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Experience feedback after 2 years operation of the RT-100 package & potential developments

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Abstract

The RT-100 type B(U) package was briefly presented at PATRAM 2013 as a solution to solve delays and disruptions that had occurred in the LLW shipping schedules in the USA. It was developed to carry up to 160ft3 (4530 L) liners loaded with low level wastes, currently spent resins and filters. The RT-100 cask design was approved in March 2014 by the USNRC, 18 months after the initial submittal of the application for a certificate of compliance. Four casks were delivered to the US market between Janu-ary and September 2014, 3 operated by Waste Control Specialists LLC (WCS), and 1 by Exelon Cor-poration.

When this new cask arrived on the market, it faced a unique challenge in a market where cask users for decades were familiar with previously existing cask designs. Therefore, our first step was to train operators and users on the handling, loading and pre-shipment inspection procedures. Detailed instructions were written to be very user friendly and understandable by everyone. A protected loading spreadsheet was developed specifically to help shippers determine the capacity of any specific liner to be transported within the RT-100. In addition, for every first “type B” shipment by a nuclear facility us-ing the RT-100, Robatel Technologies provided an engineer to the site for technical support to the shippers. A technical support hotline was put in place and a user portal is also available on our “www.robateltech.com” website for each cask user to download all the necessary documentation.

During the first years of operation of the RT-100, ROBATEL learned from customer feedback and requests and as a result, the RT-100 is now part of the US standard fleet for LLW shipments. Recent developments in 2015 make it the first type B cask certified to transport grossly dewatered resins containing up to 20% free liquid by volume.

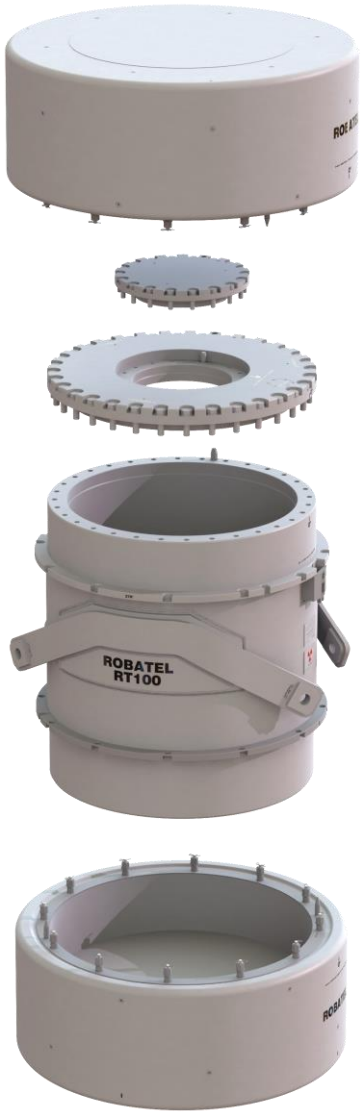
This article will lay out in further detail the major developments, lessons learned and further potential revisions of the CoC to increase the RT-100’s versatility.

Introduction

The RT-100 type B(U) package was developed for the US market as a solution to solve the delays and disruptions that were occurring in the Low Level Waste (LLW) shipping schedules. It carries up to 4.6 m3 (160ft3) of low level waste, currently spent resins and/or filters, dewatered or grossly dewatered. This package was designed based on the ROBATEL Industries proven technology for type B casks, supported by the Robatel Technologies Engineering team in charge of licensing this technology for the first time in the USA.

Thanks to its experience in cask design and licensing, the ROBATEL team has managed the whole process of cask delivery: from customer technical and content specification, Safety evaluations and calculations, Safety Analysis Report writing, scale model manufacturing and drop testing (in house drop target), and cask manufacturing. The lead time to receive the type B license for the RT-100 was about 2 years (25 months) after project start and one RT-100 cask had already been delivered to a customer before license issuance by the US NRC. An industrial risk showing the confidence of ROBATEL in its cask designs.

This paper first presents the package design with its specificities, then the key date of the project and finally it focuses on customer feedback and potential new developments using the RT-100 casks.



RT-100 main specifications

Allowed Contents per Certificate of Compliance (C.o.C) rev.1 (USA/9365/B(U)-96):	Dispersible solids, in the form of both dewatered and grossly dewatered resins and filters contained within secondary containers
Useful loading dimensions:	Height = 1956 mm (77 in) Diameter = 1730 mm (68 in)
Maximum payload:	6805 kg (15 000 lbs)
Maximum activity:	3000 A2
Gamma radiation shielding:	129 mm (5.1 in) Lead Equivalent Thickness
Maximum heat load:	200W
Overall dimensions and weight:	Height: 3316 mm (130.55 in) Diameter: 2587 mm (101.85 in) Gross weight: 41 500 kg (91 492 lbs)

Project key dates:

The project started in **February 2012**, ROBATEL launched the design of ethe RT-100 cask based on the content technical specifications requiring the inner cavity of the cask to carry up to 10-160 liners (160 cubic feet).
Eight months later, the safety analysis report was submitted to the USNRC in **October 2012.**
After having answered the first round of Request for Additional Information (RAIs) issued by the NRC, the company launched the fabrication of 4 RT-100 casks, evaluating that the design submitted to the safety authority was safe and that the SAR would pass the licensing process with no physical design modifications.
In **January 2014,** the first specimen of RT-100 cask was delivered in Andrews, Texas, USA to Waste Control Specialists (WCS), after having been manufactured and tested at the ROBATEL Industries facility in Genas, France. See figure 1.

