



**BATREC**

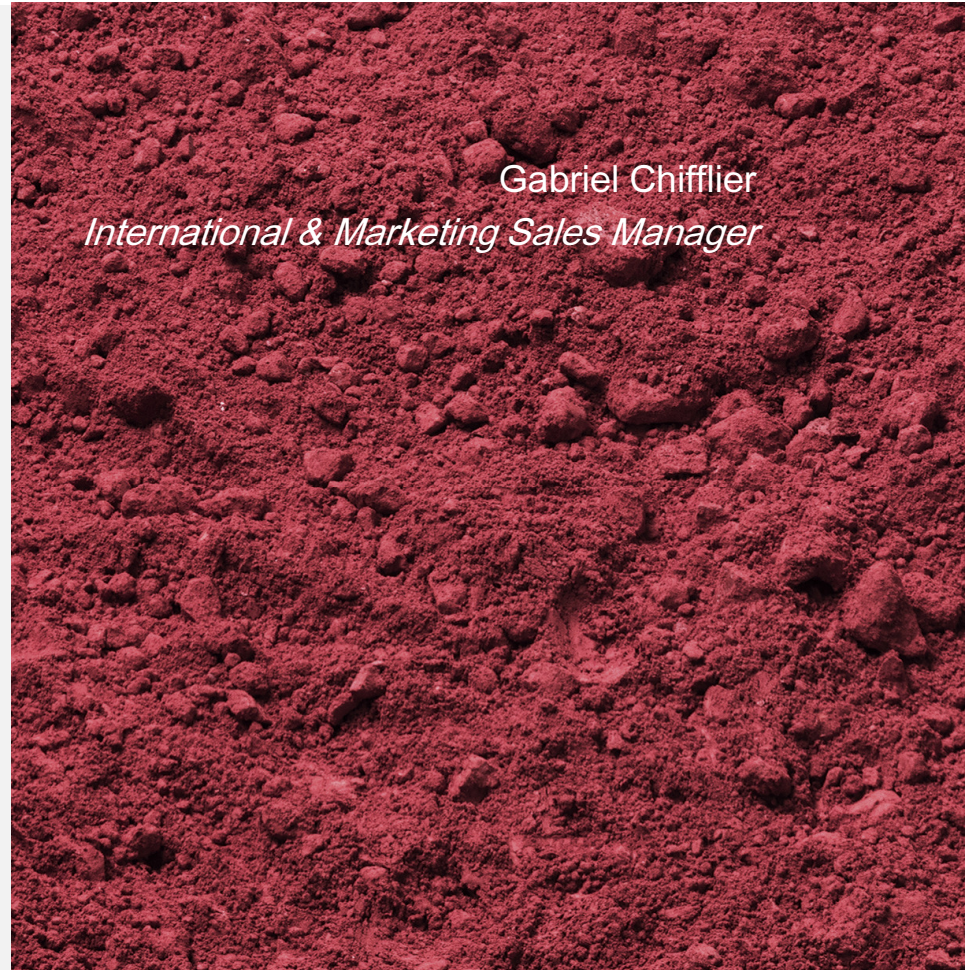
Swiss quality recycling solutions

SARPI  **VEOLIA**

