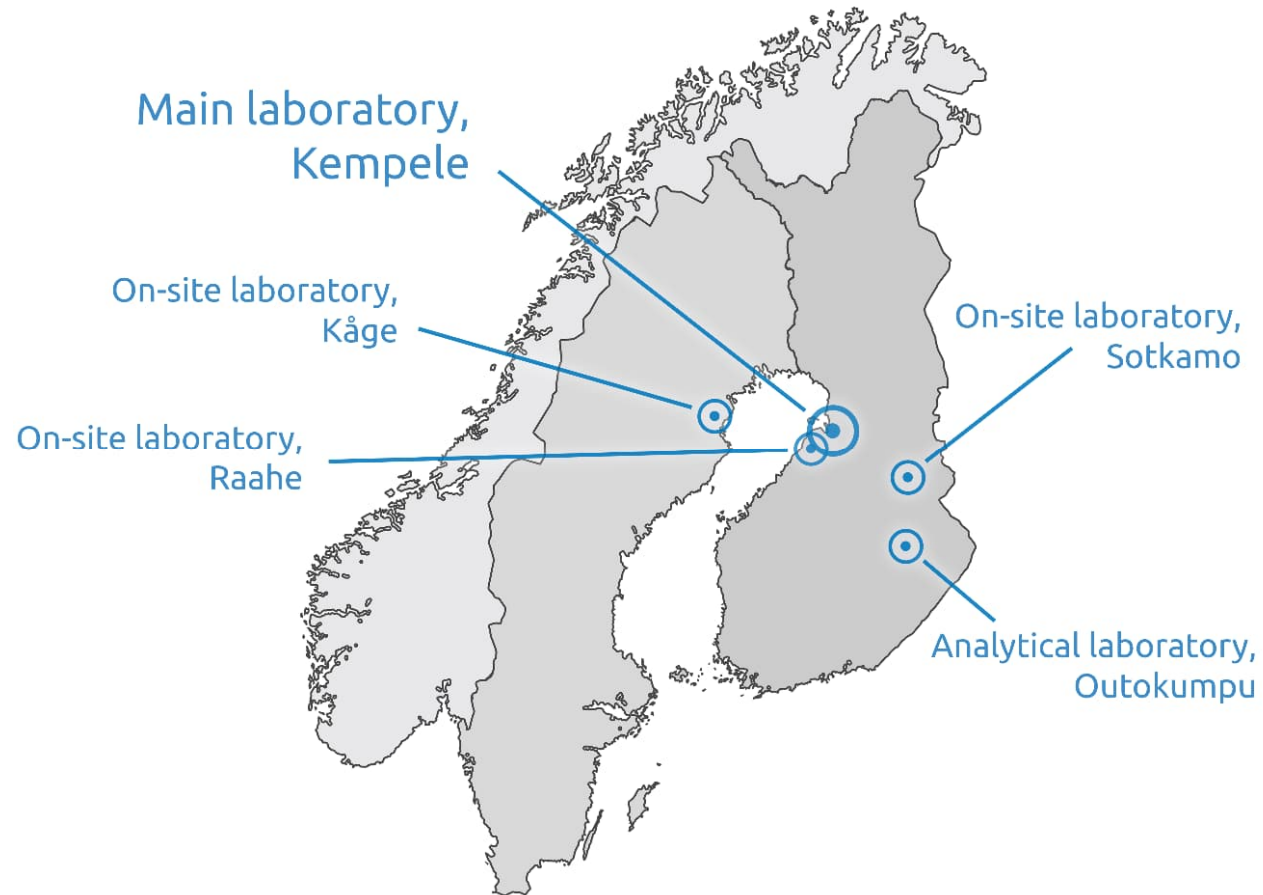


# CRS LABORATORIES OY

- Short history
- Locations
- Traditional services
- Heavy mineral separation using heavy liquids

- Founded 1994
- Owned by the management
- Concentrated on chemical analysis of mineral materials
- ~60 employees
- Strategy: Growth through forming modern high quality on-site laboratories for mining companies



- Kempele started on 2014
- Sample preparation stages in big volumes
  - Drying
  - Crushing
  - Grinding
  - Splitting
- Analysis equipment
  - AAS
  - ICP-OES



















- Sotkamo
  - Started early 2019
  - Mining laboratory that serves Sotkamo Silver, situated in their process plant
  - We do geological, process and environmental analyses including sample preparations
  - 7 laboratory technicians, one of whom is the foreman
- Björkdalsgruvan
  - Restarted on May 2020
  - Mining laboratory in which sample preparation and gold analysis is made



- Started on March 2021
- Serves primarily GTK Mintec research/pilot plant
- In future we are aiming to more and more serve other parts of mining industry with advanced analyses from Outokumpu
- 5 laboratory technicians and a chemist are currently working at the site

- XRF
  - From pressed pellet or fusion
  - Pressed pellet for lower detection limits and fusion for more accurate high concentration
- Leco C/S analyzer
  - Accurate C and S analyzer











