Case Studies & Cost Benefits

KRR (UK) Ltd's proven and safe boiler cleaning delivers real result's fast. The following case studies and cost saving illustrations demonstrate the cost effectiveness of KRR (UK) Ltd over conventional cleaning routines.

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CASE STUDY – SITA TEES VALLEY

Emergency clean to remove blockage in SH2 after failure of the soot blower in a 3-pass boiler with separate economiser

(SITA Tees Valley 29 Dec 2005)

KEY STATISTICS

Parameter designation	Before Clean	After Clean	Delta-P Pass 3/Economiser before clean	Delta-P Pass 3/Economiser after clean	Change
P after/ Delta P Pass 3 mmWG	-47.4	-14.4	41.4	8.4	-33
P after/Delta P Economiser mmWG	-113	-96.7	65.6	82.3	+16.7
T before SH °C	492	561	n/a	n/a	+69 (increase due to higher load)
T after SH °C	385	346	n/a	n/a	-39
T after Eco °C	202	197	n/a	n/a	-5
Steam load t/h	40.3	46	n/a	n/a	+5.7

KRR (UK) were called to the SITA Tees Valley site after a soot blower failure had caused a blockage. The team were on site within 24 hours, and the clean successfully achieved within one working day.

Thanks to KRR (UK)'s intervention the operators were able to continue generation until a scheduled shut down. The change in pressure loss shows that the blockage can be partly or totally removed. The higher Delta P across the economiser is due to increased steam production. The temperature reduction is a welcome by-product.

BENEFITS

There was no long term impact on generating capacity ensuring income was maintained cost effectively

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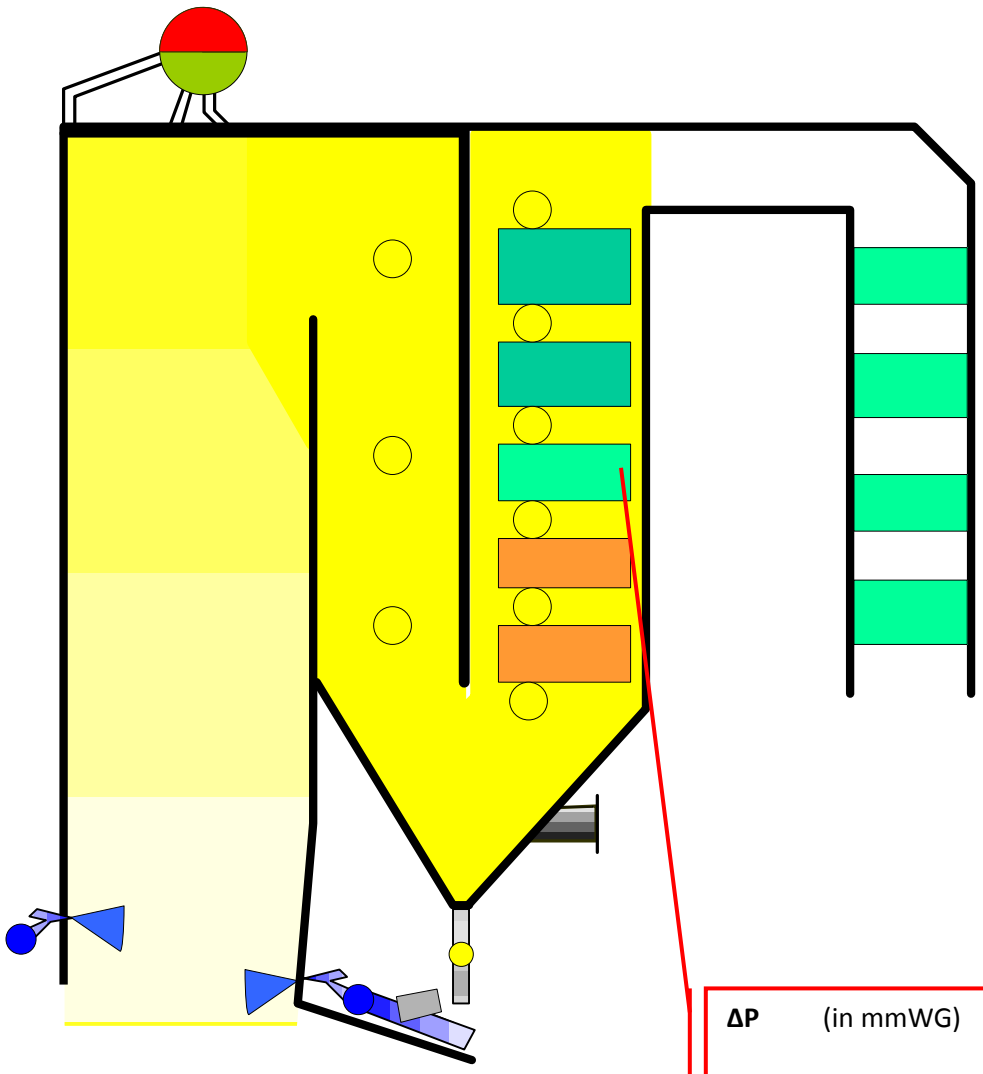
KRR UK LIMITED

