

Alstom Filborna Presentation

Rolf P. Hunt

ALSTOM

- COMPANY PRESENTATION
- FLUE GAS CLEANING PLANT CONCEPT
- NID SYSTEM

Three main activities in four sectors

Equipment & services for power generation

Alstom Thermal Power



Equipment & services for power transmission

Alstom Grid



Alstom Renewable Power



Equipment & services for rail transport

Alstom Transport



Alstom Power: present in all markets

GAS



COAL



OIL



HYDRO



NUCLEAR (conventional island)



WIND (offshore and onshore)



SOLAR



GEOHERMAL



BIOMASS/WASTE



TIDAL



...for new plants or installed base

Alstom Environmental Control Systems

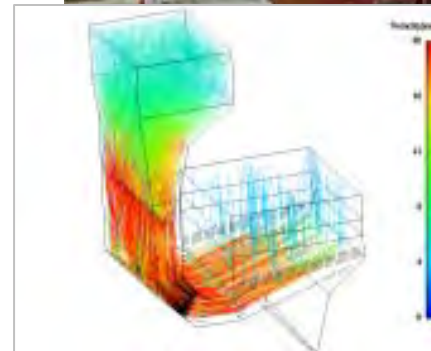
- Are** • Around 1500 air pollution control professionals world wide
- Sell** • Air pollution control systems & products for power & industrial applications
- Do** • Business driven by increasingly stricter emissions regulations
- Have** • 80 years experience in air pollution control



Our R&D Capabilities

Dedicated R&D facilities in Sweden, manned by highly-skilled teams offering:

- Applied physics / Fluid dynamics
- Chemical engineering
- Analytical laboratory
- Instruments / measuring techniques
- Laboratory for pilot plants and flow model testing
- Dedicated Lab workshop for test equipment and special services



References WtE

Alstom was a pioneer in the field of advanced Air Pollution Control systems for WtE plants and have been active there since the late 1970's, today the Alstom Reference list covers:

- The list covers more than 400 lines world wide
- Of these 49 are with NID's
- The references cover all major and commonly used technologies

Öresundskraft Project Filborna WtE CHP

Alstom/Götaverken Miljö AB



Presentation of the plant concept

The Flue Gas cleaning Plant is supplied by the companies
Alstom Power Sweden AB and Götaverken Miljö AB

ALSTOM

**GÖTAVVERKEN
MILJÖ**

The logo graphic for Götaverken Miljö consists of three curved, overlapping lines in green and blue, resembling a stylized 'S' or a wave, positioned to the right of the text.

Presentation of the plant concept

Alstom supplied the complete semi dry flue gas cleaning part and the SCR option

Alstom also managed and coordinated the overall flue gas cleaning system.

