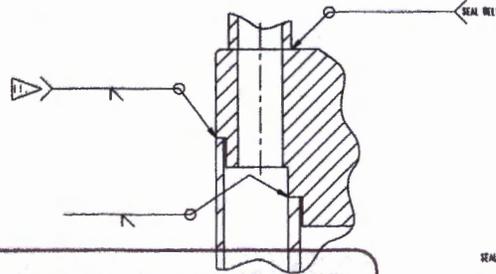
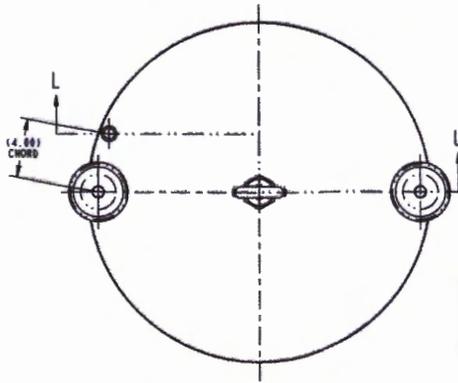
**Washington**  
TRU Solutions LLC

DWG NO	165-F-026-W3	REV	B
DATE	PT03	SCALE	1:4
PRO/ENGINEER		INTERPRET DWG PER AMS	114
		YENDOR	0/2

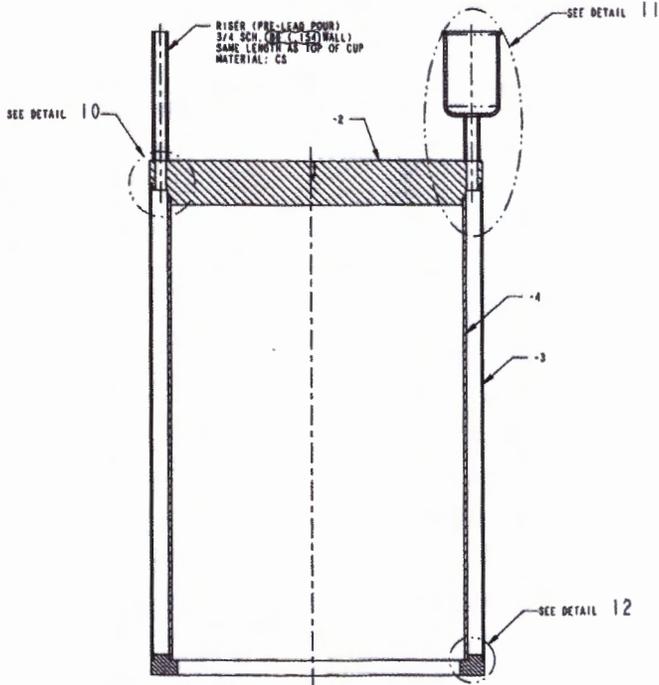
SYSTEM	WBE	DWG TYPE	CL	VENDOR
PT03	165	01300	44	240

DWG. IN INCHES U.S.C. & G.S.  
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 UNLESS OTHERWISE SPECIFIED TOLERANCES  
 2 PL DEC2 PL DEC AMPLIES 125  
 ±.03 ±.010 ±.5°  
 FRACTIONS: ±1/16

**INFORMATION ONLY**

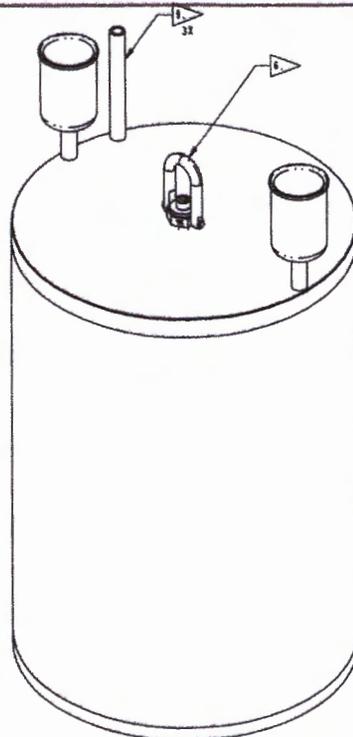


DETAIL 11  
SCALE 1:2

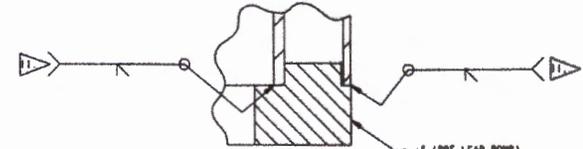


SECTION L-L

7 BODY, (PRE-LEAD POUR)  
(NO.1 RING REMOVED FOR CLARITY)



31 REFERENCE VIEW



DETAIL 12  
SCALE 1:1



REVISED PER A00. 02	JM	DAD	TR	DD	11034	DJA
REVISED PER A00. 01	JM	DAD	TR	DD	11034	DJA
REV	ISSUE DESCRIPTION	DATE	DATE	DATE	DATE	PRO