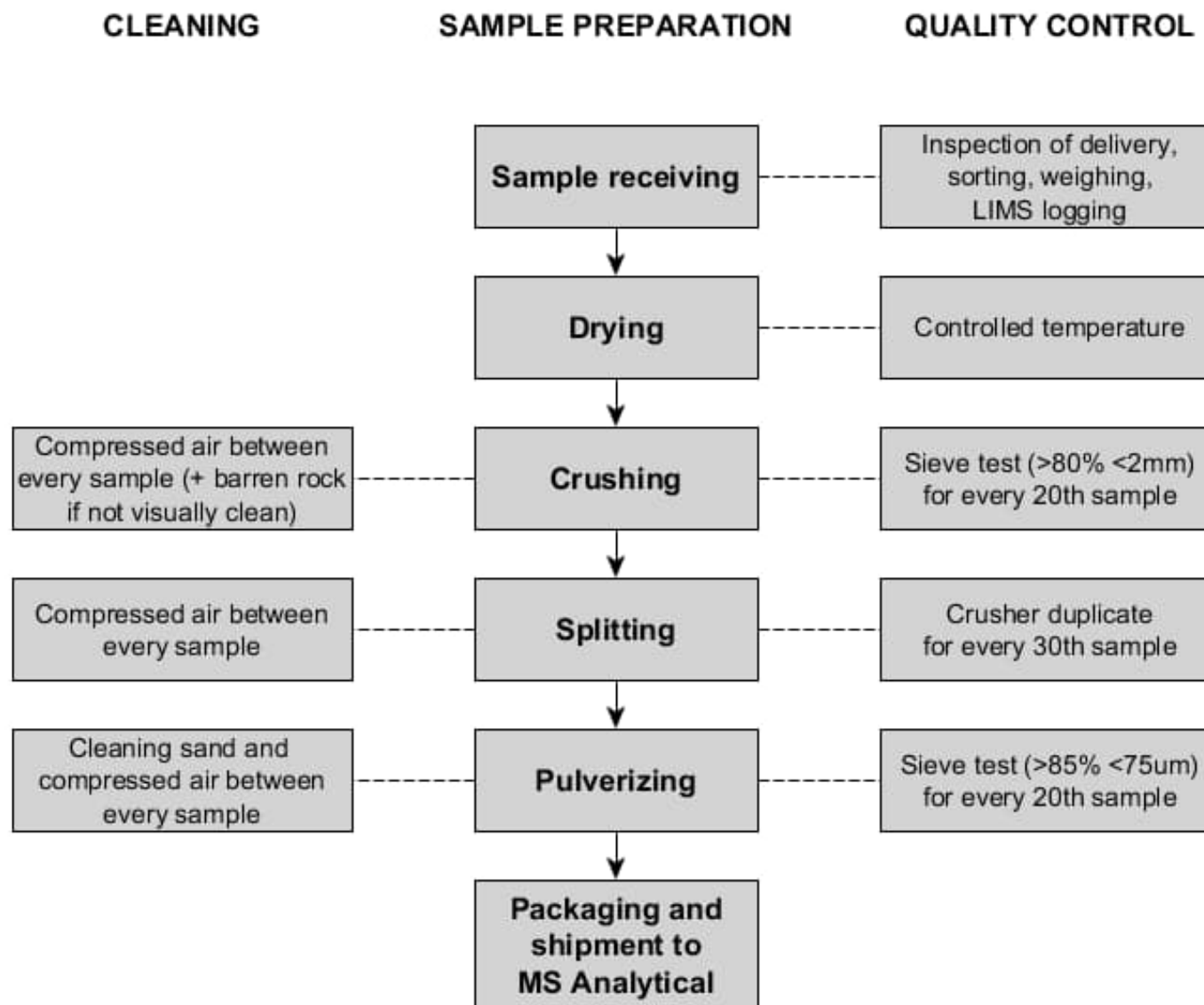
- Location serves only Otso Gold, which is a gold mine
- We do geological, process and some environmental analyses
- There is a chemist, 2 supervisors and 14 laboratory technicians working at the site
- Analysis equipment:
  - ICP-OES
  - 2x AAS

- Heavy mineral separation is not a new art
- Traditional ways of heavy mineral separation have been made with toxic substances
- Traditional substances have easier ways of getting very heavy liquids
- In MinExTarget CRS has role of developing safe and and efficient way of doing heavy mineral separation that can be done in bulk



- Modern substances include SPT (polytungstage) and LST (lithium polytungstage)





- Crushing is done to decrease particle size from rock/drill core size to 70-90% under 2mm
- For cost purposes, laboratories prefer to do the crushing in 1 step
- The finer the crush, the better the splitting quality
- Laboratory crushing is usually done by jaw crusher





- Grinding is done to decrease particle size further. Particle size needs to be fine for 2 reasons:
  - Fine ground powder gives better representation of the sample (again, better splitting)
  - Powder needs to be fine for many analytical methods to work
- Methods of grinding
  - Vibratory grinding bowls (LM2, LM5)