



# Higher Flexibilization of the Unit Operation

SR1 by STEAG Energy Services continuously monitors the lifetime of highly stressed, thick-walled components of power plant boilers and turbines. This solution thus provides the crucial basis for a more flexible unit operation and a reduction of start-up times, systematically utilizing existing load margins.

As a result of the strong addition of renewable energies, power plants have to react more and more flexibly. In different plant sections, this leads to an increased wear of components due to faster load changes and more frequent startups and shutdowns of the power plant units. As a tried and tested, certified system, SR1 continuously monitors highly stressed, thick-walled components as they are typically found in steam generators in power plants. At all times, SR1 provides validatable results and thus is an important basis of

valuation for operators, licensed inspection agencies, and responsible authorities.

**SR1 is an online system with a large number of powerful features:**

- Determination of creep damage and low cycle fatigue
- Online monitoring of the mode of operation of highly stressed components
- Definition of a reasonable amount of inspection and identification of critical modes of operation by component ranking
- Classification of operating pressure and temperature
- Online calculation of the wall differential temperature for determining the stress from load cycling
- Implementation without additional sensors
- Use of the component configuration and calculated results for further processing

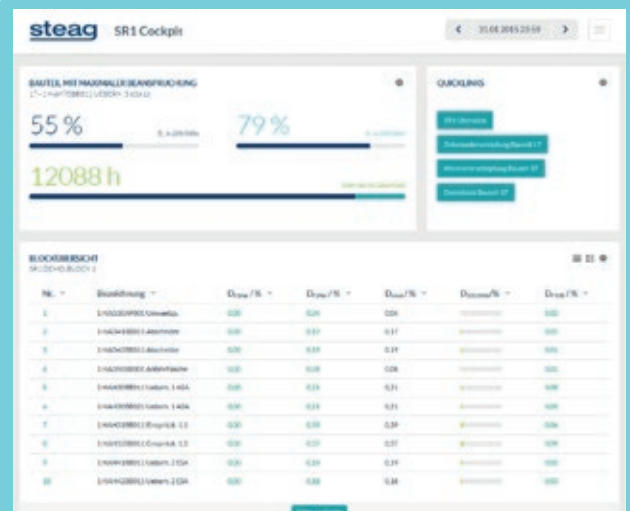
The solutions of STEAG Energy Services enable a comprehensive start-up monitoring as a crucial basis for the optimization of processes. The central goal is an optimal start-up procedure from an economic and technical point of view to be able to develop ideal application strategies for the unit.



- Potential ranges of application:**
- Plants with highly stressed, pressurized components like pipes, headers and other hollow parts as they are typically found in steam generators in power plants
  - Determination of the component lifetime consumption from the past in older plants in order to gain reserves and thus potentials for extending the operating time. This will also work if no SR1 lifetime monitoring or IT-based storage of data has been carried out so far
  - Backwards extrapolation from the beginning of the online monitoring. A reliable assessment of the history is possible already after online monitoring of ca. 5,000 hours of operation

**Validatable results with various benefits:**

- Practice-oriented, realistic component assessment
- Systematic definition and possibly extension of the deadlines for statutory recurrent inspections
- More efficient planning of inspections by selecting the components with the highest stresses from the continuous lifetime monitoring
- Faster start-up times by systematic utilization of the load margins determined via SR1
- Better assessment of different unit loads in terms of material stress and thus valuable conclusions for possible unit strategies
- Lasting minimization of the maintenance costs
- Better planning of overhauls
- Complete documentation



SR1 Cockpit

**Contact person:**  
**STEAG Energy Services GmbH**  
 System Technologies  
 Rüttenscheider Str. 1-3  
 45128 Essen (Germany)

Dr. Mario Arnold  
 P +49 201 801 4153  
 mario.arnold@steag.com

[steag-systemtechnologies.com](http://steag-systemtechnologies.com)