Appendix 4

Acronyms and Glossary

ACRONYMS

#	Number
%	Percent
°C	Degrees Celsius
<	Less than
>	Greater than
±	Plus or Minus
µg	Micrograms
µg/kg bw/d	Microgram per kilogram of bodyweight per day
µg/kg/d	Microgram per kilogram per day
µg/L	Micrograms per litre
µg/m^3	Microgram per cubic metre
µm	Micrometres (microns)
2:1 slope	A slope ratio where horizontal distance is 2 and vertical is 1 units
95UCLM	95th upper confidence level on the mean
AAAQG	Ambient Air Quality Guideline
AAAQO	Alberta Ambient Air Quality Objective
AAC	Annual allowable cut
AADT	Annual Average Daily Traffic
AANDC	Aboriginal Affairs and Northern Development Canada
AAQC	Ambient air quality criteria
AB	Alberta
ABMI	Alberta Biodiversity Monitoring Institute
ACA	Alberta Conservation Association
acfm	Actual cubic feet per minute
ACGIH	American Conference of Governmental Industrial Hygienists
ACIMS	Alberta Conservation Information Management System
ACO	Aboriginal Consultation Office
AD	Air dry basis
ADI	Acceptable daily intake
AEL	Artificial evaporative load
AENV	Alberta Environment
AEP	Alberta Environment and Parks
AER	Alberta Energy Regulator
AES	Atmospheric environment service

AEW	Alberta Environment and Water
AFLW	Alberta Forestry, Lands & Wildlife
Ag	Absorption amount/Silver
AGCC	Alberta Ground Cover Characterization
AGRASID	Agricultural Region of Alberta Soil Inventory Database
AGS	Alberta Geological Survey
AHS	Alberta Health Services
AHW	Alberta Health and Wellness
AIH	American Industrial Hygiene
AKHS	Aakom Kiyii Health Services
Al	Aluminum
ALS	Advanced life saving
AMC	Antecedent moisture conditions
AMD	Acid mine drainage
AMI	Annual moisture index
AMIS	Alberta Mineral Information System
AMMS	Aboriginal Multi-Media Society
ANFO	Ammonium Nitrate and Fuel Oil
ANOVA	Analysis of Variance
ANPC	Alberta Native Plant Council
AQ	Air quality
AQG	Air quality guideline
AQMS	Air Quality Monitoring Station
AR	As received
ARD	Apparent relative density
ARD	Acid rock drainage
ARGR	Arctic Grayling
As	Arsenic
AS	As sampled
ASIR	Age standardized incidence rates
ASL	Above sea level
ASL	Ambient sound level
ASL	Above sea level
ASMR	Age standardized mortality rates
ASRD	Alberta Sustainable Resource Development
ASTM	American Society for Testing and Materials
AT	Alberta Transportation

atm-m^3/mol	Atmospheric cubic metre per mol
ATSDR	Agency for Toxic Substances and Disease Registry
ATV	All-terrain vehicles
AUM	Animal unit months
AVI	Alberta Vegetation Inventory
AWA	Alberta Wilderness Association
AWIS	Alberta Wetland Inventory Classification Standards
AWN	Aseniwuche Winewak Nation
B	Bare, natural
B	Boron
B(a)P	Benzo(a)prene
B.P.	Before Present
Ba	Barium
BBS	North American Breeding Bird Survey
BC	British Columbia
BCAQO	British Columbia Air Quality Objectives
BCE	British Columbia Environment
BCM	Bank Cubic Metre
BCM/CMT	Bank Cubic Metre per Clean Metric Tonne
BCM/RMT	Bank Cubic Metre per Raw Metric Tonne
bcm/tonne	Bank cubic metre per tonne
BCMOE	British Columbia Ministry of Environment
BCR	Band Council Resolution
BCS	Bureau of Chemical Safety
Be	Beryllium
Benga	Benga Mining Limited
Bent	Bentonite
BESR	Break Even Strip Ratio
BFS	Bankable Feasibility Study
Bi	Bismuth
Bighorn	Bighorn Wildlife Technologies
BIL	Billion
BKST	Brook Stickleback
BKTR	Brook Trout
BLS	Basic Life Support
BLTR	Bull Trout
BMA	Bear management Area

BMC	Benchmark concentration
BMD	Benchmark Dose
BMD_{1SD} or BMC_{1SD}	BMD or BMC associated with variation of 1 standard deviation from the control
$BMDL_X$ or $BMCL_X$	Lower 95% confidence limit of bmd_x or bmc_x
BMD_X or BMC_X	Benchmark dose or concentration associated with a X% effect level
BMP	Best management practice
BMU	Bear Management Unit
BOD	Biochemical Oxygen Demand
BPF	Belt press filters
BR	Bedrock
BSL	Basic Sound Level
BTU	British Thermal Units
BURB	Burbot
bw/d	Bodyweight per day
BXL	Bulk Explosives Ltd.
C	Celsius
C	Clay
c	Carbon
C&R	Conservation and Reclamation
Ca	Calcium
Ca^2	Calcium base cation (particle)
CAAQS	Canadian ambient air quality standards
$CaCl_2$	Calcium chloride
$CaCO_3$	Calcium carbonate
CACs	Criteria Air Containment Species
CAD	Canadian Dollars
CAPEX	Capital Expenditure(s)
CARB	California Air Resources Board
CAS	Chemical abstract service
CASA	Clean Air Strategic Alliance
CB	Cobbles
CCA	Coal Conservation Act
CC-d	Coniferous, closed forest – dry
CCE	Calcium carbonate equivalency
CC-m	Coniferous, closed forest – moist
CCME	Canada Committee of Ministers of the Environment

CCS	Crowsnest Conservation Society
Cd	Cadmium
CD	Census Division
CDC	Economic development committee
CDED	Canadian Digital Elevation Data
CDW	Guidelines for Canadian Drinking Water Quality (Health Canada 2014)
CEA	Cumulative effects assessment
CEAA	Canadian Environment Assessment Agency
CEMA	Conveyor Equipment Manufacturers Association
CEP	Coal Exploration Permit
CEPA	Canadian Environmental Protection Act
CFU	Colony forming units
CH_4	Methane
CHCP	Coal Handling and Crushing Plant
CHPP	Coal Handling Processing Plant
CIA	Carbon in ash
CIP	Capital Investment Program
CL	Clay loam
Cl	Chloride
cm	Centimetre
cm^2	Square centimetres
CMAQ	Community Multi-scale Air Quality
CMHC	Canadian Mortgage and Housing Canada
cms	Cubic metre per second
CMT	Clean Metric Tonne
CN	Canadian National Railway Company
CNPGCC	Crowsnest Pass Gold and Country Club
CNR	Canadian Natural Resources
CNT	Consultation Notation
CO	Carbon Monoxide
Co	Cobalt
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalents
CO_3	Carbonite
CO-d	Coniferous, open forest – dry
CO-m	Coniferous, open forest – moist
COPC	Chemicals of Potential Concern

