BOILER MAINTENANCE AND ENERGY EFFICIENCY IMPROVMENT

CORESTO

Coresto Oy – 2020

Presentation content

- Continuous measurement importance
- Boiler Cost Saving Operational and Maintenance Optimizing

by

MoCoBo

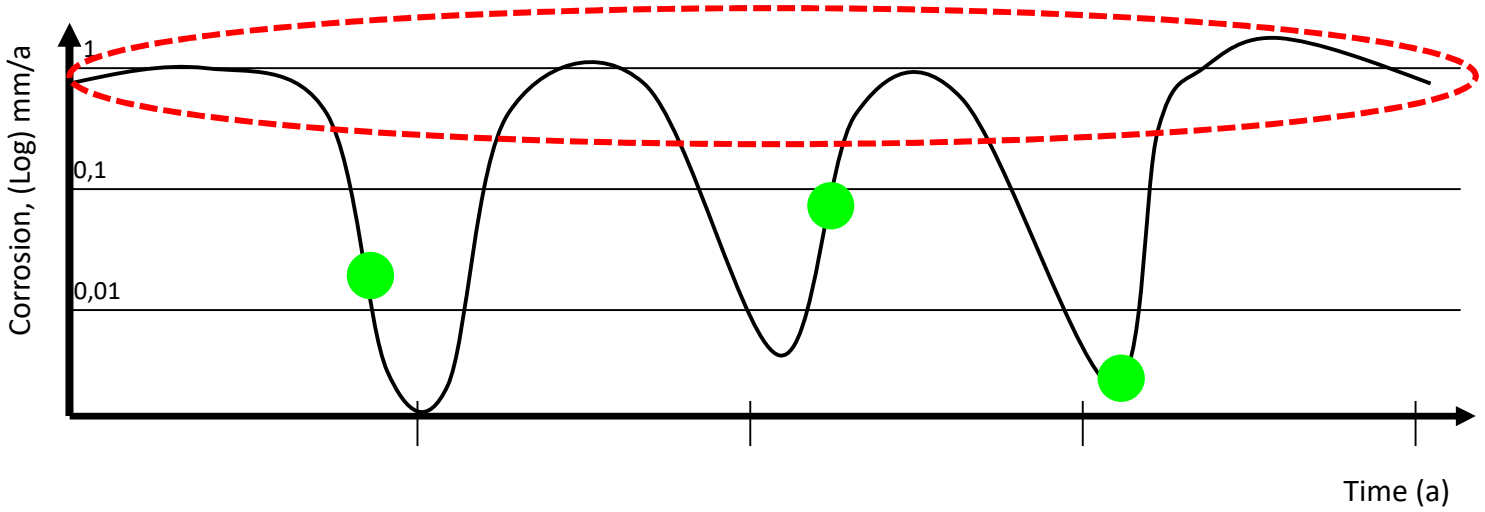
Continuous Corrosion Monitoring System

Hundred of thousands of money lost every year due corrosion, because of

- unaware of possibilities to prevent a corrosion
- unexpected shut downs and lost of production
- non planned preparations during shut downs
- repeat of mistakes

'it makes more sense to study with specimens than with real structures'

Non continuous measuring methods – right results but risk of wrong conclusion



● single intermittent measurement

Continuous Corrosion Monitoring System Benefits;

- Cost savings from early warning of corrosion problems
- Avoid / reduce unexpected corrosion damages
- On-line continuous corrosion information from the process
- "work smarter rather than harder"
- Scheduling shut downs for replacements, etc.
- Savings in the maintenance costs
- Increase operation reliability
- Less interrupts of production which means increase of production
- Systems are

"the eye and key for the well planned maintenance"

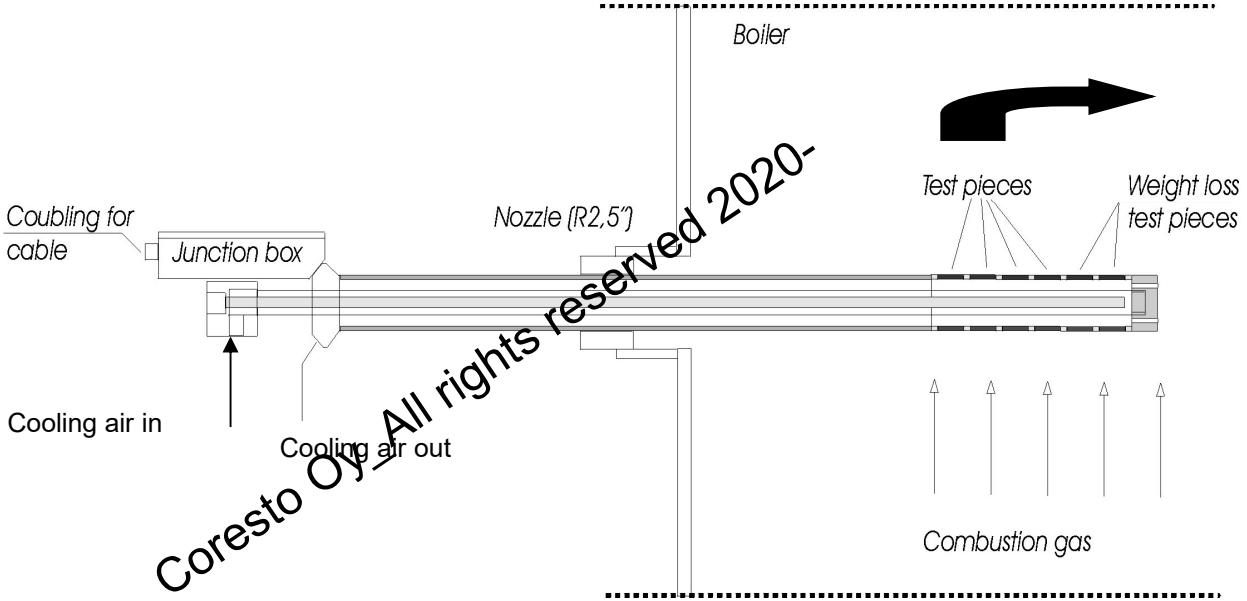
MoCoBo

- developed for the boiler on-line corrosion -, deposit forming - and “process condition” monitoring
- Full automated stand alone system for the continuous use
- Corrosion rate ‘estimation’ signal (um/a) for the boiler material(s)

