Asia-Pacific
Economic Cooperation

2011/SOM2/MTF/014
Agenda Item: 15

Mining Policy and System for Sustainable Development

Purpose: Information
Submitted by: Korea

5th Mining Task Force Meeting
Big Sky, United States
7–8 May 2011

Mining policy and system for sustainable development in Korea

May. 2011

mireco
Mine Reclamation Corp.

Positive and negative contributions of mining to sustainable development

Positive impacts

Negative Impacts

Source: www.fcx.com

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Challenging of Environmental Laws as a Tool for Achievement of Sustainable Development

No mine closure requirement

EIA

generally required as a tool for preventing the environmental impacts of mining

emphasized the importance of closure for socially conscious and fiscally safe banking purposes.

are fundamental to making pollution prevention and key component s of sustainable mining operations.

have been adopted by sixty financial institution requires the borrower to conduct a social and environmental assessment process with the proposed project.

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Definition and property of mine hazards

Mine hazards ?

u Due to soil excavation, rock cracking, grinding, ore dressing etc conducted during mine development, damages such as ground subsidence, contaminated water drainage, release of waste rocks, dust, noise, quake etc, could be caused to nature and human being (Mine Security Act, article 2 (5))

Property of mine hazards :
contamination, continuality, diffusivity, accumulation

u Acting as causes of large-scale disasters and group casualties

u In the case of expansion of contamination sources, the scale of casualty could be very wide and large costs for reclamation is needed

u even after mine is closed, mine hazards could be occurred for a long time

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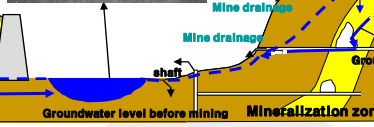
Mechanism of mine hazards

heavy metals extracted by acidic leachate and mine drainage



· Ground subsidence
· Water and soil contamination
· loss of waste rock and deforestation

- Contamination, continuality, diffusivity, accumulation→ occur for a long time even after the mine closure
- Casualty occurs continuously during not only in operation, but also after closure
- Acting as causes of large-scale disasters and group casualties → Social problem, example) occurrence of itai-itai disease at Kosung, Kyungnam, and crop contamination nearby 44 abandoned mines

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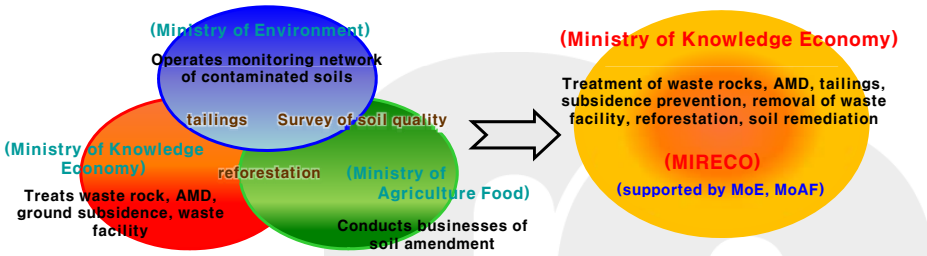
Policy of mine reclamation

- '51 Enacted the mining law : prepared the ground of the compensation for mine hazards
- '63 Enacted the mine safety law : established the duty and responsible provision for mine hazards
- '80s Along with the environmental right, the mine reclamation policy by government was established and enforced.

  → the coal industry law enactment ('86), revision ('88) : prepared the ground of governmental supports for setting up the facility for mine reclamation
- Settling businesses between department (the office for government policy coordination, 2003.11.17) : accomplished by Ministry of Commerce, Industry and Energy leading

  - not consistent and inefficient due to the duplicated accomplishment of several departments
- "Mine Pollution Prevention and Reclamation Law" enacted ('05.5.31) · enforcement('06.6.1)



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Background of Mine Reclamation Law enactment and Direction

∨ Background of enactment

- Nature and human beings are being damaged by mine hazards occurred during operation and after closure
- According to the individual law each ministry conducted businesses ineffectively
- Systematically propulsion of mine reclamation projects with the "Mine Pollution Prevention and Reclamation Law (mine reclamation law)"

∨ Basic direction

- clear obligation for the person of cause and related department for mine reclamation project
- preparation of a policy suitable to the regulative levels of Ministry of Environment, the Office of Forestry
- effective propulsion of projects and preparation of after-service policy that is no defected