CASE STUDY – SITA TEES VALLEY

SITA Tees Valley



ΔP	(in mmWG)	Before Clean	After Clean	Change
ΔP across tube bank		41.4	8.4	-33

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CASE STUDY- VEOLIA, BIRMINGHAM

Routine clean of passes 3 and 4 in a 4-pass boiler with horizontal pass 4

(Veolia Birmingham Jan 2006)

KEY STATISTICS

Parameter designation	Before Clean	After Clean	Change	Comment
Back end pressure mbar	-4	-4	0	No change; initially reductions from 7-8 to 4 mbar were achieved
T1 T Intermediate Pass 4 (Outlet SH3) °C	611	488	-123	
T2 T Intermediate Pass 4 (Outlet SH2) °C	423	347	-76	
T3 T Outlet Pass 4 °C	274	207	-67	
Steam flow t/h	67	66	-1	

See following schematic for details

This routine clean takes place every 800-900 operating hours, keeping the pressure loss across the boiler constantly low and reducing the boiler exit temperatures. Generally, boiler fouling is kept under control between off-line cleans.

BENEFITS

The need for unplanned off-line cleaning is eliminated. There is no impairment of generation, higher operational reliability and lower cooling load on the FGT system.

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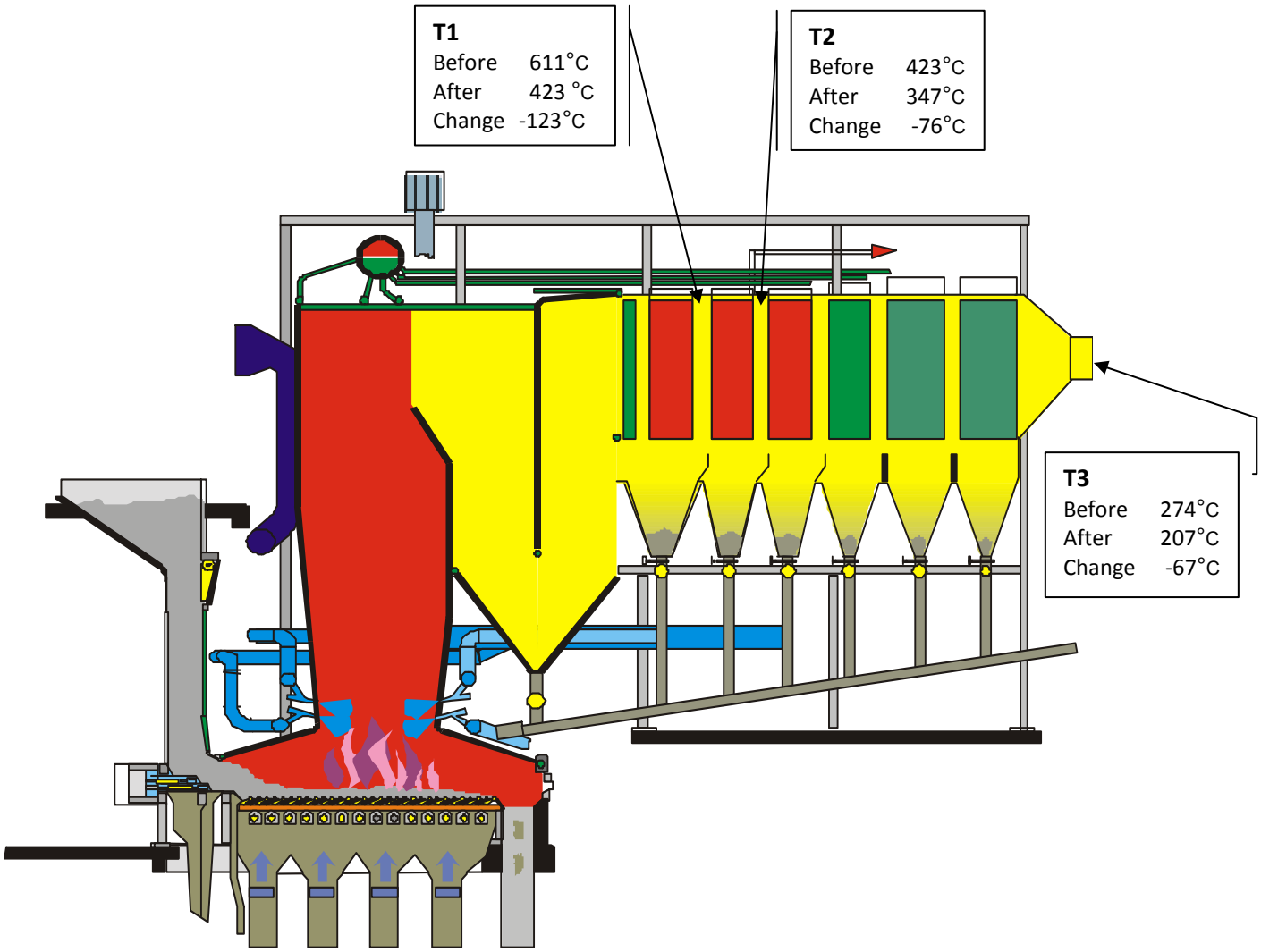
CASE STUDY – VEOLIA BIRMINGHAM



