REINHOLD ENVIRONMENTAL Ltd.

2012 NOx-Combustion Round Table & Expo Presentation

February 13-14, 2012, in Columbus, OH / Hosted by AEP

HITACHI
Inspire the Next

Hitachi Power Systems America

February 13, 2012

Maximize Hg Oxidation Through SCR

Peter Jin, Ph.D., P.E.

U-MACT Hg Compliance Strategy

HITACHI
Inspire the Next

Challenge:

New Hg Emission Limit – 1.2 lb/TBtu (for most existing units)

Strategy:

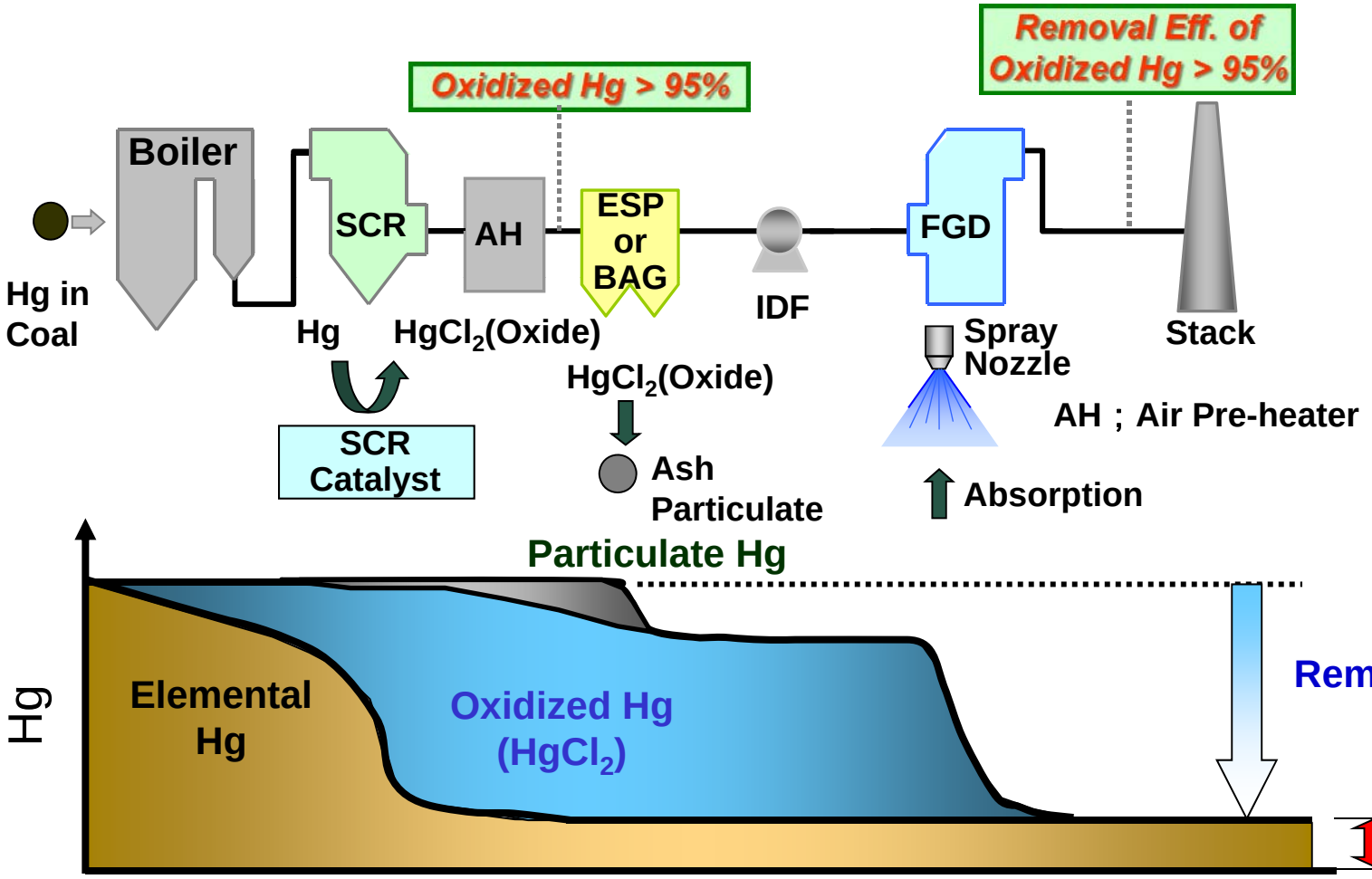
- Is Co-Benefit of Hg Oxidation through SCR a viable strategy?
- How to maximize the Co-Benefit?
- Will Co-Benefit Approach Alone Meet Plant's Hg Emission Limit?