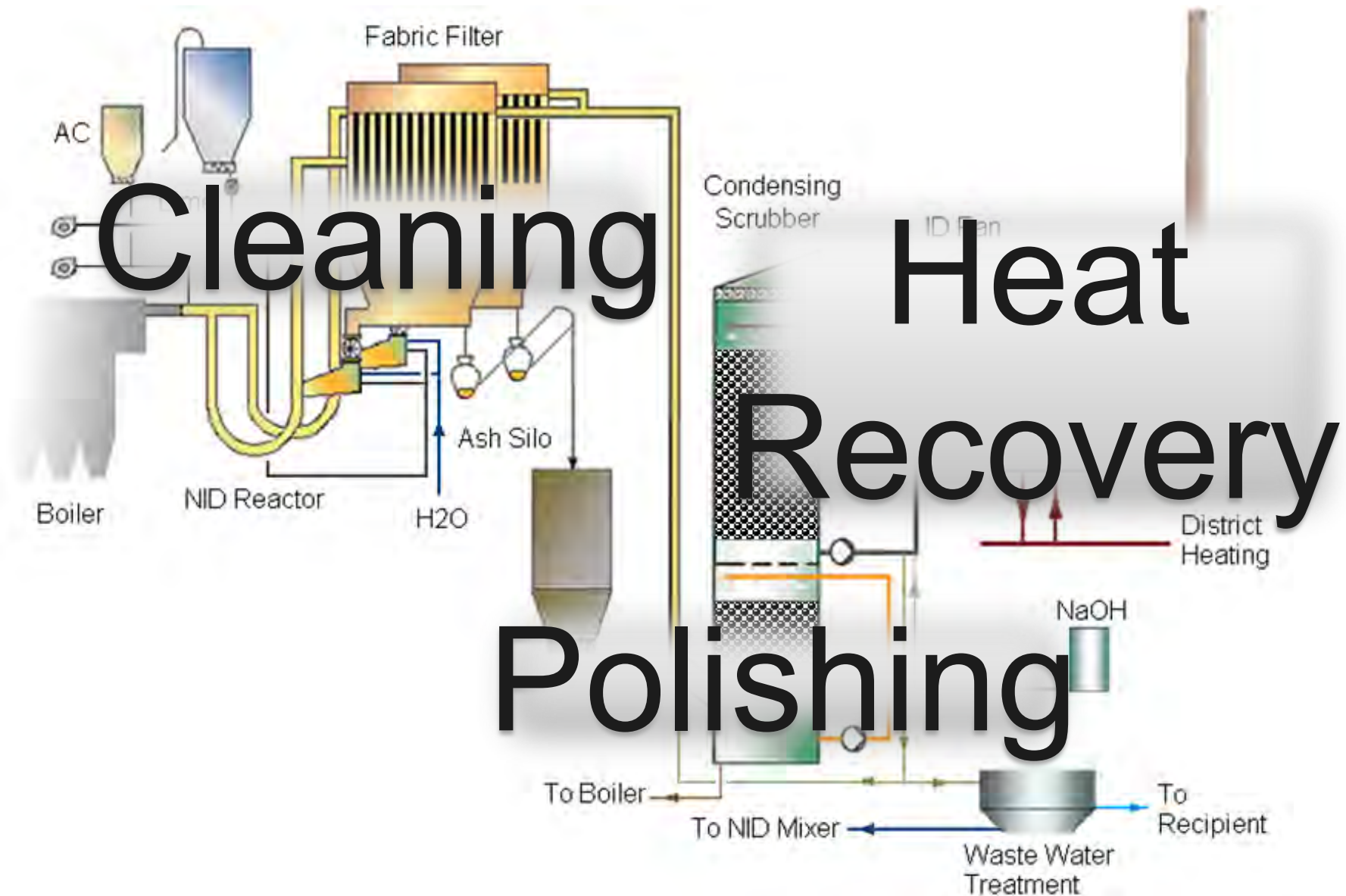
Götaverken Miljö AB supplied the polishing scrubber and flue gas condenser with associated equipment and the Absorption Heat Pump.

