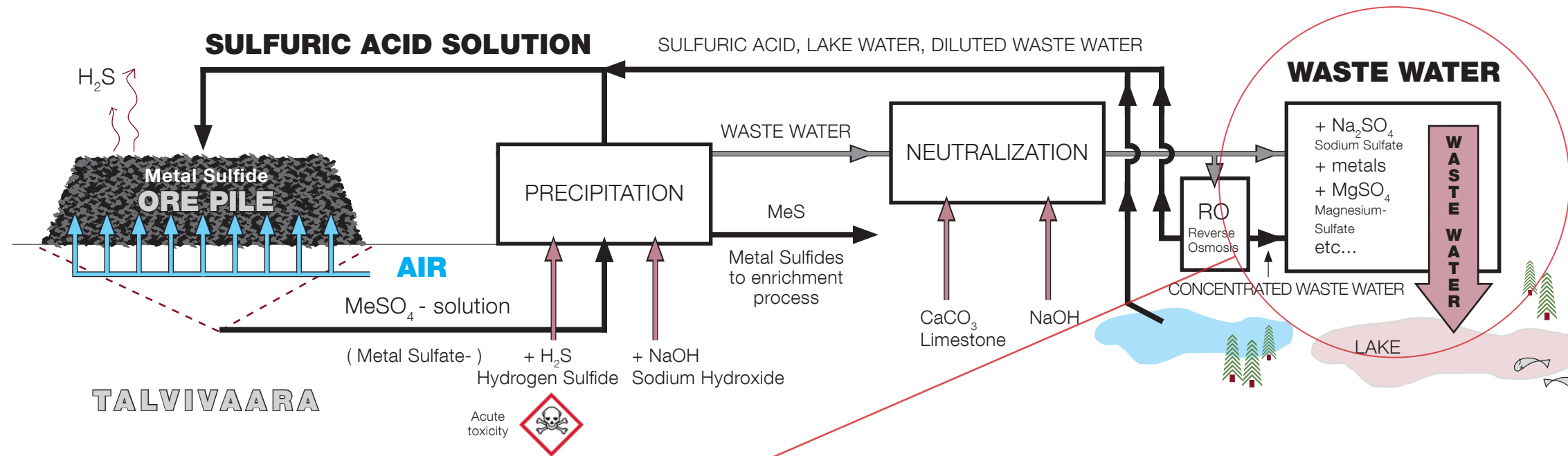


Comparison of Water Treatment of Mine

Hannu L. Suominen, Ph.D.
20.03.2015

“BIOLEACHING” METHOD

$150 \text{ m}^3 \text{ Na}_2\text{SO}_4$ - solution / 1 tn NiS = 10 000 tn NiS \Rightarrow 1 500 000 m^3 of waste water



CAPEX AND OPEX

Investment approx.....2 Milliard €

Operating expenses include:

The use of many chemicals

The necessity to clean the process water/
Cleaning expenses

Only a few commodities for sale

Poor performance of the process

PRODUCTION EXPENCE

75 000 €/ton of Nickel

Stock Price of Nickel in 2015

14 500 €/ton of Nickel

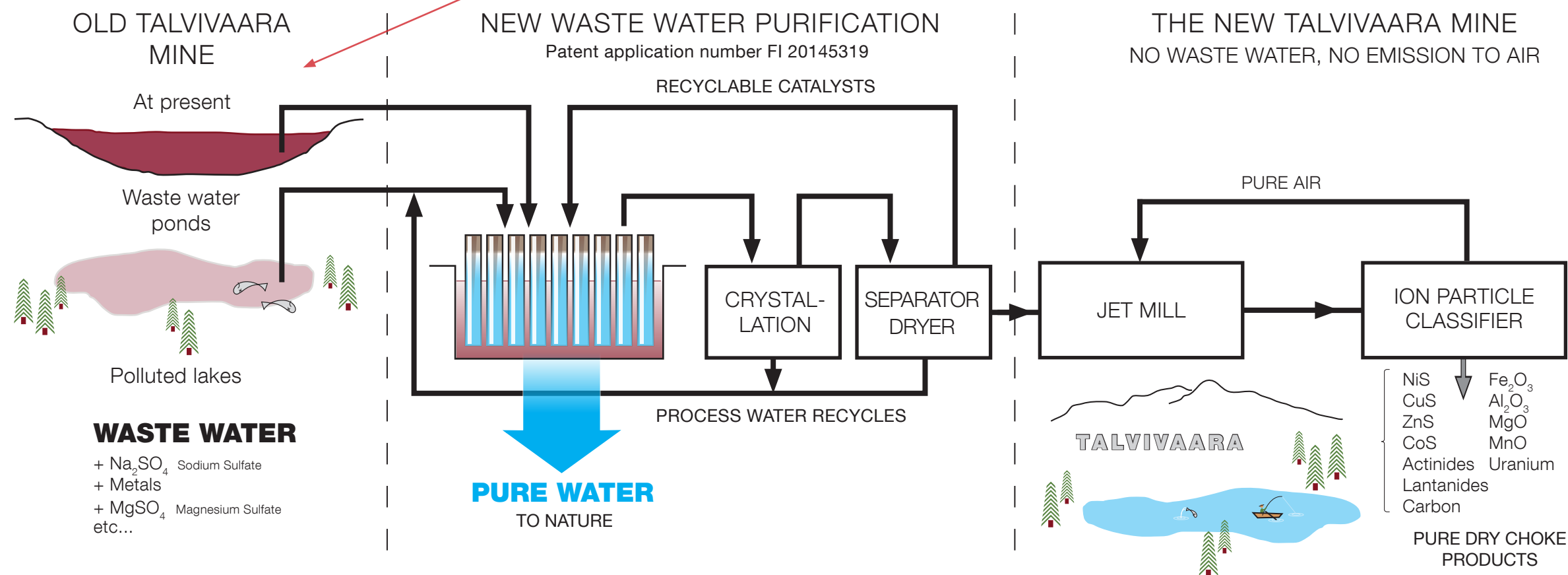
LABOR FORCE

400 workers/10 000 ton of Nickel

PURE WATER METHOD

Tri Hannu L. Suominen 26.2.2015

The "Bioleaching" Process will be terminated forever. The produced waste water (10 M m^3) and the waste water (10 M m^3) produced during the period of shutdown will be purified **on the mining site**. The mine will start the new operation by using the Dry Enrichment Technology.



INVESTMENT FOR THE OPERATION

Investment for the water purification..... 65 M€

Total 20 M m^3 of waste water

Period of purification 2 years

OPEX

1 – 2 €/m 3 of waste water

LABOR FORCE

10 workers

ATTENTION

The water purification recovers commodities for sale