  ‘NOTE: measuring the probe test materials’
- Cumulative corrosion signal
- Deposit forming signal
- Controlling the burnt fuel quality and safety mixings (REF, demolition wood, peat, etc.) sign for the corrosion behaviour
- Temperature controlled (possible to test a different temperatures)
- Fast start up of a system within flexible tested connections

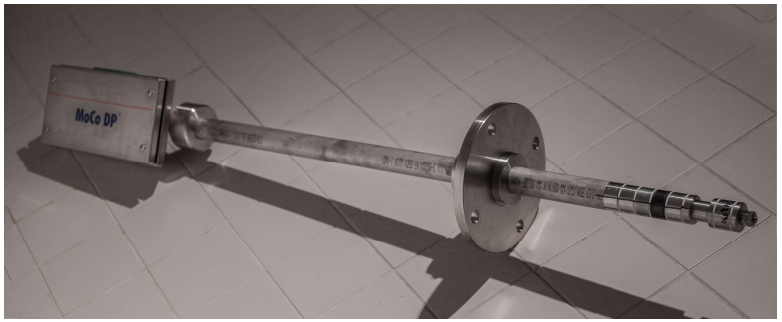
By the MoCo SH system, it's possible to measure and estimate a corrosion of a boiler structures. System corrosion rate measurement based on the electrochemical corrosion resistance measuring methods. Deposit forming act as electrolyte.

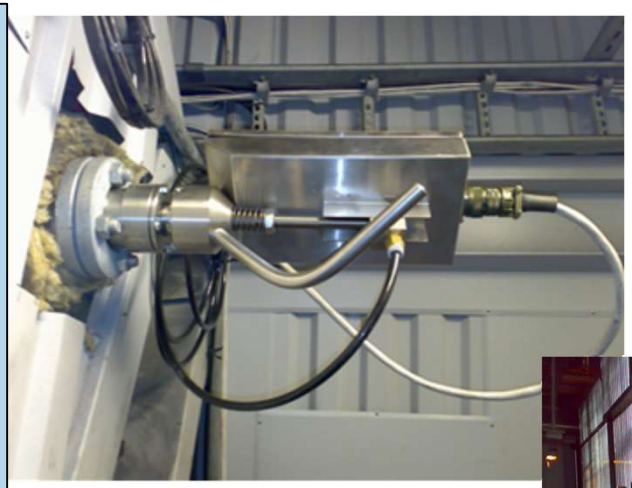
Probe testing material temperatures is automatically controlled by controlling the cooling air flow thru the probe.

