Control Of Environmental Paramters through Process Optimization

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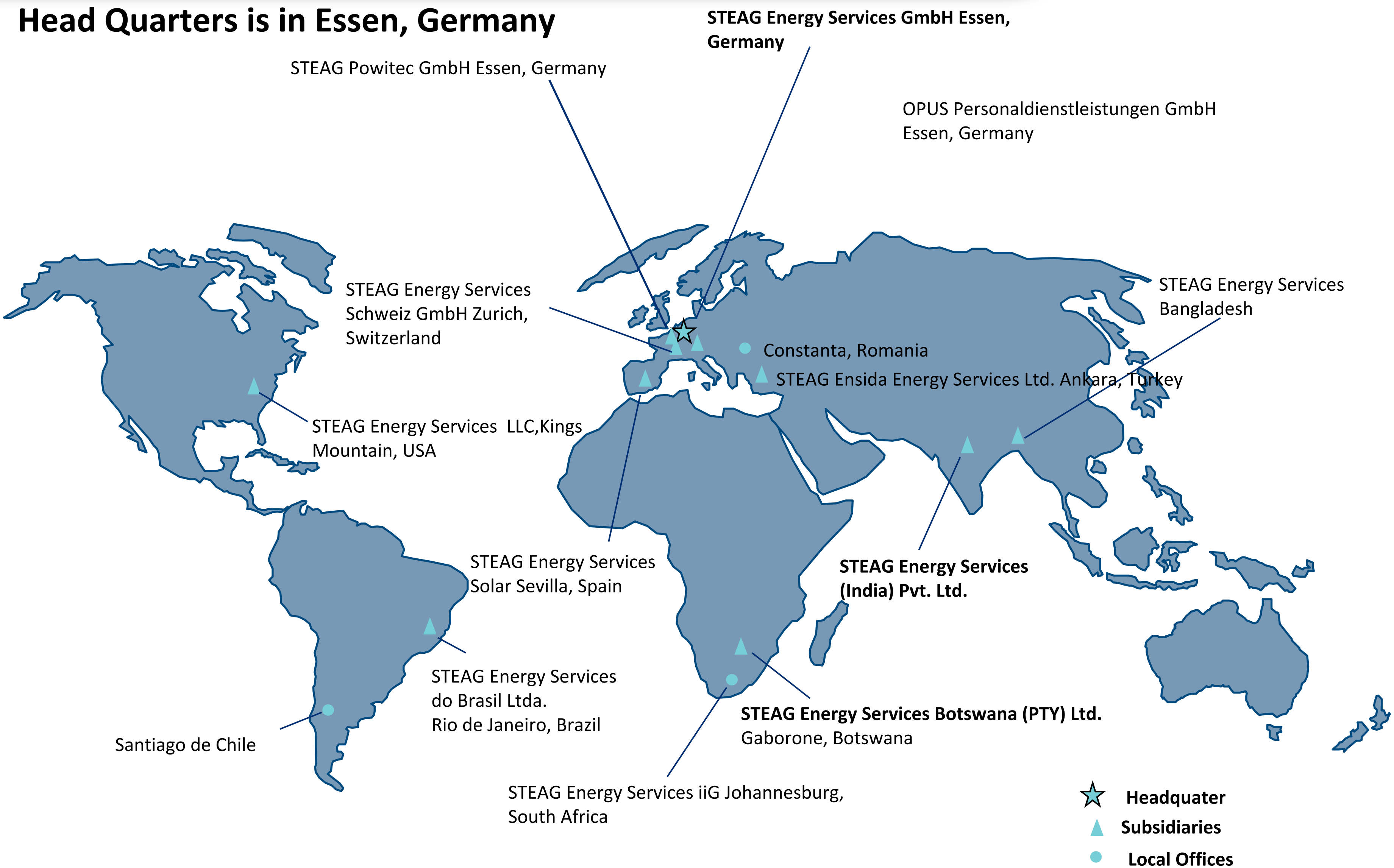
Steag Energy Services