COPD	Chronic Obstructive Pulmonary Disease
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
COSR	Cut-Off Strip Ratio
CP	Coal processing plant
CPR	Canadian Pacific Railway
CPP	Coal processing plant
CPUE	Catch per unit effort
CR	excess carcinogenic risk
CR	Consultant Report
CRAZ	Calgary Regional Airshed Zone
CRB	Conservation and Reclamation Business Plan
CRC	Cardinal River Coal
CRI	Coke Reactivity Index
CSIRO	Commonwealth Scientific and Research Organization
CSQG	Canadian Soil Quality Guidelines
CSR	Coke strength after reaction
CSSC	Canadian System of Soil Classification
CTS	Career and Technology Studies
Cu	Copper
CVR	Conveyor
CWQG	Canadian Water Quality Guidelines
CWS	Canada Wide Standards
d	Day
D	Deciduous forest - moist
D&R	Drain and rinse
D/S	Downstream
dB	Decibel
dBA	Decibel (A weighted)
dBC	C-weighed sound levels
DD5	Degree Growing Days Index
Denison	Denison Mines Incorporated
DFA	Disturbance Footprint Area
DFO	Fisheries and Oceans Canada
DGR	Dangerous Goods Route
DIC	Dissolved inorganic carbon
DLO	AEP Licence of Occupation
DM	Dense medium

DMC	Dense medium cyclone
DOC	Dissolved organic carbon
DRS	Disposition Reservations
dS/m	Deci-Siemens per metre
DTM	Digital Terrain Model
DU	Ducks Unlimited
DUI	Driving Under the Influence
DVT	Deep Vein Thrombosis
E	East
E	Ephemeral
E/L	Earth leakage
EA	Environmental Assessment
EC	Environment Canada
EC	Electric Conductivity
Ece	salinity
ED	Excused delay
EDTAC	Economic Development and Tourism Advisory Committee
EH	Effective head
EI	Employment Insurance
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
ELC	Ecological Landscape Classification
EMR	Emergency Medical Responders
EMS	Emergency Medical Services
EMTB	Emergency Medical Technician Basic
EMTP	Emergency Medical Technician Paramedic
EOM	End of mine
EOY	End of year
EP	Ecart probable
EPA	United States Environmental Protection Agency
EPEA	Environmental Protection and Enhancement Act
EPT	Ephermeroptera, Plecoptera, and Trichoptera
EQM	Equilibrium moisture
ERCB	Energy Resources Conservation Board
ERT	Emergency Response Team
ESA	Environmentally Significant Area
ESL	Effects screening levels

ESP	East Sediment Pond
ESRD	Environment and Sustainable Resource Development
EZE	Easements
FAP	Fort Air Partnership
FASD	Fetal Alcohol Syndrome Disorder
FB	Feeder breaker
Fe	Iron
FEARO	Federal Environmental Assessment and Review Office
FEL	Front end loader
fish/100 m^2	Fish per 100 square metres
FMA	Forest Management Area/ Agreement
FMU	Forestry Management Unit
FN	First Nations
FN	Fines
FOB	Free on Board
FOIPP	Freedom of Information & Protection of Privacy Act
FONS	Shrubby, open fens
FoS	Factor of safety
FOS	Foothills Ojibway Society
FP	Filter press
FPHLCC	First Peoples' Heritage, Language and Culture Council
FRAG	Forest Resources Advisory Group
FREC	Flood Recovery Erosion Control
FRI	Foothills Research Institute
FRIGBP	Foothills Research Institute Grizzly Bear Project
FRMA	Foothills Recreation Management Association
FSI	Free swelling index
FSP	Fines settling pond
ft.	Feet
FTE	Full Time Equivalent
FTNN	Treed fen
FTOR	Final Terms of Reference
FW	Forested wetland
FWAL	Freshwater Aquatic Life Guidelines
FWMIS	Fish and Wildlife Management Information System
FWP	Fresh water pond
FWR	Fresh water reservoir

G	Grams
g/cc	Grams per cubic centimetre
g/cm^2/d	Gram per square centimetre per day
g/day or g/d	Grams per day
g/hp-h	Grams per horsepower per hour
g/m^2/d	Gram per square metre per day
g/m^3	Grams per cubic metre
g/mol	Gram per mole
g/s	Grams per second
g/t	Grams per tonne
g/VKT	Grams per vehicle kilometre travelled
g/VMT	Grams per vehicle mile travelled
gar	Gross as receive
GBPU	Grizzly Bear Population Units
GBRSA	Grizzly Bear Regional Study Area
GCM	Global Climate Model
GDC	Geographic Dynamic Corp.
GDP	Gross Domestic Product
GF	Graminoid fen
GHG	Green House Gas
GIS	Groundwater Information Service
GIS	Geographical Information Systems
GLIMPS	Alberta Energy's Geographic Land Information Management and Planning System
GM	Grassy Mountain
GMCP	Grassy Mountain Coal Project
GPS	Global Positioning System
G-r	Grassland-riparian
GR	Gravels
GSC	Geological Survey of Canada
GSI	Geological strength index
G-u	Grassland-upland
GWUDI	Groundwater under the direct influence of surface water.
H	Hydrogen
H	Horizontal
h	Hour

