CERTIFICATE NO. ZA/NNR/1005/B(U) – 96

REVISION 03

PACKAGE DESIGN APPROVAL

This is to certify that the National Nuclear Regulator, being, for the purpose of the International Atomic Energy Agency, the Competent Authority in the Republic of South Africa, in respect of the transport of radioactive material, has re-certified the Certificate of Package Design Approval, as described herein, as having met the requirements for Type B(U) packages as described in the International Atomic Energy Agency, Safety Standards Series No. SSR-6, Regulations for the Safe Transport of Radioactive Material, 2012 Edition, Vienna 2012.

1. CERTIFICATE

Effective Date	:	02 January 2018
Expiry Date	:	02 January 2023

2. COMPETENT AUTHORITY

National Nuclear Regulator
Eco Glades Office Park
Eco Glades 2
Block G
420 Witch Hazel Avenue
Centurion
South Africa

3. THIS CERTIFICATE IS ISSUED ON THE BASIS OF THE APPLICATION SUBMITTED BY

Name and Address of Applicant:

NTP Radioisotopes SOC Ltd, on behalf of South African Nuclear Energy Corporation Limited (Necsa) SOC Ltd
Church Street West
Pelindaba
Republic of South Africa

4. TITLE AND IDENTIFICATION OF REPORTS

4.1 Reports

- Document No. NTP-SAR-0002 (Rev 4): Safety Analysis Report: "Beatrice" Transport Package: ZA/NNR 1005/B(U)-96
- Licencing Submission NIL39-NAR-0087: Safety Analysis Report: "Beatrice" Transport Package ZA/NNR 1005/B(U)-96

4.2 Drawings

The Package is fabricated in accordance with the following drawings-

Drawing no	Revision	Description
I:E 144:000	N	Container ZA/NNR/1005 Transport Container – Assembly
I:D 144:002	G	Liner
I:C 144:003	H	Top Liner
I:B 144:004	F	Bottom Liner
I:C 144:010	L	Inner Cover
I:C 144:011	J	Inner Cover – Top Plate
I:C 144:012	E	Inner Cover – Bucket
I:B 144:013	G	Inner Cover – Inner Cover Liner
I:B 144:014	G	Inner Cover – Lifting Eye
I:B 144:015	G	Inner Cover – Clevis
I:D 144:020	M	Inner Container
I:D 144:021	G	Inner Container – Outer Casing
I:C 144:022	G	Inner Container – Uranium Shield
I:D 144:023	M	Inner Container – Inner Casing
I:B 144:024	E	Inner Container – Bottom Spacer
I:B 144:025	H	Inner Container – Top Spacer
I:D 144:030	K	Top Cover
I:B 144:031	E	Top Cover – Lifting Eye
I:B 144:032	F	Top Cover – Clevis
I:B 144:033	E	Top Cover – Bolt
I:D 144:040	K	Outer Casing
I:B 144:041	H	Outer Casing – Identification Plate
I:D 218:001	R6	IPC Mk II (Forged)

5. PACKAGE IDENTIFICATION

The Package is identified by the Model Number:

ZA/NNR/1005/B(U) – 96

6. PACKAGE DESCRIPTION

The Package Assembly (See Figure 1) consists of a Stainless Steel Inner Container, which is placed inside a Stainless Steel Outer Casing. The Stainless Steel Inner Container is sealed by two "O"-rings that serve as outer containment barrier. Solid depleted uranium is used to provide shielding in the Inner

Container. A Cork Liner, situated between the Inner Container and the Outer Casing, serves as a thermal protective envelope during a fire and also serves to cushion the internals from mechanical shocks.

A cavity inside the Inner Container Shield contains an Inner Product Container fitted with an "O"-ring, which serves as the primary containment for this package. The transport package schematic is detailed in Figure 2.

The product is placed inside a product bottle into this Inner Product Container.