Most Cost-Effective Hg Compliance Strategy:
Maximize Co-Benefit of Hg Oxidation through SCR

Co-Benefit of Hg Oxidation through SCR

HITACHI
Inspire the Next

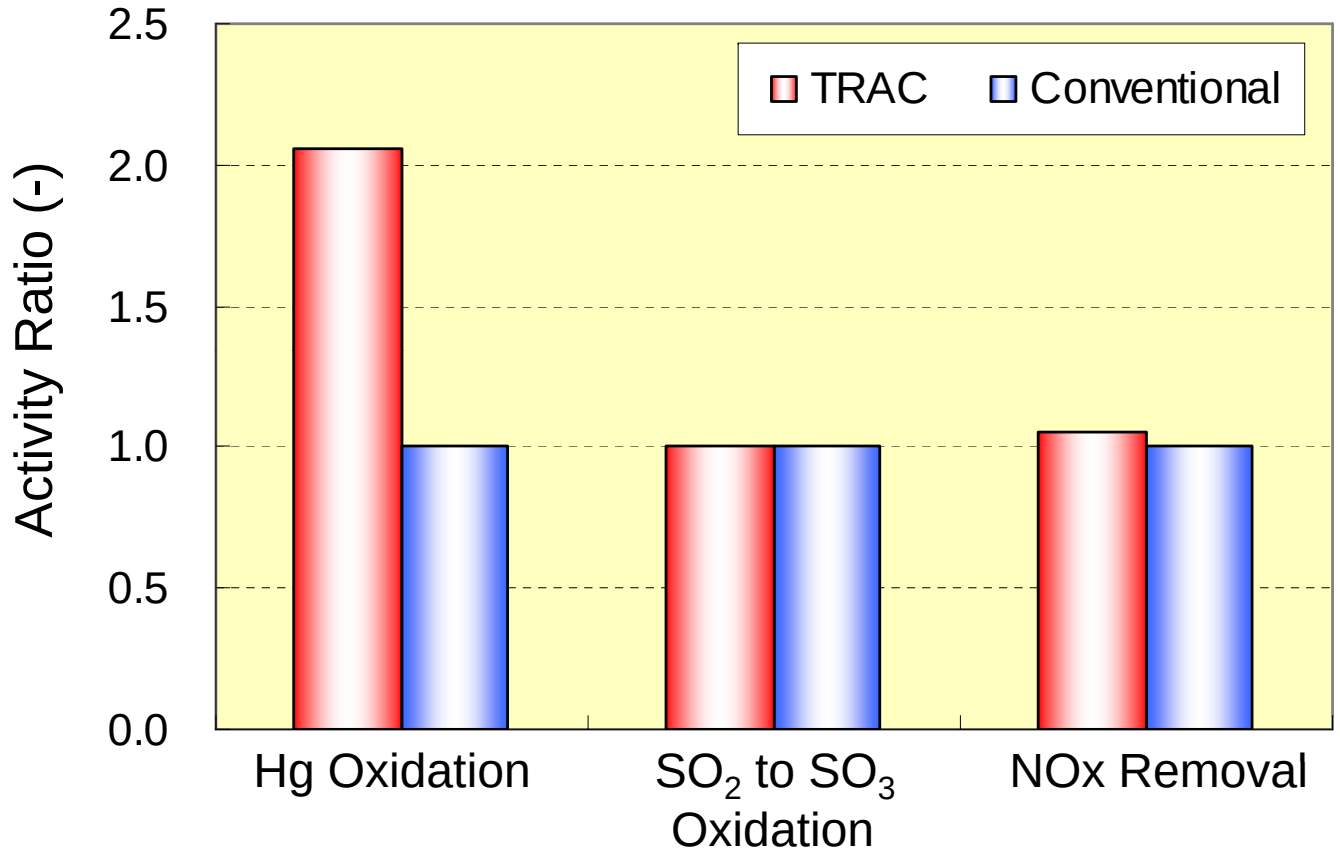
Total Hg Removal: 95 % x 95% = 90 %



SCR Catalyst is a key component for mercury oxidation

How to maximize the Co-Benefit Through SCR?