Head Quarters is in Essen, Germany



Triad

GERMAN
ENGINEERING

100,000 MW
across all
technologies

O&M
PRACTICES

>6,500 MW
full sope O&M for
third parties

O&M management
support for
further 3,500 MW

STEAG Energy Services India operations

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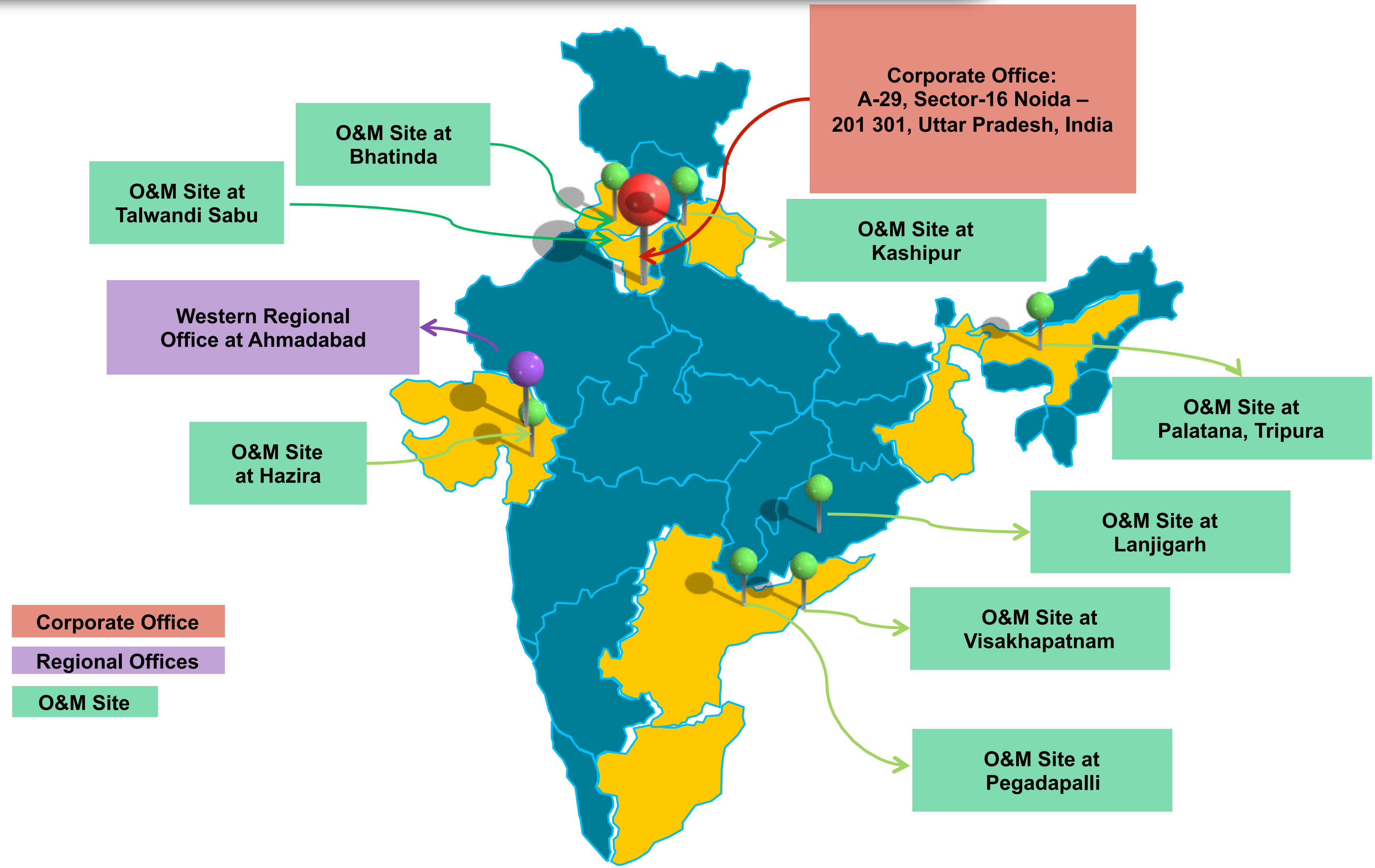

O & M Services

Plant	SIZE (MW)	Location	Owner	Contract From	To	Fuel	Scope
HINDUJA	2X525	VISAKHAPAT	HNPCL/ SES	2012	Ongoing	Coal	Comprehensive O&M
SINAGRENI	2X600	TELANGANA	SINGARENI	2016	Ongoing	Coal	Comprehensive O&M
TSPL	3X660	PUNJAB	VEDANTA	2017	Ongoing	Coal	Comprehensive O&M
STERLITE	4X600	JHARSGUDA	VEDANTA	2010	2015	Coal	Comprehensive O&M
HMEL	165	PUNJAB	HPCL-Mittal Energy Limited	2010	Ongoing	Gas	Comprehensive O&M
GSEG	530	SURAT	GSEG	2001	Ongoing	Gas	Comprehensive O&M
HALDIA	165	W.BENGAL	Haldia Petrochemicals	2006	2014	Refiner residue.	Comprehensive O&M
LANJIGARH	3x30	ORISSA	Vedanta	2017	ongoing	Coal based	Field O&M
BARAUNI	7X110+ 2X250	BARAUNI	NTPC	2018	Ongoing	Coal	Control room support
GAMA	2X108	UTTARKAND	RLG Groups	2015	Ongoing	Gas	Comprehensive O&M
OTPCL	2X365	TRIPURA	ONGC &TRIPURA.	2016	Ongoing	Gas	Comprehensive O&M