H&S	Health and Safety
H_2O	Water
H_2S	Hydrogen sulfide
ha	Hectare
HADD	Harmful alteration, disruption or destruction of fish or fish habitat
Hatfield	Hatfield Consultants
HBC	Hudson Bay Company
HBS	Hindered bed separator
HDF	Hyperbaric Disc Filter
HDPE	High density polyethylene
HEC	Human equivalent concentration
HEI	Health Effects Institute
HGI	Hardgrove Index
HHRA	Human Health Risk Assessment
HNO_3	Nitric acid
HOA	Hand off auto
hour/day	Hours per day
hp	Horsepower
HQ	Hazard quotient
Hr	Hour
hr/yr	Hour per year
HRIA	Historical Resources Impact Assessment
HRMB	Historic Resources Management Branch
HRO	Historical Resources Overview
HRV	Historical Resource Value
HSDB	Hazardous Substance Database
HSE	Health Safety and Environment
HSI	Habitat Suitability Index
HV	Heavy vehicle
HVAC	Heating, Ventilation and Air Conditioning
Hwy	Highway
Hz	Frequency
I	Intermittent
ICSR	Incremental Strip Ratio
IDF	Intensity duration frequency
IFN	Instream Flow Needs

igpm	Imperial Gallons per Minute
IHDA	Interactive Health Data Application
ILCR	Incremental lifetime cancer risk
IM	Inherent Moisture
Inc	Incalculable
IPPC	Intergovernmental Panel on Climate Change
IRIS	Integrated Risk Information System
IRP	Integrated Resource Plan
IRS	Indian Residential Schools
ISO	International Standards Organization
ISP	Industrial Sample Plot
IT	Information Technology
K	Kelvin – equal to +273 C
$K(SiAl_3O_8)$	Potassium aluminum silicate
KAI	Key Aquatic Indicators
$KAl_2(OH)_2AlSi_3(O,OH)_{10}$	Potassium aluminum silicate hydroxide
kbcm	Kilo bank cubic meter
kcal/kg	Kilocalorie per kilogram
KDC	Kinbasket Development Corporation
keq	Kiloequivalent – Equal to 1 kmol of hydrogen ion (H+).
keq/ha/yr	Kiloequivalent per hectare per year
kg	Kilogram
kg/1000l	Kilograms per 1000 liters
kg/BCM	Kilogram per bank cubic metre
kg/d	Kilogram per day
kg/d/km	Kilogram per day per kilometre
kg/ha	Kilogram per hectare
kg/ha/yr	Kilogram per hectare per year
kg/m^3	Kilograms per cubic metre
kg/t	Kilogram per tonne
kg/VKT	Kilograms per vehicle kilometre travelled
KHC	KyNaaKuKan Housing Corporation
kj/kg	Calories per kilogram
kj/kg	Kilojoules per hour
km	Kilometre
km	Square kilometres

km/hr	Kilometres per hour
km/km^2	Kilometres per square kilometre
kmol	Kilomole
KNC	Ktunaxa nation council
Kow	Octanol-water partition coefficients
kph	Kilometres per hour
kt	Kilotonne
kt Co_2e/yr	Kilotonnes of carbon dioxide equivalents per year
kt/yr	Kilotonnes per year
kV	Kilovolt
kW	Kilowatt
KWBZ	Key Wildlife and Biodiversity Zone
kWh	Kilowatt hour
L	Loam
L or l	Litre
L/h	Litres per hour
L/s/km^2	Litres per second per square kilometre
LAI	Leaf area index
LAN	Local Area Network
lb	Pound
lb/ft^3	Pound per cubic feet
LCM	Life Cycle Management
LCRC	Land Conservation and Reclamation Council
LD	Large Diameter
LDFRC	Large diameter flooded reverse circulation drilling
Leq	Energy Equivalent Sound Level
LF	Lower Foothills
LFH	Litter fermenting humified layer
LFS	Labour Force Survey
Li	Lithium
LiDAR	Light Detection and Ranging
LKCH	Lake Chub
LNDC	Longnose Dace
LNSC	Longnose Sucker
LOAEC	Lowest observed adverse effect level
LOAEL	Lowest-observable-adverse-effects level

LOC	Licence of Occupation
LOC	Limiting oxygen concentration
LOEC	Lowest observed effect level
LOEL	Lowest-observed-effects level
LOM	Life of mine
LOS	Level of service
LPN	Licenced Practical Nurse
LS	Loamy Sand
LSA	Local Study Area
LSD	Legal Sub- Division
LTC	long term closure
LUF	Land Use Framework
Luscar	Luscar Ltd.
LV	Light vehicle
m	Male
m	Metre
M	Marsh
M	Meridian
m AGL	Metres above the ground level
m/m	Metres per metres
m/s or m/sec	Metre per second
m^2	Square metres
m^2/s	Square metres per second
m^3	Cubic metres
m^3/day	Cubic metres per day
m^3/hr	Cubic metres per hour
m^3/min	Cubic metre per minute
m^3/s	Cubic metre per second
m^3/s or m^3/sec	Cubic metre per second
MA DEP	Massachusetts Department of Environmental Protection
MAML	Mobile Air Monitoring Laboratory
m asl	metres above sea level
Matrix	Matrix Solutions
max	Maximum
MBCA	Migratory Birds Convention Act

Mbcm	Million bank cubic metres
MBGS	Metres below ground surface
Mcmt	Million clean metric tonne
MDH	MDH Engineering Solutions
MDL	Method Detection Limits
MEC	Minimum Exposable Concentration
MEMS	Millennium EMS Solutions Ltd.
mg	milligram
Mg	Magnesium
mg/L	Milligrams per litre
Mg^2	Magnesium base cation (particle)
mi	Material index
MIA	Mine Infrastructure Area
Min	Minimum
MIT	Minimum Ignition Temperature
mJ	Millijoule
MLA	Mineral liberation analyzer
MM	Million
mm	millimetre or 1/1000th of a metre
Mm/yr	Millimetres per year
Mm^3	Million cubic metres
MM5	Penn State Mesoscale Model Version 5
MMBtu	Million British Thermal Units
mmHg	Millimetres of mercury
MMt	Million Metric Tonne
Mn	Manganese
MNA	Métis Nation of Alberta
MNWH	Mountain Whitefish
Mo	Molybdenum
MOE	Ministry of the Environment
MONG	Open graminoid marshes
MOU	Memorandum of Understanding
MPa	Megapascal
MPOI	Maximum point of impingement
MR	Modulus ratio
MRL	minimal risk level

MSL	Mineral Surface Lease
MST	mountain standard time
Mt	metric tonne
Mtpa	Metric tonne per annum
Mtph	Metric tonne per hour
MTPY	Million clean tonnes per year
Mud	Mudstone
MVA	Mega volt-amperes
MW	Megawatts
MWh	Megawatt hours
N	North
N	Nitrogen/Nitrate/Sodium
N_2O	Nitrous oxide
Na	Sodium
NA, N/A	Not Applicable
NAAQO	National Ambient Air Quality
NAAQS	National ambient air quality standard
NAD	North American Datum
NAPS	National Air Pollution Survey Network
NAYSPS	National Aboriginal Youth Suicide Prevention Strategy
NCC	Nature Conservancy Canada
NCM	Non centrifugal moisture
NCO	North Canada Oil Limited
NE	Northeast
NESP	Northeast Sediment Pond
NFPA	National Fire Protection Association
NH_3	Ammonia
NH_4	Ammonium
NNLP	No Net Loss Habitat Compensation Plan
NO	Nitric oxide
No.	Number
NO_2	Nitrogen dioxide
NO_3	Nitrate
NOAEC	no observed adverse effect concentration
NOAEL	No observed adverse effect level
NOEL	No observed effect level
Norwest	Norwest Corporation

