

# Ringhals Cable program

Text, 2020-01-19, Patrik Rydberg

# Nuclear power plants in Sweden

## Ringhals 1, 2, 3 och 4

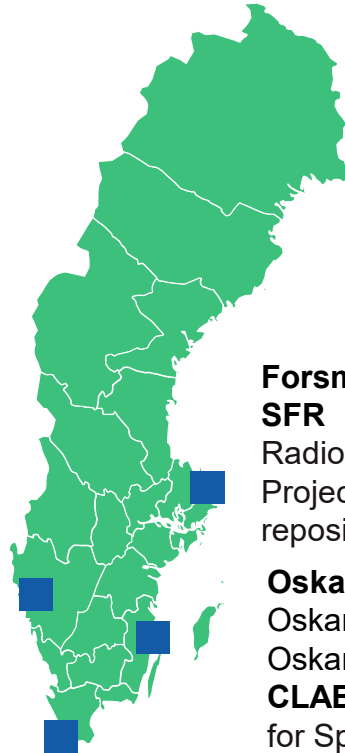
Ringhals 1 is closed down 2020

Ringhals 2 was closed down 2019

## Barsebäck 1 och 2

Barsebäck 1 decommissioned Nov 30 1999

Barsebäck 2 decommissioned May 31 2005



## Forsmark 1, 2 och 3

**SFR** Final Repository for  
Radioactive Operational Waste  
Project planning of the nuclear fuel  
repository is ongoing

## Oskarshamn 1, 2 och 3

Oskarshamn 1 was closed 2017

Oskarshamn 2 was closed 2015

**CLAB** Central Interim Storage Facility  
for Spent Nuclear Fuel

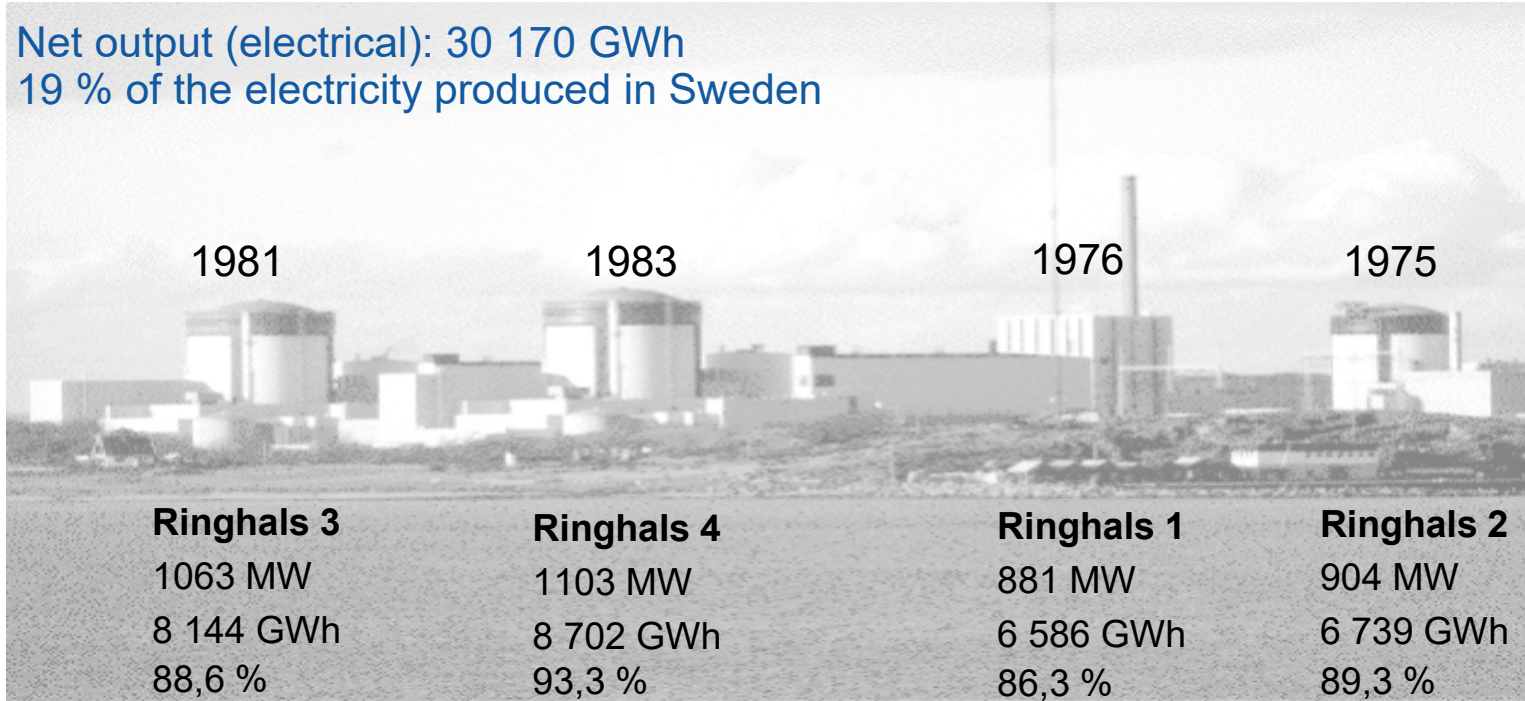
# Ringhals – the largest power plant in Sweden





