Turvallisuus- ja kemikaalivirasto (Tukes)

Finnish Safety and Chemicals Agency
Tihinen Taimo, Senior Adviser | 4.12.2013

AUTHORITY WORKING AND

AUTHORITY EVALUATION OF SAFETY

IN THE MINING BUSINESS

IN FINLAND

tukes

www.tukes.fi
Finnish Safety and Chemicals Agency (Tukes)

- **Tukes is a Supervisory Authority, we are working under the Ministry of Employment and the Economy (TEM)**
- **Resources more than 200 personnel in Tukes**
- **Tukes is the mining surveillance and permit consideration authority, nearly 20 persons in that group and also Mining safety in Tukes demands 1 -2 persons work input**
- Tukes maintains and promotes
  - the **technical safety culture and reliability** in order to **protect people, property and the environment**.
- Our tasks are divided into
  - surveillance of the **products** on the market and into the supervision of in-service **plants, installations and technical services**.
- Branches: **Chemicals**, Fireworks and **Explosives**, **Electricity and lifts**, **Pressure equipment**, **Rescue service equipment**, Construction products, Articles of precious metals, Measuring, **Mines** and Others

Mine supervision

- Nearly **fifty mines and quarries active** in Finland pursuant to **mining legislation**.
- In addition to **general safety**, mining safety also involves supervision of **hoisting installations** at Mines.
  Tukes furthermore ensures that the **ore is extracted as efficiently as possible**.
  All active mines are **inspected annually**.
- Tukes also supervises the using and storing of **dangerous chemicals (including explosives),** Finland has implemented **the Seveso II Directive**.
- **Tukes supervises**
  - **technical systems** and
  - the requirements of a **safety management system** (SMS).
- Among others the following sides collaborate with Tukes in Mine Supervision:
  - The Ministry of Social Affairs and Health (safety at work, using of explosives, environmental permits),
  - The Ministry of the Environment (environmental evaluation, pads),
  - The Ministry of the Interior (Rescue Services, Policing)
  - Geological Survey of Finland (GTK) (works under the Ministry of Employment and the Economy).
  - STUK - Radiation and Nuclear Safety Authority (works under The Ministry of Social Affairs and Health)

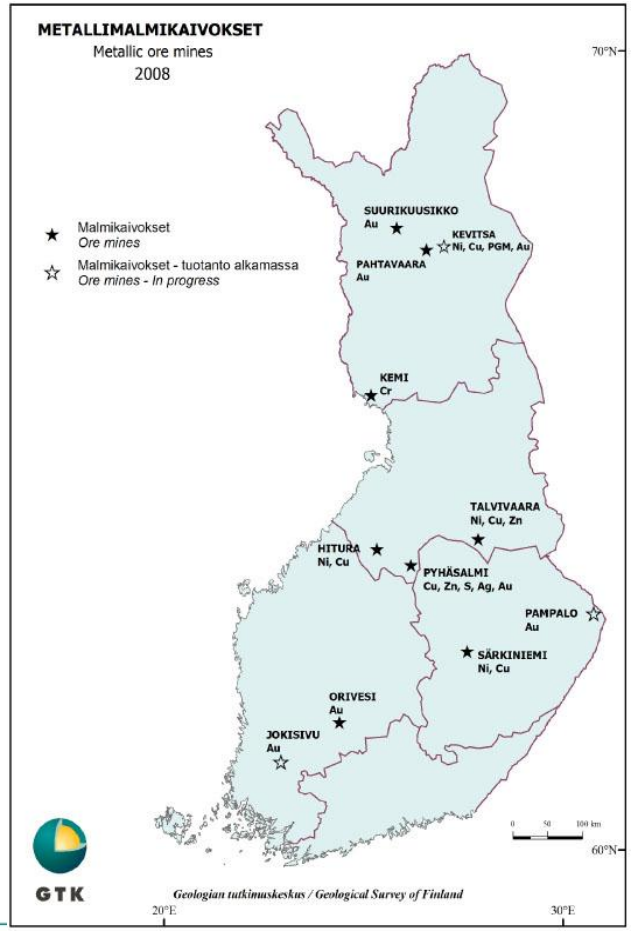
Finland`s Metallic Ore Mines and Industrial Mineral (like limestone) and Gemstone Mines