NO_X	Nitrous oxides
NPI	National Pollution Inventory
NPRI	National Pollutant Release Inventory
NPV	Net present value
NR	Natural Region
NRC	Natural Regions Committee
NRCAN	Natural Resources Canada
NRCB	Natural resource conservation board
NRDA	North Rock Disposal Area
NRPK	Northern Pike
NTS	National Topographic Map Series
NW	Northwest
NWAC	Native Women's Association of Canada
NWSP	Northwest Surge Pond
NWT	Northwest Territories
NWWG	National Wetland Working Group
O&M	Operations and Maintenance
O_2	Oxygen
O_3	Ozone
OCM	Ozone Limiting Method
OEHHA	California Office of Environmental Health Hazard Assessment
OH	Hydroxide
OHV	Off Highway Vehicles
OLM	Ozone Limiting Method
OMOE	Ontario Ministry of the Environment
OPEX	Operational Expenditure(s)
OPS	Operational Policy Statements
OSD	Out of seam dilution
OTPT	Occupational Therapists//Physical Therapists
OW	Open water
P	Permanent
Pa	Pascals
PAH	Polycyclic Aromatic Hydrocarbons
PAI	Potential Acid Input
PARC	Prairie Adaptation Research Collaborative
Pb	Lead

PBOE	Piikani Board of Education
PCL	Protective Concentration Limit
PDC	Planned development case
PDD	Project Development Case
PDD	Public Disclosure Document
PEF	Potency equivalence factor
PES	Piikani Employment Services
PEST	Parameter estimation tool
PFS	Prefeasibility study
PFSP	Pipeline Facility Surveillance Program
PG	Pasquill-Gifford
pg	Pellet group
pg/ha	Pellet group per hectare
PGA	Peak ground acceleration
PHA	Piikani Housing Authority
PHC	Petroleum Hydrocarbon
PIL	Pipeline Installation Lease
Pisces	Pisces Environmental Consulting Services Ltd.
PLA	Pipeline Agreement
Plant	Grassy Mountain Mine Coal Processing Plant
PM	Particulate Matter
PM_{10}	Particulate matter with mean aerodynamic diameter of 10 microns in size or smaller
$PM_{2.5}$	Particulate matter with mean aerodynamic diameter of 2.5 microns in size or smaller
PMF	Probable Maximum Flood
PMP	Probable Maximum Precipitation
PMTDI	provisional maximum tolerable daily intake
PNG	Petroleum and Natural Gas
PNT	Protective Notation
POD	Point of departure
ppb	Parts per billion
ppm	Parts per million
PRDL	Piikani Resource Development Ltd
Project (the)	The proposed Grassy Mountain Coal Project
PSD	Particle size distribution
PSL	Permissible Sound Level

PSSP	Plant Site Sediment Pond
PTWI	Provisional tolerable weekly intake
PVC	Polyvinyl chloride
PWGSC	Department of Public Works and Government Services Canada
PYEP	Piikani Youth and Education Program
QA	Quality assurance
QA/QC	Quality assurance / quality control
QC	Quality control
RC	Reflux classifier
REA	Rural Electrification Association
REC	Recreation Lease
REL	reference exposure level
RELAD	Regional Lagrangian Acid Deposition
ReV	Reference value
RfC	Reference concentration
RfD	Reference dose
RFMA	Registered Fur Management Area
RFQ	Request for Quotation
RGE	Range
RH	Relative Humidity
Riversdale	Riversdale Resources Limited
RIVM	Netherlands National Institute of Public Health and the Environment
RLT	Rail Loading Track
Rm	Regular Members
RMA	Resource Management Area
RMS	Risk Management Solutions
rmt or RMT	Raw Metric Tonne
RNTR	Rainbow Trout
ROE	Right of Entry
ROM	Run-of-mine
ROW	Right-of-way
rpm	Revolutions per minute
RQ	Risk Quotient
RRD	Range Road
RRMP	Reclamation Research and Monitoring Plan
RRTAC	Reclamation Research and Technical Advisory Committee
RSA	Regional Study Area

RsC	Risk-specific Concentration
RsD	Risk-specific Dose
RSF	Resource Selection Function
RTM	Ready-to-move
RWP	Raw Water Pond
s	Second
S	Sand
S	South
S	Sulfur
S1	(coal) Seam 1
S2	(coal) Seam 2
S4	(coal) Seam 4
SAAB	SREM Aboriginal Affairs Branch
SAR	Sodium absorption ratio
SARA	Species at Risk Act
Sare	Sodicity
SAS	Statistical Analysis Software
Sb	Antimony
SB	Shrubby bog
SCA	Soil correlation area
SCADA	Supervisory Control And Data Acquisition System
SCL	Sandy Clay Loam
SCN	Samson Cree Nation
SCS	Soil Conservation Service
SCWG	Soil Quality Criteria Working Group
SE	Southeast
Se	Selenium
SEIA	Socio-Economic Impact Assessment
SEM	Scanning electron microscope
SESP	South East Surge Pond
SF	Slope Factor
SF	Shrubby fen
SG	Specific gravity
SH	Shale
SH	Historically present species
SHE	Safety, Health and Environment Committee
Sherritt	Sherritt International Corporation

SHS	Spatial Harvest Sequence
Si	Silt
SiCL	Silty Clay Loam
SiL	Silty Loam
SIL	Survey Intensity Level
SiO_2	Silicon Dioxide
SiS	Silt stone
SL	Sandy Loam
SLWRA	Screening Level Wildlife Risk Assessment
SML	Surface Material Lease
SMU	Soil Map Unit
SNR	Status undetermined species
SNTC	Shuswap nation tribal council
SO_2	Sulphur dioxide
SO_4	Sulfate
SO_4^2	Sulphate
SOC	Statement of Concern
SO_X	Sulfur oxide
Sp	Spring
SPL	Sound Pressure Level in dB
spp	Species
SPSC	Spoonhead Sculpin
SQG	Soil quality guidelines
Sr	Strontium
S-r	Shrubland – riparian
SRC	Syracuse Research Corp.
SRD	Sustainable Resources Development
SRDA	South rock disposal area
SREM	Sustainable Resource and Environmental Management
SRTM	Shuttle Radar Topography Mission
SS	Sandstone
SSRP	South Saskatchewan Regional Plan
STA	Stacker
STNN	Treed swamps
Su	Summer
S-u	Shrubland-upland

