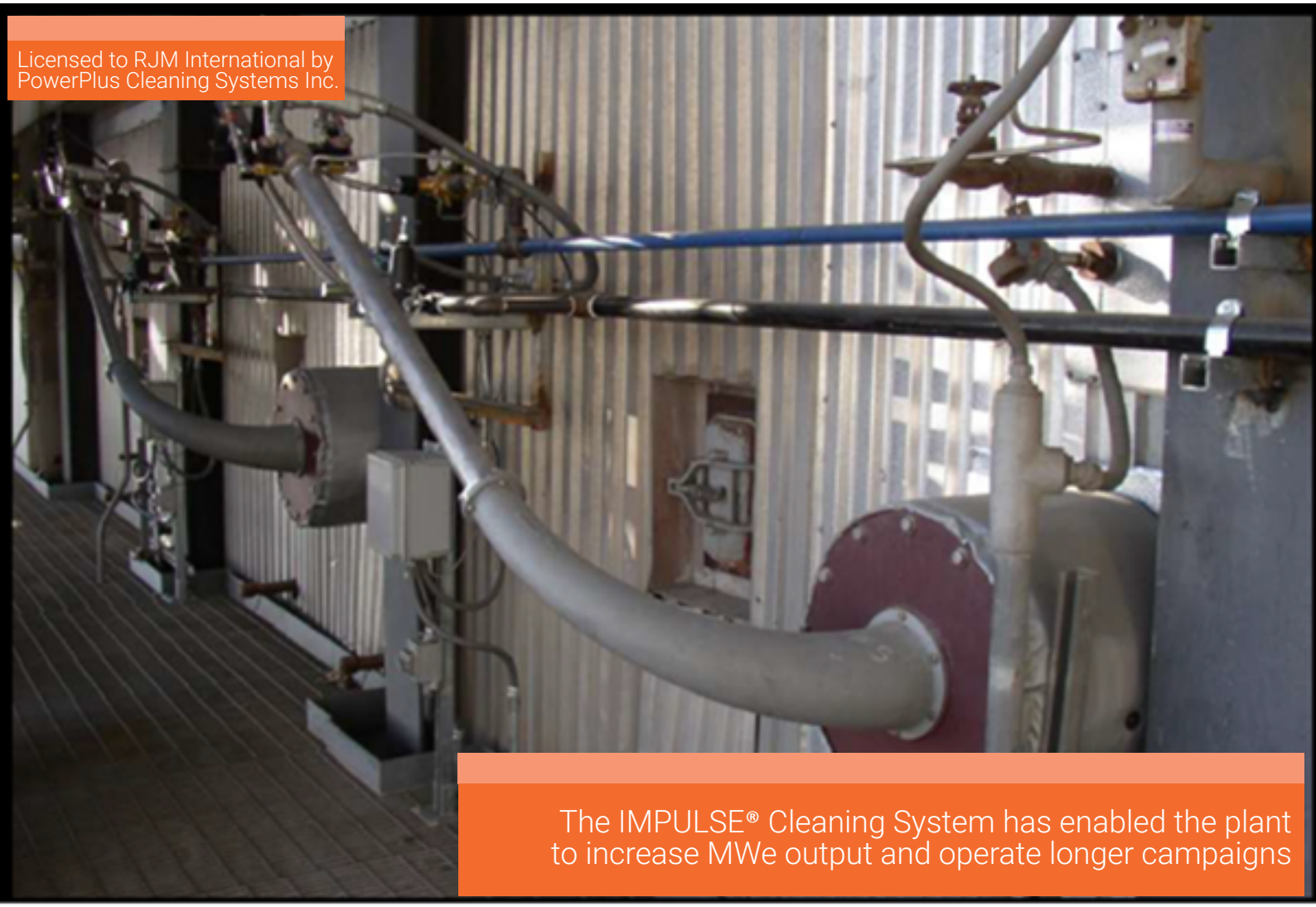
RJM resolves the most complex combustion and emissions challenges for all fuels including biomass and Energy from Waste through the application of cost-effective, innovative solutions

IMPULSE®
Cleaning System



The IMPULSE® Cleaning System has enabled the plant to increase MWe output and operate longer campaigns

RJM International is an award-winning provider of products and services that enable power producers to operate more cleanly, efficiently and reliably as they embark on their transition to Net Zero.

With offices in the UK, the USA, the EU, Singapore and Malaysia, supported by agents in key markets, RJM is able to carry out projects all over the world.