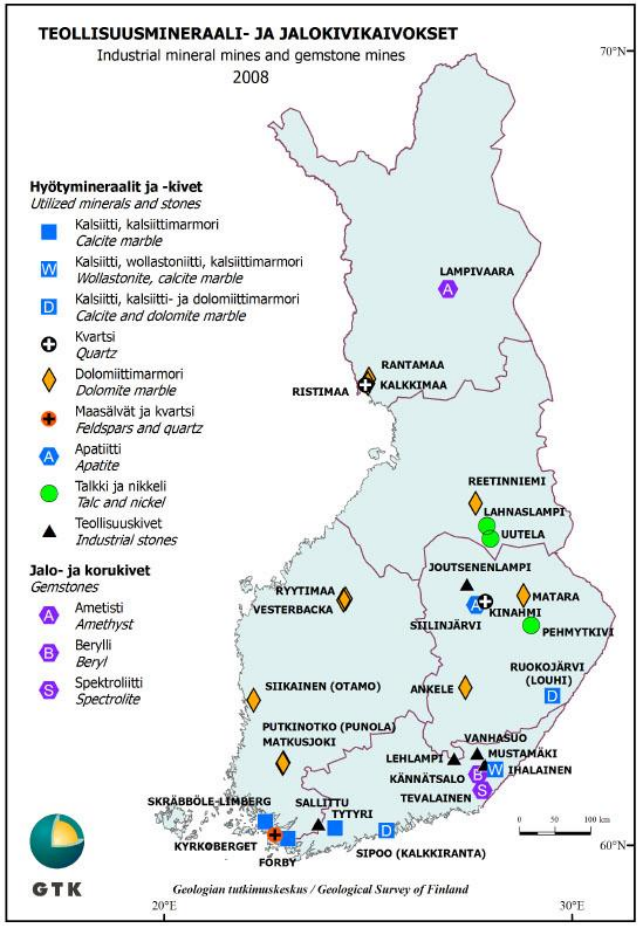
About 50 active Mines
In Finland

Metallic ore Mines

Industrial mineral Mines and

Gemstone mines





50 operating Mines in Finland at the end of 2012

GOLD MINES: 6 pcs, total mining of ore 3,8 Mt including companies from Sweden, Canada and Australia
Cu-Ni MINES: 2 pcs, total mining of ore 4 Mt including companies from Canada
Zn-Cu-Ni MINES: 3 pcs, total mining of ore 10,5 Mt including companies from Canada, Australia and Finland (Talvivaara, 8,7 Mt ore/a)
Cr-Mines: 1 pcs, total mining of ore 1,25 Mt

50 operating Mines in Finland at the end of 2012

LIMESTONE MINES: 18 pcs, total mining of ore 3,7 Mt including 4 companies from Finland, mainly Nordkalk Oy
PHOSPHATE MINE: 1 pcs, total mining of ore 10 Mt, Yara, Norway
TALC MINES: 4 pcs, total mining of ore 1 Mt, Netherlands
SOAPSTONE MINES; 6 pcs, total mining of ore 0,12 Mt,
10 pcs very small mines of quartz, aluminium, feldspar and amethyst, companies from Finland

Mine Legislation

- THE MINING ACT (621/2011)
- As the Mining act **decrees** the safety rules for mines
  - Mine Decree (392/2012),
  - The Decree (1571/2011) on mining safety,
  - The Decree (1455/2011) on the Hoisting Installations at Mines

- **Targets for the Mining Act are** *To ensure with modern legislation the preconditions for exploration and mining in a* ***socially, economically and ecologically sustainable*** *manner*
- There has to be a **balance between different interests** in the society, concerning
- • good operational business environment for exploration and mining companies
- • constitutional rights of various other stakeholders as well as private citizens
- • rights of private land and property owners
- • to secure the influence of local communities
- • to take into account **environmental protection** and competing land use issues

For the purposes of The Mining Act (621/2011), *mining minerals* shall refer to: 1) as concerns **chemical elements**:

- actinium, aluminium, antimony, arsenic, barium, beryllium, boron, caesium, mercury, fluorine, phosphorus, gallium, germanium, hafnium, silver, indium, iridium, cadmium, potassium, calcium, cobalt, chromium, gold, copper, lanthanides, lithium, lead, magnesium, manganese, molybdenum, sodium, nickel, niobium, osmium, palladium, platinum, radium, iron, rhenium, sulphur, rhodium, rubidium, ruthenium, selenium, zinc, scandium, strontium, thallium, tantalum, tellurium, tin, titanium, thorium, uranium, vanadium, bismuth, tungsten, yttrium, and zirconium, as well as minerals containing these chemical elements;