SW	Southwest
SWL	Safe working load
SWMP	Surface Water Management Plan
SWSP	South West Surge Pond
T	Time
t	Tonne
t/d	Tonnes per hour
t/h	Tonnes per year
t/kt	Tonnes per kilotonnes
t/yr	Tonnes per year
TB	Treed bog
TBD	To be determined
TBS	Teetered bed separator
TC	Trail creek
TC	Tolerable concentration
TC_{05}	Tumorigenic concentration – 5%
TCA	Tolerable concentration in air
TCEQ	Texas Commission on Environmental Quality
TCM	Total conversion method
TD_{05}	Tumorigenic dose - 5%
TDI	Tolerable daily intake
TDS	Total dissolved solids
TEF	Toxicity equivalence factor
TEK	Traditional Ecological Knowledge
TEMP	Temperature
TF	Treed fen
TGA	Thermogravimetric analysis
THC	Total Hydrocarbons
Ti	Titanium
TIA	Traffic Impact Assessment
Till	Morainal till
TK	Traditional Knowledge
TKS	Traditional Knowledge Services
Tl	Thallium
TLO	Train load out
TLU	Traditional Land Use

TLUS	Traditional Land Use Studies
TM	Total moisture
tonnes/m^3	Tonnes per cubic metre
ToR	Terms of Reference
TOW	Top of the World
TPA	Trapping Area
TPHCWG	Total Petroleum Hydrocarbon Working Group
TPR	Timber Productivity Ratings
TRPR	Trout Perch
TRS	Total Reduced Sulphur
TRV	Toxicological reference values
TS	Total solids
TSP	Total Suspended Particulates
TSS	Total Suspended Solids
TU	Traditional Use
TU	Tritium unit
TUS	Traditional Use Studies
TWI	Tolerable weekly intake
TWP	Township
U	Uranium
U.S.	United States of America
u/c	Unclassified
U/S	Upstream
UCS	Uniaxial compression strength
UF	Upper Foothills
UHMW-PE	Ultra-high molecular weight polyethylene
UL	Tolerable upper intake level
UR	Unit risk
UROC	United Riders of Crowsnest
USBM	US Bureau of Mines
USD	United States Dollars
USEPA	United States Environmental Protection Agency
UTM	Universal Transverse Mercator
UV	Ultraviolet
V	Vertical
V	Vanadium
VC	Valued Component

VEC	Valued environmental component
VFD	Variable frequency drives
VKT	Vehicle kilometres travelled
VM	Volatile Matter
VMT	Vehicle Miles Travelled
VOC	Volatile Organic Compounds
Vol	Volume
VP	Vice President
VSD	Variable Speed Drive
VWP	Vibrating wire piezometer
W	West
W/m^2	Watt per square metre
w/w	Wedge wire
W5	West of the 5th Meridian
WACEHBAP	Wabamun and Area Community Exposure and Health Effects Assessment Program
WAN	Wide area network
WCAS	West Central Airshed Society
WHO	World Health Organization
WHSC	White Sucker
Wi	Winter
WLSA	Wildlife Local Study Area
WMF	Water Management Framework
WMU	Wildlife Management Unit
WONN	Open water
WRSA	Wildlife Regional Study Area
WSC	Water Survey of Canada
WSP	West Sediment Pond
ww	Wet weight
yr	Year
YoY	Young of the Year
YT	Yellowhead Tower
Zn	Zinc
ZOI	Zone of Influence

GLOSSARY

aboriginal traditional land uses
traditional land use means established use(s) by the Aboriginal peoples (including First Nations, Métis and Inuit) through generations of custom, belief, knowledge, experience and handed down to posterity orally and by practice. The uses signify means of livelihood for survival, access and transportation, cultural heritage, spiritual values and land ethic based on the principle of perpetual sustainability of natural resources. (Métis Nation Association of Alberta, 1997)

Acidification
The decrease of acid neutralizing capacity in water, or base saturation in soil, caused by natural or anthropogenic processes. Acidification is exhibited as the lowering of pH, which can adversely affect aquatic life.

acid soil
soil of pH less than 6.5. Expert Committee on Soil Survey (1982)

ACIMS
Alberta Conservation Information Management System. As part of the International Natural Heritage Network, ACIMS provides biodiversity information for the purpose of natural resource management, development planning, and conservation. Specifically, ACIMS tracks and watches population size and condition, global and sub-national status, and geographic range of several species of flora and fauna within the province.

acute toxicity
"toxicity manifested within a relatively short time interval" (*i.e.* as short as a few minutes to as long as several days). Such toxicity is frequently caused by a single dose of the toxicant. Hodgson *et al* (1988)

adverse effect
impairment of or damage to the environment, human health or safety or property. Province of Alberta Environmental Protection and Enhancement Act (AEPEA) (1992)

adverse effects to human health
those effects, in this case primarily of a respiratory nature, that are medically significant physiologic or pathological changes generally evidenced by one or more of the following: (1) interference with the normal activity of the affected person or persons, (2) episodic respiratory illness, (3) incapacitating illness, (4) permanent respiratory injury, and/or (5) progressive respiratory dysfunction. Medical significance in this case can apply to a sensitive sub-group (*e.g.*, the young, asthmatic or elderly). American Thoracic Society (1985).

affect
to produce an effect upon. Webster's New Collegiate Dictionary (1973)

air contaminant
any solid, liquid or gas or combination of any of them in the atmosphere resulting directly or indirectly from the activities of man.

airshed
a term, denoting a geographical area, the whole of which, because of topography, meteorology, and climate, shares the same air mass. The term may also refer to an

administrative boundary such as the West Central Airshed.

alkaline soil
a soil that has a pH greater than 7.4. Expert Committee on Soil Survey (1982)

alluvial (also fluvial)
material such as earth, sand, gravel, or other rock or mineral materials transported and laid down by flowing water. ERCB (1981)

ambient air (Alberta Environmental Protection)
the atmosphere surrounding the earth, but does not include the atmosphere in a structure or in any underground space [Alberta Regulation 124/93, part 1(c)]. As illustrated by Section 8(1) of the regulations, this definition refers to the discharge "to the ambient air" and the definition does not specifically refer to locations where the public has access or environmentally sensitive receptors.

ambient noise
the all-encompassing noise associated with a given environment, and is usually a composite of sounds from many sources, other than the source of interest, near and far. Health and Welfare Canada (1989)

ambient sound level
the sound level that is present in the environment produced by acoustical sources other than the source of interest. Health and Welfare Canada (1989)

AP-42.
The USEPA's compilation of emission factors for use in calculating emissions from stationary point and area sources.

area source
an emission source which emits over a specified area rather than from a point (*e.g.* stack). Examples of area sources are wind erosion from mined but as yet unreclaimed areas.

