

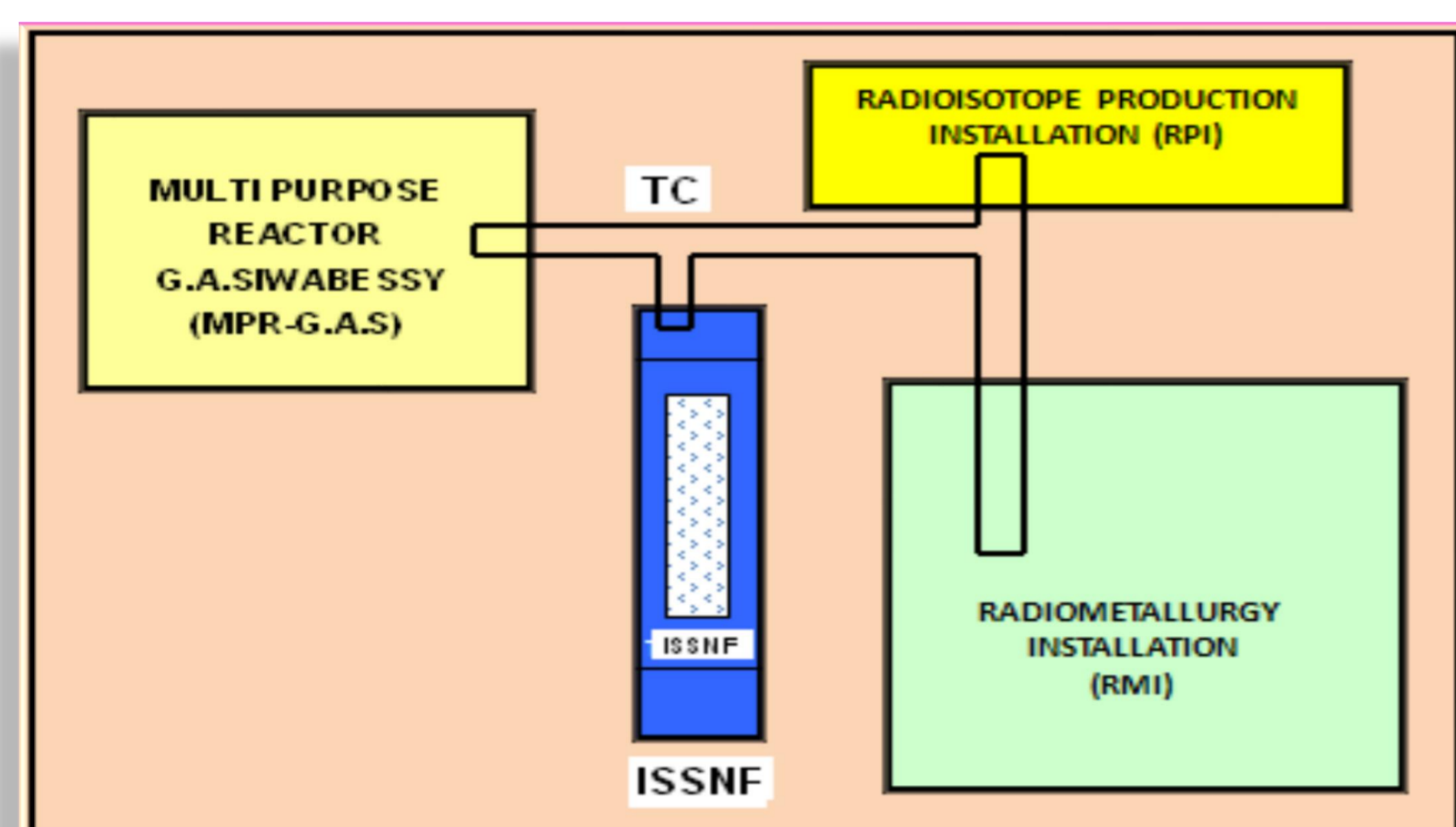
# FACILITY PERFORMANCE AND AGING REVIEW OF THE INTERIM STORAGE FOR SPENT NUCLEAR FUEL IN INDONESIA

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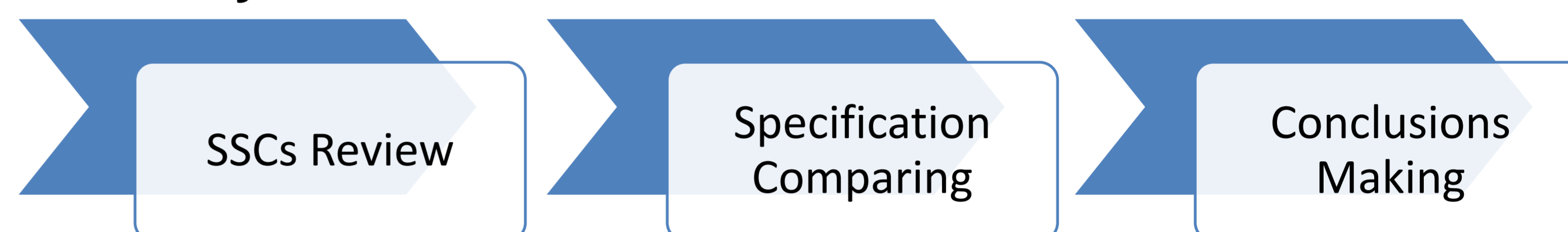
## INTRODUCTION