Presentation of the plant concept

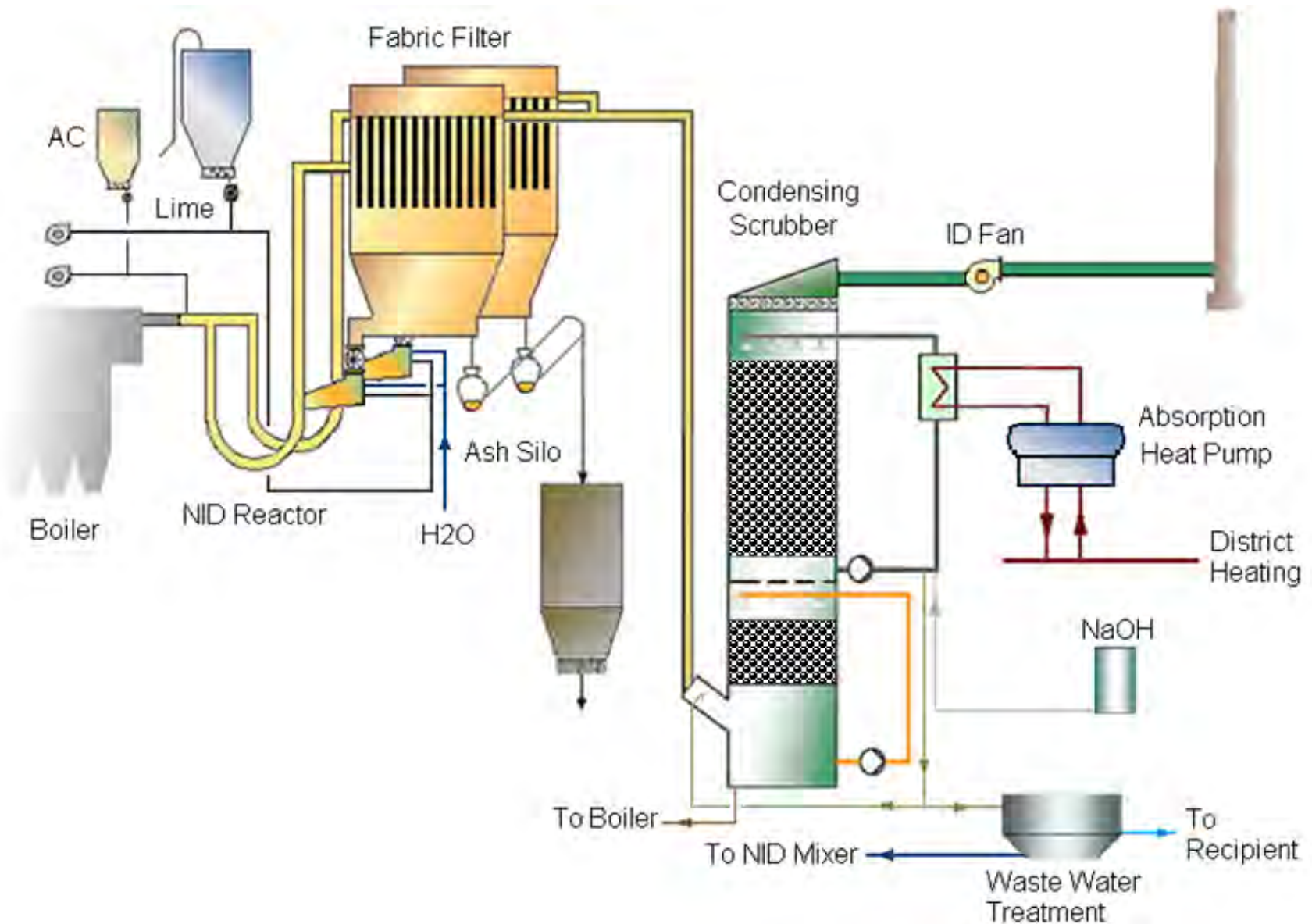
To optimise the combined system we focused our efforts on the following main areas:

- Efficiency
 - Emissions
 - Consumption
 - Residue formation
 - Energy recovery
- Availability and operability
- Robust and proven

Presentation of the plant concept



Presentation of the plant concept



NID main features

Integrated well proven semi dry flue gas cleaning system:

- Proven system with 49 WtE references to date
- Patented integrated temperature and RH control
- Safe, robust and straight forward to operate
- High availability and operability
- Combines the best advantages of the dry and semi dry technologies
- High safety on focused areas such as removal of dioxin, acid gasses and heavy metals
- Wide operating range in terms of fuel and temperature
- Minimal use of complex systems, products, processes and chemicals
- Use of CaO is easy with integrated dry slaker
- Energy efficient
- Compact solution in terms of lay out
- Can take WWTP reject water