IMPULSE® Cleaning is Revolutionising On-line Plant Cleaning

IMPULSE® Cleaning technology delivers dramatic improvements in the online cleaning of fouled surfaces, when compared to conventional cleaning systems. The pulse waves work effectively as a non line-of-site cleaning system, removing deposits without erosive damage to heat transfer surfaces, unlike conventional cleaning systems.

Case-History: Biomass plant

Outotec Biomass Gasifier Unit

21.5 MWe plant firing 165,000 tpa of waste wood

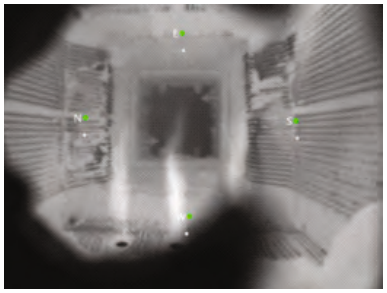
IMPULSE® objectives:
Gasifier: To increase availability
Boiler and Economiser: To increase load

RJM solution
Install 11 IMPULSE units; four each on the gasifier and economiser, and three on the evaporator

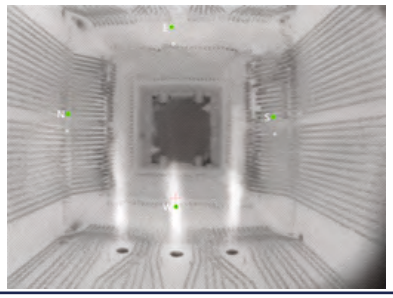
IMPULSE® results:
Post IMPULSE upgrade, gasifier availability increased by 5% (19 days) with load increase of 1 MWe)

Key benefits
The combination of increased availability and increased load has returned the plant to profit and delivered a financial payback of just over 12 months

Before: Gasifier image (Right) 28 days running with no IMPULSE® firing. Note large build-up of ash deposits on the water tubes in the top right-hand corner



After: Gasifier image (Below Right) 21 days running with regular IMPULSE® firings. Water tubes in the top right-hand corner are sHll clearly visible with minimal ash deposits



A Proven Technology for Every Fuel

Waste to Energy

BWSC 8MW unit (Elk River, Minnesota)

Firing RDF, the unit could only run for 5 to 8 weeks before air heaters were fully blocked

Post-IMPULSE installation, the unit ran for 10 to 12 weeks, with offline time reduced from 5 - 7 days to 2 - 3 days

Coal

261MW unit (Riley Power, Nearman Creek, Kansas)

Firing sub-bituminous coal

Two IMPULSE cleaning systems installed on opposing walls of reheat section of boiler. Operational running times increased from 12 months to 18 months.

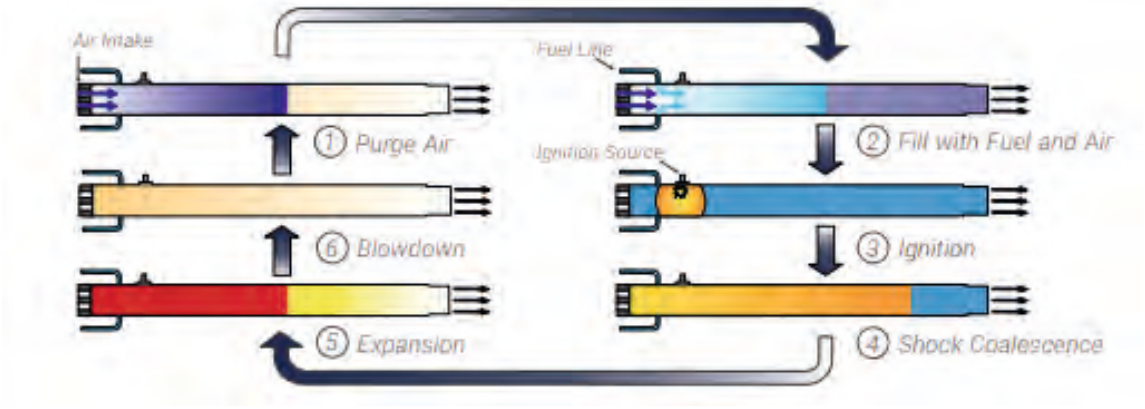
Two steam soot blowers no longer required

Four IMPULSE® control units

Key Advantages of IMPULSE® Cleaning

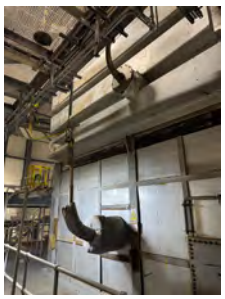
Lower CAPEX and OPEX costs than sootblowers and other detonation / acoustic cleaners
No erosion and no damage to heat transfer surfaces from steam jets or particle impact
Small footprint; does not impinge on availability of space in the plant
No moving parts (minimal repair / upkeep needed)
Does not scavenge plant steam, therefore no reduction in exported power
Negligible audible impact and recoil (other systems have a higher recoil posing safety risks)
Large coverage area; better range and deeper penetration into tube nests than sootblowers
Does not rely on “line-of-site” cleaning; greater flexibility in location of cleaning system
Suitable for all boilers, all sizes, all combustion technologies and all fuels
Proven technology with over 360 successful installations worldwide