System technologies Services

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Sl No	Product	Description
1	PADO	Performance Analysis Diagnostic and Optimization (over 120 units supplied)
2	Ebsilon	Energy and Mass flow balances of thermodynamic process(over 74 units supplied)
3	OTS	Operator Training Simulator(over 22 Simulators) supplied for various configuration of Coal, Gas and Solar systems)
4	CO	Combustion Optimization
5	SI/ PAM	Computerized Maintenance Management System (CMMS)
6	iRENYSIS	Management Dashboard (MIS)
7	PowerFactory	Distribution and Transmission Simulator
8	Fleet Monitoring	Fleet wide monitoring of performance and fault prediction
9	MOR	Merit Order Rating
10	Perf	Performance Calculation

Control of Environmental Parameters through Process Optimisation

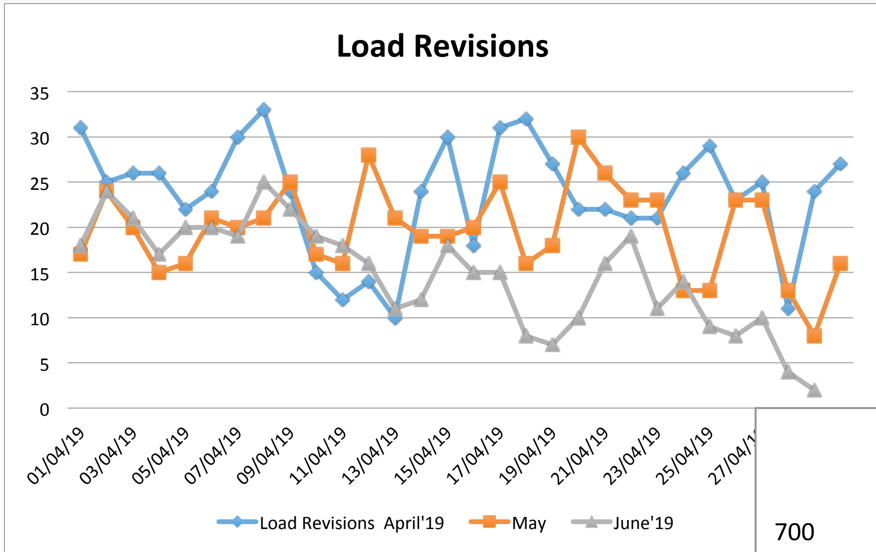
NOx Controls

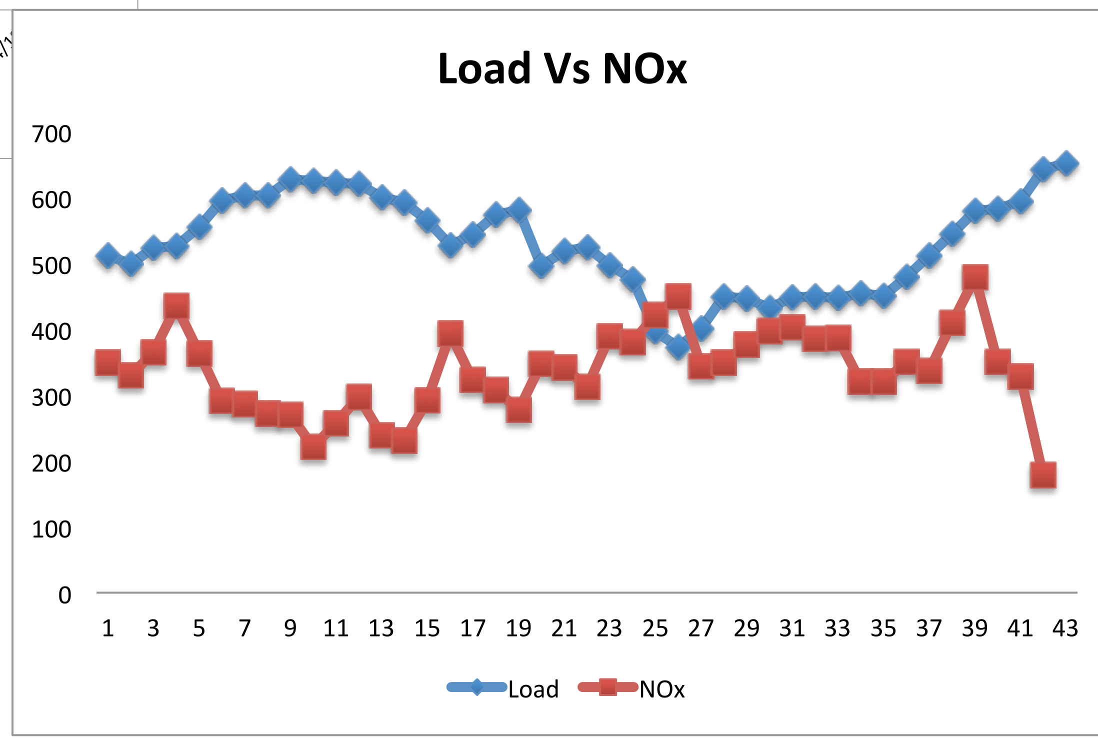
Combustion Controls
Lower Flame temperature
Create Fuel Rich condition
Lower residence time of oxidation condition
Post Combustion
Converting Nox to Nitrogen gas
Introducing reagents nto flue gas