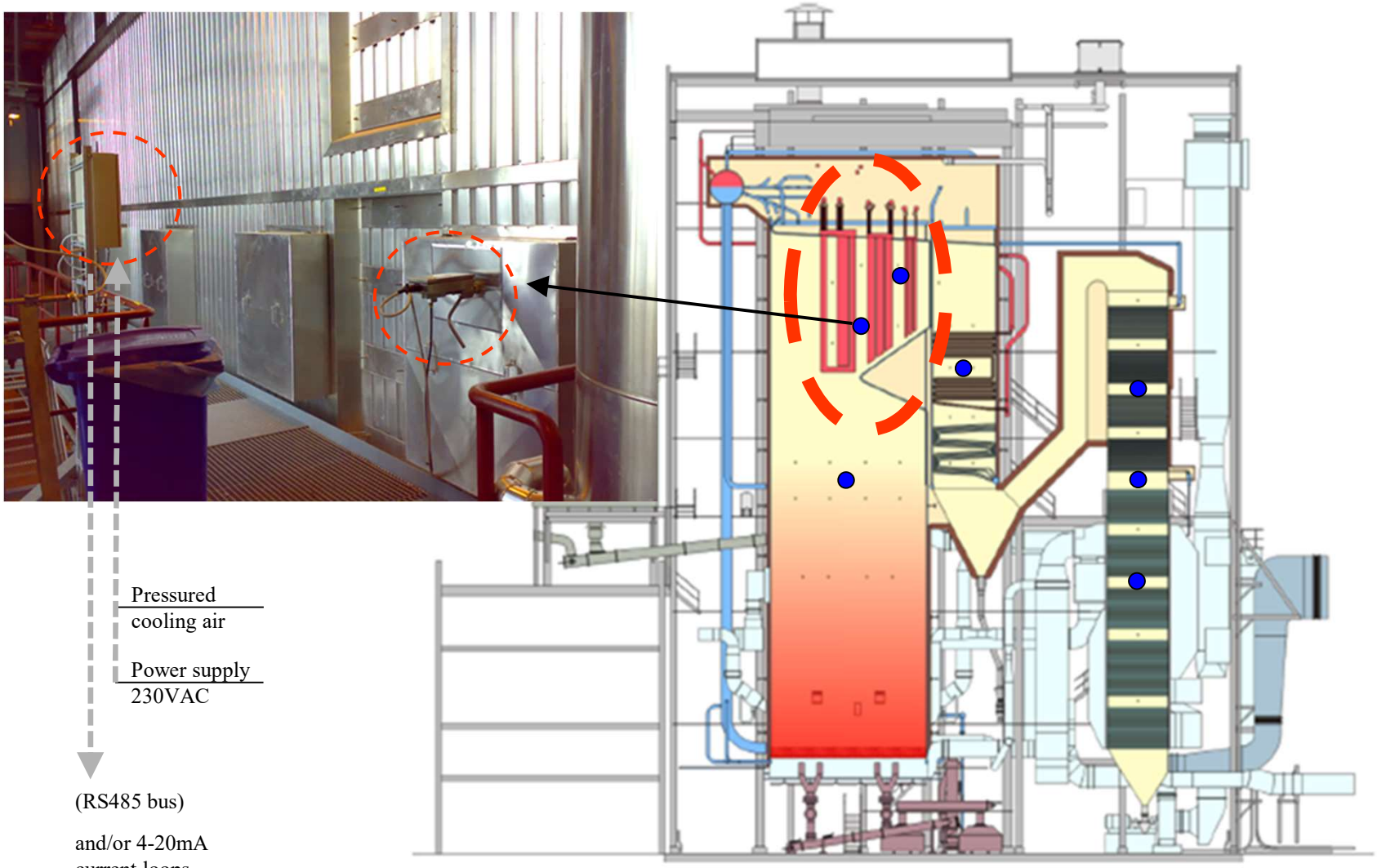


Isolated test material samples situated in the head of a probe. Probe installed thru the wall near super heater combustion gas flow.
Test material samples are isolated from each others and they have been wired with fibreglass isolated cable to the termination box in the other end of a probe.

Probe coupon material inside of a boiler corresponds the real super heater material circumstances (combustion gas flow, scaling, soot blowing, temperature, etc.). A changes in the process have an effect in a probe test material corrosion rate and it makes possible to control and estimate a process corrosion aggressivity for the real super heater material.

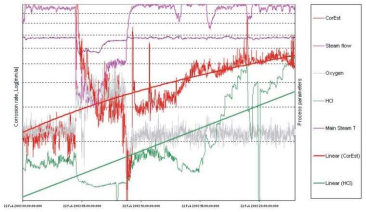






MoCo SH Corrosion Monitoring System
Remote Monitoring, VICO system and Diagnostic Expert Pool

Reports to custom



Analyzing of corrosion data > diagnostic reports to custom

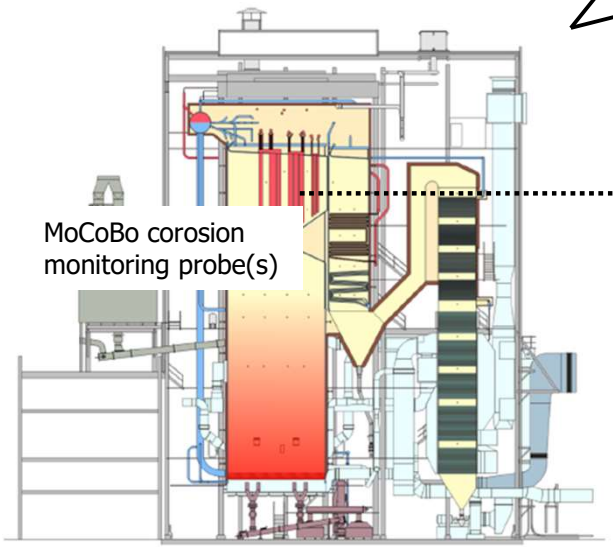
OPTION:

VICO on-line graphic corrosion-, fouling- and process monitoring server on-site

GSM/GPRS data transfer in to Coresto ITC centre,

Remote support

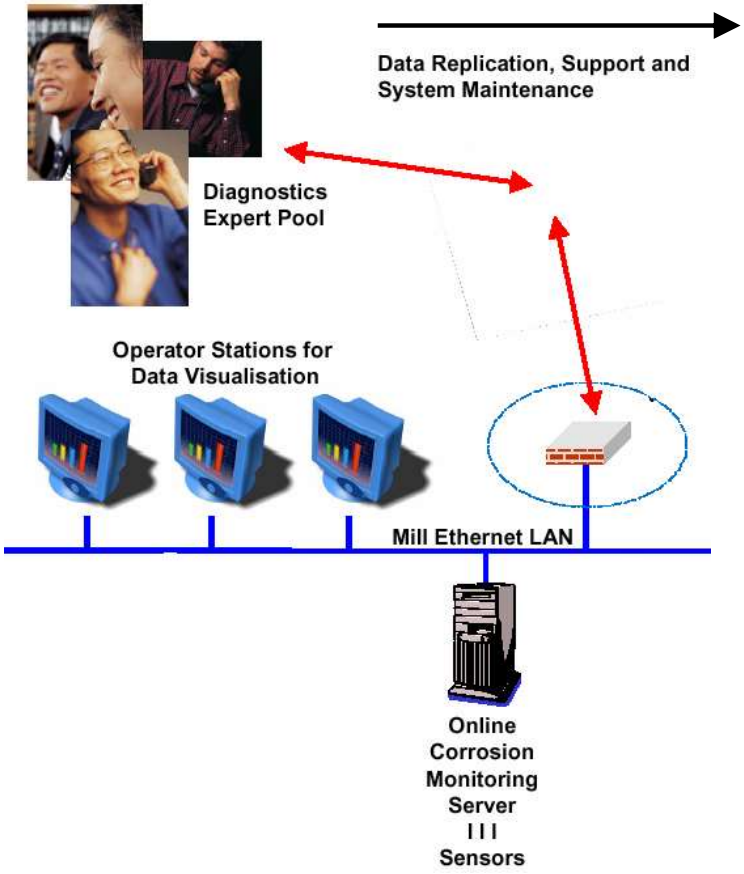
MoCo SH measuring unit

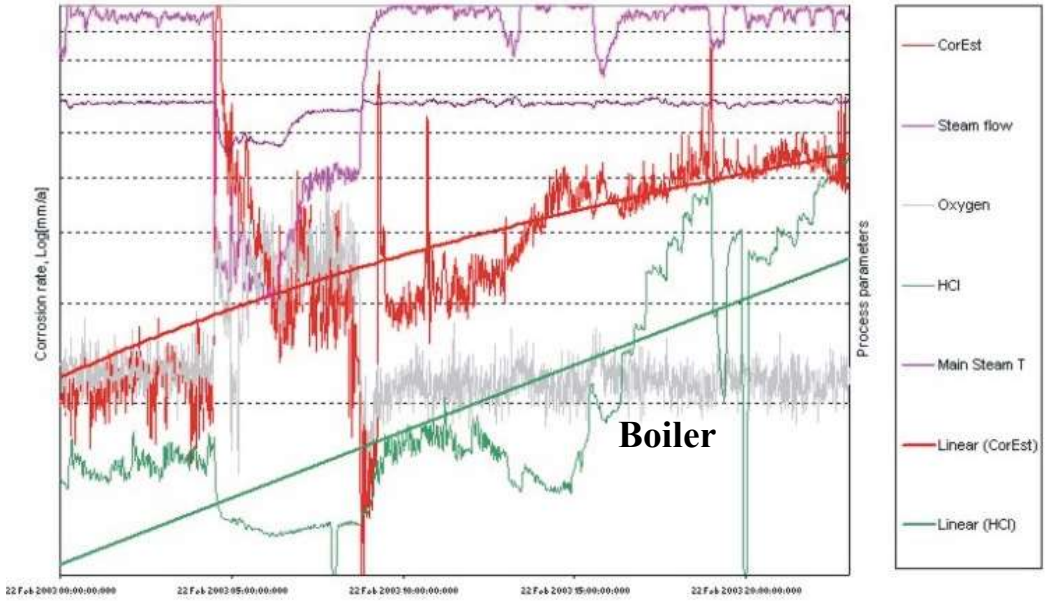


MoCoBo corosion monitoring probe(s)