# Stabilisation of Mercury



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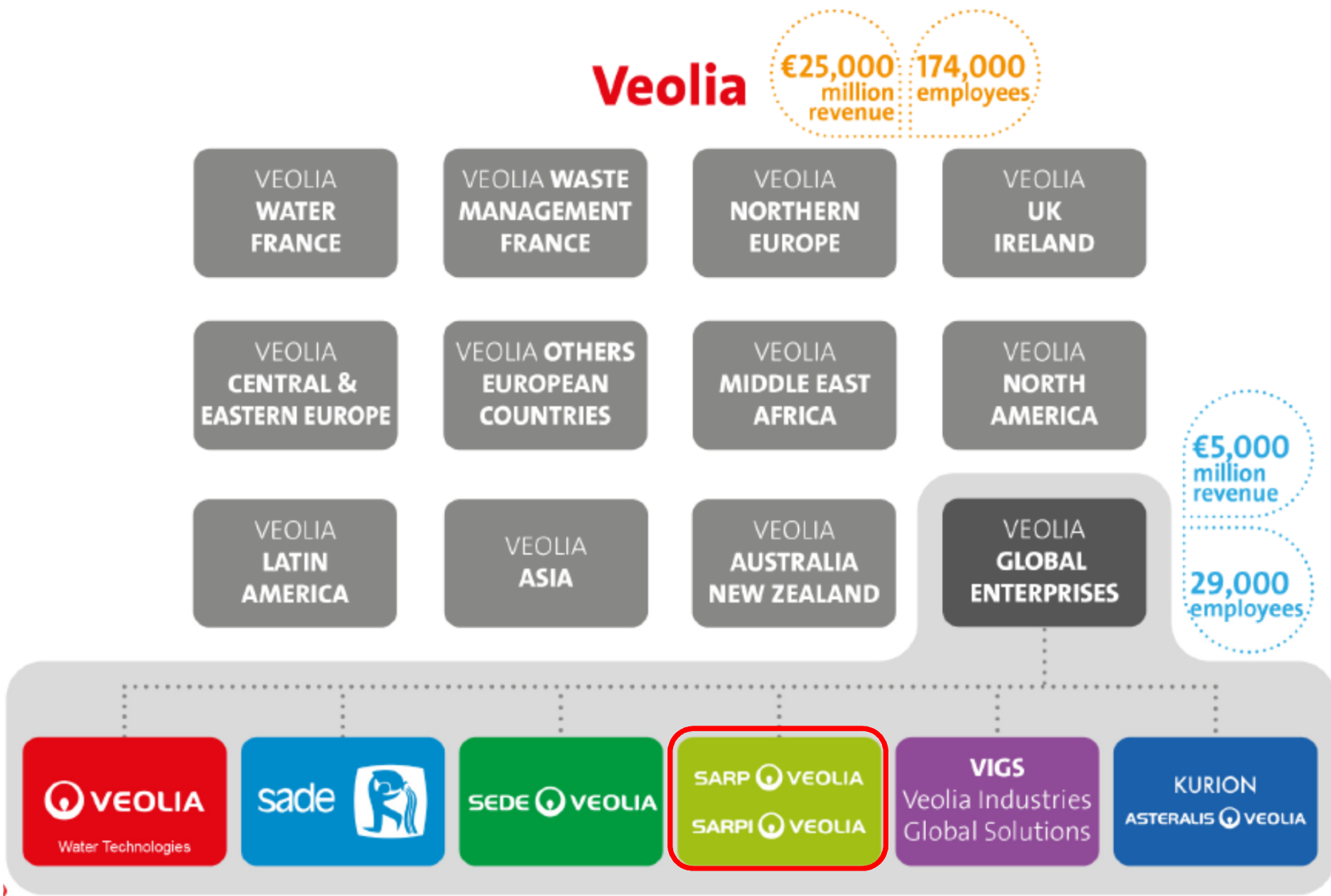
21.11.2016  
page 1

