GOOD PRACTICE GUIDE

WNTI Best Practice for Checking Shipping Containers Prior to Loading Drums of UOC and Before Dispatch

Dedicated to the safe, efficient and reliable transport of radioactive materials
WNTI Best Practices for checking Shipping Containers Prior to Loading Drums of UOC and Before Dispatch

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Introduction

This guidance document introduces and describes the checking of shipping containers upon receipt at the container yard and prior to loading at the Consignor producer’s facility and subsequent dispatch to the Consignee receiver’s facility. The document may be used to assist Consignee producers in the development of their individual operating documentation and parties are encouraged to adopt and apply the information in whatever format they find most appropriate and applicable to their needs, requirements and individual circumstances.

It has been prepared for use by the World Nuclear Transport Institute (WNTI) members and other stakeholders who transport radioactive materials in shipping containers and is not a work instruction nor should it be seen as suggesting some form of prescriptive or particular format that should be adopted by industry members.

Background introduction

The transportation of uranium ore concentrates (UOC) is a regular occurrence practiced daily utilising supply chain routes traversing public roads, railways, international waters, shipping ports and container terminals.

UOC is packaged in steel drums that are securely stowed within twenty foot general purpose shipping containers; the workhorse of the modern day shipping industry.

Shipping containers are subjected to a high degree of wear, tear and damage and whilst leasing companies have an obligation to maintain their fleet of shipping containers to meet strict guidelines, there is also an obligation for individual users to ensure that the equipment that they are receiving and subsequently using is also fit for purpose.

This WNTI document provides guidelines covering the practices that Consignors should adopt in order to fulfill their respective obligations to the overall security, safety and health of the communities and environments through which their uranium ore concentrates are transported.

All Consignor producers have an obligation to themselves and to their on-carriers to ensure that their product is packaged correctly and stowed securely within shipping containers that comply with international standards as required by the IAEA, IMO, European and North American competent authorities as well as meeting local domestic or other applicable regional regulations.

There is an additional requirement for each Consignor producer to ensure and certify that both the drums and the shipping containers are clean and free of any radioactive residue or associated surface contamination.

Consignor producers actually require two separate checklists; the first addresses the requirements associated with ensuring that the empty shipping containers are suitable and fit for purpose. The second checklist is required to check that the packed shipping container meets all necessary requirements making it ready to be shipped.

There is a requirement for two separate types of Consignor producer focused shipping container checklist.

1. Consignor producer empty shipping container inspection checklists.
2. Consignor producer packed shipping container inspection checklists.

Likewise all Consignee receivers have an interest in ensuring that the cargo shipped to them by their Consignors arrives in good condition together with an obligation to provide feedback to inform their Consignors of any situation whereby the cargo may have been compromised during transport.

There is an additional regulatory requirement for each Consignee receiver to ensure that when the de-stuffed shipping containers leave their premises they are free of any radioactive residue or associated surface contamination in accordance with IAEA “free release” requirements.
Consignor producers empty shipping container inspection checklist

There is a requirement for all Consignors to comply with the ‘Convention for Safe Container’s (CSC)’ and to conform to the shipping container packing requirements of the United States Customs and Border Protection, Customs-Trade Partnership against Terrorism (C-TPAT).

Additionally there is a further requirement to comply with the IAEA Regulations for the Safe Transport of Radioactive Material (TS-R-1) so that any drums and or shipping containers used for the transportation of uranium ore concentrates must have less than 4.0 Bq/cm² of non-fixed contamination.

The above requirements apply irrespective of whether the Consignor is utilising leased Shipper Owned (SOC) or Shipper Supplied units provided by the Carrier (Shipping Line).

In most situations, mine sites are located long distances away from container yards. Good practice suggests the utilisation of a marine surveyor to undertake pre acceptance inspections of shipping containers prior to transporting to the mine site.

In order to undertake the inspections, the marine surveyor should be provided with a copy of the Consignors shipping container specification.

