TAILINGS MANAGEMENT AT THE KIRUNAVAARA IRON ORE MINE

Challenges with tailings deposition in a cold climate

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LKAB IS THE 2ND LARGEST SUPPLIER OF IRON ORE PELLETS
100% OWNED BY THE SWEDISH STATE
4 200 EMPLOYEES
2 UNDERGROUND MINES AND 2 OPEN PIT MINES
SORTING, CONCENTRATING AND PELLETIZING PLANTS
LKAB PRODUCES YEARLY 14,8 MTON OF PRODUCTS IN KIRUNA

RESULTING IN 3 MTON TAILINGS A YEAR
145 KM NORTH OF THE ARCTIC CIRCLE

THE AVERAGE ANNUAL TEMPERATURE IS -1°C
(≈ 30 °F)
200 DAYS/YEAR OF SNOW COVER

40% OF ANNUAL PRECIPITATION AS SNOW
A COMMENT ON SWEDISH TAILINGS MANAGEMENT
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Driving factor: **Reduce costs** of construction for **dams**.

How about **water storage**?
Delayed transition
WATER SITUATION WINTER 2014/2015
AVAILABLE DEPOSITION ALTERNATIVES
SAVE VOLUME – NO TAILINGS IN THE SOUTH

USE OF NORTHERN VOLUME

TAILINGS IN CLARIFICATION POND
SAVE VOLUME – NO TAILINGS IN THE SOUTH

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TAILINGS IN CLARIFICATION POND

MAX FREEZING

MIN FREEZING
FREEZING ON A DAILY BASIS?

- Distance (flow path)
- Air temperature
- Wind speed
**CONCLUSIONS**

KIRUNA

Temperature and wind: Too rapid changes to take actions

Final solution: Raise the dams in the south to create margins
CONCLUSIONS

General: If access to water has never been a problem, the water balance has usually not been given the attention necessary, and is most likely far from sufficiently accurate to be reliable.