# BATREC's Key Figures

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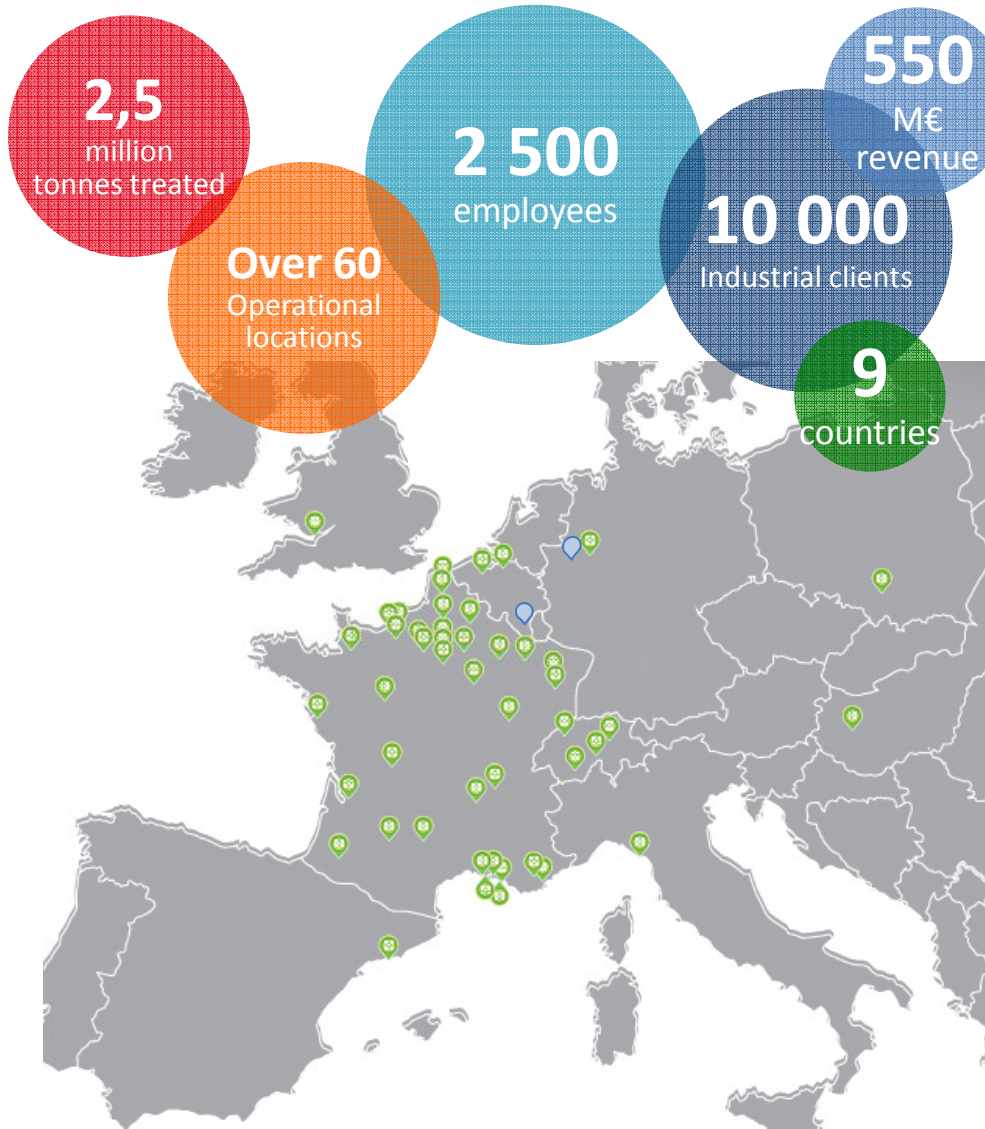
<b>Year of foundation</b>	1989
<b>Turnover in 2015</b>	14.7 Mio. CHF = 13.2 Mio €
<b>Employees</b>	68
<b>Certifications</b>	ISO 9001, ISO 14001 and OSHAS 18001
<b>Shareholders</b>	100% VEOLIA managed by: <b>SARP Industries</b> = hazardous waste management division of Veolia
<b>Business areas</b>	<ul style="list-style-type: none"><li>- Battery recycling</li><li>- Reactivation of activated carbon</li><li>- Decontamination of Hg-guards</li><li>- Recycling of Hg waste</li><li>- <b>Stabilisation of mercury</b></li></ul>

# BATREC's Place in the Veolia Organisation





# SARP Industries in brief



- 14 lines of high temperature incineration with energy recovery 800 000 T/an
- 5 secure landfill sites for stabilised waste 320 000 T/an
- 18 water/hydrocarbon treatment plants 400 000 T/an
- 9 physical-chemical treatment plants 220 000 T/an
- 27 transfer stations
- 15 facilities dedicated to recycling of: solvents, used motor oil units dedicated to the recycling, vegetable oil, hydrocarbons, metals
- 2 thermal desorption units for depollution of soil



# Our presence in Latin America

Contact in VEOLIA Argentina: Mr. Benjamín Tarelli. Cel: +54 91154873132



**10.800**  
employees

Committed to **quality of service** and **customer satisfaction**



Veolia has gained unique experience in the integrated **management of water, waste and energy**



The Group believes in **research, innovation and ongoing development** to provide tailor-made solutions with ever-increasing environmental, social and economic efficiency.