Dimensions (approximate) of the Package:

Outer container:	Ø286 x 374mm
Inner container:	Ø178 x 238mm (Cavity Ø50 x 103mm)
Inner product container:	Ø49 x 102mm

Weights (approximate) of the Package:

Outer container:	126 kg
Inner container:	85 kg
Depleted Uranium:	74 kg

7. AUTHORISED CONTENTS

The maximum authorised contents of the Beatrice package is given in the table below-

Radionuclide		Activity	Form	Formulation	Product Bottle	Volume (Max)
^{99}Mo		1500 Ci (55.50 TBq)	Solid	MoO_3 powder	Stainless Steel/ Glass	-
		1500 Ci (55.50 TBq)	Liquid	NaOH solution	Stainless Steel	40ml
		320 Ci (11.84 TBq)	Liquid	NaOH solution stabilised with NH_4NO_3	Stainless Steel	40ml
		660 Ci (24.42 TBq)	Liquid	NaOH solution stabilised with NaOCl	Stainless Steel	20ml
		900 Ci (33.30 TBq)	Liquid	NaOH solution stabilised with $NaNO_3$ or H_2O_2	Stainless Steel	20ml
^{131}I		250 Ci (9.25 TBq)	Liquid	NaOH solution with or without reducing agent	Glass	20ml
^{192}Ir		4000 Ci (148.0 TBq)	Solid	Ir-metal	Stainless Steel	-

8. CONDITIONS FOR USE OF THE PACKAGING

The maintenance required on this transport package is described in the handling instructions. NTP-SOP-9010 Rev 3 (or such future revisions as accepted by the competent authority): *Handling Instructions for the ZA/NNR 1005/B(U)-96 "Beatrice" Transport Package* and in essence entails the following:

8.1 The on-condition replacement of the "O" – rings of the Inner Container.

8.2 Replacement of "O" – ring of the Inner Product Container before every shipment of radioactive material.

8.3 Replacement of the Inner Product Container after every shipment of liquid I-131, if any leakage from the product bottle into the Inner Product Container has occurred or is suspected.

8.4 The coating of all screws with copper grease before every shipment to prevent galling.

8.5 The pressure testing of the Inner Product Container every 3 years.

9. NOTIFICATION

9.1 The owner of a package, manufactured in accordance to the design covered by this Certificate, shall forward the packaging serial number to the competent authority.

9.2 Should a package be disposed of or change ownership, then this change must be notified to the competent authorities.

9.3 Accordingly, the party relinquishing ownership of a package shall forward the name of the new owner to the competent authority.

9.4 The consignor of a package compliant with the design covered by this Certificate, shall check that the package bears a serial number, as well as a Model Number, as identified in Section 5 above.

10. MODE(S) OF TRANSPORT

The package described by this Certificate may be transported by all modes of transport.

11. SPECIFICATIONS OF QUALITY ASSURANCE PROGRAMME

11.1 A quality assurance system as described in document NTP-PRG-0100 must be applied to the design, manufacture, controls and tests of the packaging.

11.2 All packaging must be periodically inspected and as necessary, repaired and maintained in good condition so that they continue to comply with the relevant requirements and specifications, even after repeated use.

12. GENERAL CONDITIONS

12.1 Each user of this certificate must have in his possession a copy of this certificate and all documents necessary to properly prepare the package for transportation.

12.2 This certificate does not relieve the consignor or carrier from the compliance with any requirements of the government of any country through or into which the package will be transported.

13. MARKING AND LABELS

The package must bear the marking ZA/NNR/1005/B(U)-96 in addition to any other required markings and labelling.

14 RELEVANT REGULATIONS

International Atomic Energy Agency Safety Standards Series No. SSR-6, Regulations for the Safe Transport of Radioactive Material, 2012 Edition, Vienna 2012.

15. EXPIRY DATE

This certificate expires at midnight on 02 January 2023.

