Extraction of metals from mine water

SveMin Conference

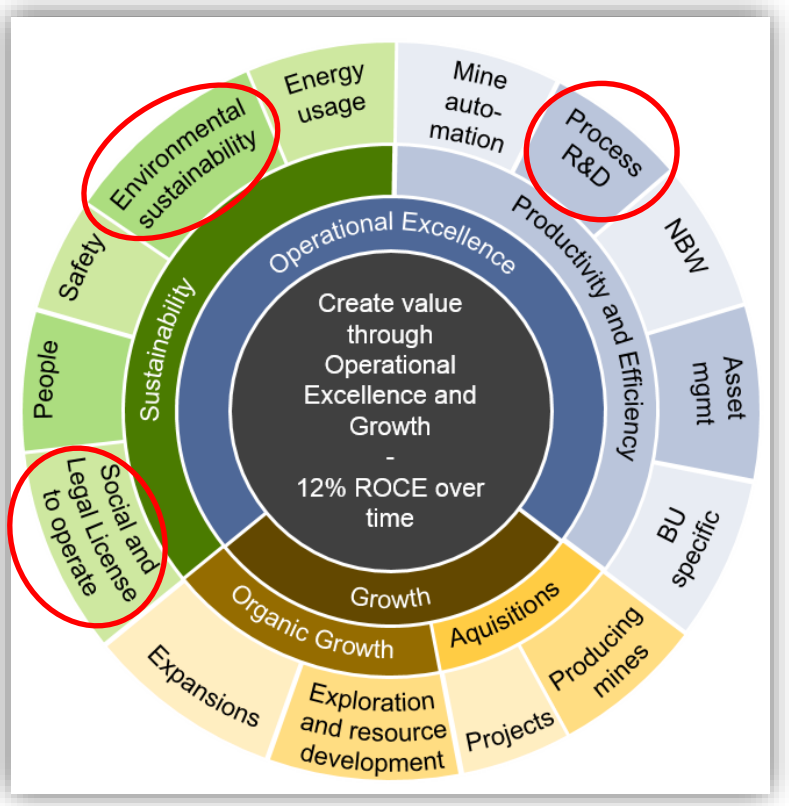
Skellefteå Oct 2nd – 3rd

Water Treatment Technology & Processes
Boliden Mines

Content

- Why extracting metals?
- Case description
- Iron precipitation circuit
- Results
- Discussion
- Other studies

Boliden Mines Strategy Focus Areas



Case description – Maurliden site

- Skellefteå district
- Two open pit mines
- Complex mineralization
- High sulphur and arsenic content in waste rock


Photo: Boliden Mineral AB


Photo: Boliden Mineral AB

- Acid Mine Drainage
- Leachate from waste rock dumps
- Current treatment - lime neutralization