- Indonesian Transfer Channel – Interim Storage for Spent Nuclear Fuel (TC-ISSF) was built in 1993, obtain operating licenses in 2008 which is valid for 10 years until 2018.
- To extend the operating licence for next decade, the operatory body have to ensure that the ISSF will be safely operated by determining the result of the facility performance and aging review.
- The main function is to store SNF arising from the operation of the GA Siwabessy Multipurpose Reactor (GAS-MPR).



## METHODOLOGY

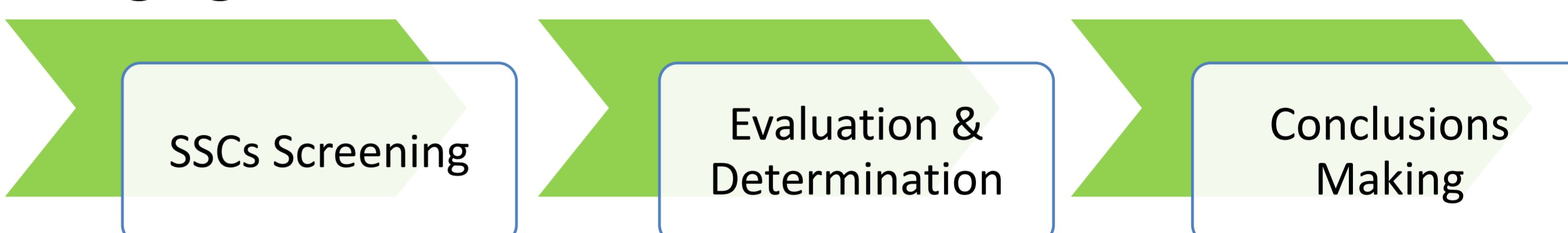
### 1. Facility Review



- Concrete
- SS Liner
- Building
- Spent fuel rack etc

Limit of operation conditions

### 2. Aging Review



- SSCs classification

Critical SSCs

## RESULT AND DISCUSSION

### 1. Facility performance review

SSCs that are important for safety and the review shown as below:

#### a. Concrete & SS liner

- The ultrasonic test results show that SS liner is still 3 mm (same as the basis design).

#### b. Building structure

- The results of the visual test found no significant crack or

#### c. Ventilation, purification, cooling, & demineralized system

- Assessment conducted during the period of 2008-2017 shows a good performance.
- Water cond. 1.5µS/cm, temperature around 26.90 C.
- Visualization using Human Machine Interface (HMI)

#### d. Spent fuel rack

- Calculation of SNF rack with aluminium material criteria using Monte Carlo N-Particle version 6 (MCNP6) program obtained  $K_{eff}$  value of 0.7709.

### 2. Aging review

Class	Structure, System and Component Group
SSC I (critical); important for safety, not redundant, not easily repaired or not easily replaced	Stainless-steel liner at concrete structure
SSC II; important for safety, but redundant or easy to do SSCs inspection or replaced	Building, ventilation, cooling system, purification, main electrical supply, demineralized water, rack.
SSC III; not SSCs that is important for safety but it is not easy to do SSCs inspection or repair	Crane, mast transfer unit, movement bridge, sluice gate.
SSC IV; other components	System control, alarm, compressed air, etc.

Object monitored	Measured value	Limit of normal conditions
pH	5,8 – 7,1	5,5 – 7,5
Conductivity	1,36 - 1,54	< 15 µS/cm

The corrosion test results show that SS 304 corrosion rate was 0.002 mpy on TC-ISSF water pool medium and can withstand corrosion attack for more than 40 years.

## CONCLUSIONS

- Facility performance and aging review of TC-ISSF facility were done by review of SSCs and supporting facilities of TC-ISSF.
- Several modifications were also made to facilitate the operation and monitoring of support system.
- The review was conducted in SSCs which important to safety, there are liner inspection by ultrasonic detector, sipping test of the SNF to detect leakage of cladding, corrosion study of cladding and liner material, support system performance, etc.
- The results show that the thickness of the liner is still 3 mm, no leakage detected of the cladding which was tested, corrosion rate is 0.002 mpy which was predicted to hold for more than 40 years operation, the water parameters are well maintained, and all the support system are working properly as designed.
- From the review results, TC-ISSF can still be operated properly for at least the next 20 years.

## ACKNOWLEDGEMENTS

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