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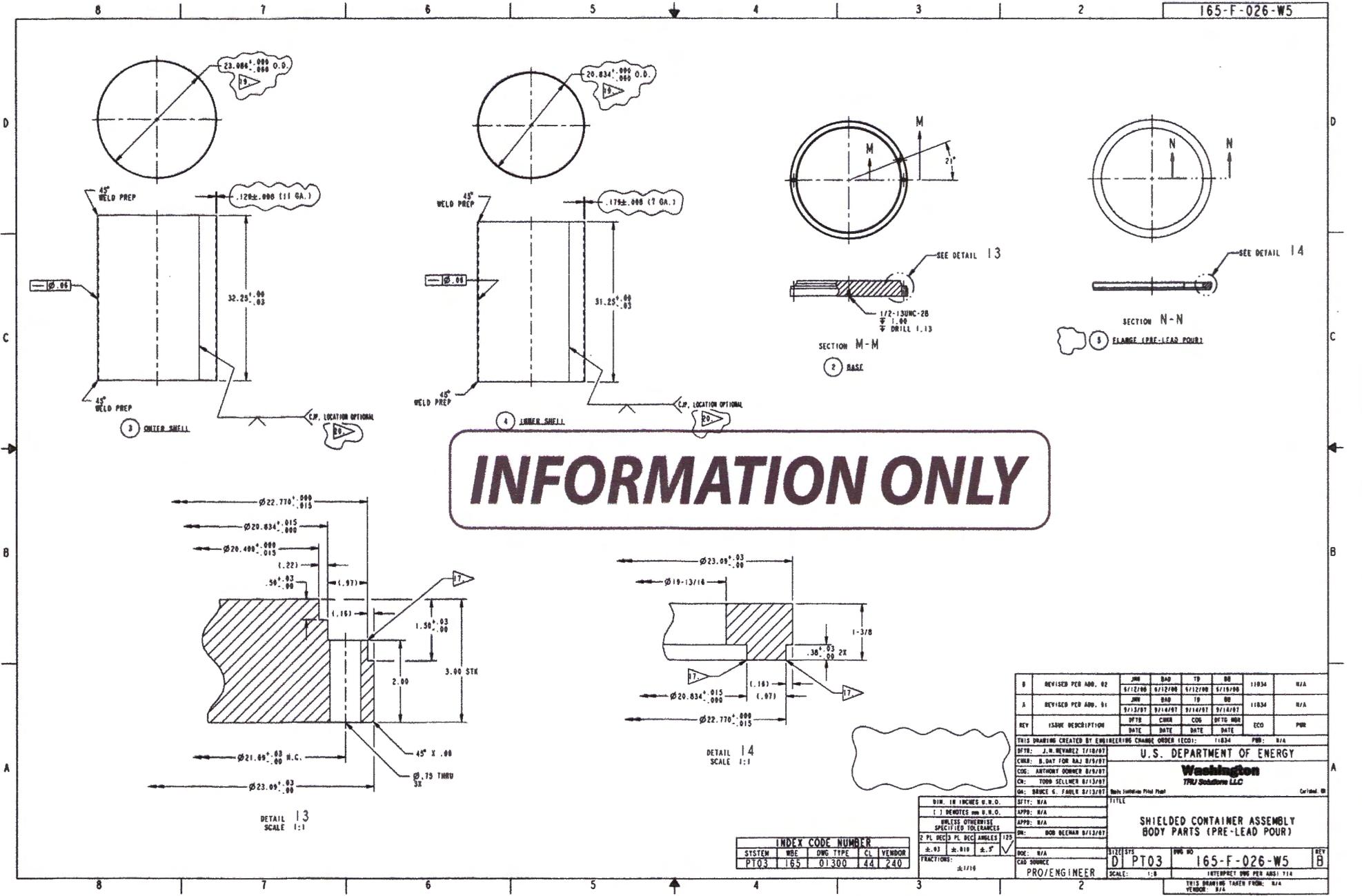
U.S. DEPARTMENT OF ENERGY  
**Washington**  
TRU Solutions LLC

DWG: 30 INCHES O.D.O.  
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1.5 DIMETERS MIN D.R.O.  
APPR: N/A  
UNLESS OTHERWISE SPECIFIED TOLERANCES  
R PL DEC2 PL DEC ANGLES 125  
A. 03 A. 010 A. 7  
FRACIONS: 1/16  
DOW: N/A  
EAD SOURCE: PRO/ENGINEER

TITLE: SHIELDED CONTAINER ASSEMBLY BODY (PRE-LEAD POUR)  
SIZE: STD  
DWG NO: 165-F-026-W4  
SCALE: 1:4  
REV: B  
THIS DRAWING TAKEN FROM: N/A  
YEAR: 0/2

INDEX CODE NUMBER				
SYSTEM	USE	DWG TYPE	CL	VENDOR
PT03	165	01300	44	240

**INFORMATION ONLY**



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A	REVISED PER ADD. 01	JUN 01/12/06	DAQ	TD	DD	11034	N/A
REV	ISSUE DESCRIPTION	DATE	CHKR	COG	DTG HDR	ECO	PRG
THIS DRAWING CREATED BY ENGINEERING CHANGE ORDER (ECO):		11034	PWB: N/A				
DTR: J.N. REVAEZ 1/10/07		U.S. DEPARTMENT OF ENERGY					
CMB: B. DAY FOR RAJ 8/9/07		Washington					
CMC: ANTHONY SOMMER 8/9/07		TRU Solutions LLC					
CR: TODD SELLNER 8/13/07		Scale: 1:1					
CM: BRUCE G. FAULK 8/13/07		Date: 8/13/07					

INDEX CODE NUMBER				
SYSTEM	WBE	DWG TYPE	CL	VENDOR
PT03	165	01300	44	240

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1:1 REDUCES MIN U.S.O.	APP: N/A
UNLESS OTHERWISE SPECIFIED TOLERANCES	APP: N/A
2 PL DEC3 PL DEC ANGLES 12.5	APP: N/A
±.03 ±.010 ±.5	APP: N/A
FRACIONS: 1/16	APP: N/A
PRO/ENGINEER	APP: N/A

TITLE	SHIELDED CONTAINER ASSEMBLY BODY PARTS (PRE-LEAD POUR)
SIZE/STG	D/PT03
DWG NO	165-F-026-W5
SCALE: 1:1	INTERPRET DWG PER ANSI 714
THIS DRAWING TAKEN FROM: N/A	VENDOR: N/A