

Footprint reduction: Liquid and solid waste reduction by using Reversed Osmosis

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INTRODUCTION

- **Objective:** Reduce amount of heavy metals and radionuclides with RO
Reduce amount of solid secondary radioactive waste from water treatment
- **Opportunity:** Reduce footprint and storage costs of solid waste
- **Constraints and challenges:** New waste treatment method must be fit into existing liquid waste processing process

NRG PROJECT

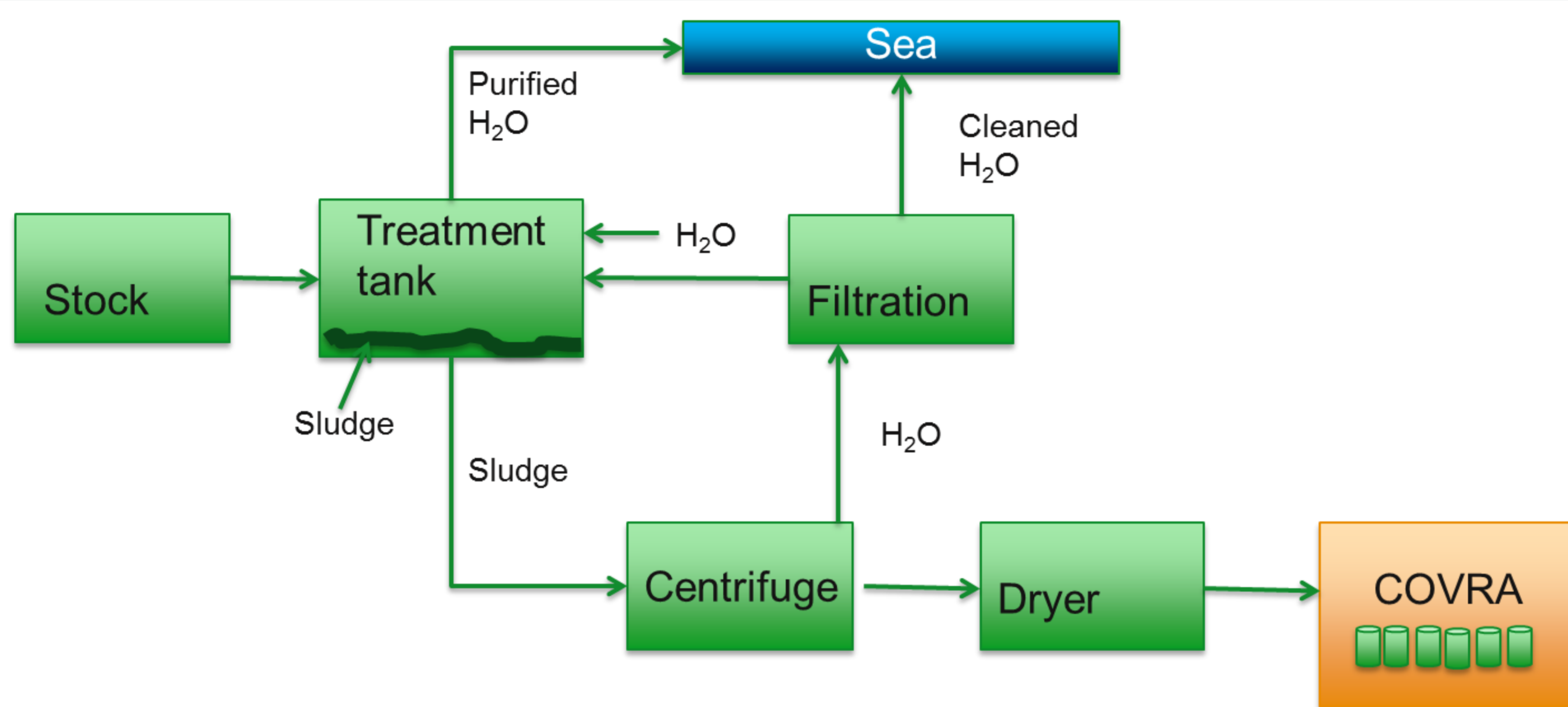


Fig. 1: flow diagram water treatment

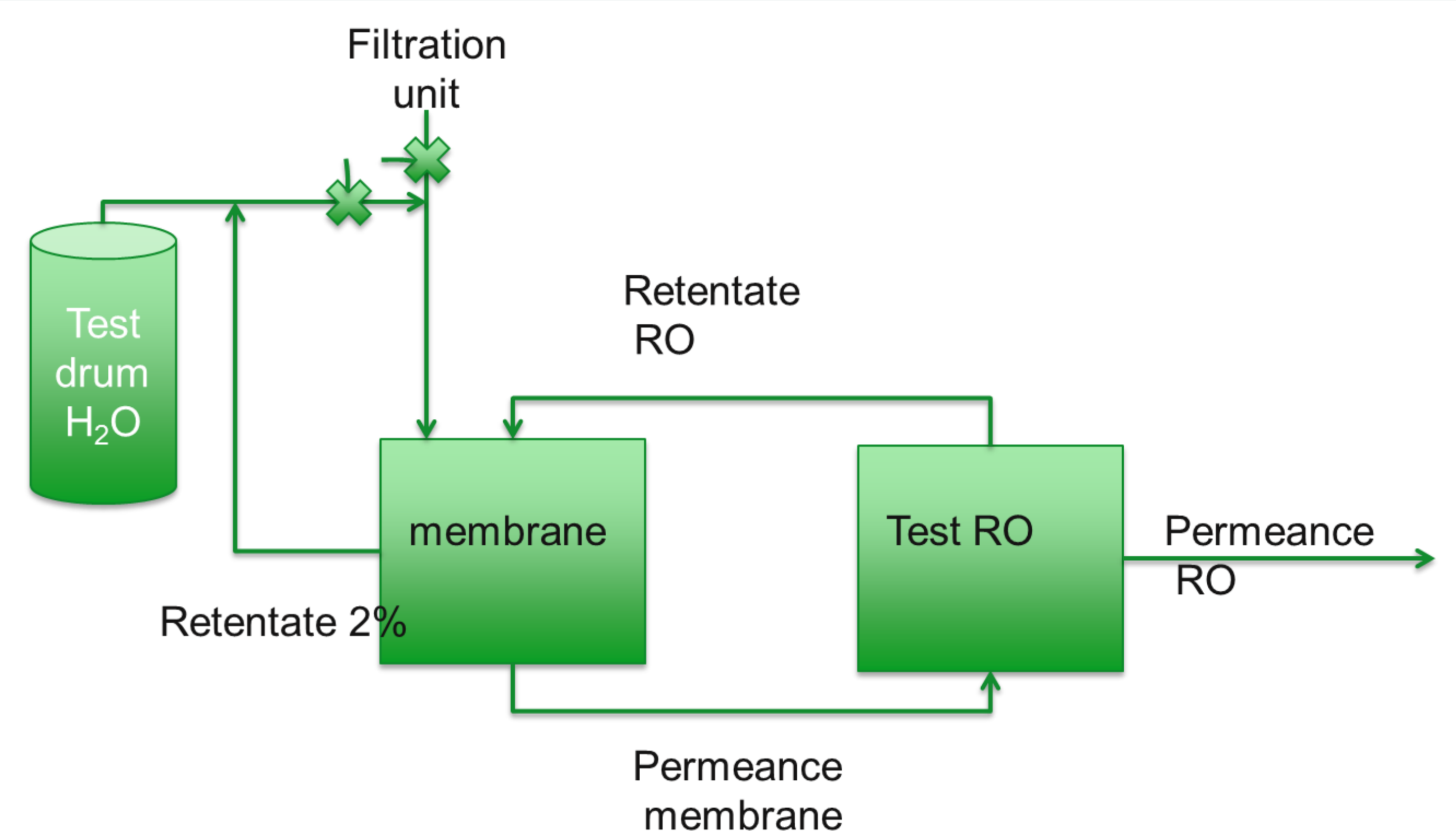


Fig. 2: flow diagram test installation



Fig. 3: Test installation reversed osmosis

Tested waste water streams:

- HFR pool water
- Waste water nuclear facilities
- Molybdenum production water
- Etching water
- Pipe cleaning water

RESULTS AND WAY FURTHER

	HFR pool H ₂ O	Waste water nuclear facilities	Mo prod. H ₂ O	Etching H ₂ O	Pipe cleaning H ₂ O
Element	Removal [%] with RO	Removal [%] with RO	Removal [%] with RO	Removal [%] with RO	Removal [%] with RO
P	***	± 100	± 100	± 100	± 100
Cr	***	± 100	± 100	± 100	91,7
Co	***	***	± 100	***	± 100
Ni	48,7	96,6	98,6	99,8	97,5
Cu	1)	45,2	-49,1	40,4	-40,1
Zn	34,8	88,9	81,1	99,4	69,6
As	± 100	± 100	89,8	89,3	90,7
Cd	***	***	***	87,5	± 100
Sn	***	***	***	± 100	***
Hg	***	32,0	± 100	***	***
Pb	49,1	98,3	35,8	81,7	98,2
N	*	93	± 100	*	*
O	*	± 100	64	*	*

*** Element not present in this type of water; 1) Cu contamination; ± 100 Amount smaller than detection limit; * Not tested for this type of water

- ✓ The amount of flocculent that has to be used can be reduced up to 50%
- ✓ It becomes possible to re-use waste water in certain cleaning processes which was not possible before the use of RO
- ✓ The water which is released is much cleaner than without the use of RO

Way Further:

- Introduction of reversed osmosis installation in the waste water treatment process