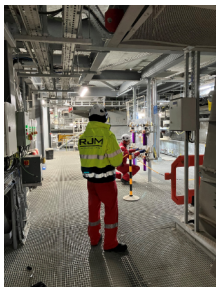
Harnessing Supersonic Shockwaves to Deliver Optimal Cleaning



The technology behind the IMPULSE boiler cleaning system was originally developed by GE and detonates a mixture of fuel and air to create a supersonic shock wave. Each IMPULSE shock wave is characterised by a high density front, followed by an ultra-low pressure wave behind the shock that generates a vacuum. This in turn creates a substantial edge vortex or eddy current.

The repeated combination of ultra-high and ultra-low pressure waves causes a series of currents to pass through the boiler which effectively dislodge and sweep away stubborn deposits on the front and opposing faces of the heat transfer tube surfaces. In addition, wherever shock waves are reflected off any hard surfaces, this further improves the effectiveness of the cleaning.





Some of Our IMPULSE Customers

Wide Range of Multi-Fuel Applications in the USA, the UK and the EU

IMPULSE installations worldwide

Facility Type	Fuel	Number of facilities	Total number of IMPULSE systems installed
Utility	Coal/PetCoke	49	198
WtE	MSW Mass Burn	8	61
WtE	Refuse Derived Fuel	1	6
Co-Gen	Biomass	6	29
Industrial	Waste Heat Recovery	11	74
Total		**75**	**368**

Large municipal utility in northern Florida

2 x 297.5MW Circulating Fluidised Bed Units

Firing Coal, Petcoke and Refuse Derived Fuels

Post IMPULSE installation, Unit 1 is now delivering over $ 2.24 million annual reduction in Opex and Unit 2 an Opex reduction of over $ 2.28 million (300 days at full load). Unit 2 now has an improved heat rate of 2.5%.

Following the impressive results of the first IMPULSE installation, an additional 14 units were installed on Unit 1 less than two years later.

Why IMPULSE Cleaning from RJM?

Customers confirm that the IMPULSE Cleaning System delivers significant operational advantages, including increased plant run times, reduced cleaning time, greater reliability and raised MWe outputs

Evaluation of optimal deployment → **Detailed Design and Engineering** → **Manufacture and Supply** → **Installation, Commissioning and Optimisation** → **On-going Customer Support**

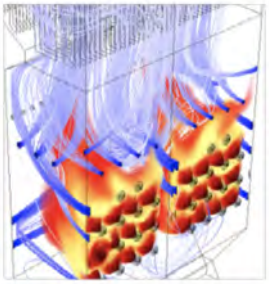
A full service offer from RJM

Utility power generators, process plants as well as biomass and Energy from Waste operators are seeking out RJM to help resolve the most complex operational, combustion and emissions challenges.

A combination of tightening emissions regulations and the imperative to transition to Net Zero means power producers need to take a new, whole plant approach to maintain viable and reliable generation.

Today RJM is working with a wide range of customers to secure their generation future.

- Completed 60,000MW of successful combustion solutions to leading generators world wide
- Extensive experience across a wide range of biomass and waste fuels
- Industry-leading fuel and combustion experts working in-house
- Expertise across all aspects of material handling, combustion systems and ancillary equipment
- Wide range of products and services adapted to suit each individual customer
- State-of-the-art, in-house CFD modelling capabilities
- End-to-end offer from consultancy and design engineering to installation and commissioning
- Multi-fuel Ultra-Low NOx burners for coal, coal-to-gas and coal-to-biomass conversions



Some of RJM's biomass and Energy from Waste customers

SOLAR21, Gren, fortum, Bio Energie Centrale Cuijk, INDIVUS, px, equitix, drax, TRADEBE, BWSC, GREENCOAT RENEWABLES, Foresight group, Dominion Energy

RJM is the exclusive licensed distributor in the UK and Europe (Asia-Pacific: Non-exclusive) for IMPULSE® Cleaning System technology, designed and developed by PowerPlus Cleaning Systems Inc. of Missouri, USA

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Certified ISO 45001:2018 Health & Safety Management
Certified ISO 14001:2015 Environmental Management
PREWIN NETWORK