

# SentientBoilerClean

## Easy Optimised Boiler Cleaning

### General Fact Sheet

#### Introduction

SentientBoilerClean is Synengco's intelligent sootblowing technology.

#### Intelligent Sootblowing

Intelligent sootblowing is the generic term used by the Electrical Power Research Institution (EPRI) to describe a range of systems that control sootblower operation instead of an operator or scheduled time-controlled system.

EPRI has evaluated Intelligent Sootblowing systems installed in power plants since 2002. In a large number of these studies, Intelligent Sootblowing significantly improved power plant operation and efficiency.

Synengco is one of the successful vendors to have taken part in EPRI- sponsored intelligent sootblowing demonstrations.

Traditional intelligent sootblowing systems:

- Require a large range of additional instrumentation;
- Require a period of several sootblowing cycles for training; and
- Cannot respond adequately if, for example a boiler undergoes a different operation profile, there is a change of coal type or sootblowers are not available for an extended period.

#### Sootblowing Impacts

Sootblowing has a large impact on boiler operation and can influence:

- **Reliability** through slagging, fouling, tube failures (erosion, creep, fatigue, quench) and process stability.

- **Capacity** through load reduction to deslag, steam set points and Emissions.
- **Performance** through economiser exit gas temperature, performance- boiler heat transfer, performance- sootblower operations and super heat steam and reheat temperature.

#### SentientBoilerClean

SentientBoilerClean is an industrial software solution focused on "intelligent" dynamic sootblowing.

Synengco's project experience has demonstrated that the keys to success are customising the solution to the particular unit, taking a synergetic view by quantifying all the sootblowing impacts and managing each sootblower individually.

#### The Benefits of SentientBoilerClean

Unlike its competitors, the benefits that are available from SentientBoilerClean are:

- No additional instruments are usually required;
- It adapts to variable coal quality;
- At allows for individual sootblower control; and
- No outage is required during the commissioning process.

#### SentientBoilerClean Control Architecture

SentientBoilerClean implements the following 10-stage control architecture;

1. **Boiler modelling:** Precisely created and operated in real time using existing instrumentation.
2. **Sootblower characterisation:** Sootblower impact on the thermal conductance of the boiler elements is analysed and self learned.
3. **Mode selection:** Each sootblower is individually optimised and placed in one of four modes being, manual, cycle, schedule or optimise mode.
4. **Optimisation:** Sootblower scheduling is optimised based upon objectives that can be a combination of any or all of efficiency, asset life, and/or emissions.
5. **Schedule recommendation:** A recommended sootblowing schedule to meet long-term requirements is created.
6. **Constraints:** The system checks the current status of the unit taking into account the short-term requirements and applies appropriate constraints. These constraints are codified operator and engineer knowledge of the impact of the boiler operation. The unit then has a constraints adjusted schedule.
7. **Minimum/Maximum rules:** Sootblower scheduling is checked and adjusted to prevent excessive or infrequent operation.
8. **Operator priority:** Operators retain the capacity to recommend sootblower operation when required.
9. **Demand balance:** Scheduling may be further adjusted to ensure sootblowing resources are not exceeded or for the completion of warm cycles.
10. **Sootblow initiation:** Final scheduling implemented by integration with sootblower controls.

### Instrumentation and Control

Apart from the SentientBoilerClean server itself, no additional instrumentation or hardware is usually required. This has the benefits that:

- No plant outage is required;
- Very high resolution of furnace cleanliness is available without further instrumentation; and
- Any increased risk from boiler modification is avoided.

Even without additional instrumentation, the system is capable of very high resolution in determining furnace cleanliness.

SentientBoilerClean validates plant instrument sensor readings and has the ability to self-sense, thereby reducing concern about plant instrumentation and not-in-service conditions.

SentientBoilerClean works with the existing sootblowing control system. This allows the conventional sootblowing system to be maintained and also allows for the full manual operation of the sootblowing system in the event that it is required. Existing protective logic is untouched.

### User Interface

The user interface for SentientBoilerClean can be:

- Provided through the existing digitals control system;
- Provided through the sootblower control human machine interface; or
- A web based septem.

### Commissioning

Commissioning of SentientBoilerClean is greatly enhanced because no additional instrumentation is required and no plant outage is necessary. An installation window can be co-ordinated around major plant outages.

The SentientBoilerClean operation may also be initiated in stages over several weeks or months to ensure that the full impact of SentientBoilerClean is understood by the entire organisation. This is useful where one aspect of the SentientBoilerClean impact is to be studied prior to moving on to another aspect.

### Our expertise

Synengco's people and technologies operate at the coalface at power generation sites across the globe.

We are world specialists in information intensive systems.

SentientBoilerClean is driven by Synengco's award winning software, SentientSystem®.

In recognition of the contribution it made to the advancement of technology, SentientSystem was accredited to the Australian Technology Showcase in 2001 and again in 2007.



### The Payback Period

Synengco's SentientBoilerClean effectively pays for itself. Clients have experienced payback periods ranging from 6 to 18 months.

### To Contact Us

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