Since there is always the opportunity for damage to occur to the shipping container during handling and transport between the container yard and the mine site, a further inspection should be made both internally and externally to ensure its structural integrity upon receipt of the shipping container at the mine site.

Should defects be found at any stage during the above shipping container inspection process it is good practice to digitally photograph the defect in order to provide feedback to the marine surveyor and or to the shipping container supplier.

Consignors may wish to include additional checks as they deem appropriate for their particular circumstances.

<table>
<thead>
<tr>
<th>Inspection location</th>
<th>Date / Time arrived</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shipping Container Number</td>
<td>Date / Time of inspection</td>
</tr>
<tr>
<td>Shipping Container Safety Plate Number</td>
<td>Nature of defect</td>
</tr>
</tbody>
</table>
External Checks

- Record shipping container number details, name of person undertaking the inspection and the date of inspection.
- Record the Approved Continuous Examination Program (ACEP) and CSC approval details, shipping container type, date of manufacture, maximum gross, stack and shipping container tare weight details for the shipping container indemnity and cleanliness certification.
- Check that the ACEP identification label or the validity of the CSC container safety approval plate and re-inspection date has not expired.
- Check the undercarriage to ensure there is no damage to the under floor timber, the shipping container floor rails or the box Tyne channels etc. Extreme care must be taken to ensure worker safety when performing these checks. The employee should never stand underneath the shipping container when performing these checks.
- Check that all exterior surfaces have minimal surface and no major structural rust. The shipping container should been in good condition and have a visually pleasing appearance. Even though the shipping container is acceptable for use, the general appearance of the shipping container has a significant impact on public perception.
- Undertake visual checks to ensure there is no obvious damage, holes or cracking of the external wall, roof paneling or corner joints. Minor cracks in joints can be filled with silicon if required.
- Ensure that any bowing or warping of roof or wall surfaces fall within the stated Institute of International Container Lessors (IICL) limits.
- Check both doors to ensure they are not distorted and close tightly; that all door fittings, locking mechanisms, door gaskets and seals are in serviceable order.
- Remove any previously applied placards, markings and associated warning or advisory labels.
- Check the top and bottom mounted corner fitting locking structures for serious damage.
- Always feel free to record and document any issues irrespective of them being considered good or bad as photographic evidence is irrefutable and in the modern age of the digital camera is a cheap form of insurance.

Internal Checks

- Check that the shipping container has been cleaned free of any previous cargo residue material. Check that there is no dirt or debris left on the floor or the door of the shipping container.
- Undertake a survey of the shipping container prior to packing to ensure that no form of contamination is present.
- Check that all interior surfaces have minimal surface and no major structural rust.
- Undertake visual checks to ensure there is no obvious damage, holes or cracking of the internal wall, roof paneling or corner joints. Minor cracks in joints can be filled with silicon if required.
- Ensure that any bowing or warping of roof or wall surfaces fall within the stated IICL limits.
- Check that there is no damage or evidence of fresh staining to the shipping container flooring.
- Ensure that the top and bottom securing lugs are both appropriate and fit for use.
- Undertake a water proof test** to ensure the integrity of the overall sealing capability of the shipping container to effectively prevent the entry or discharge of material or moisture.

**Water proof test: This is best done by entering inside the shipping container and having someone close both of the shipping container doors. Due to the extremes of temperature experienced at many if not most mine sites, consideration as to the total time spent “shut” inside the shipping container must be given. Additionally caution should be taken as there is always the possibility that residual potent gases from the fumigation of previous cargoes could also be present. Should any indication of daylight be seen through the door seals or from elsewhere within the shipping container it must be assumed that water could gain entry and therefore the shipping container should be deemed unfit for purpose.
Overall suitability for purpose

- Determine and sign off as to whether the shipping container is fit for purpose.
- If suitable assign the unit as being ready to be packed.
- If unsuitable, do not pack the shipping container, sign off the report, reject the unit and follow internal processes to have the shipping container returned to the shipping container supplier.
- File and store copies of acceptance or rejection report in line with internal operating procedures.