2) as concerns **minerals** and
3) as concerns **rock types**
4) **Other materials in the Mining Area**

- 2) andalusite, apatite, asbestos minerals, barite, bauxite, bentonite, beryllium, dolomite, phlogopite, fluorite, graphite, garnet, ilmenite, calcite, kaolin, corundum, quartz, kyanite, leucite, feldspar, magnesite, muscovite, nepheline, olivine, pyrophyllite, rutile, sillimanite, scapolite, talc, diamond, vermiculite, wollastonite, and other precious stones;
- 3) Stones, marble and soapstone.
- 4) Furthermore, this Act is applicable to the exploitation of materials in the bedrock and earth in the mining area referred to mentioned herein the Mining Act

PERIODICAL INSPECTION OF MINING SAFETY

TUKES, INSPECTION AGENDA

Safety inspecting and auditing in mines by Tukes

ADVICE

TRAINING

Accident investigation

INSPECTING:
- IN THE BEGINNING
- PERIODICAL
- WITH CHANGES

MINE LEGISLATION
CHEMICAL LEGISLATION
EXPLOSIVE LEGISLATION

DEMANDS TO EQUIPMENTS

WHAT DO WE MEAN WITH MINE SAFETY ?

YOU MUST KNOW YOUR *HISTORY* BUT YOUR PLANNING AND OPERATION MUST BE IN *MODERN* SOCIETY!

WHAT ARE YOUR VALUES?

WHAT BENEFITS DO YOU WANT?

MINE SAFETY MEANS TO KNOW ALL KIND OF RISKS, TO KEEP THEM AT ACCEPTABLE LEVELS, TO UNDERSTAND WHAT TO DO!

YOU CAN PREVENT AND CONTROL ONLY THOSE RISKS WHICH YOU HAVE REGOGNIZED.

THE MAIN OBSERVATION IS IN THE STRUCTURAL AND TECHNICAL SAFETY OF THE MINE

ACCIDENT PREVENTION POLICY MUST BE DOCUMENTED

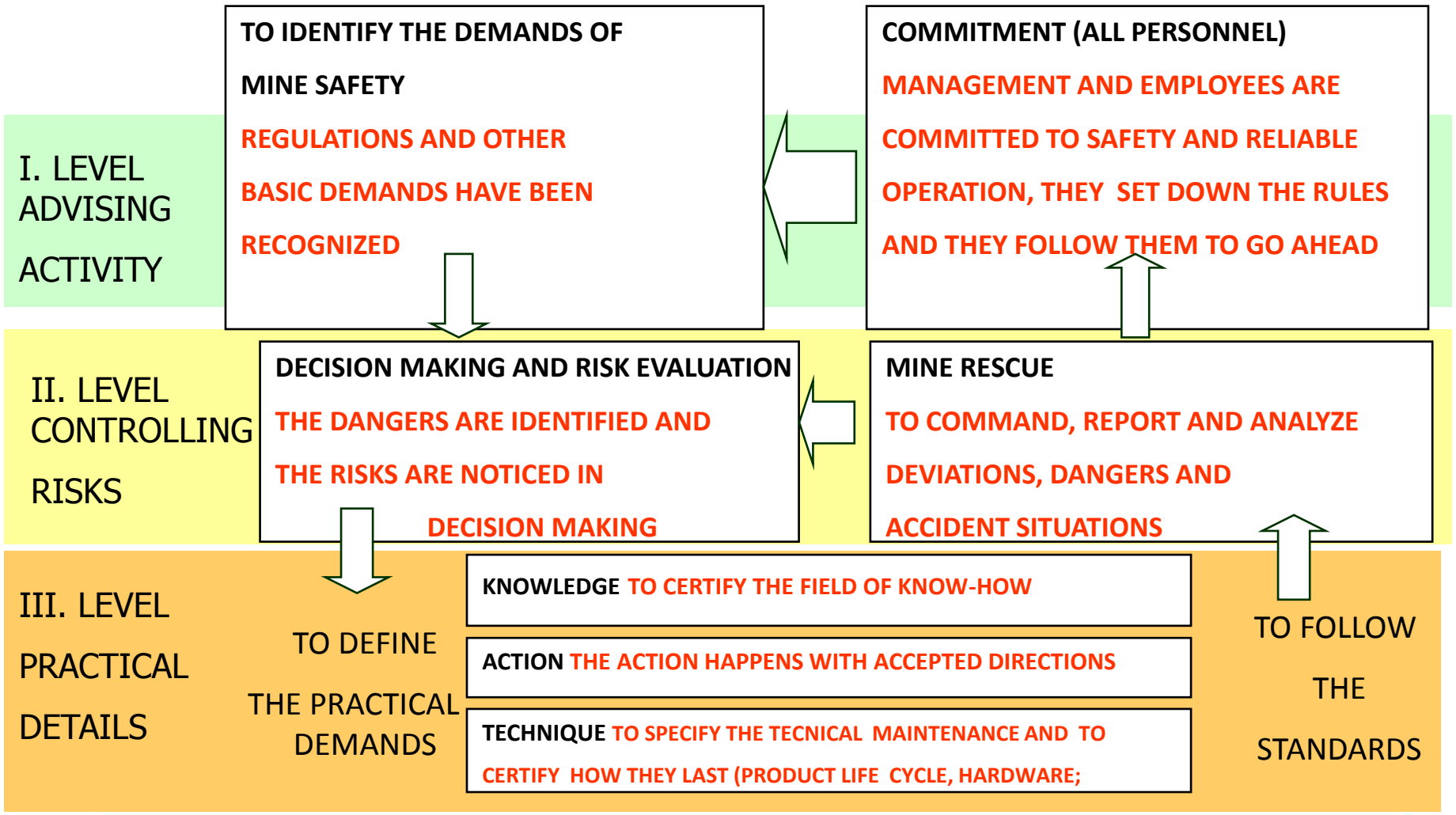
- **PLANNED INFLUENCE ON BETTER SAFETY**
- **COMPREHENSIVE SOLUTION**
- **INTEREST GROUPS**
- **NETWORKING**
- **OUTSOURCING, SUBCONTRACTOR**