Aquifer.
An underground consolidated or unconsolidated geological unit (material, stratum or formation), or set of connected units that contains sufficient saturated permeable material to yield economical quantities of water to wells and springs.

area source
An emission source which emits over a specified area rather than from a point (*e.g.* stack). Examples of area sources are wind erosion from mined but as yet unreclaimed areas.

aspect
the direction toward which a slope faces. ERCB (1981)

attenuation
reduction in force. Powter (1994)

avifauna
the birds of a specific region or period.

B horizon
a subsoil horizon characterized by one of: (1) an enrichment in clay, iron, aluminum, or humus (Bt or Bf). (2) a prismatic or columnar structure that exhibits pronounced coatings or stainings associated with significant amounts of exchangeable sodium (Bn or Bnt). (3) an alteration by hydrolysis, reduction, or oxidation to give a change in colour or structure from the horizons above or below, or both (Bm). Powter (1994)

background
amounts of substances present in the ambient air due to natural (*i.e.*, not man-made) sources.

Background concentration.
The concentration of a chemical in a defined control area during a fixed period before, during or after data gathering.

Base Cation.
An alkali or alkaline earth metal cation (Ca2+, Mg2+, K+, Na+).

Base flow.
Groundwater flow to a surface water body (lake, swamp, stream, *etc.*); the part of stream flow that is solely supported by groundwater discharge.

baseline
a description of conditions existing before development against which subsequent changes can be detected through monitoring. Baselines normally must consist of statistically adequate descriptions of the variability inherent in the valued environmental component prior to the onset of the planned action. As such, the baseline study itself is not a predictive tool, although it does describe the condition from which a valued environmental component is predicted to change. Beanlands and Duinker (1983)

Base of Groundwater Protection.
Identifies the approximate depth where groundwater changes from non-saline (fresh) to saline, in Alberta. The database and map provide the base of the deepest non-saline aquifer, if available or the base of a specified formation or a general depth when salinity data are lacking. Established by Alberta Environment and the AER.

bedrock
the solid rock that underlies soil and the regolith or that is exposed at the surface. Powter (1994)

bedrock spoil
the bedrock material that has been mined and dumped. It may consist of hard fragments of varying size or may be soil-sized particles. Powter (1994)

bench
large steps or level areas cut into slopes.

bentonite
a type of mineral deposit consisting principally of montmorillonite clay. (A major constituent of drilling muds.) Powter (1994)

benzene.
A colourless, liquid, flammable, aromatic hydrocarbon that boils at 80.1°C and freezes at 5.4-5.5°C.

bioaccumulation
a widespread term that describes a process by which chemical compounds are taken up by terrestrial and aquatic organisms from the medium directly and through the consumption of contaminated food. Powter (1994)

biodiversity
variability among living organisms from all sources including inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems. Biodiversity Working Group (1995)

biophysical
the biological and physical-chemical components of the environment. It includes

flora, fauna, atmosphere, noise, water, landform and soils (terrain), heritage resources, resource-associated land-use factors including (but not limited to) forestry, agriculture, and recreation. Alberta Energy and Natural Resources (1980)

bog
(1) a peat-covered or peat-filled wetland, generally with a high water table having a low bearing strength. The water of a bog is generally acid and low in nutrients. Bogs usually support a black spruce forest but may also be treeless. They are usually covered with sphagnum and feathermosses and ericaceous shrubs. (2) a peat-covered area or peat-filled wetland, generally with a high water table. The water table is at or near the surface. The surface is often raised or level with the surrounding wetlands, and is virtually unaffected by the nutrient-rich groundwaters from the surrounding mineral soils. Hence, the groundwater of the bog is generally acid and low in nutrients. The dominant peat materials are Sphagnum and forest peat underlain, at times, by fen peat. The associated soils are Fibrisols, Mesisols and Organic Cryosols. The bogs may be treed or treeless and they are usually covered with Sphagnum mosses, feathermosses, and ericaceous shrubs. Powter (1994)

Borehole.
A hole drilled into the earth, for the purpose of extracting core, or into which a monitoring well may be installed.

broadcast seeding
scattering seed on the surface of the soil. Contrast with drill seeding which places the seed in rows in the soil. Powter (1994)

brunisolic
these soils, which occur under a wide variety of climatic and vegetative conditions, all have Bm or Btj horizons. The great groups Melanic Brunisol, Eutric Brunisol, Sombric Brunisol, and Dystric Brunisol belong to this order. A soil order of sufficient development to exclude it from the Regosolic order, but without sufficient development to include it in any other order. These soils develop under various climates and vegetation, and are frequently characterized by a reddish colour. Powter (1994)

bryophyte
a general term for mosses and liverworts.

bulk density (soil)
the mass of dry soil per unit of bulk volume. The mass is determined after drying to a constant weight at 105°C. The bulk volume is that of the sample as taken in the field and includes the volume of the solids and of the pore space. Measures of bulk density (Db) are expressed in SI units (kg/m^3) and/or units derived from them. Mg/m^3 is the preferred unit. Derived units, such as Mg/m3, t/m^3 or g/cm^3 are numerically equal. Db values generally range from 0.90 to 1.80 Mg/m^3 (900 to 1800 kg/m^3). In commercial and engineering applications, Db is often expressed in lb/ft^3 and it has been called apparent density. Powter (1994)

CO_2e.
Carbon dioxide equivalents. An expression of the total amount of greenhouse gases in the air, taking into account their relative contributions to global warming and climate change, as if all substances were CO2

C horizon.
a mineral horizon comparatively unaffected by the pedogenic processes operative in the A and B horizons except for the process of gleying (Cg) or the accumulation of calcium carbonate (Cca) or other salts (Csa). A naturally calcareous C horizon is designated Ck. Powter (1994)

calcareous soil
soil containing sufficient calcium carbonate, often with magnesium carbonate, to effervesce visibly when treated with cold 0.1 N hydrochloric acid. Powter (1994)

calcium carbonate equivalent
the total inorganic carbon content of soil material expressed in terms of percent calcium carbonate (CaCO3). Powter (1994)

CALMET. California Meteorological Model. Used to process meteorological data for input into the CALPUFF model.

