



# Enhanced Pressure Vessel Extension Scheme 2020

SCIC-JOINT AGENCIES DIALOGUE 2019  
20 November 2019



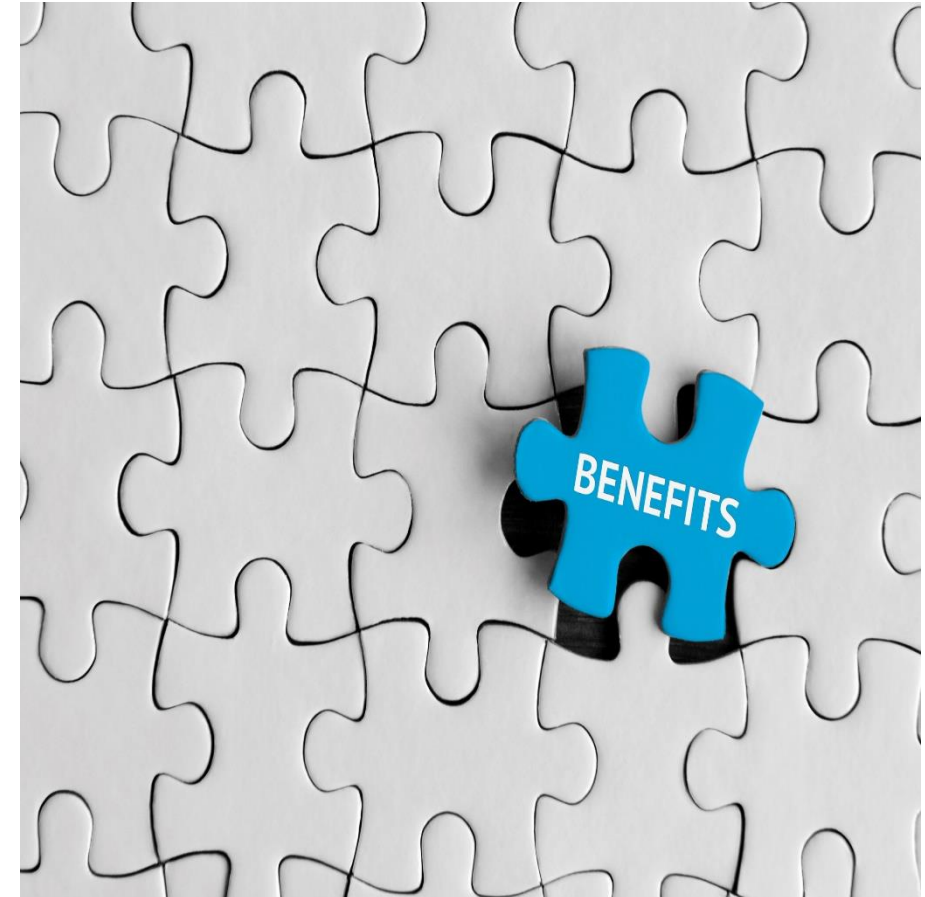
MINISTRY OF  
MANPOWER

# Enhanced Pressure Vessel Extension Scheme 2020

Summary of Enhancements

# PVES – Benefits to Companies

- ✓ Allow companies that can safely manage PVs, the flexibility to plan for shutdowns without frequent and unnecessary disruptions.
- ✓ Improved safety for personnel without need to conduct high-risk activities related to shutdown and start-up of plants.
- ✓ Manpower and cost savings due to extended run length and avoidance of frequent shutdowns.