→preparation of basis for the sustainable development of domestic mining

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Main contents of mine reclamation law

- Basic plan of mine reclamation (5 years) and execution plan (every year) establishment (article 7 and 8)
- Contents of mine reclamation project (article 11)
  - improvement of water quality, reforestation and prevention of ground subsidence
  - removal of waste facilities and treatment, soil amendment
  - others: survey of mine hazards, research, technical development, education
- Propulsion subject of mine reclamation projects (article 12)
  - mining righter, national trusts (MIRECO, professional mine reclamation corp)
- Security of revenue source for mine reclamation projects (article 22~27)
  - budget for mine reclamation : governmental contribution, obligator shares etc.
- Establishment of MIRECO (article 31~46)

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Propulsion system of mine reclamation

Prevention of mine hazards in mining site	· conducted from 1980s · subject for on-going and abandoned mines · governmental support : 100% for abandoned mines,<70% for operating mines	Conducted by mayor, provincial governor
Mine reclamation for abandoned mines	· started from 1990s · subject for rationalized abandoned mines · governmental donation	Conducted by Coal Industry Promotion Board
Mine reclamation	· started when MIRECO established · subject for operating and abandoned mines · government donation : 100% for abandoned mines 70% for operating mines	Conducted by MIRECO

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Purpose of foundation of MIRECO

• Creation of comfortable environments by conducting mine reclamation projects effectively and contributes national economy by supporting the mine industry

• sustainable development of mines

Solve the hindrance of natural environment and human health caused by mine hazards that occur from the initial stage of mine until after closure

• recovery of shriveled regional economy

Creation of substituted industrial base for abandoned mining area

• Creation of comfortable and enjoyable mine local area

thorough after-service of the mine

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Status of mine and mine hazards

❖ in Korea

Class.	Coal mines	General mines			Total
		Metallic	Non-metallic	Sub total	
Total	349	988	669	1,657	2,006
Operating	9	52	669	721	730
abandoned	340	936	0	936	1,276

❖ Status of mine hazards of suspended and abandoned mines (type of mine hazards)

Class.	mines	Sites of mine hazards							
		AMD	Waste rocks	tailings	subsidence	Abandoned facility	Abandoned pits	?	total
Abandoned mines	936	19	90	30	9	20	348	-	516
Coal mines	340	36	138	-	114	104	-	7	399
total	1,276	55	228	30	123	124	348	7	915

❖ Status of mine hazards of suspended and abandoned mines (by region)

Class.	Kyung gi	Kangwon	Chungbook	Chungnam	Junbook	Junnam	Kyungbook	Kyungnam	others	total
Abandoned	33	49	43	61	35	37	77	46	7	388
Coal mine	-	115	19	49	1	13	23	-	-	220
total	33	164	62	110	36	50	100	46	7	608

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Propulsion procedure of mine reclamation projects

Establishment and announcement of mine reclamation plan (Minister of MKE)	-Law article 8(1) and enforcement ordinance article 4 -establish and announce the plan until Sep 30, every year
Application of request for mine reclamation plan (miner, MIRECO)	-law article 8(3), enforcement ordinance article 2 -miners apply to MIRECO, and MIRECO apply to MKE
Approval of mine reclamation plan (Minister of MKE)	-enforcement ordinance article 8
Operation of mine reclamation project (MIRECO, miners, specialized corp)	-law article 12 and enforcement ordinance article

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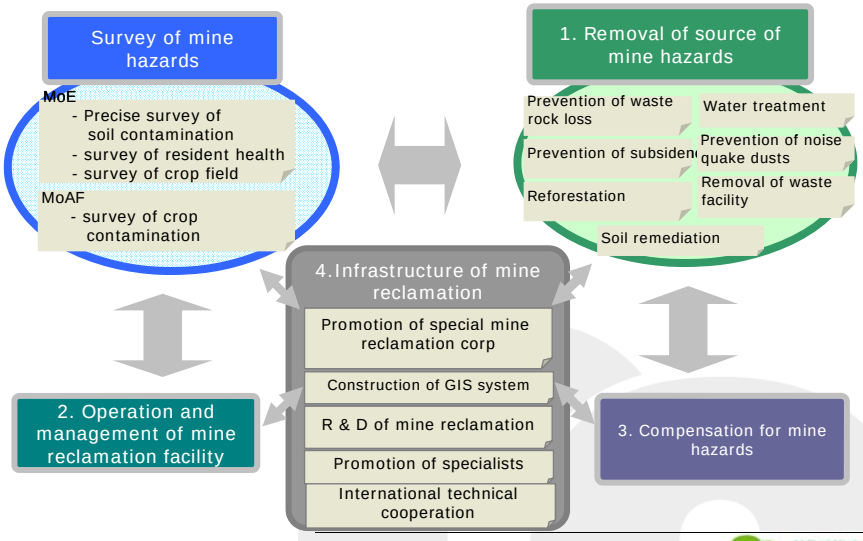
Propulsion plan of each business