The mining operator is obliged to ensure mining safety. The operator shall pay particular attention to the structural and technical safety of the mine and to prevention of dangerous situations and accidents in the mine, alongside limitation of detrimental consequences caused by them.

TUKES INSPECTION AGENDA
yearly inspections by Tukes

- 1 Establishment and its operations
- 2 Recognition of the demands of legislation
- 3 Management and personnel commitment
- 4 Risk assessment and management of change
- 5 Identification of safety requirements
- 6 Emergency preparedness
- 7 On-site tour (choosing a certain part of the site)
- 8 Summary

ELEMENTS CONCERNING THE PREVENTION OF ACCIDENTS IN MINES



AGENDA, 1 Establishment and its Operations

- Quarrying/ possible problems/ future plans/geology...
- Supervision of utilization of extractable minerals
- Organisation, number of personnel, own and outside workers, contractors and subcontractors/ network
- Personnel working underground/ on ground
- Manufacture, transportation and storage of explosives at the mine
- Transportation and storage of flammable, healthy or environmentally dangerous chemicals, gases, dusts
- Processes, layout (Seveso II directive)

AGENDA, 2 The Recognition of the Demands of Legislation

- Permits from Tukes/ Mining, Explosives, Chemicals
- Reporting duties to authorities/ the Mine Company
- Inspections/ Authorities
- Environmental analyses and permits
- Documents

• Safety report
• Major Accident Prevention Policy
• Rescue Plan (internal and external)

AGENDA,
3 Management and personnel commitment

- The systems to which the company is committed (quality, environmental and safety management system)
- Technical and organisational safety targets and aims, measurement and handling the results (e.g. Personnel safety audits and rounds, meetings, statistics, themes, investments on safety, accidents, near-misses, leaks, ignitions, various trends)
- Safety and auditing reports regarding human safety and the natural environment (essential findings)
- Management's processing of safety issues
- Persons in charge: persons responsible for operational principles and other responsible persons and experts/maintenance, rescue, work safety, environment, guarding, pressure vessels, transport, electricity...
- The agreements with contractors

AGENDA,
4 Risk assessment and management of change

- Danger/ risk management (general)
- What methods are used/ when have the assessments been carried out?
- What are the biggest risks?
- YOU MUST KNOW YOUR RISKS AND KEEP THEM AT A TOLERABLE LEVEL!
- Management of change
- How are the results of risks or hazard assessments taken into account in decisions relating to safety, for instance are the contracts with the contractors safe enough?