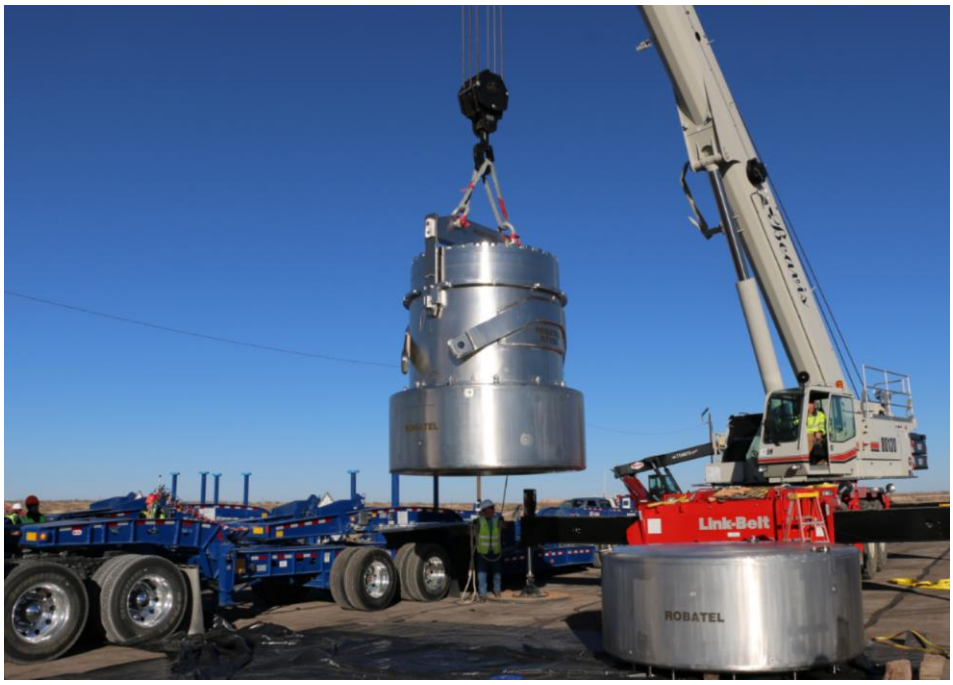


Figure 1. re-assembling of the RT-100 cask at delivery in TX

In **March 2014,** Robatel Technologies was issued a type B(U) license by the US NRC for the RT-100 model allowing shipment of dewatered resins and filters contained within secondary containers, thus making the available RT-100 package specimen ready for servicing the industry.
The first waste shipment using the RT-100 cask took place at the Exelon Corporation Peach Bottom Nuclear Generating Station in **June 2014**. The waste was shipped to the WCS disposal facility in Andrews, Texas.
The three remaining casks ordered were delivered respectively in **May 2014**, **July 2014** and in **September 2014**, completing the available RT-100 fleet. See figure 2.