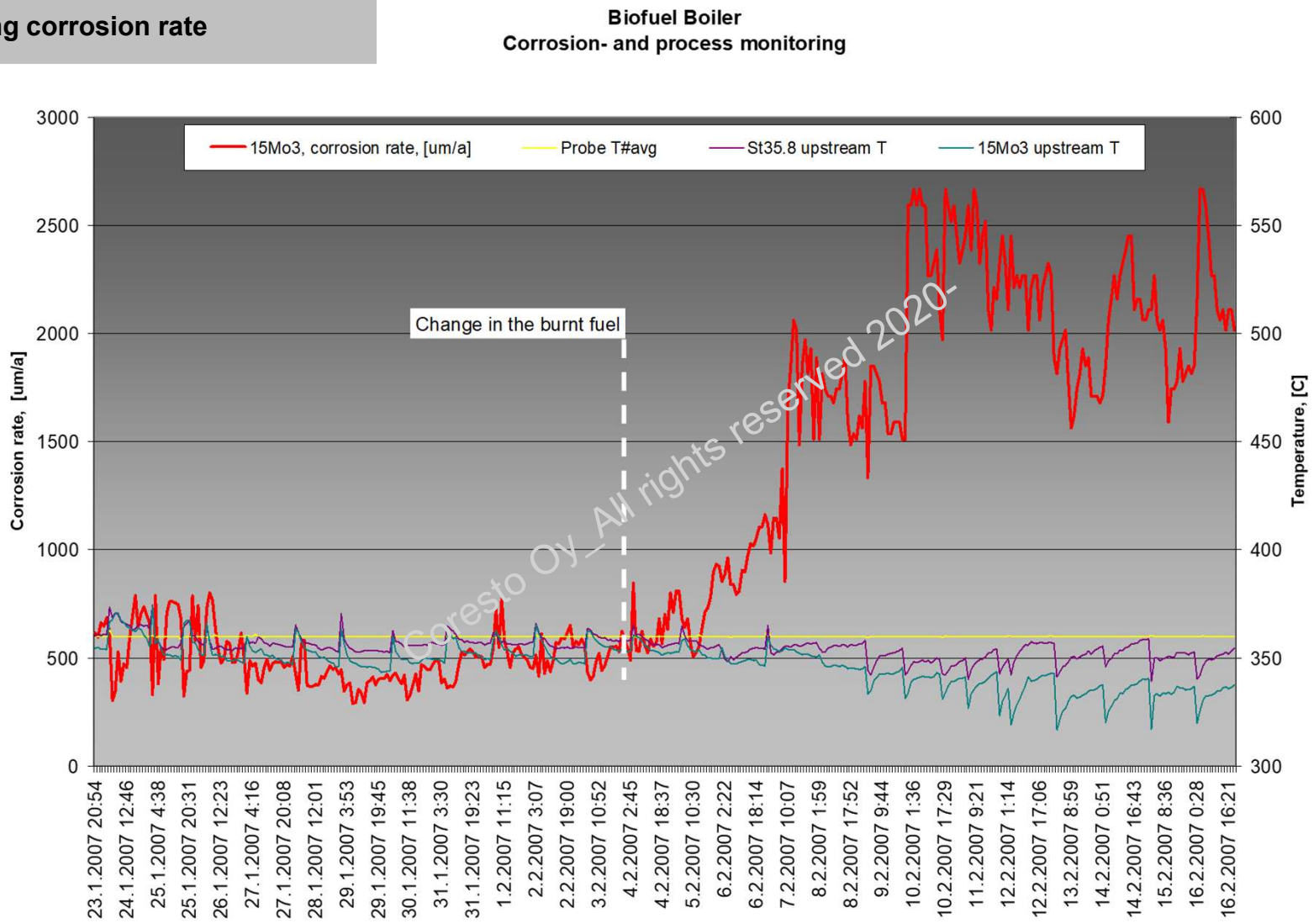
Information to DCS

- Bus> Modbus RTU (RS485)
- Modbus Ethernet TCP/IP
- .. 4-20mA signals



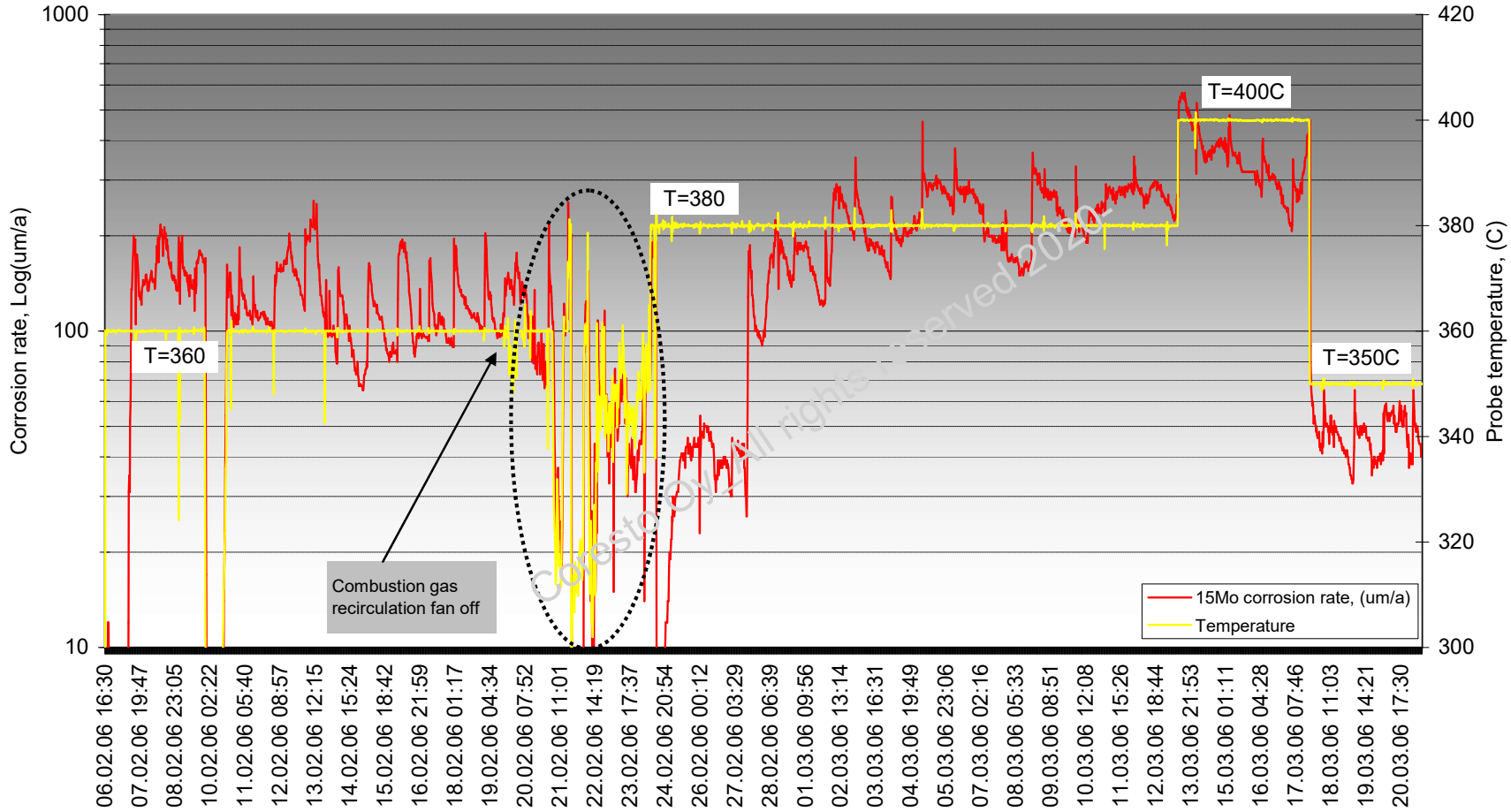


Change in the burnt fuel >
Increasing corrosion rate



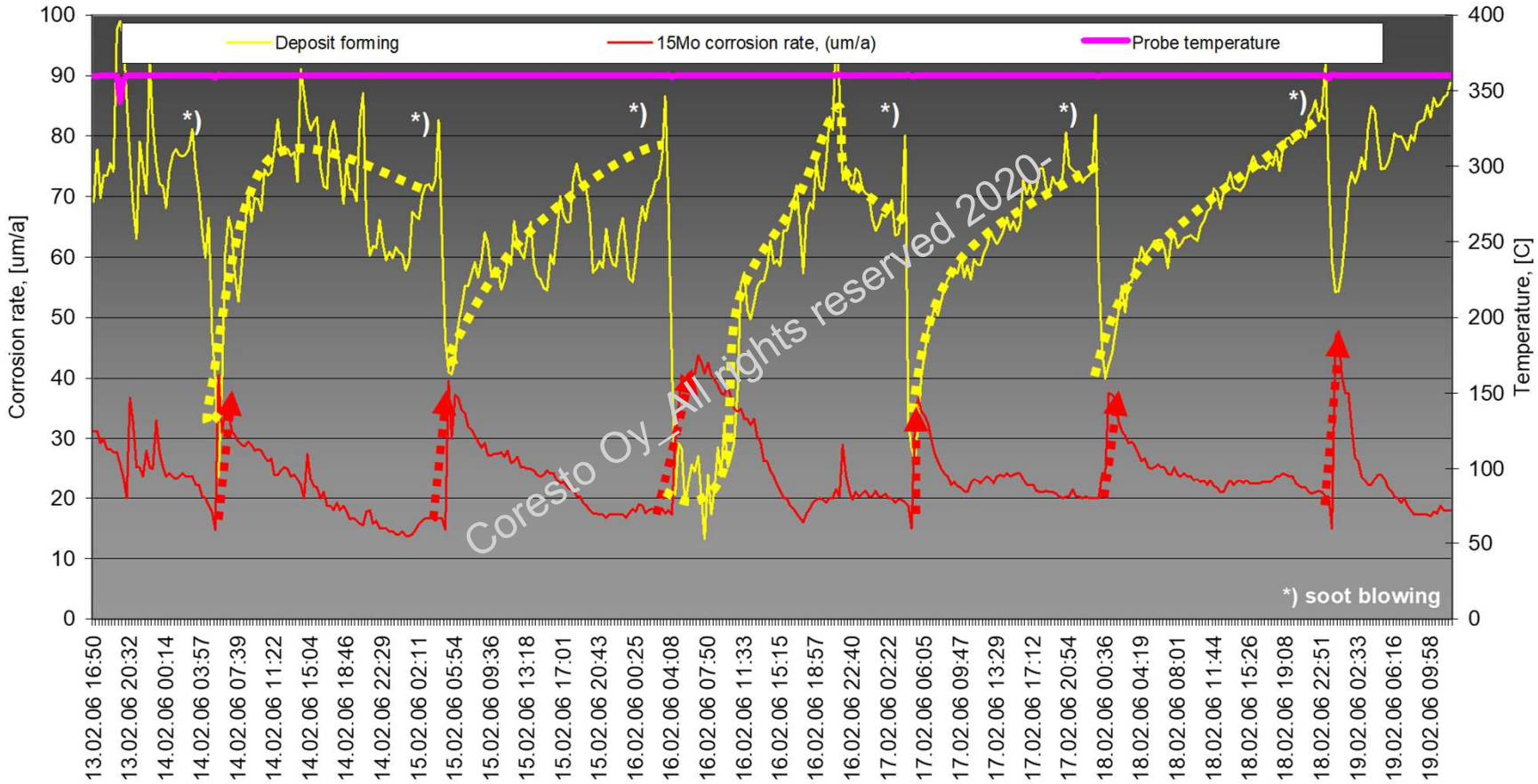
Change of Temperature
> corrosion rate

Boiler Corrosion- and Process Monitoring



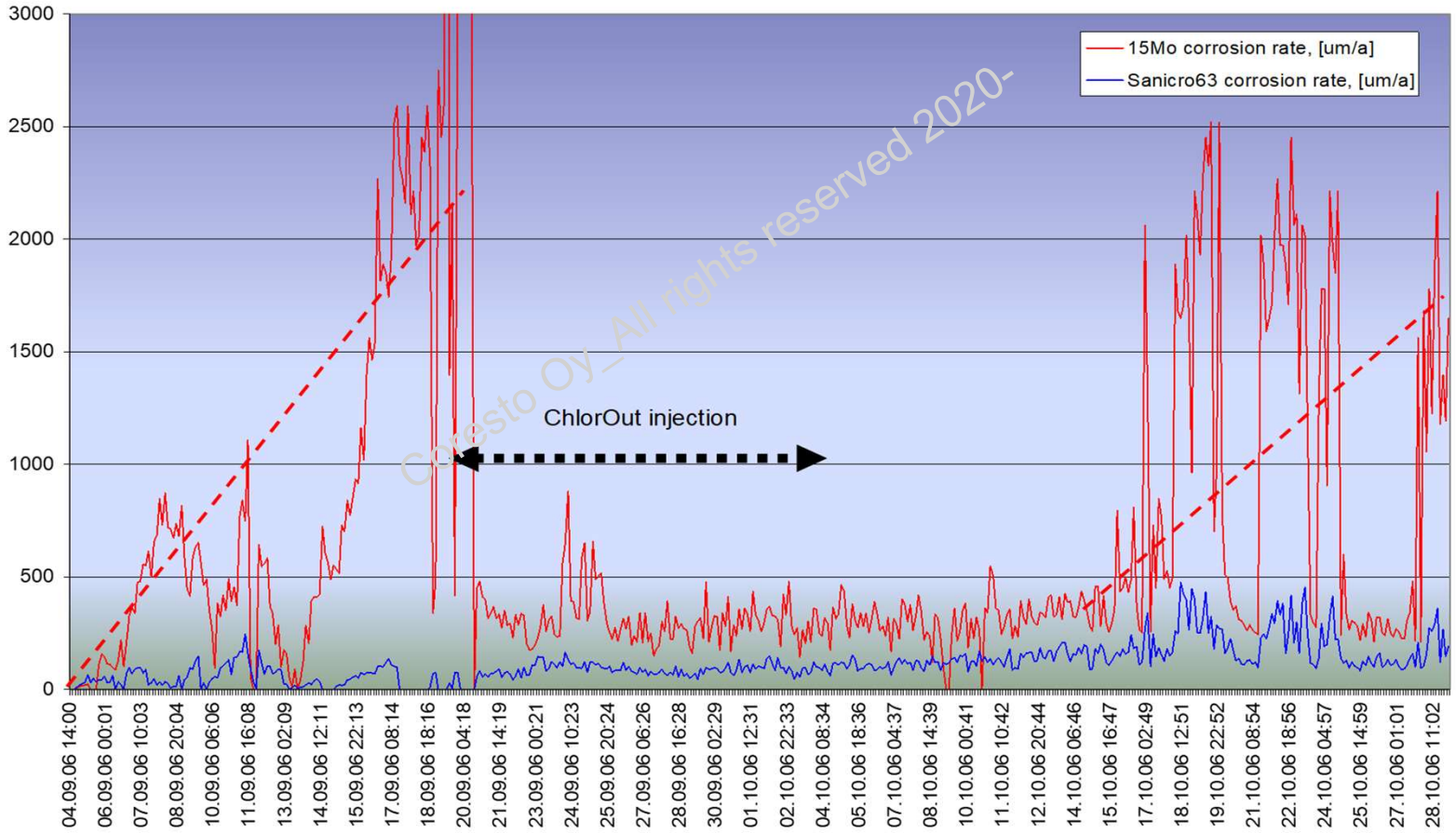
Deposit forming / soot blowing