# At the service of cities and industries in Latin America

Over 15 years operating in Latin American cities, Veolia has acquired a unique vision of **the urban and environmental challenges**.

We propose **innovative services** to address these challenges, through the **integrated management of water, waste and energy services**. Our aim is for the solutions that we provide to contribute towards the economic and social development of the areas where we work.

## Cities



## Industries



Veolia, as a **partner in the growth of industry**, offers a wide range of tailor-made services covering all sectors and their needs.

Through our key sectors oil and gas, mining, pulp and paper, food and beverage, we **value ordinary and hazardous waste, decontaminate soil, dismantle sensitive facilities, recycle water and manage energy**.





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# Stabilisation of Mercury



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21.11.2016  
page 7



# Context

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The global evolution of environmental legislation e.g.

- US export ban (Mercury Export Ban Act of 2008)
- EU export ban (Regulation (EC) No 1102/2008)
- UNEP Minamata Convention on Mercury

creates a demand for a safe & sustainable disposal / long-term storage of metallic Mercury.



# Context

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## Especially customers from

- Cl-Alkali industry
- natural gas production
- nonferrous mining industry  
(e.g. Gold mining)
- nonferrous metallurgy

show a high corporate responsibility,  
they want or must ensure that their  
mercury does not re-enter the market  
and thus they are asking for disposal  
solutions of their metallic mercury.



# Mercury stabilisation

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**The problem:** Mercury is extremely toxic

**The challenge:** How to safely dispose an extremely toxic substance?

**The solution:** Transformation of the metallic Mercury into a non-toxic compound that can be safely disposed → **“stabilisation”** or **“mineralisation”**



# Mercury stabilisation

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## The idea behind Mercury stabilisation as HgS

- transformation of very toxic Hg into non toxic mercury sulphide (HgS)



# Mercury stabilisation

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## Advantages of the transformation of Mercury into HgS