# PVES 2020 Scheme - Key Enhancement Areas

Implementation Date – 1 XXX 2020

- ✓ The PVES Scheme reviewed after completion of the full cycle of the 2012 CLA Scheme.
- ✓ Key enhancements included based on industry feedback for a more risk-based and progressive PV Inspection regime.
- ✓ Enhancements also made based on advancements in Inspection Methods and Technologies as well as International benchmarks
- ✓ Conclusion of 1<sup>st</sup> Cycle of the 2012 CLA Scheme gives confidence that Scheme is working well with good track record of companies under the Scheme

## Key Enhancement Areas

- 1 Shifting from a prescriptive Inspection Regime to a more progressive **Risk-based Inspection Philosophy**
- 2 Expansion of Scope to include **ALL PVs** that are part of a continuous process plant or unit that are designed for extended run length cycles.
- 3 Extension of the maximum statutory inspection interval for **Fired Steam Boilers from 2 years to 5 years**
- 4 Other enhancements to **On-Stream Inspection and Monitoring Activities**

# 1

## Adoption of RBI Philosophy as a Principal Criterion for Extension

### Current Requirements

- Current guidelines were prescriptive on establishment of PVMS and SGSU as a criteria for extension.

### Proposed Revision

- Shifting to a more outcome-based and risk-based Inspection Philosophy (RBI) that involves use of risk analysis to develop an effective inspection plan. Includes assessment of **Probability of Failure (POF)** and the **Consequence of Failure (COF)** as principal criteria for extension.
- Ensure a common approach (inspection methodology, scope and intervals), placing importance on assessment of all credible damage mechanisms that could be expected to affect the equipment.
- Plant Owner personnel and Competent Person shall possess relevant competency to meet the needs of a RBI Inspection approach.



# 2

## Expansion of Scope to include All Pressure Vessels that are designed for extended run length cycle

### Current Requirements

Current scope applied only to Steam Boilers, Steam Receivers or Air Receivers that are part of a continuous process plant or unit that are designed for extended run length cycle and that they cannot be taken out of service for examination without causing a consequential shutdown of the entire plant or unit



### Proposed Revision

Scope expanded to include all PVs that are part of a continuous process plant or unit that are designed for extended run length cycles. The consideration whether there is a **consequential shutdown** of the entire plant or unit is no longer required.



# 3

## Extension of Maximum Statutory Examination period for Fired Steam Boilers

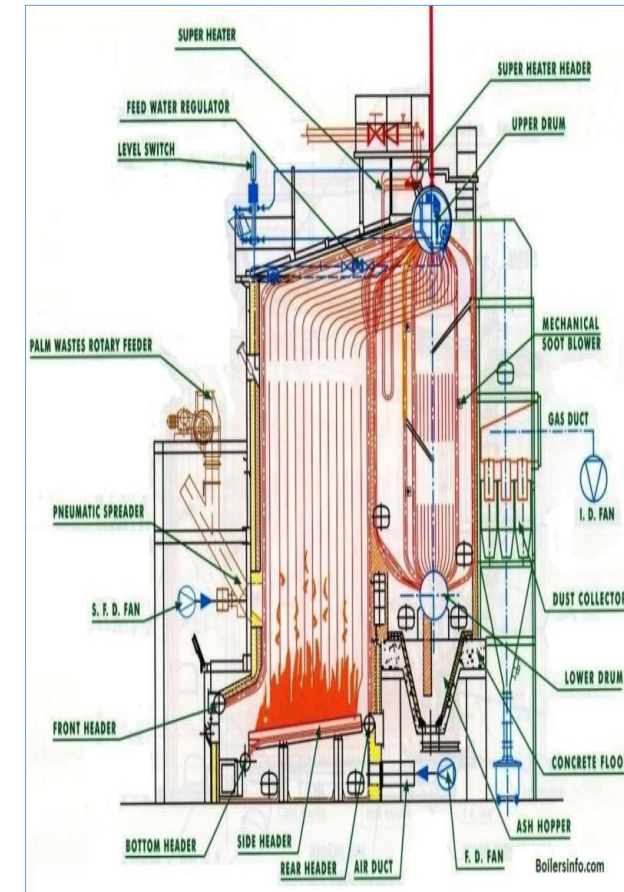
### Current Requirements

- Under current scheme, fired Steam Boilers, are allowed a max period of up to **2 years** from the last statutory examination date. Unfired steam boilers, Steam Receivers, and Air Receivers are allowed a max period of up to **5 years** from the last statutory examination date.