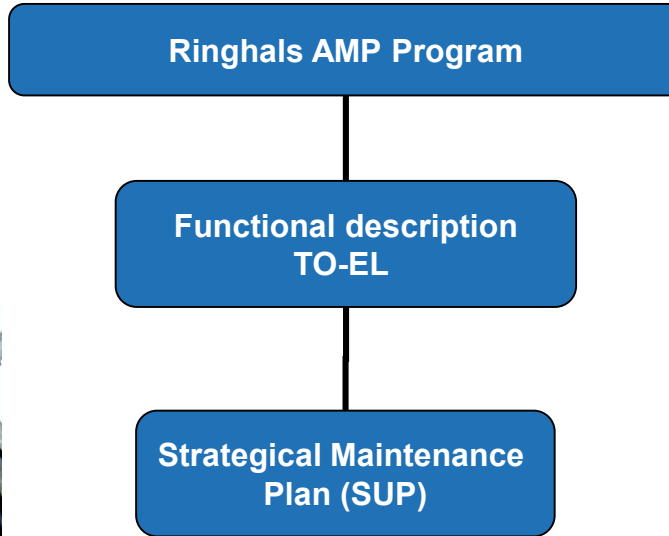
# Ringhals 2018

Net output (electrical): 30 170 GWh  
19 % of the electricity produced in Sweden





# Ringhals cable ageing program



# Ringhals cable ageing group

Technical working group

Convening  
Josef Sumegi

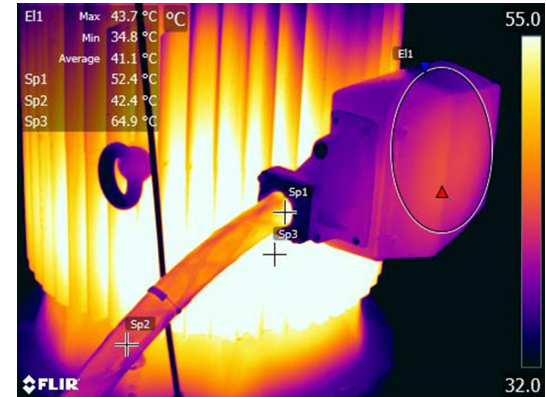
Electric  
Technical department

Electric  
Quality department

Electric  
Maintenance department

# Ringhals cable ageing program

- The cable that is picked in the program involved almost all cable types installed in the plants.
- We are doing walkdowns in the plants with IR camera.
- We have identified areas that exceed 30°C outside containment.

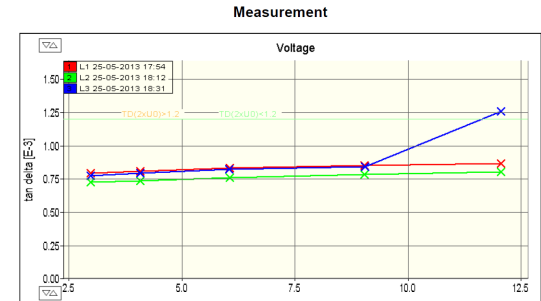




# Ringhals cable ageing program

## 6,6kV Medium Voltage Cable

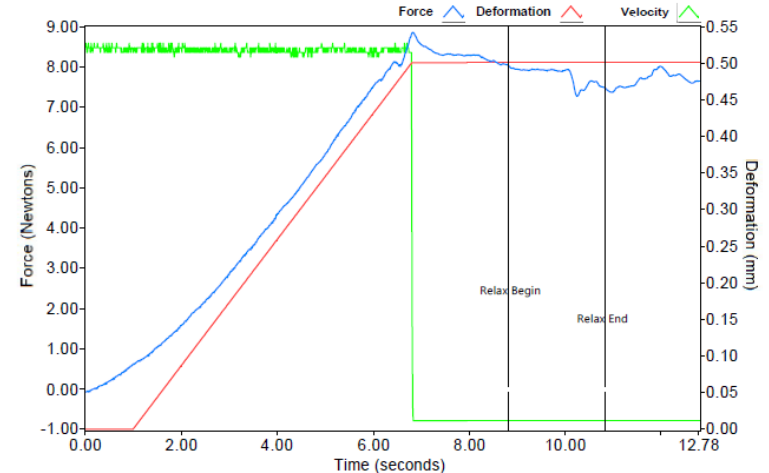
- Almost all off this cables are inside the building structure.
- Cable to the emergency diesel generators are placed in drained cable culverts above a walking culvert to the diesel building.
- We are using VLF Tan Delta measurement for this cable.
- We will start with PD measurement in this Outage.



# Ringhals cable ageing program

Power Cable 500V

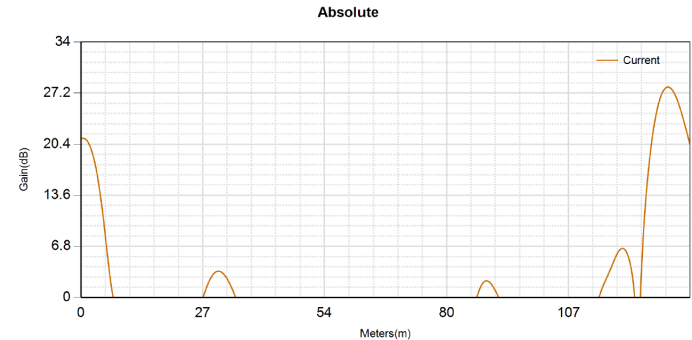
- We are using LIRA measurement to find local degradation.
- For cable inside containment we are using indenter/modulus.



# Ringhals cable ageing program

## I/C Cables

- We are using LIRA measurement to find local degradation.
- For cable inside containment we are using indenter/modulus.





# Ringhals cable ageing program

On going project

- One Time Inspection
  - Investigate coupling boxes
  - Terminal connections in cabinets
- SAMPO
  - Polymers in nuclear application
- Thermal ageing project
  - Correlate Indenter and EAB

# Ringhals cable ageing program

## Experience Exchange

- EKG
  - Nordic Cable User Group
  - TVO, OKG and FKA
- EPRI
  - Cable User Group



# Thank you.

# QUESTION?