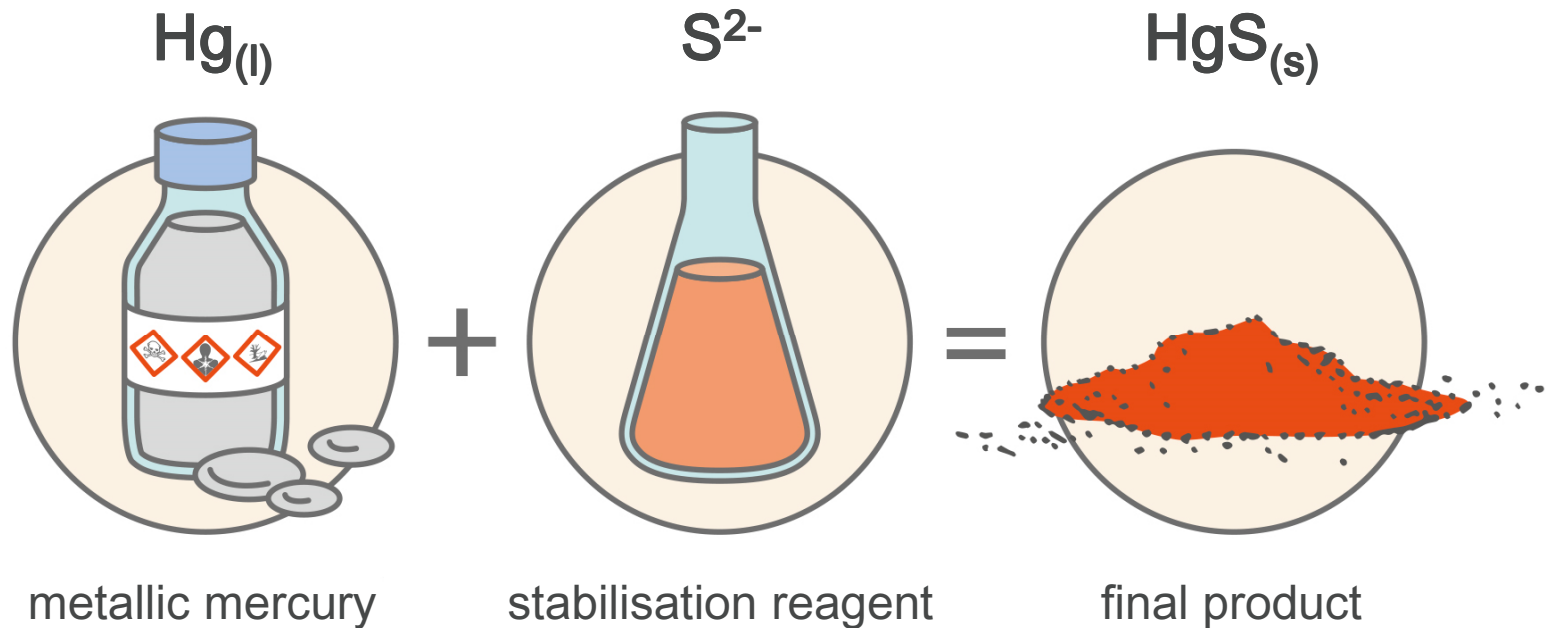
- HgS is the most stable mercury compound
- HgS is the most insoluble mercury compound
- Hg is transformed into its natural mineral form, cinnabar (= HgS)



# Stabilisation methodology

## BATREC's approach:

- Mixing of metallic Mercury with a stabilisation solution





# Stabilisation process – capacity

## capacity

- 500 kg mercury / batch
- 2 reactors
- 1.000 t mercury / year

## process characteristics

- simple reactants
- low temperature
- wet process guarantees very low Hg emissions
- no gaseous Hg in the process
- short reaction times
- simple equipment