### Proposed Revision

- While Industry is pushing for more liberal max limits, industry needs time and experience to mature before the max limits on inspection intervals could be expanded aggressively.
- More time needed to gather data to determine how the PVES scheme would run and how the industry is reacting to it.
- MOM recognises that with technological advances, the construction of boilers as well as the inspection methodologies have improved, which significantly lower the risks of a boiler operation
- **Hence the max statutory examination period for Fired Steam Boiler will be increased from 2 years to 5 years**



# 4

## Other Enhancements to On-Stream Inspection and Monitoring Activities



Area	Current Requirements	Proposed Revision
1	External Visual Inspection of AR and SR	<b>External visual inspection of AR &amp; SR</b> to be carried out at suitable intervals as determined by the Owner and the Competent Person. Such tests shall be carried out <b>at least in every 5 years or at least once during the extension period whichever is lesser.</b>
2	Sulphur Recovery Unit (SRU) Inspections	<b>SRU inspections:</b> On-stream inspection and monitoring program shall include on-stream thickness gauging and inspection of critical areas <b>at suitable intervals as determined by the Owner and the Competent Person, but at least once during the extension period.</b>



# 4

## Other Enhancements to On-Stream Inspection and Monitoring Activities



	Area	Current Requirements	Proposed Revision
3	Thickness Gauging & NDE	To conduct on-stream UTG on periodic basis, other NDEs as necessary.	<b>Thickness Gauging &amp; Non-Destructive Examinations:</b> to be carried out as necessary based on a RBI approach within the extension period. Such plans shall be determined jointly by the Owner and the Competent Person.
4	In-situ Testing of Safety Valves	To conduct every <b><u>12 months.</u></b>	<b>In-situ Testing of Safety Valves:</b> to conduct an in-situ test of all safety valves under steam pressure, at least once in every period of <b><u>24 months</u></b> , so far as is reasonably practicable. <b>If assisted-lift test method is used, it shall be conducted by laboratories accredited by SAC</b>

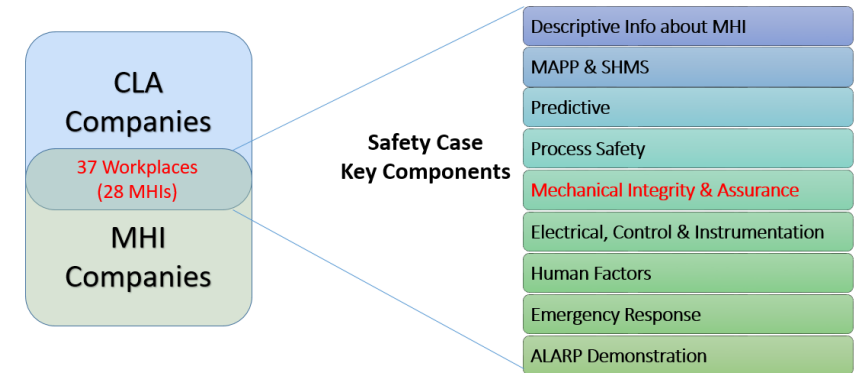
# PVES 2020 – Transitional Arrangements

- ✓ Transitional arrangements is currently being finalised. Details will be announced shortly through the updated Guidelines.
- ✓ Companies under current CLA2012 scheme will continue to operate as usual
- ✓ PVs under CLA2012 will continue to operate until the next shutdown period.
- ✓ Companies that wish to enjoy the enhancements under the PVES2020 will have to make fresh application to MOM to demonstrate that they have establish and implement a sound **Risk-based Inspection methodology** to manage the risks of the PVs, in compliance with the requirements set out in the guidelines
- ✓ Companies that do not wish to enjoy the enhancements under PVES2020 can choose to remain within CLA2012 for the next few years



# PVES 2020 – Integration with Safety Case Regime

- ✓ Going forward the assessment of PVES by MOM will be integrated within the overall Safety Case regime
- ✓ This will be managed within the Key Element of **Mechanical Integrity and Assurance** under the Safety Case regime
- ✓ MOM will conduct regular audits of the PVES in addition to the Internal Audits and the third-party Technical Audits





MINISTRY OF  
MANPOWER

**The End**

Thank you for your attention