Controls	Expected NOX reduction	
Low Nox burners	40-60%	**Cost intensive**
Overfired air	30-50%	
Reburn/Gas recirculation	40-50%	
Water Steam injection	20-25%	
Trims		**Cheaper options**
Burner out of Service	10-15%	
Fuel biasing	10-20%	
Low Excess air	5-15%	

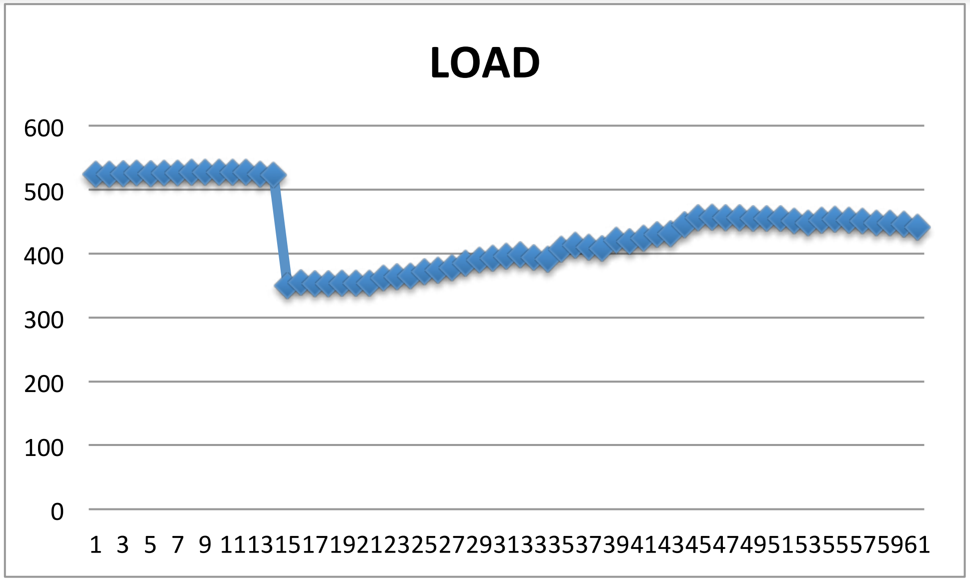
Ref:Ron D. Bell, P.E., MPR Associates, Inc.