Case description – metals extraction concept

Fe and As removal

•Mixed Fe/As sludge

Bulk sulfide precipitation

•Zn/Cu sulfide sludge

Neutralization

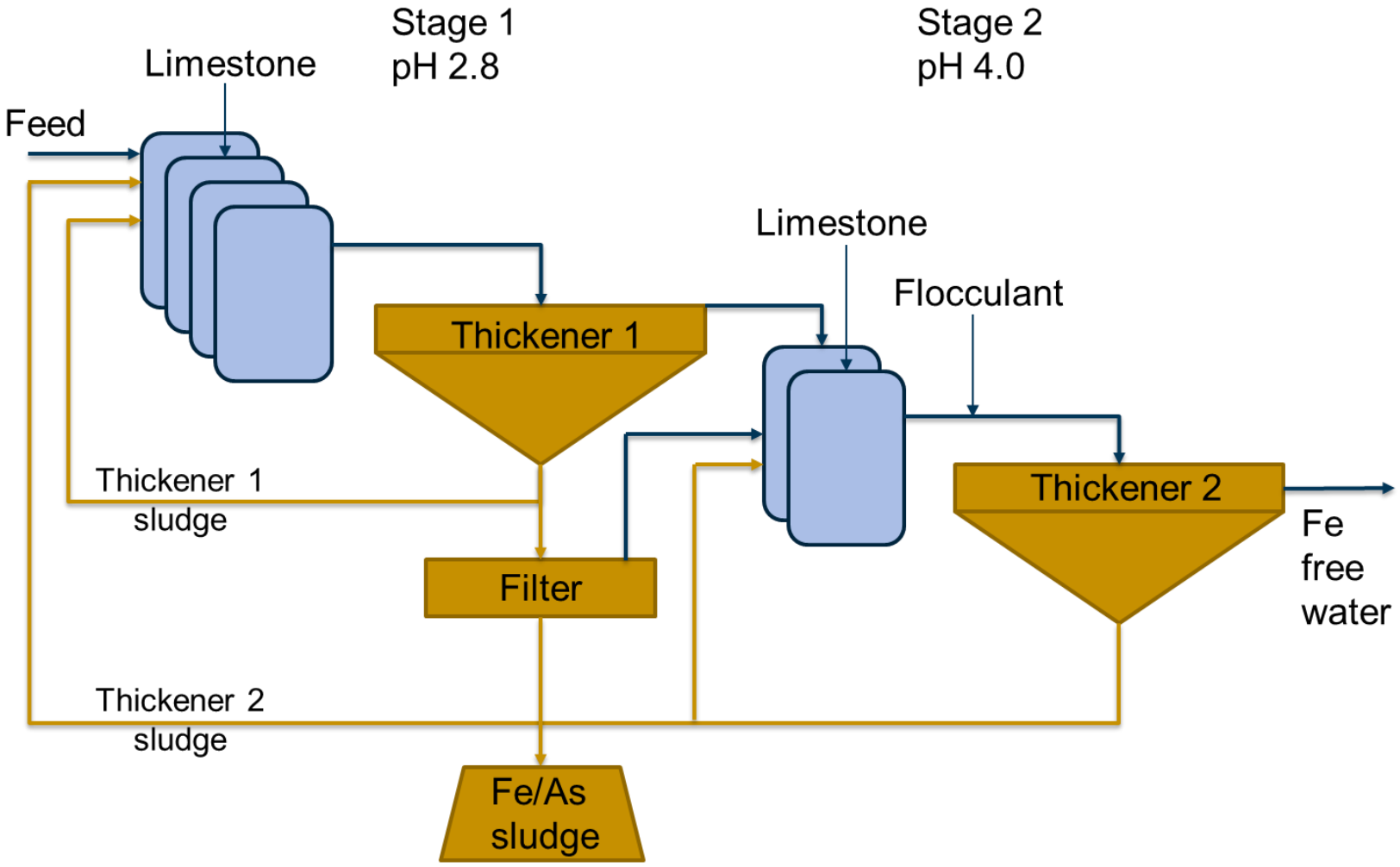
• Al, Mn, Mg sludge

Iron precipitation circuit

- Process patented by Boliden
- Selective removal of iron from water and leaching solutions
- Minimal losses of valuable metals
- Maximum utilization of reagents
- Easy to filter sludge