M B TYOBEKA
CHIEF EXECUTIVE OFFICER

04/09/2017
DATE:

National Nuclear Regulator
P O Box 7106
CENTURION
0046

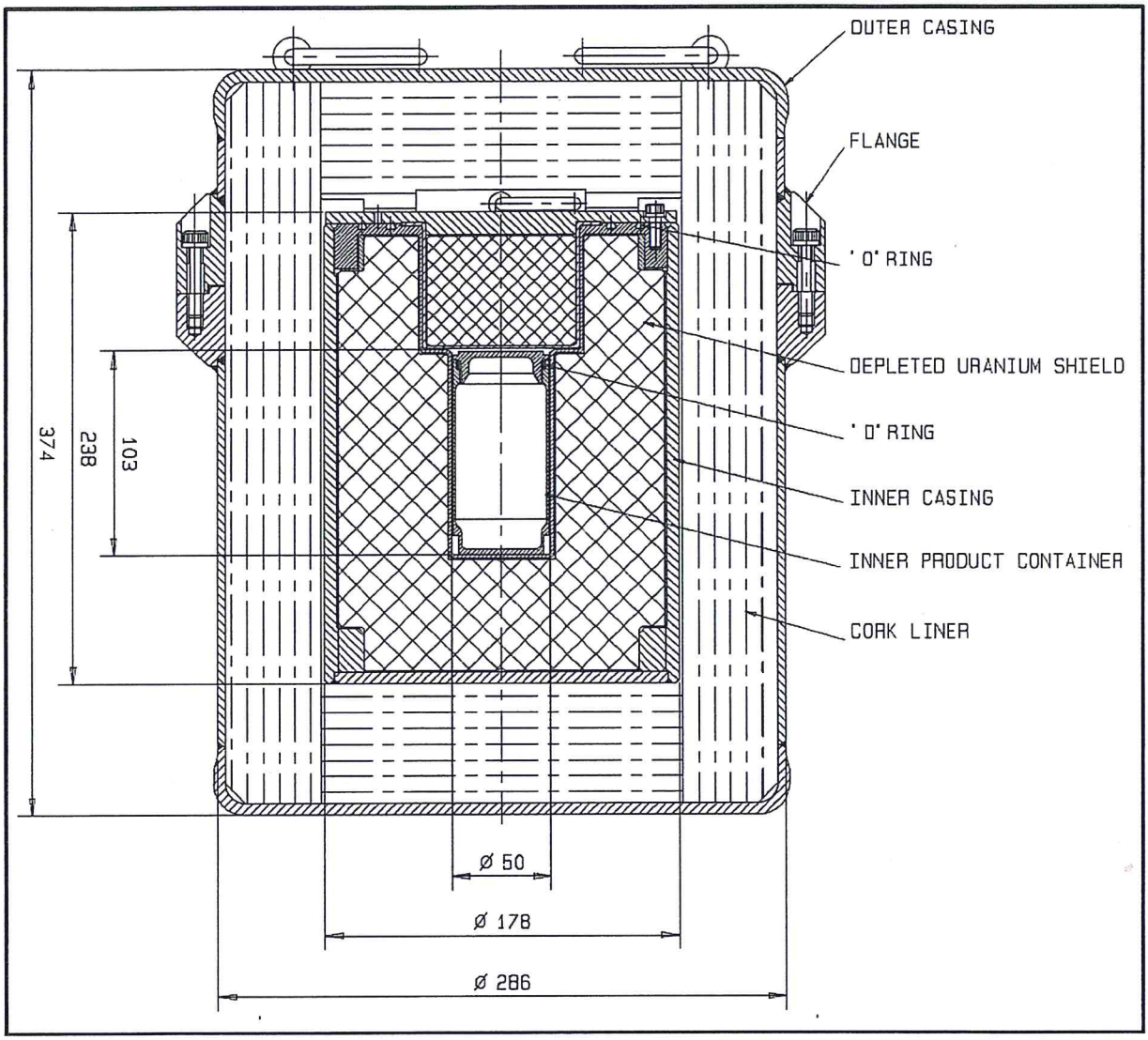