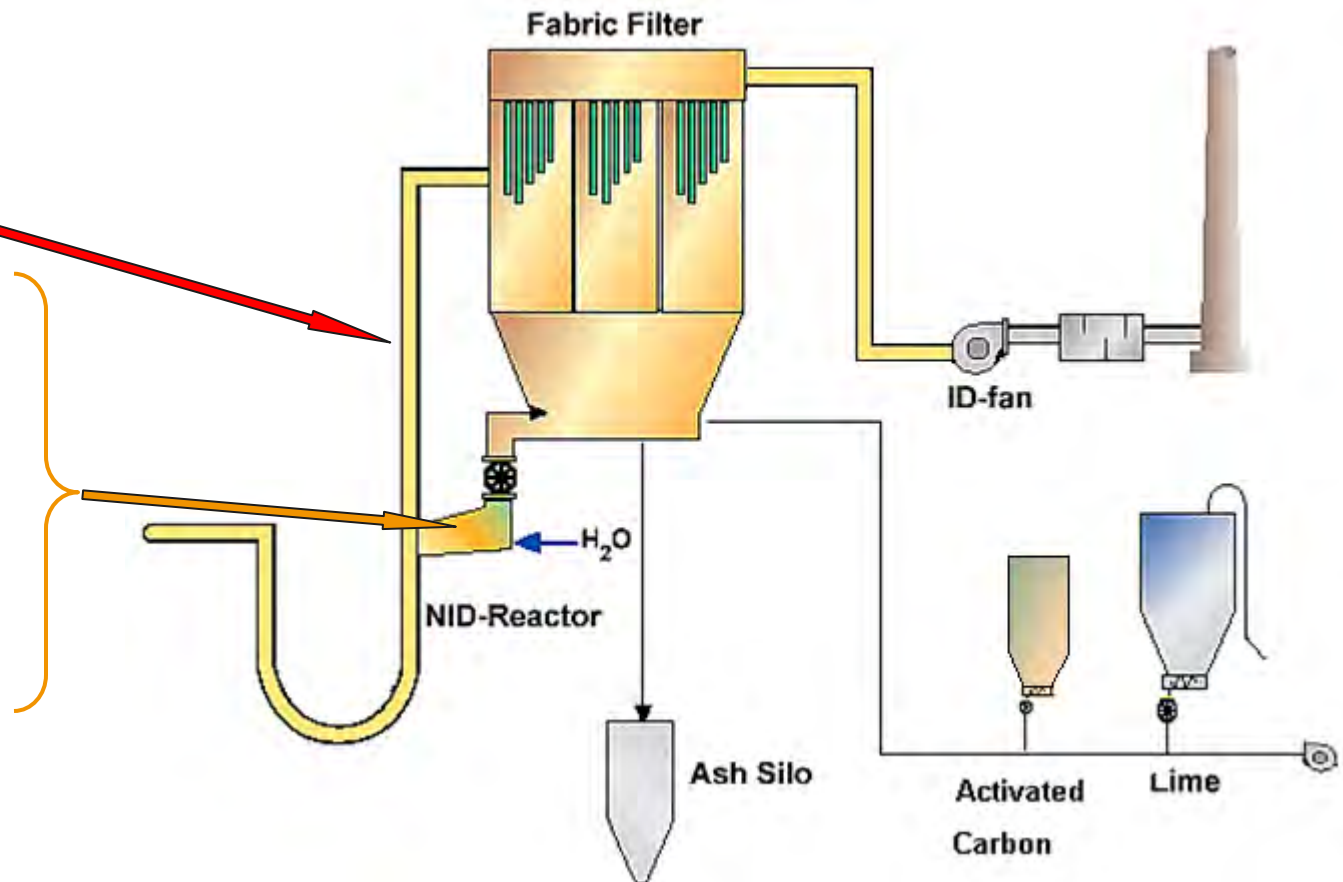
Guaranteed Emission to air

Element	Inlet data	24 h average	Unit
Flue gas flow	130.000		Nm ³ /h (6% O ₂ wet gas)
Temperature	160		°C
Dust	2.000	5	mg/Nm ³
HCl	1.200	5	mg/Nm ³
SO ₂	1.000	25	mg/Nm ³
HF	12	0,5	mg/Nm ³
NH ₃	15	5	mg/Nm ³
		<u>½ h average</u>	
Cd+Pb	1	0,015	mg/Nm ³
Hg	0,2	0,02	mg/Nm ³
Σ HM	12	0,2	mg/Nm ³
PCDD/PCDF	5	0,05	ng/Nm ³