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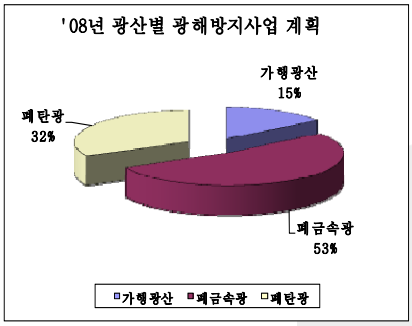
Mine reclamation business, 2008

▶Classified by mine type

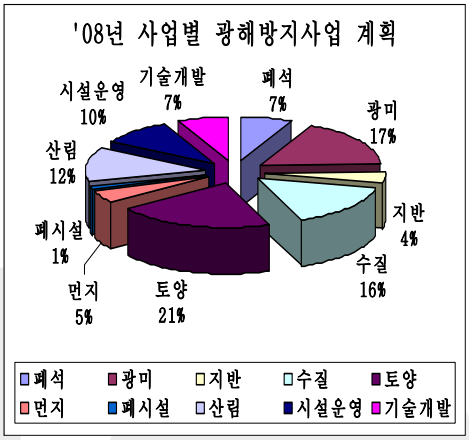
Mine reclamation business plan

(unit : $)

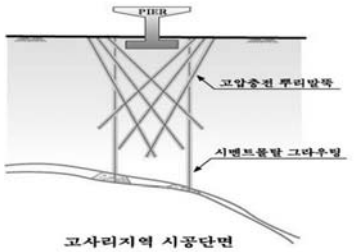
Operating mines	Abandoned metallic mines	Abandoned coal mines	total
9,609,091	34,672,727	21,172,727	65,454,545



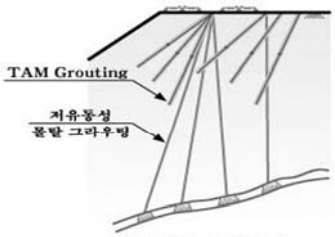
▶classified by business type Mine reclamation business plan



Status of mine reclamation tech. (ground reinforcement)



고사리지역 시공단면



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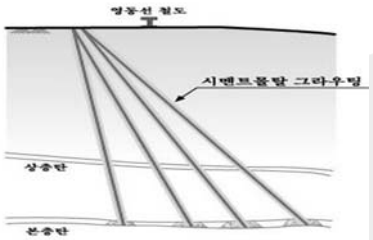
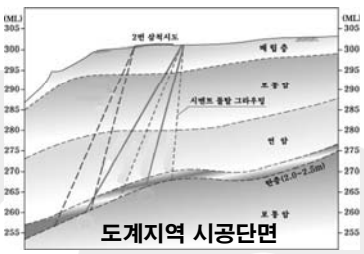
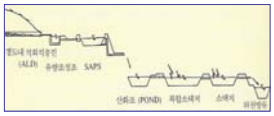


심포리지역 시공단면



도계지역 시공단면

Status of mine reclamation tech. (water treatment)



AMD ⇩ Flowrate adj ⇩ pH adjustment ⇨ Oxidation ⇨ Neutralization ⇨ Settling ⇨ effluent

NaOH, coagulant ⇩ Neutralization

Settling ⇩ sludge ⇨ dewatering

Case of abandoned coal mine

Sukgong-Dogye coal mine : '94 constructed

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Mine reclamation business

∨ Infrastructure of mine reclamation

Upbringing mine reclamation specialists

· actively upbringing mine reclamation specialists that have technology, equipment, expertise, and funding
· Make only 「mine reclamation specialists」 conduct mine reclamation businesses and technology and efficiency of facilities to be enhanced through competing between specialists

Constructing GIS system

· till 2016, GIS system will be step-by-step construct and used for analysis and estimation
· Complex mine hazard map (mine location + pit map + geological map + topographic map + documents)