Figure 1: Beatrice Package Outline Drawing

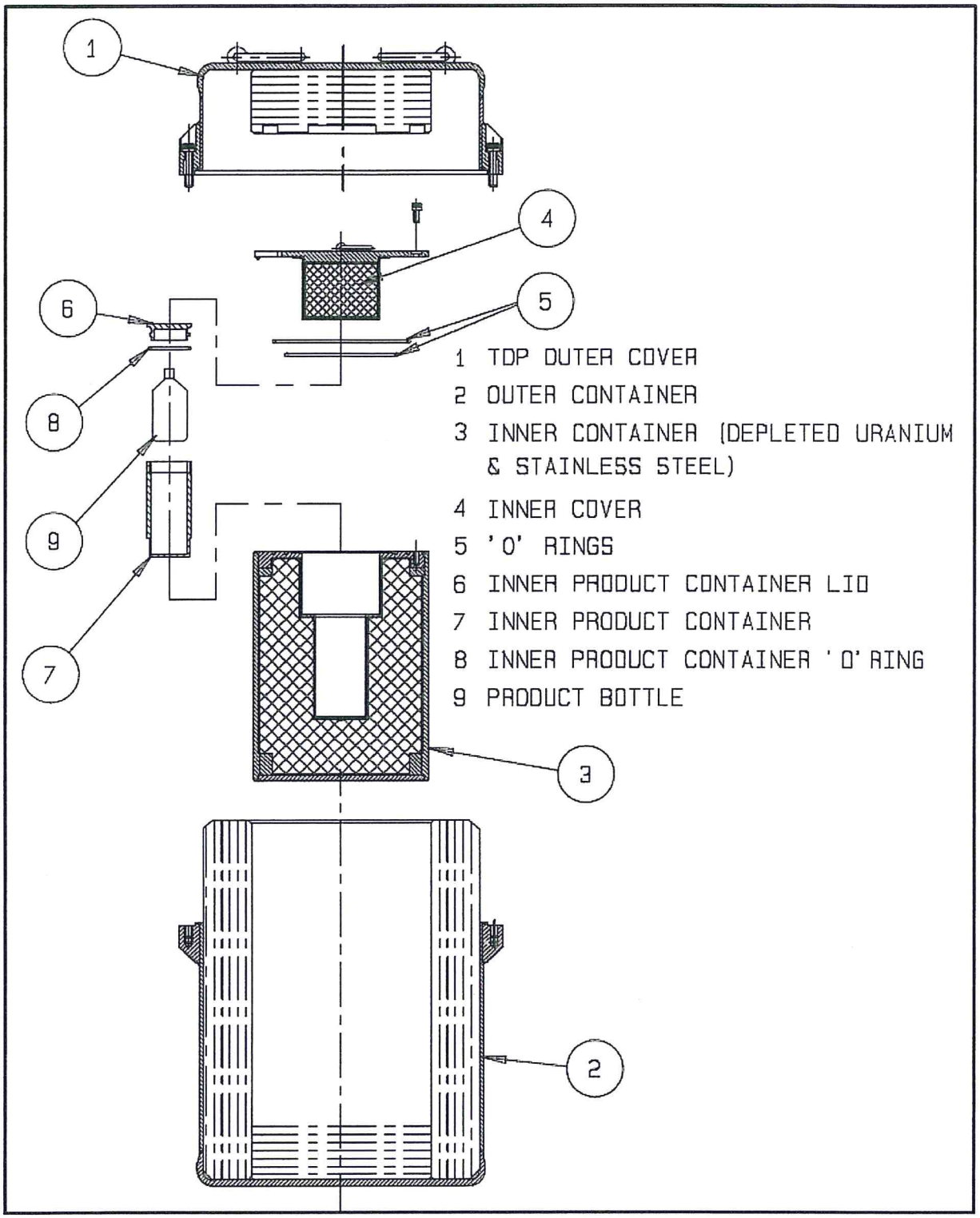

Figure 2: Schematic of Beatrice Package