

Integrity analysis of secondary cooling system of PUSPATI TRIGA Reactor

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Outline

- Introduction
- Objective
- Testing
- Methodology
- Results and Discussion

Introduction

- PUSPATI TRIGA Reactor – operated 32 years
- Some of the components and systems are facing with the ageing
- Secondary system will be upgrade in the near future

Objective

- These study aim to produce the baseline data information of components integrity for secondary cooling system.
- To study corrosion characteristic of secondary pipe material

Testing

- Water Chemistry Test
- Corrosion Potential Test
- Ultrasonic Thickness Gauge

Testing Methodology

- Water Chemistry Test
 - i. 1 liter specimen of water from cooling tower
 - ii. Filter the water
 - iii. Use pH meter to determine pH and concentration of chloride



- Corrosion Potential Test
 - i. Specimen of water from cooling tower
 - ii. Carbon steel used as a material tested
 - iii. Corrosion analyzer and Gamry Instrument Framework Software use to analyze corrosion rate, E_{corr} and I_{corr}



- Ultrasonic Thickness Gauge
 - i. Four sample points of inlet and outlet secondary pipe selected to analyze
 - ii. The pipe material is Galvanized Iron
 - iii. The Krautkramer DMS 2 use determine the thickness of pipe
 - iv. Three reading taken for each point



- UT test point

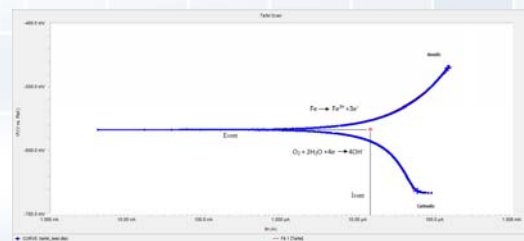


Results and Discussion

- pH = 7.723
- Cl^- = 2.096 ppm
 - Sea water = 19 000 ppm
 - Tab water = 4 ppm

- Corrosion rate = $553.3E-3$ mmpy
- I_{corr} = $47.70 \mu A$
- E_{corr} = -567.0 mV

- Tafel plot

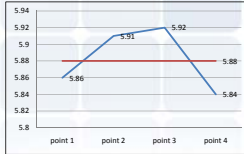


- Inlet pipe



- Thickness reduce= 2.33 %

- Outlet pipe



- Thickness reduce= 2.00 %

Conclusion

- pH for secondary cooling water is near to natural
- Corrosion rate is low for carbon steel
- Only about 2 % of thickness reduce, it is not due to corrosion
- Further study will be done