Research and development of mine reclamation technology

· Enter to the level of advanced countries within 10 years through conducting self R & D of mine reclamation
· Prepare the technical road map for each field of mine reclamation and drive R & D for core technology

Upbringing specialists

· Develop and manage educational programs though connecting University, Research Institute, and Specialists

International technical cooperation

· drive the acquirement of advanced technology through technical cooperation of mine reclamation with advanced countries such as USA and Japan etc
· Promote multilateral cooperation projects with international organization, regional partners as long-term projects

◇ in order to drive the infrastructure of mine reclamation business, more or less 5% of total budget of mine reclamation business are invested every-year for R & D and upbringing specialists

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Cases of eco-friendly mine reclamation project

v Kangwonland parking lot

- Use the reclaimed site of pumice pile

v Kangwonland entrance

- Reforestation of Dongwon Samsung coal mine

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Cases of eco-friendly mine reclamation project

v Samchuck coal mine - reforestation

○ flat ground (79,026㎡) built on the dam of waste rock
- 1 level : 10,904㎡
- 2 level : 45,870㎡
- 3 level : 22,252㎡

○ Use plan
- Playground - Sports complex

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Cases of eco-friendly mine reclamation project

v Jungdong(Daeduck) coal mine

-Seeding land of
Kangwon land

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Cases of eco-friendly mine reclamation project

v Moon-kyung coal musium

after

before

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Cases of eco-friendly mine reclamation project

v Water treatment

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Cases of eco-friendly mine reclamation project

v Dongwon Samwang coal mine

v Pungwon coal mine

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Cases of eco-friendly mine reclamation project

v Sukbong coal mine

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Cases of eco-friendly mine reclamation project

v Samma-taejung coal mine

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Cases of eco-friendly mine reclamation project

▼ Hamtae coal mine (active treatment facility]

▼ Najun coal mine electro-dialysis treatment facility

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Cases of eco-friendly mine reclamation project

v Soil remediation site at Dal-chun abandoned metallic mine

- As, Ni, and Zn in soils are over the regulatory limits
- Rem. area : 396,700 m^2
- Survey and design : '03. 5~'04. 5 (about $80,000)
- Remed. (soil washing) : '05. 5~'06. 6 (about $5 mil]
- contaminated soils and groundwater were treated on-site

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Cases of eco-friendly mine reclamation project

v Tailing dam of Il-kwang mine

• A wild flower park has been built using the area of process facility and tailing dam

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Cases of eco-friendly mine reclamation project

▼ Restoration of abandoned facilities (Tae-young coal mine)

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Cases of eco-friendly mine reclamation project

▼ Restoration of abandoned facilities (Samchuck coal mine-Gohan)

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Cases of eco-friendly mine reclamation project

▼ Restoration of abandoned facilities (Samchuck coal mine-Gohan)

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Suggestions for sustainable development of mining sector in APEC economies (1)

1) New policies and legislation being formulated for mine closures in developing APEC economies should contain the following major components:

- specific provisions for mine reclamation and rehabilitation;
- a requirement of both environmental and social impact assessments, and associated work plans;
- a requirement of a bonding and financial surety program;
- Specific provisions for mine abandonment and post-closure activities; and
- Enforceable and specific monitoring procedures to ensure the compliance with the law and regulations.

Suggestions for sustainable development of mining sector in APEC economies (2)

2) A provision in terms of technologies, training, and financial support from developed economies would be beneficial for the development of mine closure management in developing economies.

3) Guidelines of mine closures from international organizations are recommended to be applied appropriately to mines in developing economies.

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Suggestions from MTF Korea for attaining sustainable development in mining sector of APEC economies (1)

1) Through allowing mine operation for mine owners who has enough capitals and technologies, mining activity could ensure environment and safety for sustainable development.

2) General mining infrastructure should be provided by increasing government supports.

3) The social understanding that mining is a 3D (Dirty, Difficult and Dangerous) occupation should be changed through environmental improvements such as the minimization of mine hazards and accidents through adopting modern technological reclamation and security systems.

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Suggestions from MTF Korea for attaining sustainable development in mining sector of APEC economies (2)

4) Promoting mining as a great source of taxation for local governments should be encouraged.

5) International cooperation for the management of mines and securing of mineral resources between developed economies and rich mineral resources holding economies should be established.

6) The application of cost-benefit analysis is recommended for establishing sustainable development of mining sector and related policies

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