HITACHI
Inspire the Next



TRAC® – TRiple Action Catalyst

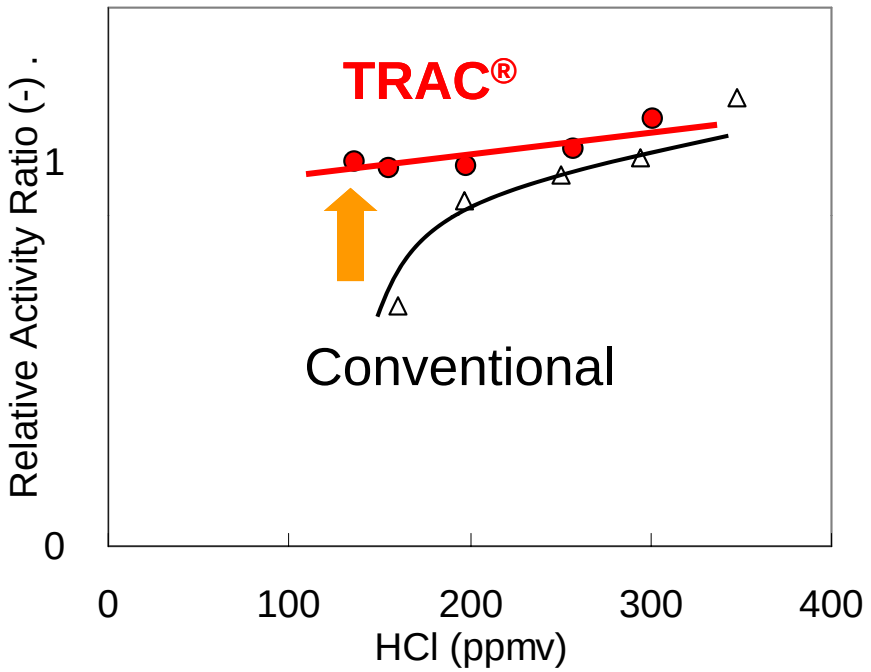
1st High Mercury Oxidation

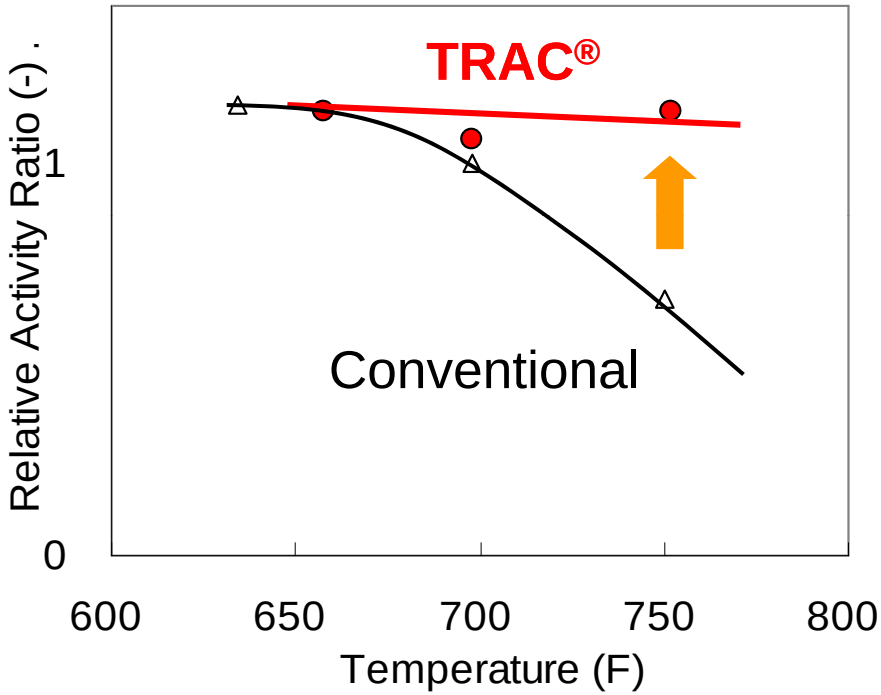
2nd High DeNOx Performance

3rd Low SO2 to SO3 Oxidation