CALPUFF. California Puff Model, used to estimate ambient concentrations of substances in air, and deposition of those substances (*e.g.*, acid deposition).

capability (land)
an evaluation of land performance that focuses on the degree and nature of limitation imposed by the physical characteristics of a land unit on a certain use, assuming a management system. The suitability of land for use without permanent damage. It is an expression of the effect of physical land conditions, including climate, on the total suitability for use, without damage, for crops that require regular tillage, for grazing, for woodland and for wildlife. Land capability involves consideration of the risks of land damage from erosion and other causes and the difficulties in land evaluation owing to physical land characteristics, including climate. Powter (1994)

cation exchange capacity (CEC)
a measure of the total amount of exchangeable cations that a soil can hold, expressed in terms of milliequivalents per 100 g of soil. Powter (1994)

cation
an ion carrying a positive charge of electricity. The most common soil cations are calcium, magnesium, sodium, potassium, and hydrogen. Powter (1994)

cation exchange
the interchange between a cation in solution and another cation on the surface of any surface-active material, such as clay colloid or organic colloid. Powter (1994)

check dam
a) structure made from soil materials and used to stabilize and control undercutting of drainage ditches. b) small dam constructed in a gully or other small watercourse to decrease the streamflow velocity, minimize channel scour, and promote deposition of sediment. CN Engineering (1996)

chernozemic
an order of soils that have developed under xerophytic or mesophytic grasses and forbs, or under grassland-forest transition vegetation, in cool to cold, subarid to subhumid climates. The soils have a dark-coloured surface (Ah, Ahe, or Ap) horizon

and a B or C horizon, or both, of high base saturation. The order consists of the Brown, Dark Brown, Black, and Dark Grey great groups. Powter (1994)

chronic toxicity
the development of adverse effects after an extended exposure (conventionally at least one-tenth of the expected life span of an organism), to relatively small quantities of a toxicant. Hodgson *et al,* (1988)

clay
(1) as a rock term: a natural, earthy, fine grained material that develops plasticity with a small amount of water. (2) as a soil term: a textural class. (3) as a soil separate: a material usually consisting largely of clay minerals but commonly also of amorphous free oxides and primary minerals. (4) As a particle-size term: a size fraction less than 0.002 mm equivalent diameter. Powter (1994)

Closure.
The point after shutdown of operations when regulatory certification is received and the area is ready for other uses.

coal
a black or dark brown combustible mineral substance formed in nature by various degrees of metamorphism or coalification of vegetable matter. Miscellaneous coal terms include: a) bituminous coal is a relatively soft coal; a mineral coal which contains widely varying amounts of volatile hydrocarbons and tarry matter. b) metallurgical coal is coal with characteristics making it suitable for production of coke that can be used by the iron and steel industry. c) raw coal is unwashed coal. d) refuse is that portion of the seam as mined which is rejected by the preparation plant as unusable. e) run-of-mine (ROM) coal is coal as it leaves the mine, including impurities and before any size reduction. f) slurry is a suspension of fine coal and other assorted materials in water; usually the largest particle does not exceed approximately 10 mesh in size. g) washed coal is coal which has been cleaned in a preparation plant to reduce impurities. Brumbaugh *et al,* (1982)

coal seam
a bed or stratum of coal; usually applied to large deposits of coal. The Coal Association of Canada (1985)

coarse texture (soil)
the texture exhibited by sands, loamy sands, and sandy loams but not including very fine sandy loam. A soil containing large quantities of these textural classes. Powter (1994)

compaction
increasing the density of a material by reducing the voids between the particles by mechanical effort. The closing of the pore spaces among the particles of soil and rock, generally caused by running heavy equipment over the area, as in the process of levelling the overburden material of strip mine banks. The moving of soil particles closer together by external forces. In the compaction process, individual soil particles are packed closer together and soil aggregates are crushed, thus greatly reducing porosity. The major causes of soil compaction are: (1) natural consolidation during soil forming processes (*e.g.*, the weight of glaciers during the ice ages); (2) trampling by animals and humans; (3) natural shrinkage of soil upon drying; (4) use of heavy equipment. Powter (1994)

concentration. Quantifiable amount of a chemical in environmental media.

Cone of Depression
(also termed Drawdown Cone). A depression in the water table or potentiometric surface that is the shape of an inverted cone (funnel) and that develops around a well as a result of groundwater withdrawal from the well; the area around a discharging well where the hydraulic head in the aquifer has been lowered by pumping. This defines the area of influence of a well.

conifer
a tree belonging to the order Coniferae with cones and evergreen leaves of needle shape or "scalelike". The tree is harvested to produce wood known commercially as "softwood". Powter (1994)

conservation
a policy which seeks to sustain future useable supplies of a natural resource by present actions. The protection, improvement, and use of natural resources according to principles that will assure their highest economic or social benefits. The planning, management and implementation of an activity with the objective of protecting the essential physical, chemical and biological characteristics of the environment against degradation. Conservation (soil) (1) Protection of the soil against physical loss by erosion or against chemical deterioration; that is, excessive loss of fertility by either natural or artificial means. (2) A combination of all methods of management and land use that safeguard the soil against depletion or deterioration by natural or man-induced factors. (3) The division of soil science dealing with soil conservation. Powter (1994)

consistence
(1) the resistance of a material to deformation or rupture. (2) the degree of cohesion or adhesion of the soil mass. Terms used in soil survey for describing consistence at various soil-water contents are: Wet soil: non-sticky; slightly sticky; sticky; very sticky; non-plastic; slightly plastic; plastic and very plastic. Moist soil: loose; very friable; friable; firm; very firm; compact; very compact; and extremely compact. Dry soil: loose; soft; slightly hard; hard; very hard; and extremely hard. Cementation: weakly cemented; strongly cemented, and indurated. Powter (1994)

Contaminants.
A general term referring to any chemical compound added to a receiving environment in excess of natural concentrations. The term includes chemicals or effects not generally regarded as “toxic,” such as nutrients, colour and salts.