Consignor (producer senders) packed shipping container inspection checklist

After the shipping container has been packed and well prior to preparing the shipping documentation, each packed shipping container should once again be inspected.

Good practice suggests that wherever possible a person independent of those specifically involved in the packing of the shipping container conducts a final external and internal check addressing the requirements above applying to empty shipping containers also addressing the additional items below:

- Confirm with those specifically involved in the packing of the shipping container that no incidents occurred during packing of the shipping container that may have resulted in shipping container contamination.
- If a possible contamination incident did occur, confirm that the shipping container was emptied, cleaned and resurveyed.
- If resurveyed, confirm that survey results were documented and acceptable.

- Ensure that all drums are adequately secured.
- Check that locking seals on each drum lid are tight and that each drum has the applicable Radioactive Category label and Marine Pollutant labeling.
- Check that the drum details match the drum, batch and lot details against the shipping container packing log sheet.
- Conduct wipe tests on the external surface of all drums. When using a well established and reliable drum cleaning station, a random selection of drums can be wipe tested based on statically sampling techniques.
- Ensure that there are no obvious signs of residual or extraneous packaging or securing material.
- Close and lock the shipping container doors applying the designated seal numbers as per the shipping container log sheet.
- Clean and wash the external surfaces and undercarriage of the shipping container to remove residual surface dust or soil that could contain or support any form of contamination.
- Clean, prepare and affix a UN2912. Cat III Yellow and Marine Pollutant labels to the four sidewalls of the shipping container.
- In order to eliminate the possibility of contaminated soil becoming caught up in the undercarriage of the shipping container, store the packed and inspected shipping container on a clean area of bituminous or concrete covered hardstand area ready awaiting transport from the mine site.
- File and store copies of the final inspection report in line with internal operating procedures.
- Always feel free to record and document any issues irrespective of them being considered good or bad as photographic evidence is irrefutable and in the modern age of the digital camera is a cheap form of insurance.
Suggested specification for shipping containers to be used for the transportation of UOC

- Ideally all shipping containers used to transport UOC should be rated to 30 (30.4) tonne load capacity.
- The CSC plate on each shipping container must indicate a valid re-inspection date or ACEP identification.
- All shipping containers must be ISO 1496-1 compliant having an adequate number of top and bottom anchor points.
- Shipping containers are to be free of dents in walls, doors and roof.
- Shipping containers need to have under floor box channeling for fork lift tykes.
- Shipping containers are to be clean inside and outside having minimal surface and no major structural rust.
- Shipping containers should be totally free of any holes or cracks that may allow the entry or discharge of material or moisture into or from within the shipping container.
- Shipping containers must have adequate door seals that provide effective dust proof seals preventing the entry or discharge of material or moisture into or from within the shipping container.
- At least one of the locking handles on each shipping container door must have a hole capable of allowing the placement of a shipping container bolt seal.

For further information refer to the Institute of International Container Lessors (IICL) Guide for Container Equipment Inspection 5th Edition (IICL-5)
### Combined Shipping Container Indemnity and Drum and Shipping Container Cleanliness Form

Combined declaration covering compliance for 'Shipper Owned Containers (SOC)' with the 'Convention for Safe Containers (CSC)' and conformance with container packing requirements of the United States Customs and Border Protection, Customs-Trade Partnership Against Terrorism (C-TPAT) and also addressing IAEA para 508 - 509 requirements that drums and shipping containers have less than 0.4 Bq/cm² non fixed contamination.

Compliance is deemed to be demonstrated by the use of an 'Approved Continuous Examination Program (ACEP) Authorisation' issued to the Managing Agent/Owner of said units being Containerpool as agent for Textainer as per details below taken from the CSC plate on each container.

**Bill of lading: ABAB098765**  
**Delivery: 12345**  
**Vessel: LOLLIPOP 121N**

The following 'Shipper Owned Containers (SOC)' are hereby stated to be structurally sound, each fully compliant with the current requirements of the 'Convention for Safe Containers (CSC)' and have been monitored at the Olympic Dam mine site and found to be free of radioactive contamination as defined in the latest applicable edition of the IMDG Code.

