Project 4 - Major installations for the initial smelting of cast iron and steel and for the production of non-ferrous metals

Comments: One of the main sources of water pollution is drainage from surface and underground mines, waste rock stockpiles and tailings ponds wastewater. Both leaching and runoff contribute to the water pollution.

CATEGORY	FACTOR	COMMENTS
AIR	fluorides	flora, fauna
	heavy metals:	reference 2
	lead (Pb)	toxic, metabolic poison
	mercury (Hg)	natural vegetation
	cadmium (Cd)	carcinogen, property pollutant, hazardous substance, flora, fauna, human health
	copper (Cu)	destroys crops
	cobalt (Co)	hazardous substance, human health
	nickel (Ni)	carcinogen, hazardous substance, hazardous waste constituents, priority toxic pollutant, human health, aquatic life, fauna, soil
	chromium (Cr)	carcinogen, hazardous substance, hazardous waste constituents, priority toxic pollutant, human health, aquatic life, flora, fauna, soil
	selenium (Se)	hazardous waste, hazardous waste constituents, priority toxic pollutant, human health, aquatic life, fauna, soil
	zinc (Zn)	carcinogen, hazardous substance, hazardous waste, priority toxic pollutant, human health, aquatic life, flora, fauna
	hydrogen cyanide	hazardous substance, hazardous waste, poison gas, flammable gas, human health, reference 3
	hydrogen fluoride	hazardous substance, hazardous waste, corrosive material, human health, reference 3
	methane (CH4)	greenhouse gas, volatile, flora, reference 1
	non-methane volatile organic compounds (NMVOC)	volatile, climate change, fauna, human health, reference 1
	oxides of nitrogen (NOx) / NxO	acid rain, flora, fauna, climate, soil, historical sites, human health, reference 1
	oxides of metal (PbO, SbO, SnO,AlO)	acid rain, flora, fauna, climate, soil, historical sites, human health
	oxides of sulphur (SOx)	acid rain, flora, fauna, climate, soil, historical sites, human health, reference 1
	other hazardous substances	human health, flora, fauna
	persistent organic pollutants	reference 4
	poly-aromatic hydrocarbons	carcinogen, hazardous wastes, priority toxic pollutants, human health, flora, fauna, aquatic life
	particle emissions	human health, flora, fauna, historical sites
	oil vapour	human health, flora, historical sites
	tar fumes	human health, flora
	odour	human health
	noise	
	vibration	

CATEGORY	FACTOR	COMMENTS
WATER	cyanides	hazardous substance, hazardous waste constituents, priority toxic pollutants, human health, aquatic life, wildlife
	fluorides	flora, fauna
	heavy metals:	reference 2
	lead (Pb)	toxic, metabolic poison
	mercury (Hg)	natural vegetation
	cadmium (Cd)	carcinogen, property pollutant, hazardous substance, flora, fauna, human health
	copper (Cu)	destroys crops
	cobalt (Co)	hazardous substance, human health
	nickel (Ni)	carcinogen, hazardous substance, hazardous waste constituents, priority toxic pollutant, human health, aquatic life, fauna, soil
	chromium (Cr)	carcinogen, hazardous substance, hazardous waste constituents, priority toxic pollutant, human health, aquatic life, flora, fauna, soil
	selenium (Se)	hazardous waste, hazardous waste constituents, priority toxic pollutant, human health, aquatic life, fauna, soil
	zinc (Zn)	carcinogen, hazardous substance, hazardous waste, priority toxic pollutant, human health, aquatic life, flora, fauna
	hydrogen cyanide	hazardous substance, hazardous waste, poison gas, flammable gas, human health, reference 3
	hydrogen fluoride	hazardous substance, hazardous waste, corrosive material, human health, reference 3
	nutrients C/N/P	water quality, aquatic life
	persistent organic pollutants	reference 4
	poly-aromatic hydrocarbons	carcinogen, hazardous wastes, priority toxic pollutants, human health, flora, fauna, aquatic life
	phenolic compounds	hazardous substance, hazardous waste, priority toxic pollutant, human health, aquatic life, wildlife
	sulphates	human health, water quality, aquatic life
	other toxic substances	water quality, aquatic life
	waste / by-products	water quality, human health, aquatic life
	suspended solids	water quality, aquatic life
	dissolved solids	
	total solids	
	chemical oxygen demand (COD)	
	total organic carbon (TOC)	
	change in pH	
	colour	
CLIMATE	changes in ambient air temperature	
	particle emissions	
	changes in humidity	
	greenhouse gas emissions	CO, CO2, methane, NMVOCs, NOx, SOx, CFC, HCFC

CATEGORY	FACTOR	COMMENTS
FLORA	changes in natural vegetation	project location, emissions
	disturbance of aquatic habitat	
	disturbance of plant habitat	
	disturbance of natural vegetation	
	decrease in biodiversity	
	impact of threatened species	
	changes in species population	
	changes in aquatic food web	
	changes in mammal food web	
	impact on protected areas	
FAUNA	migratory changes - birds	project location, emissions
	migratory changes - mammals	
	disturbance of wildlife habitat	
	decrease in biodiversity	
	impact on threatened species	
	changes in species population	
	impact on threatened area	
	changes in mammal food web	
SOIL	soil acidification	heavy metals, other pollutants
	soil contamination	
	erosion	project location
	changes in moisture content	lowering groundwater level for mining purposes, changes in surface waters for mining purposes
	changes in water table	lowering of groundwater for mining purposes
LANDSCAPE	land use changes	
	tailings ponds	leachates into water sources
	storage sites for waste rock	reduction in space for agriculture, noxious elements emitted to atmosphere
	visual aspects	
	physical composition	
	impact on sensitive lands	
HISTORICAL MONUMENTS	changes to historical sites	acid rain pollution
	changes to palaeontological sites	
HUMAN HEALTH & SAFETY	changes in ambient noise levels	
	changes in disease incidence:	lung disease (heavy metals), pregnant women (Hg, Pb), blood disorders (Pb, Cd, Co, Ni)
	risk of spills	
	risk of surface water contamination	
	risk of ground water contamination	
	risk of explosions/fire	
CULTURAL HERITAGE	cultural changes	
	land use changes	
	way of life	
SOCIO-ECONOMIC	changes to well being of life	
	changes to quality of life	
	quality of recreational facilities	
	quantity of recreational facilities	
	present use of natural resources	
	potential use of natural resources	
	employment opportunity	
	economic development - transboundary	

References

1. Proceedings of the EMEP Workshop on Emission Inventory Techniques, Regensburg, Germany, 2-5 July, 1991, EMEP/CCC-Report 1/91
2. Economic Commission for Europe Convention of Long-range Transboundary Air Pollution, Task Force on Heavy Metal Emissions, June 1994
3. Economic Commission for Europe, Convention on the Transboundary Effects of Industrial Accidents
4. Economic Commission for Europe, State of Knowledge Report of the UN ECE Task Force on Persistent Organic Pollutants
5. Recommendations to ECE Governments on the Prevention of Water Pollution from Hazardous Substances