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# Quality of HgS

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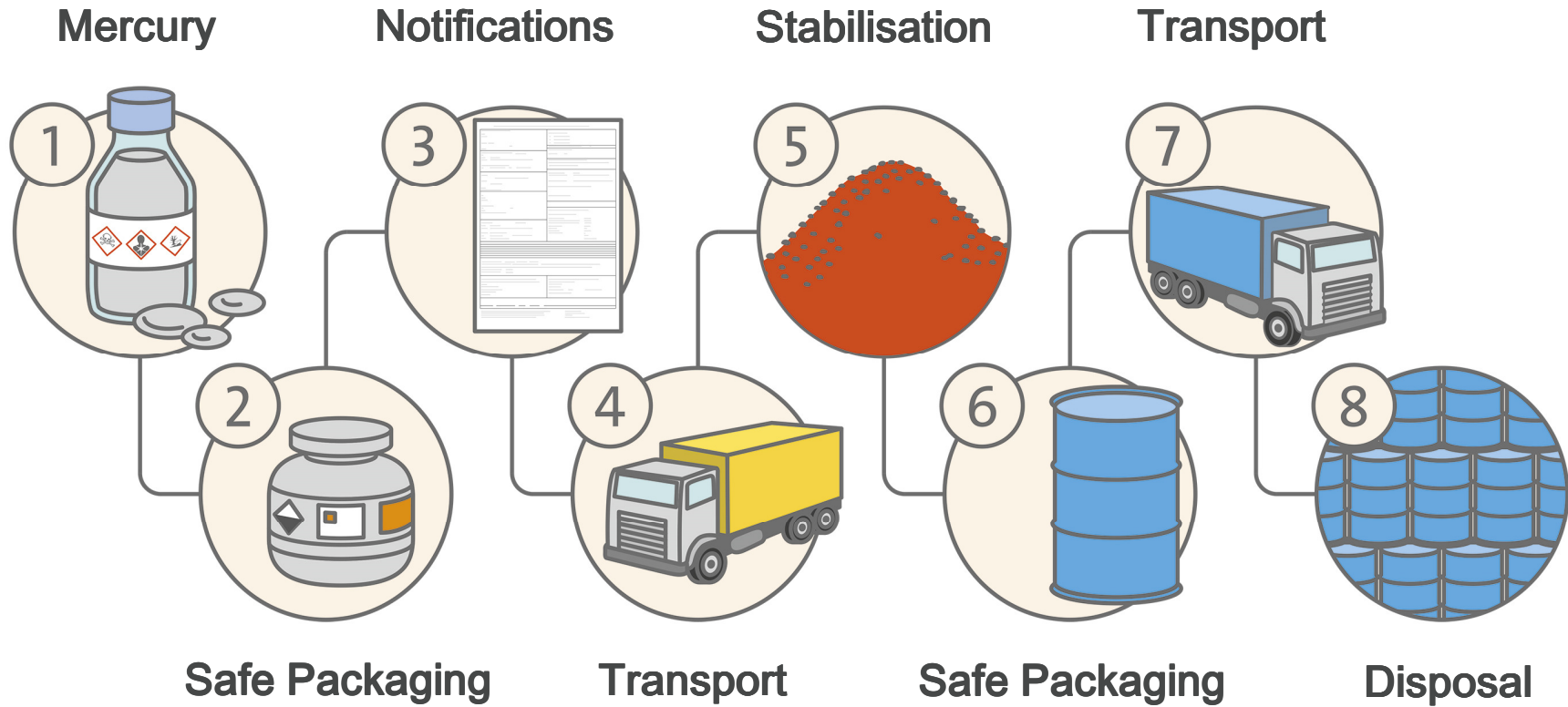
Conversion rate of Hg into HgS:  
**>99.999 %**

very high conversion rate ensures:

- very low mercury vapour emissions from the product: **< 20  $\mu\text{g}/\text{m}^3$**
- acceptance criteria for permanent storage in salt mines fulfilled



# From Mercury to Permanent Disposal



***BATREC takes care of the whole process in a “cradle to grave” concept !***



# Shipping of Hg from South America to Europe – a problem?

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... NO – a big **advantage!**

- no need for longsome permitting processes (e.g. operating approval) to operate a stabilisation plant on site in South America
- no risk of emissions, contaminations etc. for the customer on his site
- the supply of approved transportation containers for Hg is part of BATREC's offer  
→ *no investment costs at all for the client*



# Shipping of Hg from South America to Europe – a problem?

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... NO – a big **advantage!**

- liabilities linked to the produced HgS are transferred to BATREC
- safe disposal solutions (e.g. salt mines) for HgS only exist in Europe / Germany
- no difficulties / uncertainties with the acceptance of the HgS in the salt mine
- no additional efforts with notifications under the Basel Convention  
→ *both Hg and HgS need a notification to be transported to Europe, thus a treatment in South America cannot avoid to have to build still a waste export license*