AGENDA,
5 Identification of safety requirements

- **Technical requirements and condition of the equipment**
- Maintenance Organization
- Plans for maintenance and their realization
- Periodical inspections of electrical equipment, mining vehicles, hoisting installations etc.
- **Operating instructions**
- Regulations concerning the safe operation and maintenance of the mine
- **Competence and training**
- The way in which the personnel and subcontractors are inducted into their work and duties
- Defined competence requirements for the tasks

AGENDA, 6 Emergency preparedness

- A definition of what constitutes a deviation
- Internal and external emergency plan
- Practice and training with rescue team/ fire drill
- Instructions for handling deviations and emergency situations
- Accident reporting
- Deviation reports

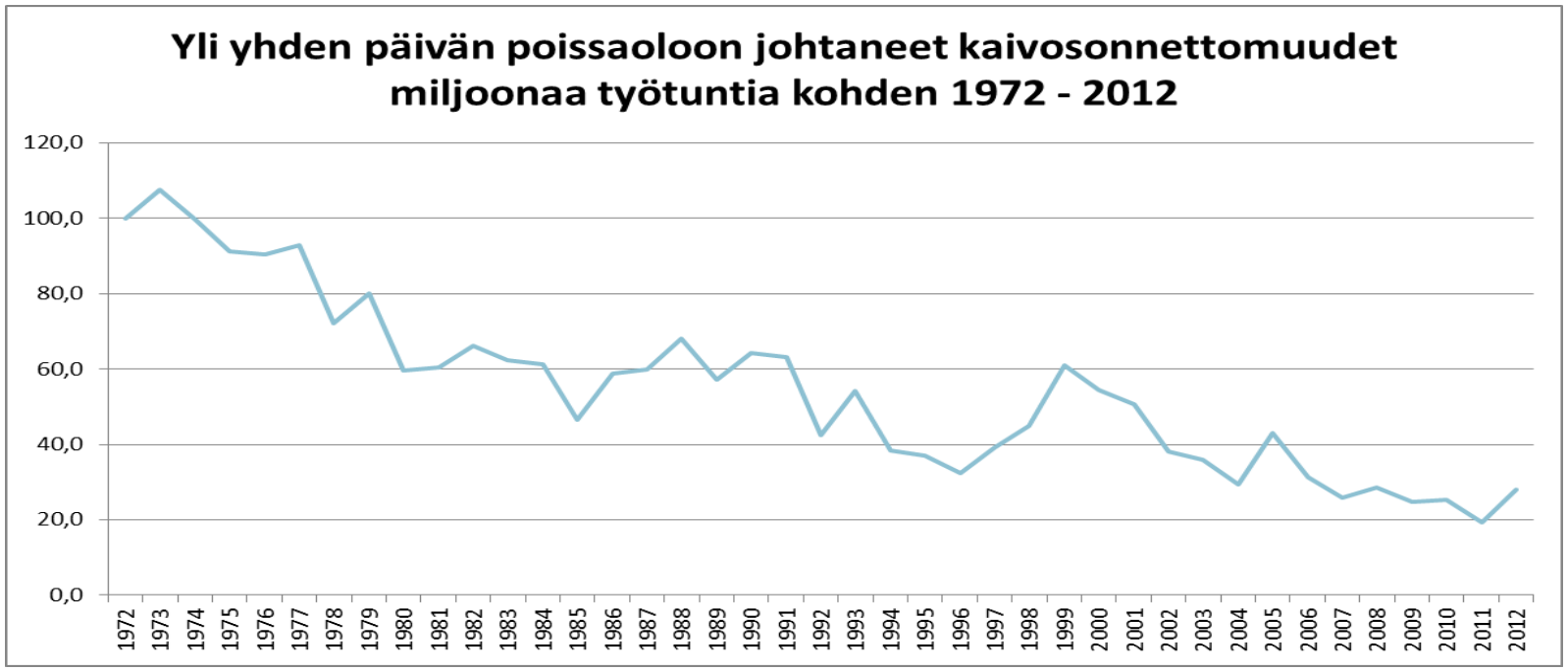
AGENDA, 7 On-site tour (choosing a certain part of the site)

- To interview random personnel or some persons chosen from the organisation like electricity, maintenance, foremen etc.
- Looking around
- What is new, repaired?
- New areas?
- Any problems with
  - geology
  - water
  - stresses
  - ventilation
  - loose stones
  - gases
  - etc.