MRC Pilot Testing Results With TRAC

HITACHI
Inspire the Next



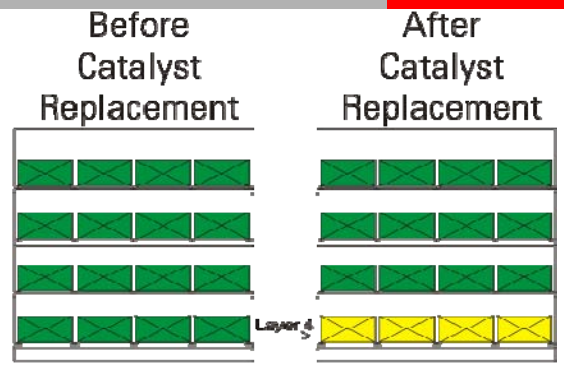


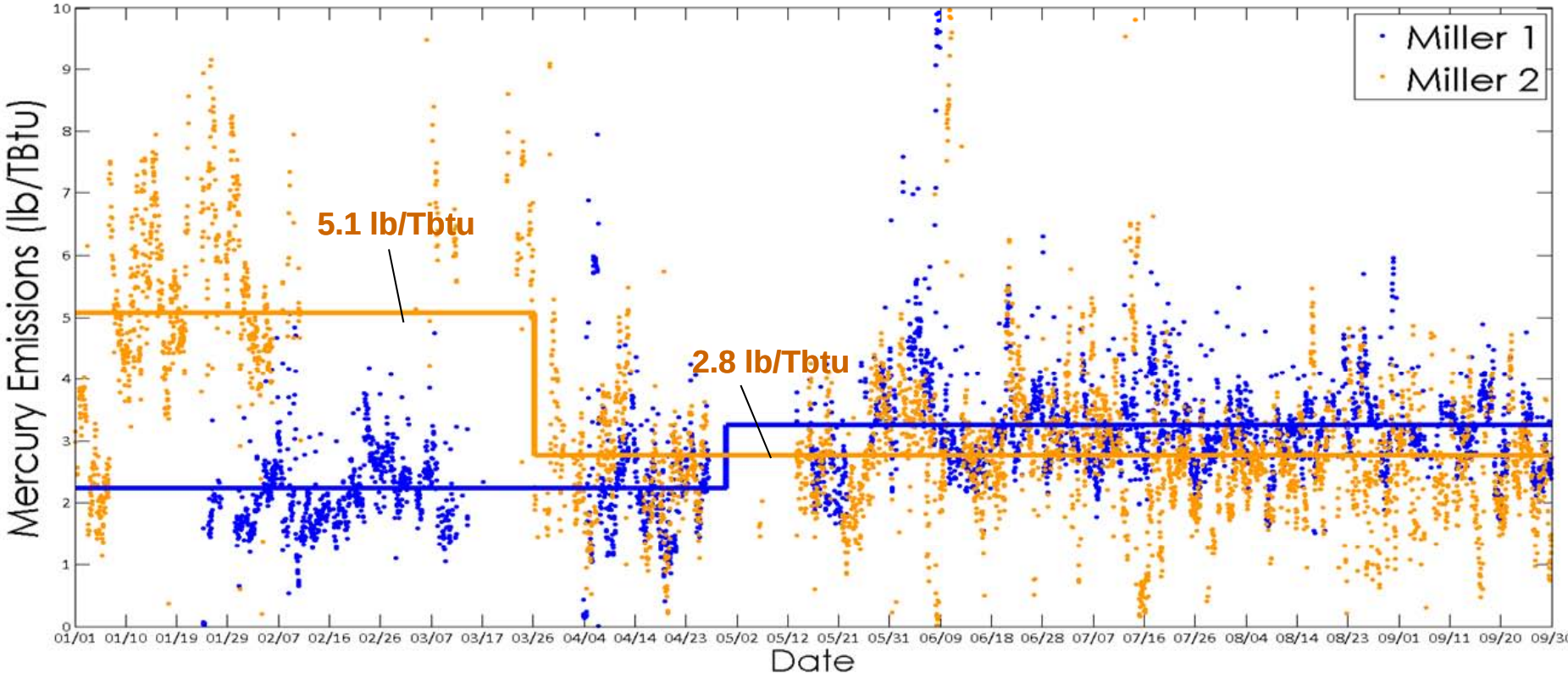
Higher Hg oxidation at lower HCl concentration
Higher Hg oxidation at higher temperature