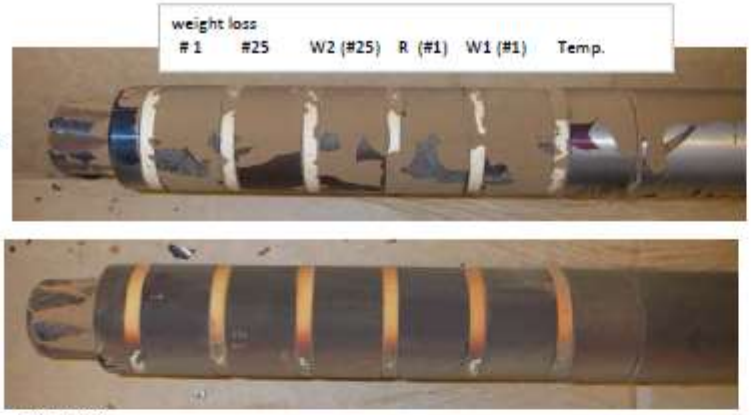
Boiler Corrosion Monitoring
Soot blowing_corrosion (corrosion rate increase after soot blowing)



Controlling of the effect of additives / inhibitors

ChlorOut Injection
MECO CB Corrosion Measurement, T 420ºC

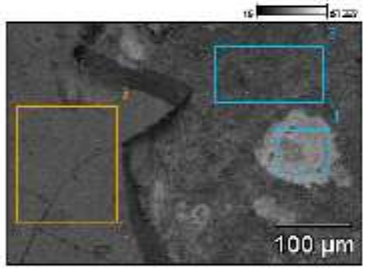




		with depos washed (HNO3)				
		start	end		dm	dm
		g	g	g	g	
#1	13CrMo	44.811	45.7163	?	0.9053	?
#25	DMV310N	46.097	46.3119	?	0.2149	?

wsahing with HNO3 was not done