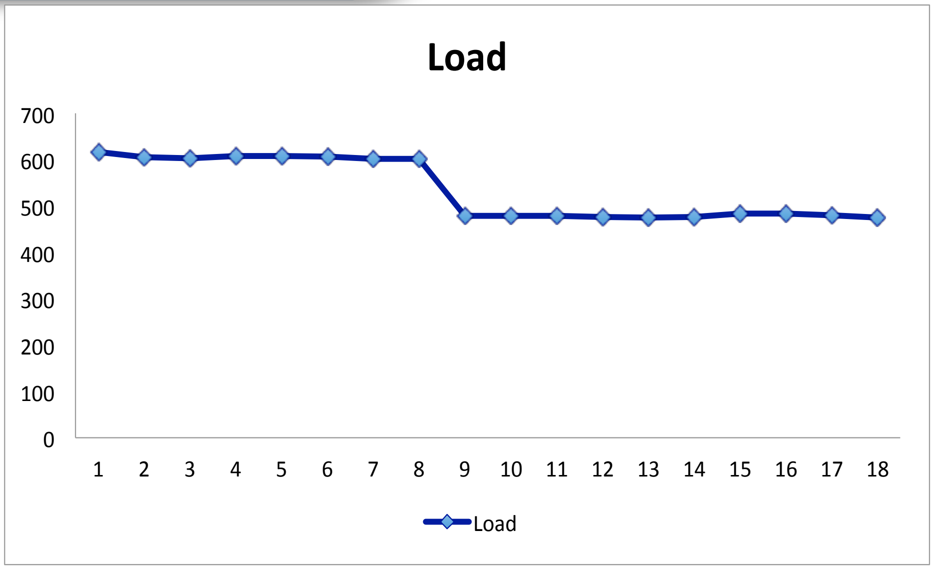
Load fluctuation-Impact on Environmet

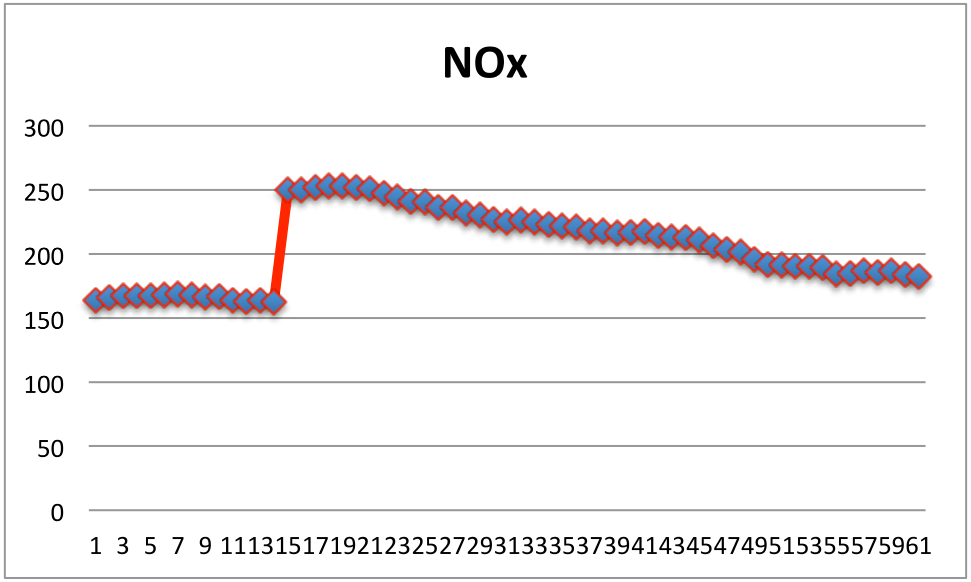


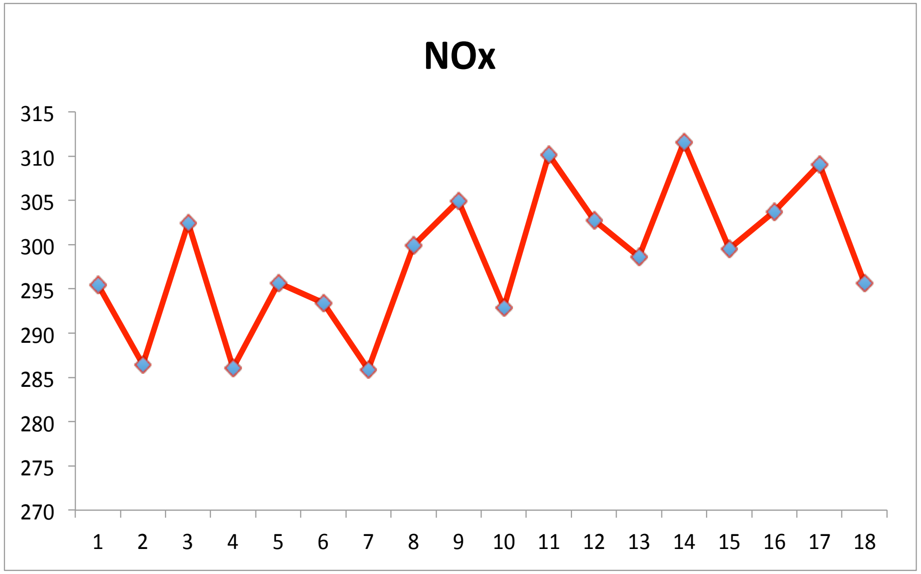


Variation of Nox with load at sub critical units









Process Optimisation

Digitalized diagnostics and efficiency enhancement