Plant Miller Co-Benefit Results With One Layer TRAC

HITACHI
Inspire the Next

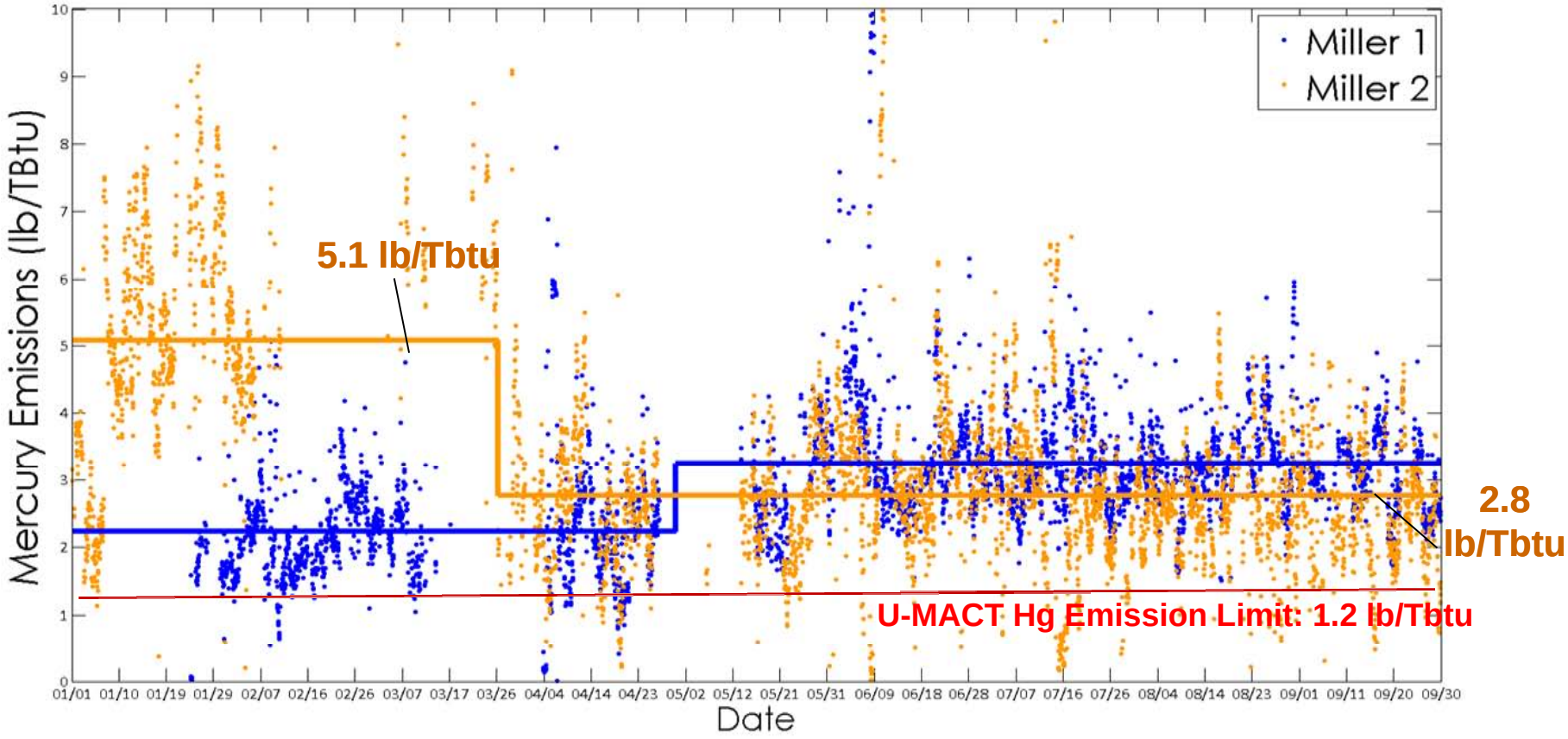
Gas Flow Rate	3,397,200 m^3N/hr
Temperature	720 F
NOx	130-230 ppm
SO_2	125-325 ppm
HCl	1-7 ppm
NOx Removal	90 %
Slip NH_3	<2 ppm





Will Co-Benefit Approach Alone Meet Plant's Hg Emission Limit?