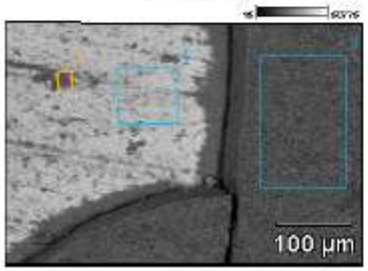
13CrMo(3)



SEM at wind side

	O-K	Na-K	Mg-K	Al-K	Si-K	P-K	S-K	Cl-K	K-K	Ti-K	Cr-K	Mn-K	Fe-K
13CrMo(3)_pt1	20.6	0.5	0.7	2.6	3.1	0.5	4.0	0		0	0	0.2	62.7
13CrMo(3)_pt2	35.2	6	0.7	5.8	6.1	1.2	10.4	0.1	.1	0.2	0	0	18.1
13CrMo(3)_pt3	37	1.9	1.7	4.0	5.4	1.1	10.6	0	14.8	0.3	0	0.5	13.5
No chlorine													
Ca and K as sulfate													

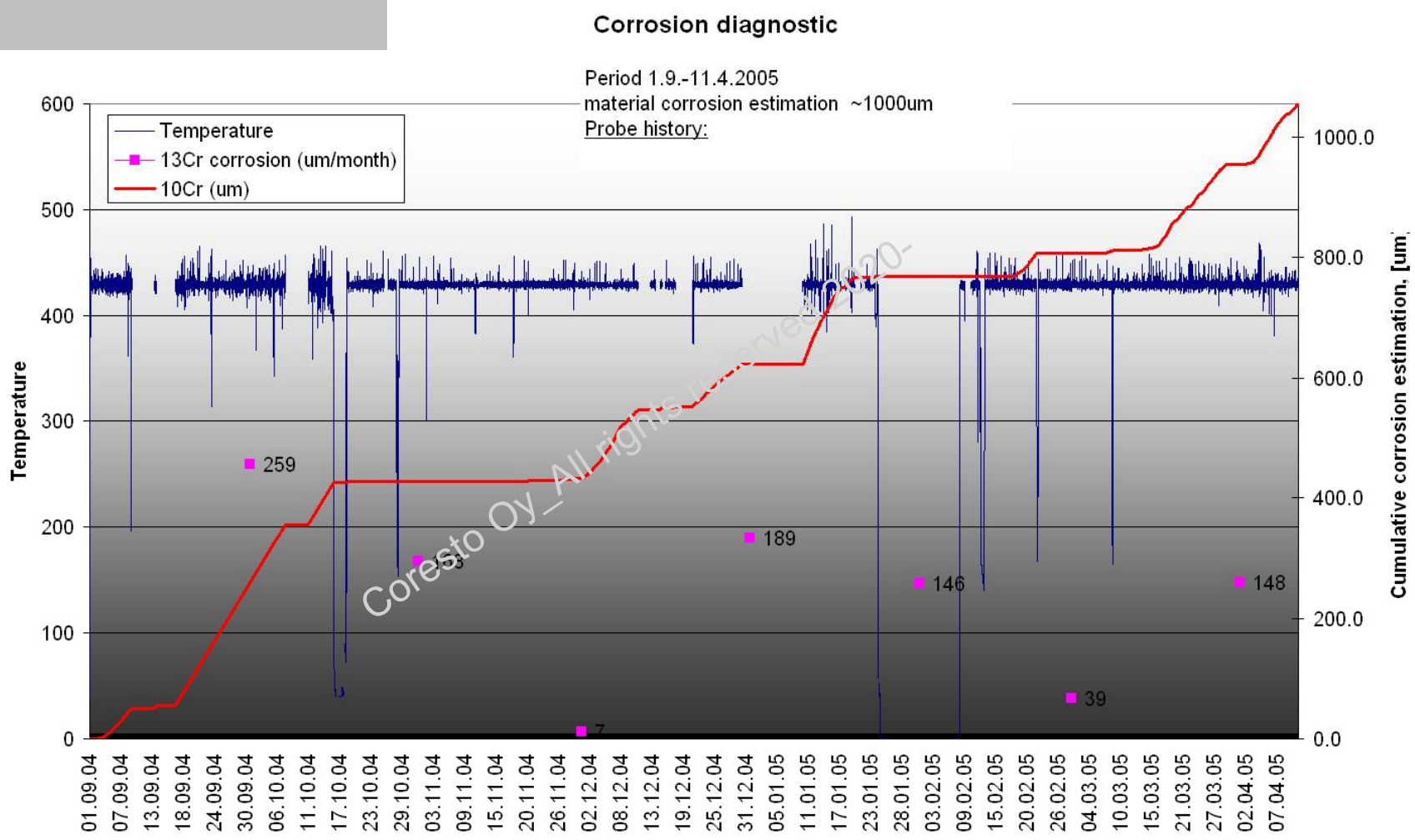
310N(2)