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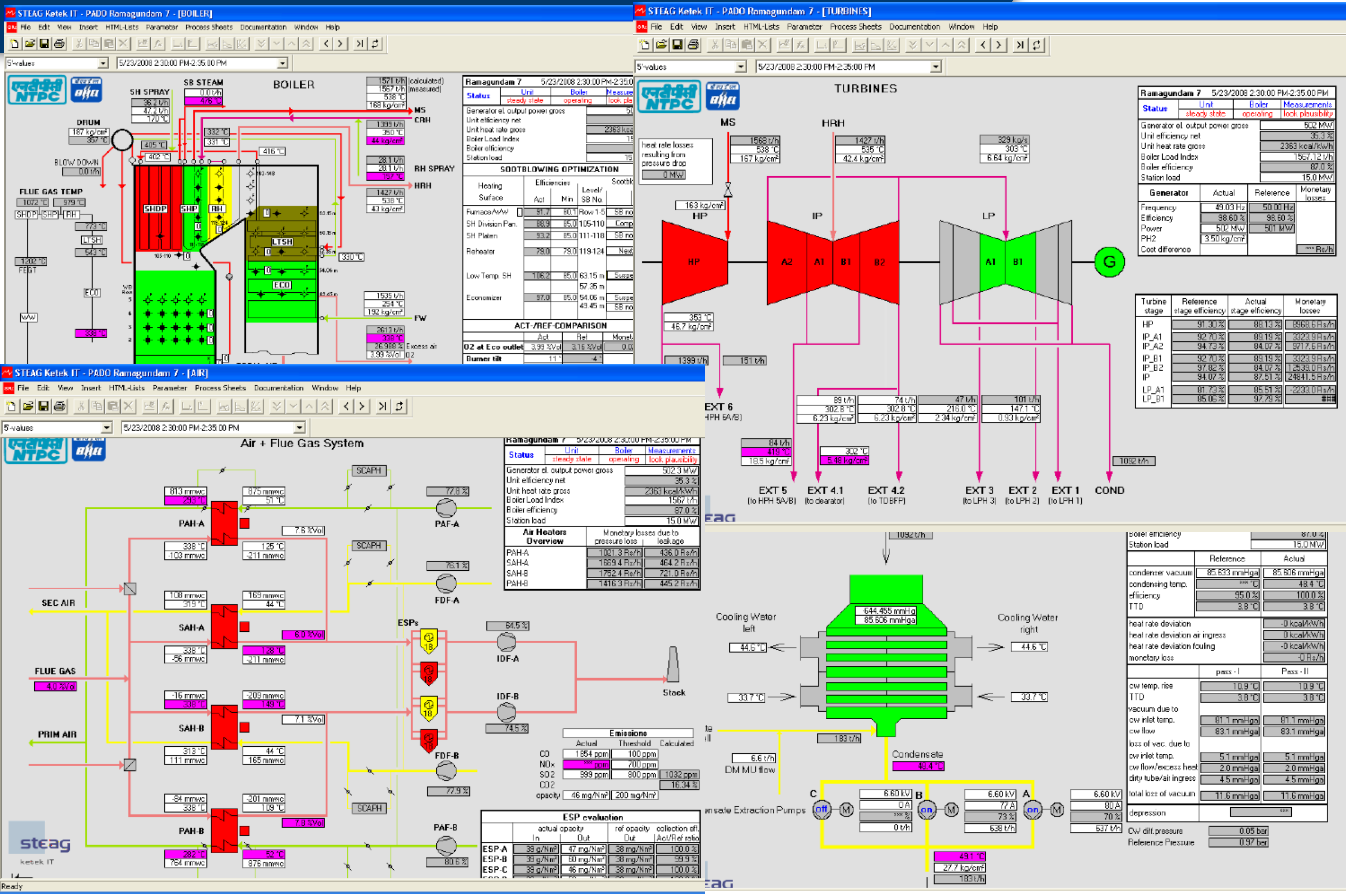


Process Optimzation

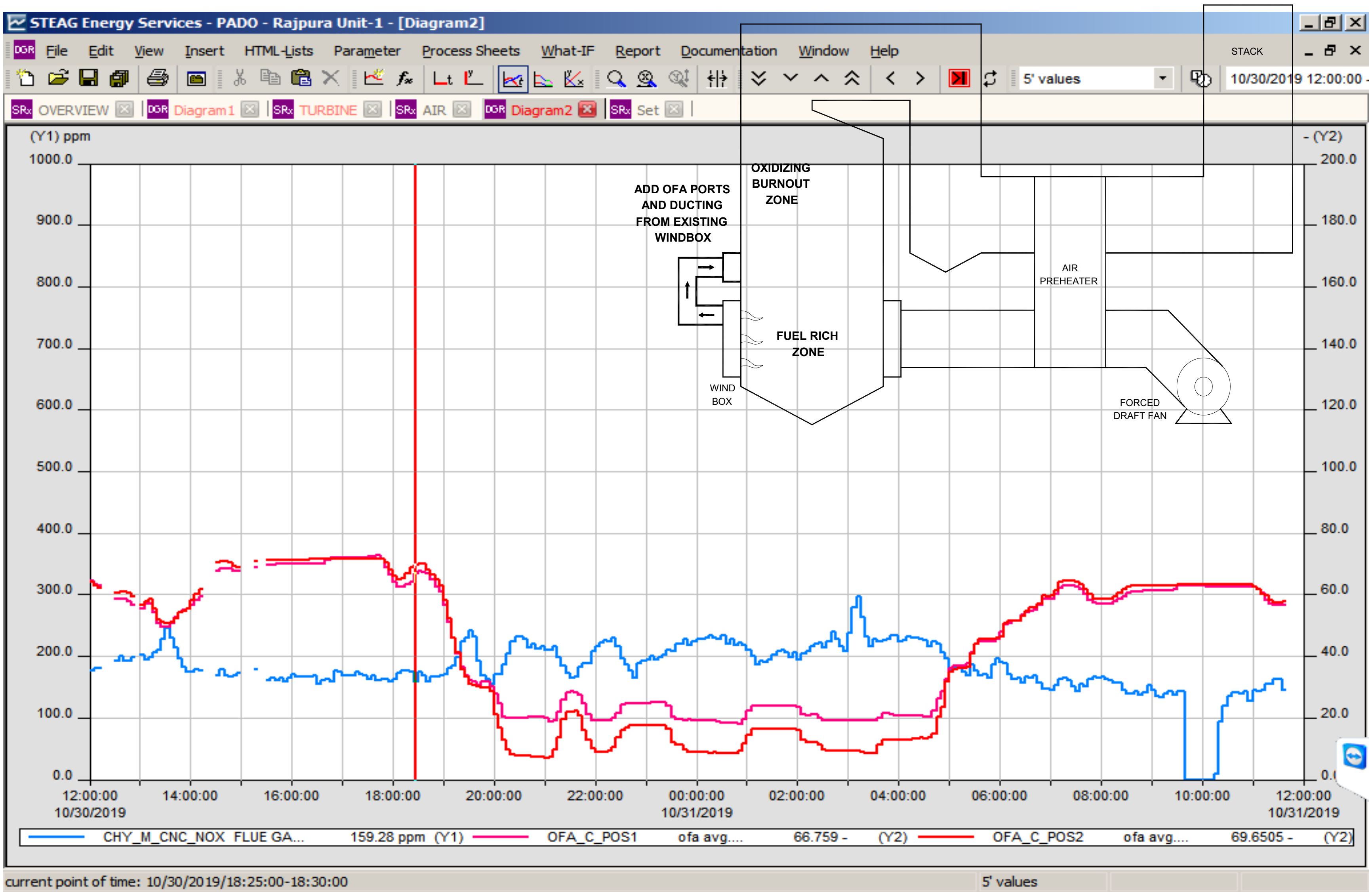
Parameter Set point sets those critical parameters which the operator can pre-set, and obtain the Optimal values which the operator can try to achieve through suitable actions for optimizing efficiency.