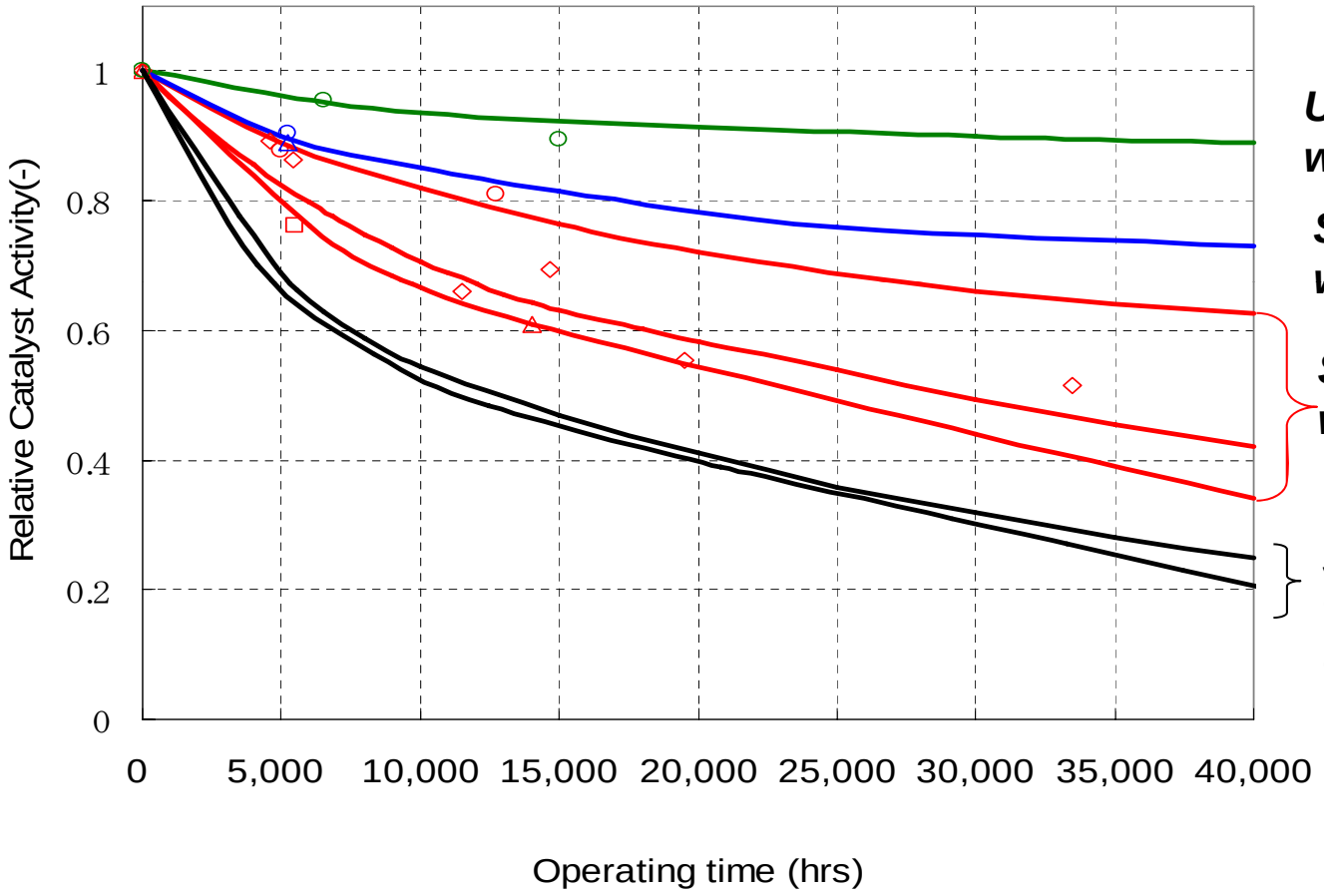
HITACHI
Inspire the Next



For PRB, will three Layer TRAC® meet the Hg Emission Limit (1.2 lb/Tbtu)?

For Bituminous coal, Hitachi guarantee over 90% Hg Oxidation (end-life guarantee), so the Co-Benefit Approach alone can meet Plant's Hg emission limit.

Additional Benefit of TRAC



Un-staged Combustion w/ TRAC

Staged Combustion w/ TRAC

Staged Combustion w/CP

Staged Combustion w/ Conventional Catalysts

TRAC showed greater durability performance (slower deactivation) for PRB

TRAC® Summary

HITACHI
Inspire the Next

- High Hg oxidation for coals with lower HCl concentration levels.
- High Hg oxidation for units with high gas temperatures.
- Slower deactivation from catalyst poisons.
- Oxidize 95% of Hg for Bituminous coal - Co-benefit approach alone can meet plant's Hg emission limit.
- For PRB coal, co-benefit approach alone may not meet plant's Hg emission limit, but it can significantly reduce operating costs by reducing the amount of AC or halogen injection.

TRAC® is the Most Cost-Effective Strategy for Hg Emission Control

HITACHI
Inspire the Next