<table>
<thead>
<tr>
<th>Lot Number</th>
<th>Container Number</th>
<th>Seal Number</th>
<th>ISO Container Type</th>
<th>Max Gross Kg</th>
<th>CSC Approval Reference</th>
<th>Allowable Stack Weight for 1.8 g</th>
<th>Date of manufacture</th>
<th>ACEP number (if available)</th>
<th>kg Net U₃O₈</th>
<th>Qty of drums</th>
<th>Radiation levels monitored and within requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>CLHU3328171</td>
<td>292853/854</td>
<td>1CC-135GC20</td>
<td>30,480</td>
<td>D-HH-2624/GL2362</td>
<td>216,000</td>
<td>Apr-01</td>
<td>BDA-02 TEXTAINER</td>
<td>17,352,612</td>
<td>48</td>
<td>Yes</td>
</tr>
<tr>
<td>21</td>
<td>CLHU3417480</td>
<td>292855/856</td>
<td>CB22-07-02</td>
<td>30,480</td>
<td>D-HH-3405/GL7083</td>
<td>216,000</td>
<td>Mar-04</td>
<td>BDA-02 TEXTAINER</td>
<td>17,182,210</td>
<td>48</td>
<td>Yes</td>
</tr>
<tr>
<td>22</td>
<td>TGHU2706570</td>
<td>292857/858</td>
<td>CB22-07-03</td>
<td>30,480</td>
<td>D-HH-3405/GL7083</td>
<td>216,000</td>
<td>Apr-04</td>
<td>BDA-02 TEXTAINER</td>
<td>17,857,693</td>
<td>48</td>
<td>Yes</td>
</tr>
</tbody>
</table>

The visual inspection and examination found the following points to be in order:

All of the 3 shipping units were found to be in compliance with the packaging standards for UN2972 Class 7 LA-1 material as approved and audited by the relevant Competent Authority.

The soundness, sealing, labeling and gross weight of each drum, the overall servicablety and condition of the plastic inner insert material and the structural soundness of the shipping containers, including the continuous inspection labeling.

The placarding of the containers, and the soundness and rigidity of the 'Cordstrap' local restraint lashing system of all of the shipping units meets the regulatory requirements of transitioning countries.

I confirm that a visual inspection and examination has been undertaken of the internal and external condition of each shipping unit, including doors, inspection panels, latches (as applicable) for delivery 12345 comprising 3 shipping containers packed with uranium ore concentrate and that the freight containers identified above have been monitored at the XXXX Mining Corporation mine site and found to be free of radioactive contamination as defined in the latest applicable edition of the IMDG Code.

CONTAMINATION means the presence of a radioactive substance on a surface in quantities in excess of 0.4 Bq/cm², fixed plus non-fixed, for beta and gamma emitters and low-toxicity alpha emitters. Natural uranium is a low-toxicity alpha emitter. Contamination is measured as averaged over 300 cm², reference the applicable edition of the IAEA TS-R-1 Regulations for the Safe Transport of Radioactive Material. Natural uranium concentrates are comprised primarily of two (2) alpha emitters, 238U and 234U and two (2) beta emitters, 234Pu and 234Th. Once secular equilibrium is established, the total alpha activity therefore radioactive measurement may be conducted by either alpha measurement or by beta measurements.

For and on behalf of the Consignor, XXXX Mining Corporation  

Joe Packer  
Packaging Superintendent  

Packing date: 11/02/2011
Photographs
1 Unloading a cask of vitrified high-level waste, Mutsu-Ogawara Port, Japan
2 Road transport of spent fuel in Japan
3 Cask for MOX fuel
4 Sea transport of vitrified high-level waste
5 Unloading operations, Barrow Port, UK
6 Spent fuel cask
7 Sea transport of vitrified high-level waste
8 48" Hex cylinders
9 30" Hex cylinders with overpacks
10 Purpose-built vessel, Mutsu-Ogawara Port, Japan