Process inputs
Coal Quality
PA flow
SA flow
Burner tilts
Furnace O2
Over Fire Air Damper positions

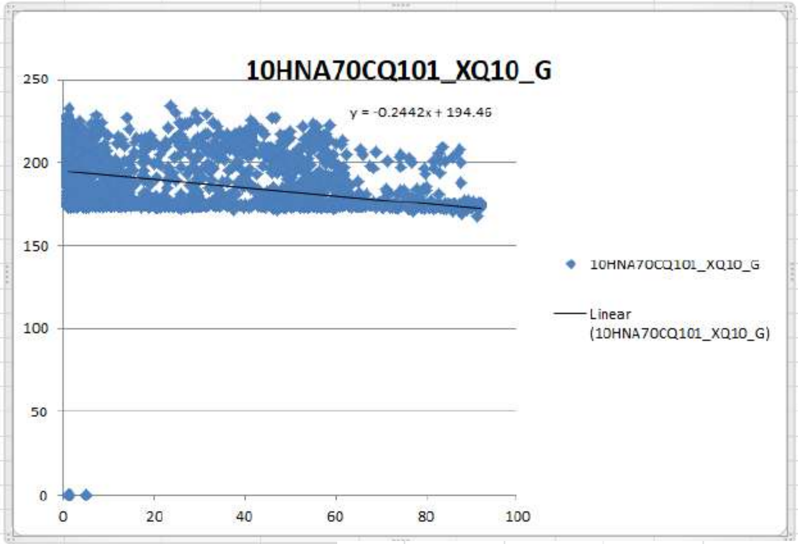
Process Out put
Optimised Efficiency
& NOx