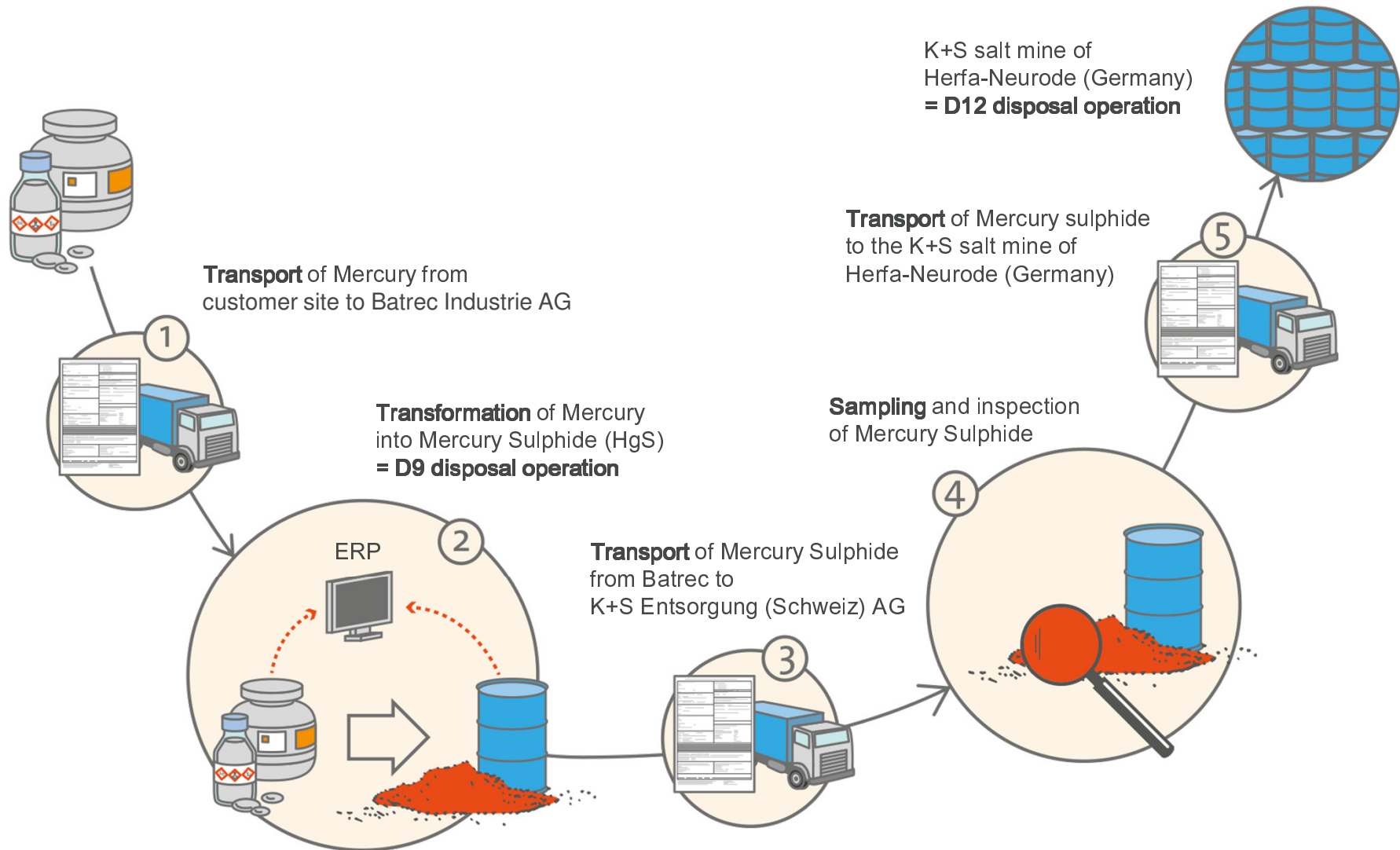
# notification – Basel Convention

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- **guarantees full traceability** along the transportation and treatment chain for both customers and competent authorities involved
- international, standardised and well known procedure
- the whole preparation of the notification is part of BATREC's offer
  - >20 years of experience exporting hazardous waste all over the world guarantees smooth and fast application.
  - Veolia Latam network ensures local support with local authorities and notification application
  - transportation and associated risks & liabilities covered by BATREC / VEOLIA



# Traceability chain for the stabilization of Mercury





# From Mercury to Permanent Disposal – the different sites involved



- **Batrec**  
stabilization plant, transformation of recovered Hg into HgS
- **K+S Switzerland**  
Swiss subsidiary of K+S salt mine
  - transfer platform
  - external inspection site
  - analysis
- **K+S Herfa Neurode**  
K+S salt mine, permanent storage for HgS