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CASE STUDY – London Waste Ltd

Routine Clean Flue Gas Treatment (FGT) at London Waste Ltd

(London Waste Ltd ongoing)

Key Advantages

- Safety – Cleaning is carried out via 2 manholes; previously this could only be achieved by abseiling, followed by manual cleaning
- Efficiency – The internal surfaces are cleaned back to the metal; the fallen material is then removed from the access door at the base of the FGT equipment
- Time savings – The core intervention lasts around 2 h; manual cleaning used to be much more time consuming; no scaffolding is required by KRR

Depending on the FGT technology this is normally an off-line clean carried out 1-2 times per annum.

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ILLUSTRATION

Cost Savings to Operators through Off-Line Boiler Cleaning

	Assumptions Made	Cost for average boiler (13t/h MSW, 40t/h steam)
Cost of down-time in addition to other maintenance	3 days additional down time as clean is done during shut-down @ £20,000/day	£ 60,000
Cost of scaffolding		£2,000
Contractors cost for manual cleaning and/or sandblasting	2 days sandblasting team @ £ 1000/day	£ 2,000
Disposal cost of sand/debris	If off-line it has to be disposed of at higher cost than the routine disposal of bottom ash; assume 2 tonnes @ £200.00	£ 400
TOTAL COST		£ 64,400
COST OF BANG AND CLEAN		£ 7000 - £ 9900
Benefit to Operator		**£ 57,400 - £ 54,500**

Notes:

Cleaning during shut-down can normally be done in a one-day intervention (set-up and take-down can be the day before or after and doesn't interfere with the normal plant operations. The fact that the boiler is shutting down creates ideal conditions for detonation cleaning (heat gradient) and allows for normal removal of the ash.

The table above is based on reasonable assumptions and current cost estimates (Nov 2007).

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ILLUSTRATION

Cost Savings to Operators through On-Line Boiler Cleaning

	Assumptions Made	Cost for average boiler (13t/h MSW, 40t/h steam)
Cost of down-time for off-line cleaning	4 days down time as clean is done during shut-down @ £20,000/day	£80,000
Cost of scaffolding		£2,000
Contractors cost for manual cleaning and/or sandblasting	2 days sandblasting team @ £'1000/day	£2,000
Disposal cost of sand/debris	If off-line it has to be disposed of at higher cost than the routine disposal of bottom ash; assume 2 tonnes @ £200.00	£400
Fuel oil cost for start-up	& hours start-up at 18MW power burners and fuel price 32p/litre	£4,000
TOTAL COST		£88,400
COST OF BANG AND CLEAN		£ 7,500 - £10,400
Benefit to Operator		£ 80,900 - £78,000

Notes:

Cleaning on-line can normally be done in a one-day intervention (set-up and take-down can be the day before or after and doesn't interfere with the normal plant operations). Ash is normally removed with the bottom ash.

The table above is based on reasonable assumptions and current cost estimates (Nov 2007).

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