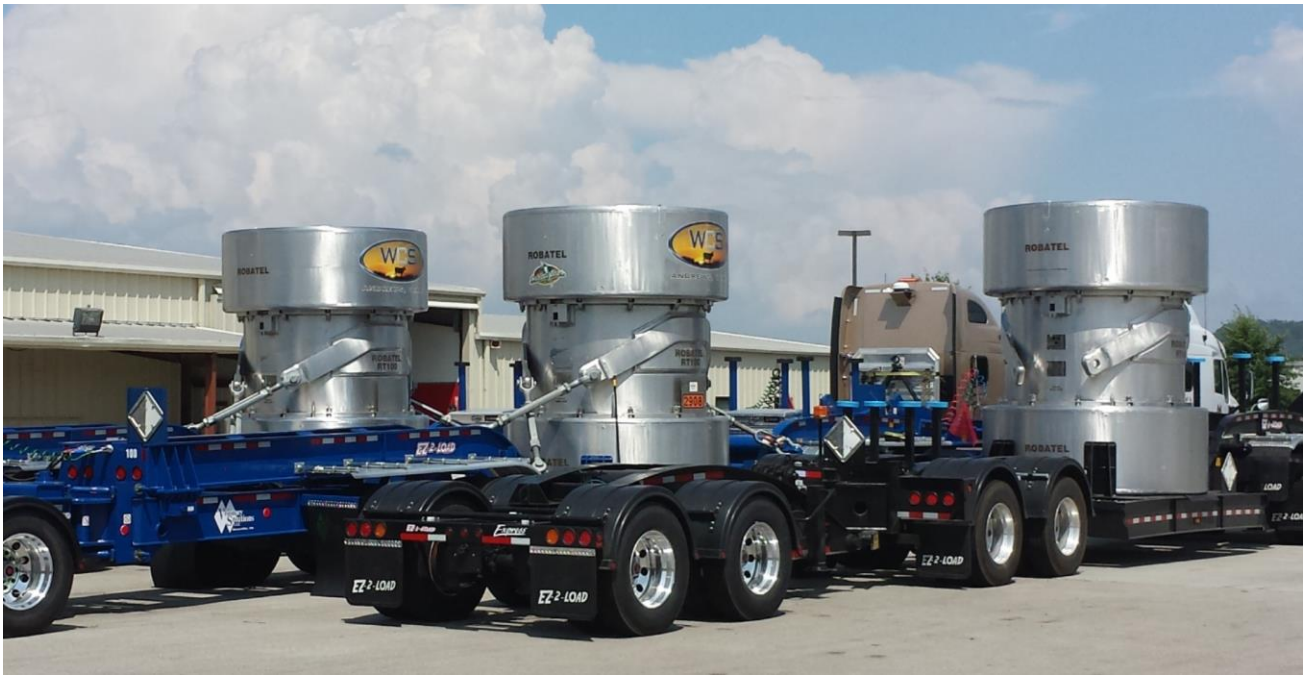


Figure 2. Part of the RT-100 fleet delivered in the USA

In **December 2014**, the first delivered RT-100 cask was submitted to its first annual maintenance operations and inspections, which it passed without issue. Since this date, there has been eight successful annual maintenance cycles performed on the RT-100 fleet. For conservatism, it is assumed that an annual maintenance cycle takes 5 working days to be completed.

In **January 2015**, Robatel Technologies submitted an amendment to the NRC to allow shipment of grossly dewatered resins and filters containing up to 20% free standing liquids.

Six months after submittal of the amendment request, Robatel Technologies received the authorization through the Certificate of Compliance USA/9365/B(U)-96 revision 1 in **July 2015 [ref 1].** This amendment made the RT-100 the first of its kind to allow shipment of grossly dewatered resins in the USA.

In **September 2015**, Robatel Technologies launched a system for distributing controlled documents to external entities through its website Client Portal. This portal allows Robatel to efficiently distribute updated procedures, files, and drawings to all authorized users; in compliance with the NQA-1 quality management system and 10 CFR Part 71 requirements.

Customer feedback and potential developments:

Customer Feedback:

Since June 2014, the first RT-100 shipment, there has been more than 50 LLW shipments made using the RT-100 cask model, from and towards many different sites in the USA. In this, Robatel Technologies team has been training the following sites to operate the RT-100 cask:

- WCS
- Peach Bottom
- Monticello
- Three Mile Island
- Calvert Cliffs
- South Texas Project
- Dresden
- LaSalle
- Byron
- Clive
- Bear Creek

From all the uses of the RT-100 cask, the more recurrent comments on the RT-100 are the following:

- The stainless steel design makes it a robust, reliable and easy to maintain cask
- The illustrated step by step procedures are a key success in introducing this new cask to the market
- The Robatel loading table spreadsheet makes it easy for shippers and receivers to confirm contents meet the requirements of the C.o.C
- The larger Lead Equivalent Thickness reduces the dose received by the teams compared to other casks
- To meet the need of our risk adverse Industry, Robatel Technologies performs onsite training for the first shipment at each site.

Robatel has developed further services than design, licensing, and manufacturing of casks. The company also ensure the site trainings, the annual maintenance, the eventual corrective maintenance, the engineering support for loading operations, the revision of operating and maintenance documents and the controlled distribution to users, thus providing a complete service the cask operators and users.

Potential developments:

ROBATEL received an authorization letter to ship irradiated hardware for a specific project in September 2014. The robust design of the RT-100 anticipated the possibility to amend the C.o.C to allow transportation of **solidified resins**, **irradiated hardware**, **sealed sources**, and/or **miscellaneous wastes**.

Conclusions:

During the first years of operation of the RT-100, ROBATEL learned from customer feedback and requests and as a result, the company developed new services to ensure an optimize reactivity and to ensure the highest level of availability of the cask for operation. The RT-100 is now part of the US standard fleet for resins and filters LLW shipments; and its versatility with a large cavity, a heavy payload and a substantial radiation shielding make it well suited for other potential contents.

References

[1] Certificate of Compliance for RT-100 Radioactive Material Packages 9365 revision 1 – docket number 71-9365 – Package #USA/9365/B(U)-96