SOME CONCLUSIONS AND OBSERVATIONS OF MINE SAFETY IN FINLAND

Mineaccidents in Finland, One Day absence

Mineaccidents, More than one day absence per one million working hour between 1972 - 2012



GENERAL RISKAREAS IN MINING

- 1. TRAFIC: COLLISIONS, MACHINE FALL
- 2. ROCK FALL
- 3. FIRES
- 4. EXPLOSIVES HANDLING
- 5. TARNSPORTATION AND USE OF CHEMICALS
- 6. DAM LEAKS
- 7. GASES AND DUSTS
- 8. COMMUNICATION
- 9. COMPETENCE, TRAINING
- 10. ELECTRICITY

THE MINE AREA IS CHANGING CONTINUALLY

SOME ASPECTS TO THE APPLICATION OF THE MINING ACT

- WHOSE IS THE BENEFIT? PRIVATE OR OFFICIAL INTEREST? GOALS? IT DEPENDS WHO IS ANSWERING, LIKE:

THE MINING OPERATOR
THE CO-PARTNERS
THE FINANCIER/SPONSORS
THE AUTHORITIES
THE SUBCONTRACTORS
THE INHABITANTS IN THE NEIGHBOURHOOD

- WHAT OTHER LEGISLATION CONCERNS THE MINING SECTOR?

THE PRICE OF ORE,
INCREASING PRODUCTIVITY
REDUCING THE ENVIRONMENTAL IMPACT (NATURE TO BE DESTROYED),
WORKINGPLACES,
INVESTMENTS

In case of **Finland,** we are speaking about the mineral policy for a country
- with strong Nordic democratic traditions
- with high percentage of private land ownership
- with **high demands of environment protection**

THE FINNISH GOVERNMENT SUPPORTS SUSTAINABLE MINING

Covers issues of wide scope **environment**, energy, **logistics,** education, **R&D**, international cooperation, permits, **land use planning** and public administration

DOCUMENTS

DOCUMENTS…

- - PERMIT PROCEDURES (EXPLORATION, ESTABLISHMENT OF A MINE, GOLD PANNING, MINING SAFETY PERMIT)
- STATEMENTS ON A PERMIT APPLICATION
- PUBLICATION OF THE PERMIT APPLICATION
- MINING SAFETY DOCUMENTS
  - RISK EVALUATION
  - THE INTERNAL RESCUE PLAN FOR A MINE
  - THE MINING MAP
  - THE PERSON IN CHARGE OF MINING SAFETY
- PREPARING FOR TERMINATION OF MINING ACTIVITY

Mining Act 112 §, Mining safety requirements

General duty to ensure mining safety

- ***The mining operator*** is obliged to ensure mining safety.
- The operator shall pay particular attention to
  - the structural and technical safety of the mine and
  - to prevention of dangerous situations and accidents in the mine, alongside limitation of detrimental consequences caused by them.

Separate provisions are issued regarding occupational safety in a mine and handling and use of explosives and chemicals.

PUBLIC DISCUSSION IN FINLAND AT THE MOMENT

- ENVIRONMENTAL PROBLEMS OF TALVIVAARA MINE
- THE ORE RESERVES GO FOR FREE TO FOREIGN COMPANIES AND THE PROFITS FLOW TO FOREIGN COMPANIES OUTSIDE OF FINLAND
- ENVIRONMENTAL AND CONSERVATION OF NATURE QUESTIONS

TO MINE OR NOT TO MINE?

THE MAJOR ASPECT AND MAJOR CONTRAST IS THE FINNISH NATURE, ITS WATERS, FORESTS AND WILDERNESS!

THE SAFETY BEGINS FROM THE PLANNING!

ONE EXAMPLE!

DRAGON MINING IS PLANNING TO OPEN A GOLDMINE IN KUUSAMO NEAR THE ”BEAR RING” TREKKING AREA

TOURISM
URANIUM
REINDEER OWNERS

SOME CONCLUSIONS

- NO REMARKABLE NEW MINES WITHOUT BIG AND WEALTHY FOREIGN COMPANIES OR CAPITAL:
- Higher and higher costs of ore prospecting (blind ore bodies)
- Expensive and time consuming permit processes (especially conservation of nature areas)
- FINLAND WAS NUMBER 1 (2012), FRAZER

PEAT
GRAVEL
SAND
CLAY
STONES…

Tukes is not the Authority, but AVI and ELY and Communes are handling License Application for taking gravel , peat etc.