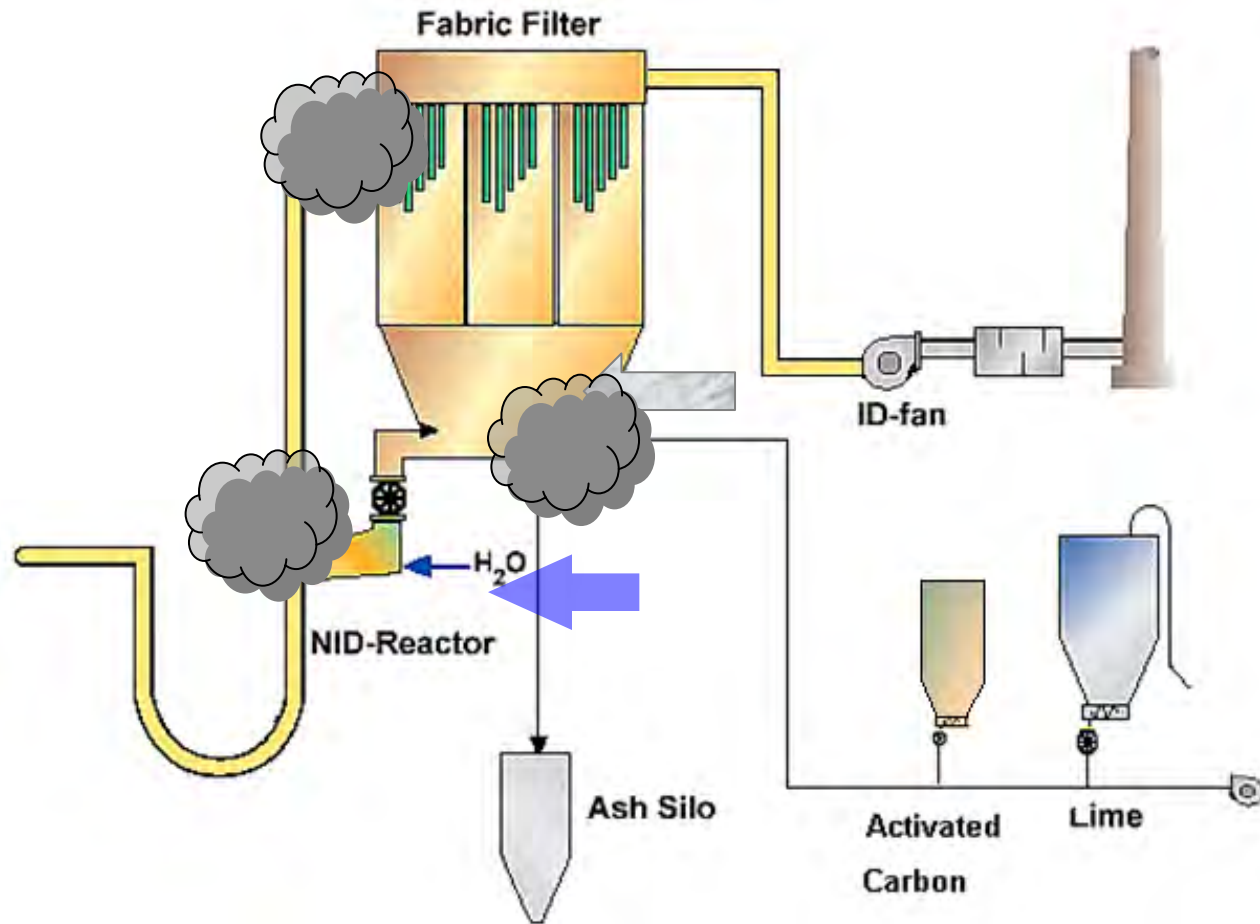
NID system

Feature:

- ROBUST AND COMPACT REACTOR
- USE OF CaO WITH DRY SLAKER
- CONTROLLED HUMIDIFICATION AND MIXING
- INTEGRATED RECIRCULATION SYSTEM



NID operating principle



Thank you
for your attention

Questions?

www.alstom.com

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