Photo: Mohammad Khoshkhoo

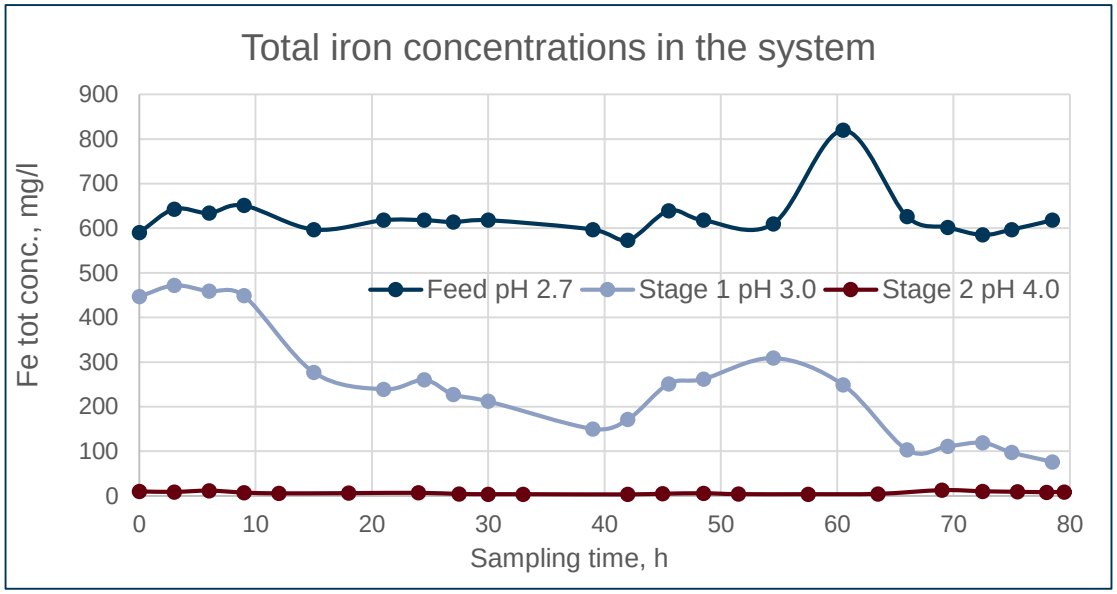
Iron precipitation circuit



Results

- Fe_{tot}<5 mg/l
- Removal rates:

  Iron >99%
  Arsenic >97%
  Antimony >96%
  Lead >87%
  Chromium >71%



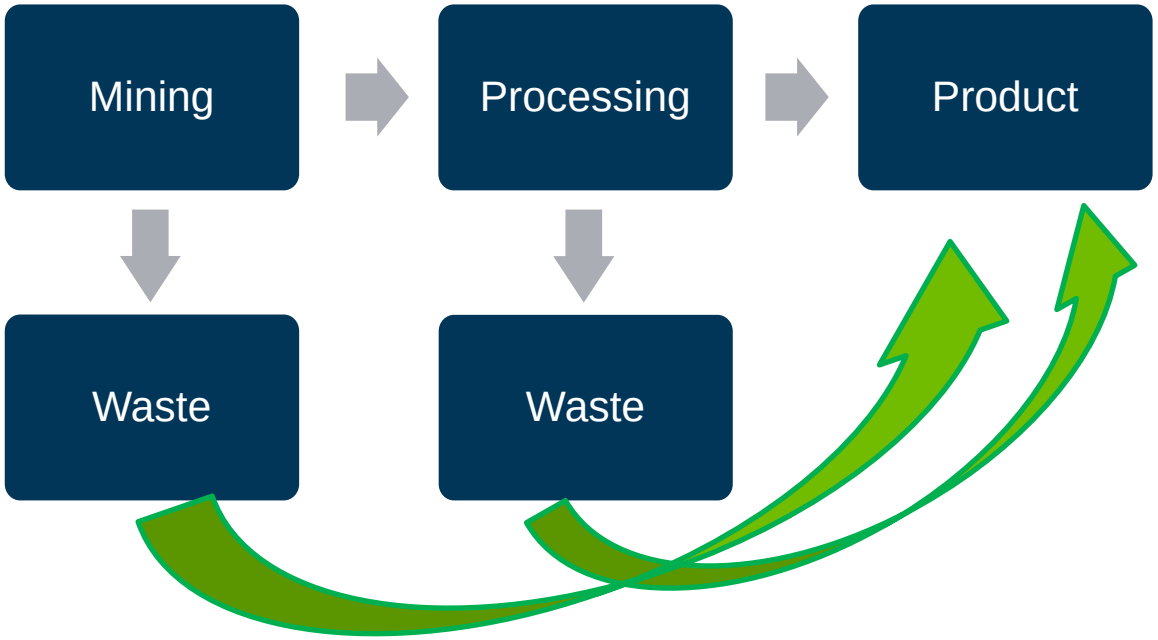
- Metals remaining in water:
  Cu, Zn, Ni, Al, Mg, Mn
- Approx. recovery potential:

  20 t/a Copper
  95 t/a Zinc

Fe/As sludge

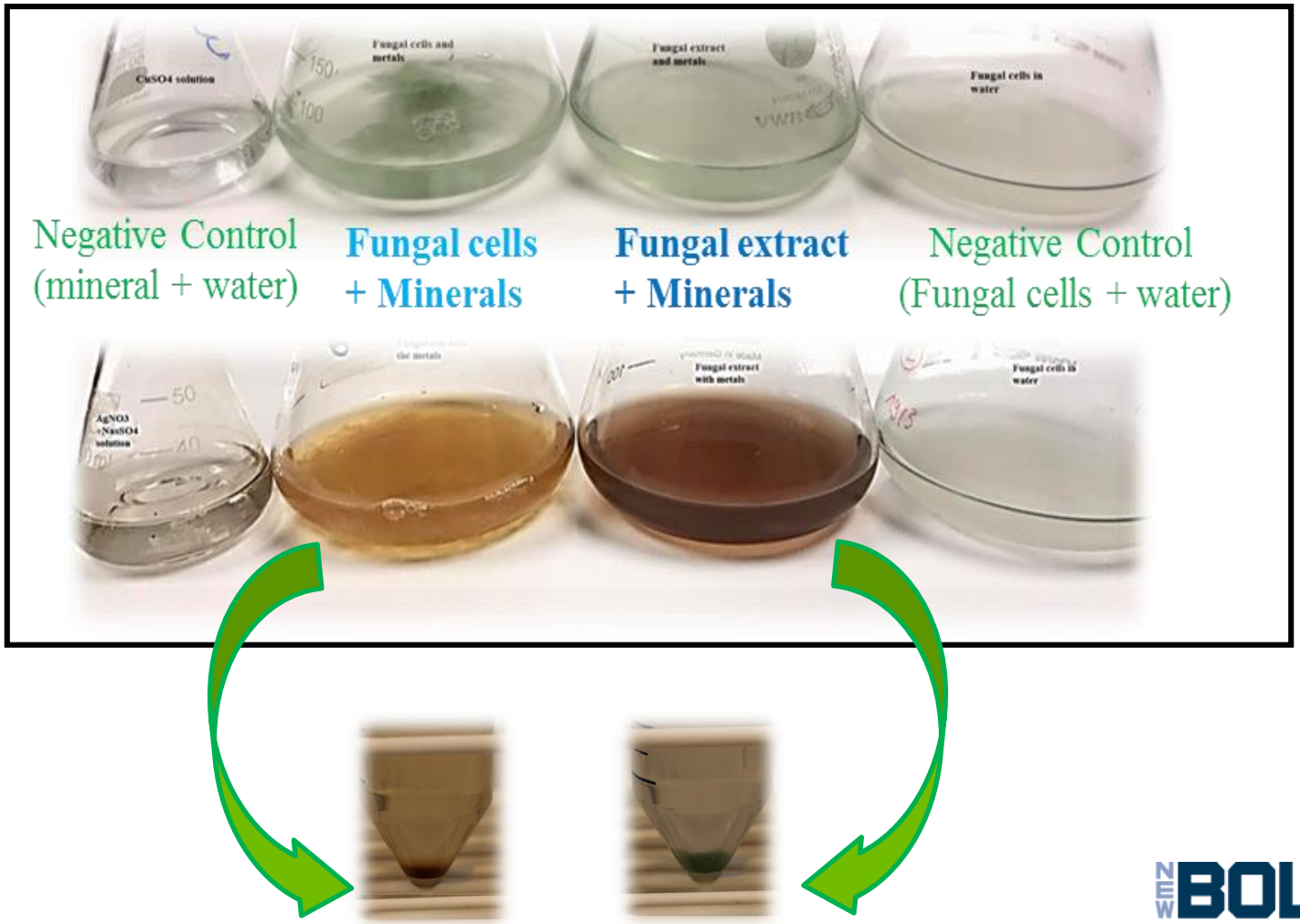
Discussion

- More complex process compared to traditional neutralization
  - Automation & control
  - Reagents, energy, and labour costs
  - Several types of sludges produced



Other studies

CAMM2 High-Risk project with LTU – Microbial Valorisation of acid mine drainage sludge (ValorAMD)




BOLIDEN
Thank you for your attention!
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SOCIETY