Eskom	WORKING PROCEDURE	Allocation Centre 38A	Reference Number KWW-TES-021	Rev 3
NNR: NO No.:	ENCAPSULATION OF NON-COMPACTABLE RADIOACTIVE WASTE IN CONCRETE DRUMS			PAGE 1

KORC	ACCESS	IMPORTANCE CATEGORY	NEXT REVIEW DATE	DATE AUTHORISED
NO	Nuclear Restricted	SR	2025-11-05	2020-11-05

COMPILED / REVISED	REVIEWED	AUTHORISED
(sgd) U PHILANDER	(sgd) X NOVEMBER	(sgd) C LE ROUX
U PHILANDER	X NOVEMBER	C LE ROUX
SENIOR TECHNICIAN RADWASTE	SUPERVISOR RADWASTE	SENIOR SUPERVISOR TECHNICAL RADWASTE
DATE 2020-11-04	**DATE** 2020-11-04	**DATE** 2020-11-05

THIS PROCEDURE HAS BEEN SEEN AND ACCEPTED BY:

U Philander	Document Custodian
M Minnaar	RP Development
E Ellis	ALARA

CATEGORY 1 – PROCEDURE IN HAND

FCA	ALARA REVIEW	SUPERSEDES
PROTECTION	YES 2020-10-28	KWW-TES-021, Rev 2 dd. 2017-07-31 FULL REVIEW

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1.0 PURPOSE

1.1 To describe the process for encapsulating non-compactable radioactive waste in concrete drums.

2.0 SCOPE

2.1 Applicable to the final capping station – 6,7 m level NAB N031.

3.0 DEFINITIONS AND ABBREVIATIONS

3.1 Definitions

3.1.1 **NCW** – Is either non-compacted waste in steel drums and concrete drums or high active trash directly encapsulated in a concrete drum.

3.2 Abbreviations

3.2.1 **NAB** – Nuclear Auxiliary Building

3.2.2 **RPC** – Radiation Protection Certificate

3.2.3 **RPM** – Radiation Protection Monitor

3.2.4 **RPOO** – Radiation Protection Operations Office

4.0 REFERENCES

4.1 Referenced Documents

4.1.1 335-2, Rev 5: Koeberg Nuclear Power Station Management Manual

4.1.2 KAA-500, Rev 13: The Process for Controlled Documents

4.1.3 KSA-011, Rev 14: The Requirements for Controlled Documents

4.2 Applicable Documents

4.2.1 VLP-WAC-001: Vaalputs Waste Acceptance Criteria

4.2.2 Waste Treatment Form (LLW 13)

5.0 PREREQUISITES

	ACTIONS AND CHECKS	SIGN
5.1	The encapsulation of non-compactable radioactive waste in concrete drums must be carried out by the Radwaste Section under a Work Request and an RPC.	
5.2	RPM to be in attendance for the duration of the encapsulation process.	
5.3	Ensure that the solid radwaste treatment system (TES) is available.	
5.4	Ensure that the demineraliser water distribution system (SED) is available.	
5.5	Ensure that the drain and vent system (RPE) is available.	
5.6	Ensure that the alarm processing system (KSA) is available.	
5.7	Ensure that the general control system (KRG) is available.	
5.8	Ensure that the instrument air distribution system (SAR) is available.	

6.0 PRECAUTIONS AND LIMITATIONS		SIGN
6.1	This procedure can be performed in any unit state.	
6.2	Comply with Power Station Regulatory and Safety Standards.	

7.0 PRE-JOB PREPARATION

	ACTIONS AND CHECKS	SIGN
7.1	Receive the Work Request to drum non-compactable radioactive waste and discuss the contents with the Vertical Planner.	
7.2	Report to RPOO for the RPC and dosimetry, and check the availability of Radiation Protection cover.	
7.3	Check the availability of overhead crane 9 DMN 005 PR.	
7.4	Establish telephonic communication with the Outside Batching Plant Operator, and request the Operator to prepare the concrete capping mix.	
7.5	Make sure that the Waste Transfer Form (LLW 13) is available (available electronically G:\Koeberg\Nuclear Services\Radiation Protection\SharePoint Migration\RP Operations\Radwaste\LLW-13 Forms\LLW13 CONCRETE DRUMS)	
7.6	Check operability of capping station drum trolley 9 TES 003 CX.	
7.7	Ensure adequate lighting available in N030, N031 and N032 to perform the work safely.	

NOTE: *1) The two main sources of non-compactable radioactive waste come from the Decontamination Workshop and from the Containment during outages. Both the Decon Workshop and the Containment Buildings are supplied with C1 concrete drums without liners fitted for the disposal of waste with a contact doserate of 2 mSv/h or greater.*

2) A C1 concrete drum is also placed in N030 as near to the entrance door as possible. Any non-compactable active waste with a contact doserate of greater than 2 mSv/h, or waste that cannot be conditioned in a steel drum due to its size generated in the NAB, will be taken to N030 and, under Radiation Protection supervision, will be placed into the concrete drum.

3) Ensure that all contaminated pressurised containers have been pierced (depressurisation) and flattened (volume reduction) before treatment/conditioning as non-compactable waste.

(4) A distance of 250 mm ± 50 mm from the top lip of the concrete drum must be left when filling with active waste. This will ensure that the top of the drum will be under the 2 mSv/h contact reading when the waste is encapsulated in concrete and the final cap is cast.