The Land extraction act in Finland handles

- **All extractive elements** utilizing from earth and rock as: stones, gravel, sand, clay, soil
- **except**
  - Elements, Minerals and Stones defined in the Mine Legislation, taken in context of building or taken in the water areas by promise of AVI
  - Peat, the Land extraction act does not handle peat, which is handled by environment permission procedure

DEMANDS FOR LAND EXTRACTION

- Areal, Local and communal planning
  - Ground water areas, timing of the taking, aftercare, the width and quality of the area
- Rare and unique Scenery, Geology, Biology, Noise, Vibration and Dust
- Prohibited areas: 50 m to public road, 100 – 600 m to waters and lived buildings, 10 – 30 m to neighbours boundary
- THREE DEMANDING LEVELS FOR TAKING GRAVEL: TO TAKE ACCOUNT
  - THE EXTENT OF THE AREA,
  - EFFECT TO THE NEAR SURROUNDINGS, AND
  - AFTER CARE DEMANDS

Peat

- Peat production area is about 60000 – 80000 hectares in Finland
- Used for energy, electricity and surroundings
- The peat production is predicated on the weather

Burning peat stack and fire is spreading like wildfire in peat bog

Peat production areas /Surroundings

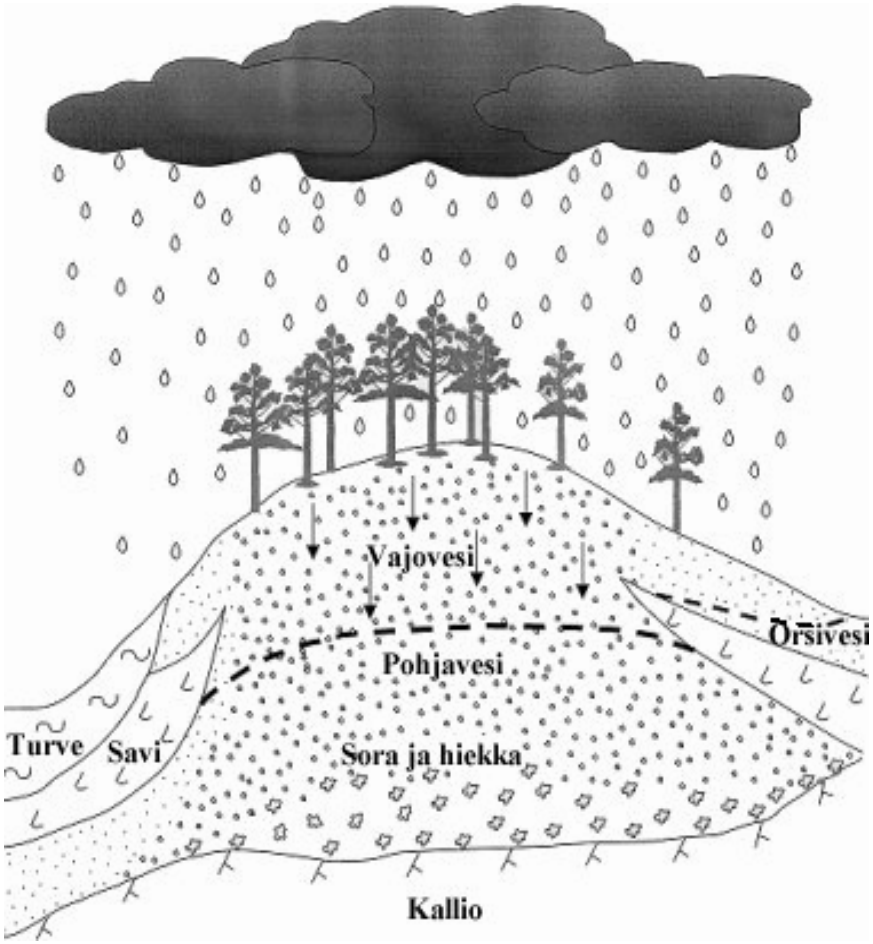
Areas after Gravel taking

- *The blot on the landscape*
- *The Groundwater*

may be spoiled (open earth`s surface, deep slopes, no humus…)

THE PICTURE:

The rainwater is falling down to create ground water, which can be easely spoiled



Thank you for your attention!
More information www.tukes.fi