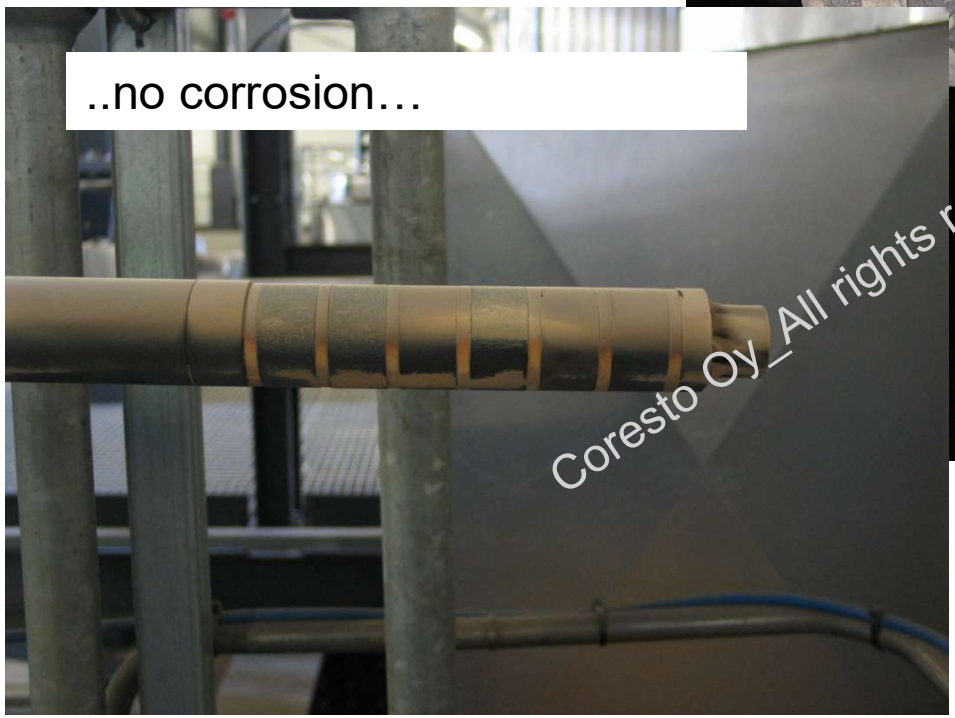
	O-K	Na-K	Mg-K	Al-K		Cl-K	K-K	Ca-K	Ti-K	Cr-K	Mn-K	Fe-K	Ni-K
310N(2)_pt1	12.6	0	0.7		1.0	0	0.8	0.7	0	24	1.5	40.7	16.1
310N(2)_pt2	33.4	1.2	1.4	.3	5.4	0	4.4	7.9	0.1	16.5	1.9	14.0	3.5
310N(2)_pt3	41.2	1.8	1	4.9	11.7	0.1	9.5	13.5	0	0	0.4	10.9	0
No chlorine													
Ca and K as sulfate													

Difference between the two materials in the same probe / process circumstances

Cumulative corrosion



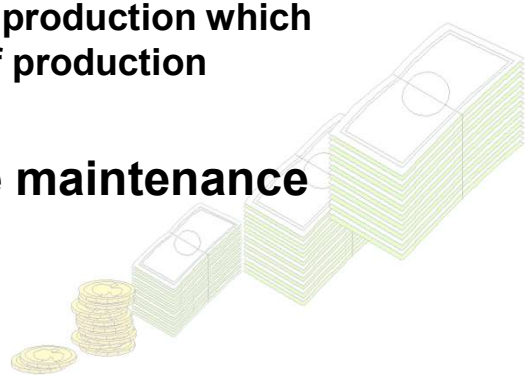
MoCo SH
>>> minor corrosion after 12 month operation



- Early warning of corrosion problems
- On-line continuous corrosion information from the process

  "work smarter rather than harder"
- Avoid / reduce unexpected corrosion damages
- System readings can be used as process optimizing
- Key in the well planned maintenance
- Scheduling shut downs for replacements, etc.
- Increase operation reliability
- Less interrupts of production which means increase of production

- **Savings in the maintenance costs**



- Enable of a testing of a new materials for the future
- Knowledge for the Increase Safety
- Investing in Corrosion Monitoring

  - Cost Benefit Considerations

Thank you.

We are at your service.

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