8.0 INSTRUCTIONS

8.1 Encapsulating of Non-compactable Radioactive Waste into Concrete Drums

	ACTIONS AND CHECKS	IDENTIFICATION	COMMENTS	SIGN
8.1.1	Energise the final capping station.	601 CC key switch	601 LA white cap indicator on panel illuminated	
8.1.2	Pull out the emergency stop button.	601 TO red hand pump type	602 LA white cap indicator on control desk illuminated	
8.1.3	Carry out a panel lamp test.	602 TO black pushbutton	All LA indicator caps illuminated on control desk	
8.1.4	Check that the drum trolley 003 CX is in the loading position.	605 TO black pushbutton	604 LA white cap indicator illuminated on control desk	
8.1.5	Using the overhead crane, transport the drum to be filled from the storage area to the capping station.	9 DMN 005 PR		
8.1.6	Lower the drum onto the trolley 003 CX using a “spotter”.			
8.1.7	Move the trolley with the drum to the concreting position.	603 TO black pushbutton	606 LA green cap indicator illuminated 604 LA white cap indicator goes out	
8.1.8	Make sure that the trolley is in the concreting position.		605 LA white cap indicator illuminated 606 LA green cap indicator goes out 607 LA red cap indicator illuminated	
8.1.9	Retract the drip tray.	606 TO black pushbutton	608 LA white cap indicator goes out 609 LA white cap indicator illuminated	
NOTE:	*Establish telephonic communication with the outside batching plant operators. They will advise when the concrete mix is ready. They will transport the mix to the outside capping station and position it on its stand. From this point onwards, communication must remain open between the inside and outside operators. If communication is lost, the process must be stopped until communication is re-established.*			
8.1.10	Confirm that the concrete mix is positioned on its stand.		613 LA white cap indicator illuminated.	
8.1.11	Instruct the outside operator to connect the wet mix hopper electrically and pneumatically.		Control of the hopper conveyor belt is now with the operator on the panel inside the NAB.	
8.1.12	Start the wet mix hopper conveyor.	610 TO red pushbutton	614 LA green cap indicator illuminated 615 LA red cap indicator goes out	

ACTIONS AND CHECKS		IDENTIFICATION	COMMENTS	SIGN
8.1.13	Continue to fill the drum with concrete until the waste is just covered.			
8.1.14	Stop the wet mix hopper conveyor.	611 TO red pushbutton	614 LA green cap indicator goes out 615 LA red cap indicator illuminated.	
8.1.15	Move the drip tray back into position.	607 TO black pushbutton	608 LA white cap indicator is illuminated	
8.1.16	Move the trolley with the drum to the loading position.	605 TO black pushbutton	606 LA green cap indicator illuminated 605 LA white cap indicator goes out	
8.1.17	Make sure that the trolley with the drum is in the loading position.		606 LA green cap indicator goes out 607 LA red cap indicator goes out 604 LA white cap indicator illuminated	
8.1.18	Radiation Protection will now take the doserate readings on the drum top and side.		Results entered on the Waste Transfer Form (LLW 13) (available electronically G:\Koeberg\Nuclear Services\Radiation Protection\SharePoint Migration\RP Operations\Radwaste\LLW-13 Forms\LLW13 CONCRETE	
8.1.19	Using the overhead crane lifts the drum high enough to allow Radiation Protection to take doserate readings on the base of the drum.	9 DMN 005 PR	Results entered on the Waste Transfer Form (LLW 13) (available electronically G:\Koeberg\Nuclear Services\Radiation Protection\SharePoint Migration\RP Operations\Radwaste\LLW-13 Forms\LLW13 CONCRETE	
8.1.20	Take the drum to the high position on completion of Radiation Protection readings and replace it in the intermediate storage area in N030.			

NOTE: *At the end of the filling process, or at the end of each working day, the capping station must be washed down. The outside operators must wash down the concrete descent tube first. The inside operators can then precede with washing down, paying particular attention to the throat of the concrete descent tube and drip tray.*

	ACTIONS AND CHECKS	IDENTIFICATION	COMMENTS	SIGN
8.1.21	Shut down the capping station control panel.	601 CC key switch	601 LA white cap indicator goes out	
8.1.22	Push in the emergency stop button to prevent unauthorised use of the capping station.	601 TO red hand pump type	602 LA white cap indicator on control panel goes out	
8.1.23	Radiation Protection is to ensure that the sign-posting is updated and that the capping station doors are locked on completion of the work, or at the end of each working day.			
NOTE:	*After the initial fill, the concrete drum containing encapsulated non-compactable radioactive waste must remain in N030 for a minimum of 14 days to cure before final capping of the drum can take place.*			

9.0 ACCEPTANCE CRITERIA

N/A

10.0 RECORDS

10.1 All records generated must be retained as permanent records.

11.0 ATTACHMENTS

Appendix 1 – Non-compactable Waste

Appendix 2 – Justification

APPENDIX 1

NON-COMPACTABLE WASTE

1. ACCEPTABLE NCW INVENTORY

- Open Valves
- Open Piping
- Metal plates
- Steel
- Rubber
- Concrete
- Assorted filters (Filter Elements)
- Aerosol cans (Depressurised and flattened)
- Wood
- Activated Carbon (Charcoal filter filler material)
- Plastic
- Bags of tissue
- I&T sources (with small quantities of I_{131})
- Wires
- Cables
- Insulation
- Fibreglass
- Cotton
- Polyester

2. NON-ACCEPTABLE SCRAP OR WASTE AS NCW

- Grease or oil
- Sludge
- Pressurised containers
- Explosive or pyrophoric materials
- Hazardous or toxic materials

APPENDIX 2

JUSTIFICATION

Revision 1

1. Full review.
2. Procedure aligned to address human performance fundamentals in ensuring proper place keeping in accordance with KGA-088.

   Safety Screening: S2011/0008

Revision 2

1. Full review.
2. Safety Screening: S2017-0345.

Revision 3

1. Scheduled review.

   Safety Screening S11269