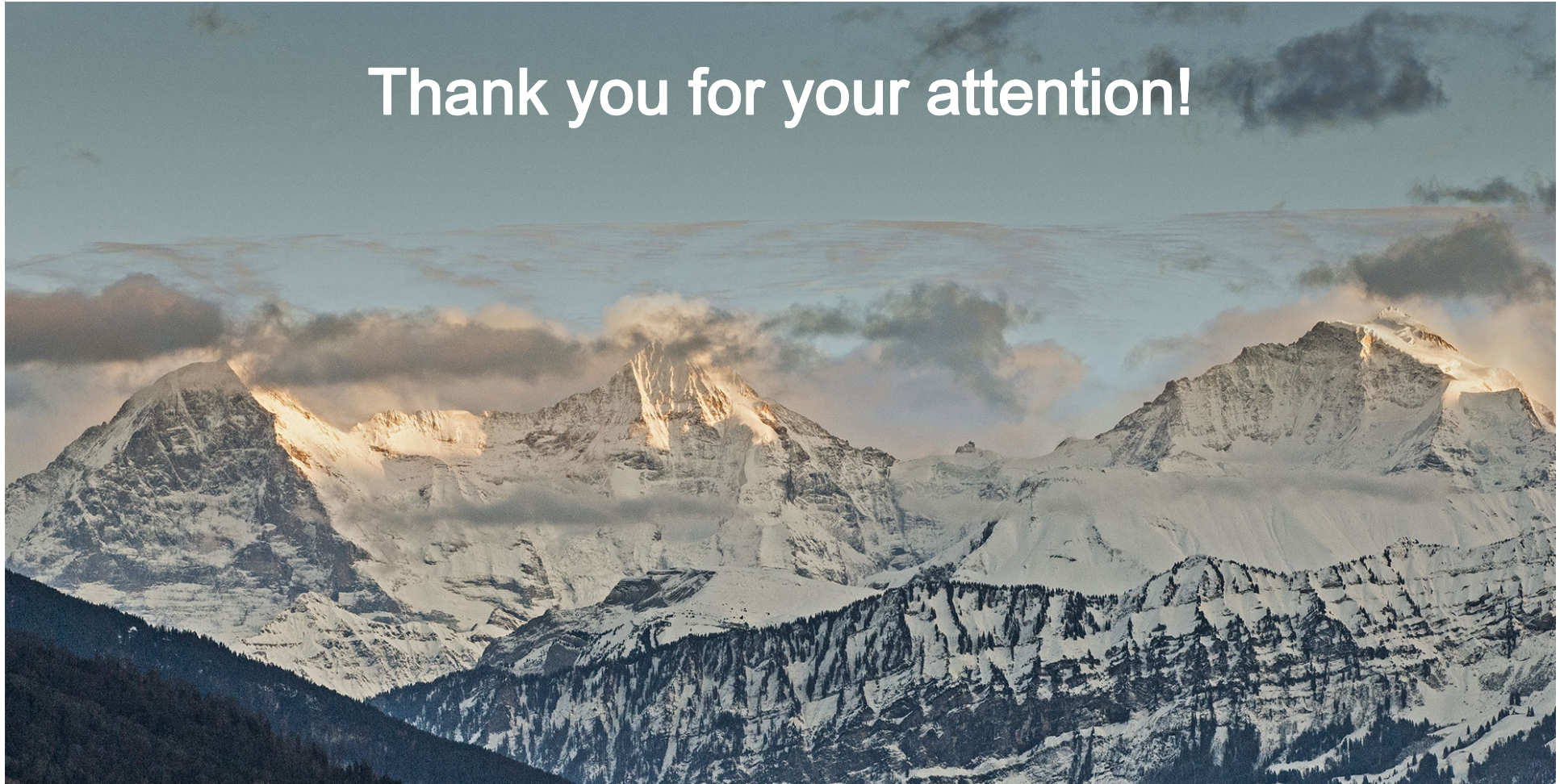




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## Thank you for your attention!



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21.11.2016  
page 23