Variation of Nox with Furnace Oxygen

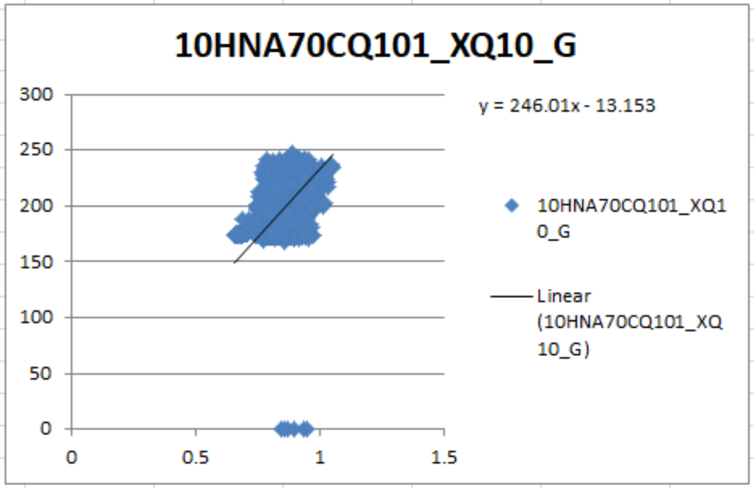
OFA damper regulation



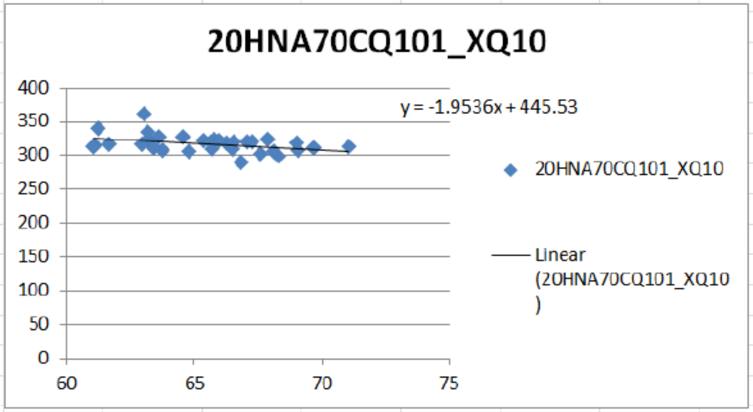
Parameter trending and training



Burner tilt variation

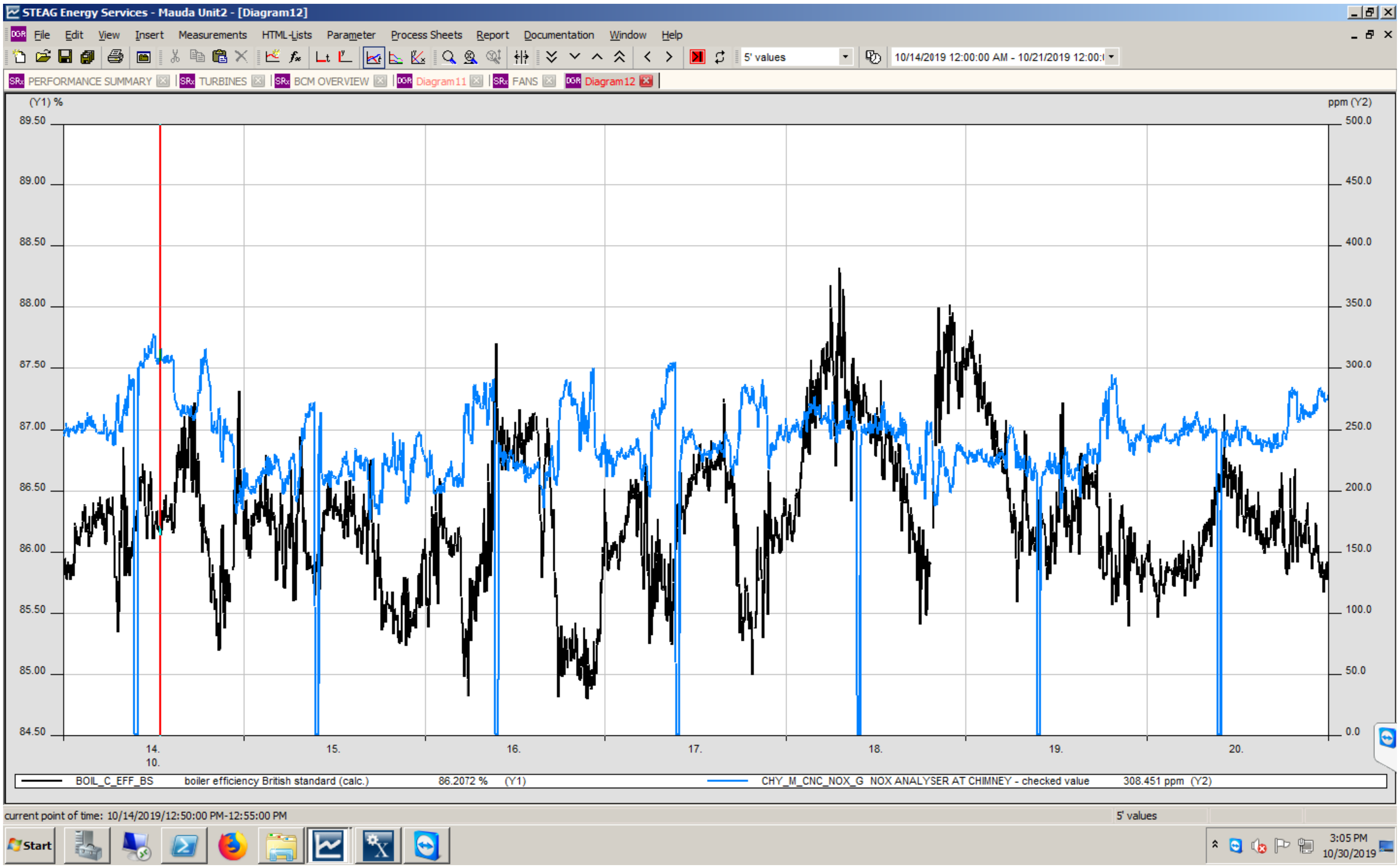


PA/SA ratio variation



Nox = -1.9536 x OFD_UPPER + 445.53

Variation of Boiler efficiency with NOx



Thank you

K.bhanuprakash@steag.in
9717298317