coversoil
unconsolidated materials including salvaged surface soil, salvaged Regolith, or selected bedrock spoil used to top-dress spoils to build a better quality minesoil. Powter (1994)

cricetid rodents
a family of rodents in the large and complex superfamily Muroidea. It includes true hamsters, voles, lemmings, and New World rats and mice.

criteria air contaminants (CACs)
a substance emitted to the air for which a national ambient air quality standard (NAAQS) has been promulgated by the U.S. EPA. Those criteria pollutants are

particulate (PM10 and PM2.5), SO2, NO2, O3, CO and Pb.

critically imperilled plant species
extremely rare, ≤5 occurrences in the province or only a few remaining individuals; or may be imperilled because of some factor of its biology which makes it especially to extiration. Argus and Pryer (1990)

cumulative environmental effect
the effect on the environment which results from effects of a project when combined with those of other past, existing and imminent projects and activities. These may occur over a certain period of time and distance. Canadian Environmental Assessment Act (CEAA) (1994)

decibel (dBA)
a single number sound pressure level measurement in decibels frequency weighted to provide a reasonable correlation to loudness as perceived by a human being. For example, a level of 40 dB could be represented by quiet conditions in a public library; whereas a level of 70 dB is analogous to the level of a typical TV set. CRC A-8 Application (1993)

degradation (soil)
the changing of a soil to a more highly leached and weathered state, usually accompanied by morphological changes such as the development of an eluviated, light coloured A horizon or a decline in soil quality. Processes include wind and water erosion, salinity, organic matter depletion, acidification and compaction. Powter (1994)

dewatering
the removal of water from a volume of rock or soil to effect a drawdown of the water table.

dip
the angle at which a vein, structure or rock bed in inclined from the horizontal, measured at right angles to the strike. Carrington (1971)

discharge
the volumetric rate of flow of water in a stream.

discharge (of groundwater)
a point or area in which groundwater leaves the subsurface environment and enters the surface environment.

dispersal
the spreading of reproductive plant parts from one place or area to another. Powter (1994)

disturbed land
land on which excavation has occurred or upon which overburden has been deposited, or both. Powter (1994)

diurnal raptor
bird of prey that hunt for food primarily on the wing, using their keen senses, especially vision.

diversion
a channel constructed across a slope to intercept surface run-off, changing the course of all or part of a stream or the runoff, thereby reducing sediment problems. ERCB (1981)

Divide.
A topographic high (or ridge) separating surface watersheds (catchments). A groundwater flow divide is an elevated area, line or ridge of the potentiometric surface separating different groundwater flow systems.

Domestic Use.
Water used by and connected to a household for personal needs or for household purposes, such as drinking, bathing, heating, cooking, sanitation or cleaning, and landscape irrigation.

drainage (soil)
soil drainage refers to the frequency and duration of periods when the soil is not saturated. Terms used are - excessively, well, moderately, imperfectly, and poorly drained soil. Powter (1994)

drawdown
the lowering of water levels caused by pumping of groundwater from wells, pits *etc.* The difference between the natural (non-pumping) water level and the depth to water at a given instant during either the pumping or recovery intervals (referred to as "residual drawdown" during the recovery period); the distance between the natural water level and the surface of the cone of depression.

ecodistrict
a subdivision of an ecoregion based upon distinct physiographic and/or geologic patterns. Lacate (1969)

ecological receptor
a non-human organism identified as potentially experiencing adverse effects from exposure to contaminated soil either directly through contact or indirectly through food chain transfer. Powter (1994)

ecoregion
an area characterized by a distinctive regional climate as expressed by vegetation. Lacate (1969)

ecosite
a subdivision of an ecosection and an area with a unique recurring combination of vegetation, soil, landform, and other environmental components. Strong and Anderson (1980)

ecosystem
a community of interdependent animals and plants, including humans, together with the total environment which they inhabit, interact with, and which interacts. Tilleman (1994)

ecotype
a local ecological race adapted through natural selection to a particular habitat. Powter (1994)

effect
(a) Direct effects, which are caused by the action and occur at the same time and place. (b) Indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate and related effects on air and water and other natural systems, including ecosystems.

Effects and impacts are synonymous. Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects. Source: 40 CFR 1508.8

elevation head (Groundwater). The height of the point of measurement (the bottom of the well) relative to a geodetic datum (usually sea level) expressed as metres

eluviation
the removal of soil material in suspension or in solution from a layer or layers of the soil by the downward or lateral movement of water. Powter (1994)

emission factor
an average value which relates the quantity of a substance released to the atmosphere with the activity associated with the release of that substance. It is usually expressed as the weight of that substance divided by a unit weight, volume, distance or duration of the activity that emits the substance (*e.g.*, kilograms of particulate emitted per tonne of rock moved). Using such factors permits the estimation of emissions from various sources of air pollution. In most cases, these factors are simply averages of all available data of acceptable quality, generally without consideration for the influence of various process parameters such as temperature, reactant concentrations, *etc.* (modified from U.S. EPA, January 1995).

environment
the components of the earth and includes: (i) air, land and water; (ii) all layers of the atmosphere; (iii) all organic and inorganic matter and living organisms; and (iv) the interacting natural systems that include these components. Province of Alberta Reg. 115/93 (1993)

environment (CEAA)
the components of the Earth, and includes

(a) land, water and air, including all layers of the atmosphere,

(b) all organic and inorganic matter and living organisms, and

(c) the interacting natural systems that include components referred to in paragraphs (a) and (b). Source: Canadian Environmental Assessment Act (CEAA).

environmental assessment
in respect of a project, an assessment of the environmental effects of the project that is conducted in accordance with AEPEA, CEAA and the associated regulations.

environmental effect
means, in respect of a project, (a) any change that the project may cause in the environment, including any effect of any such change on health and socio-economic conditions, on physical and cultural heritage, on the current use of lands and resources for traditional purposes by aboriginal persons, or on any structure, site or thing that is of historical, archaeological, palaeontological or architectural significance, and (b) any change to the project that may be caused by the environment, whether any such change occurs within or outside Canada. Canadian Environmental Assessment Act (CEAA) (1994)

environmental impact
the net change, positive or negative, in human health and well-being that results from an environmental effect, including the well-being of the ecosystem on which human survival depends. Tilleman (1994)

environmental impact assessment (EIA)
a process or set of activities designed to contribute pertinent environmental information to project or program decision-

making. In doing so, it attempts to predict or measure the environmental effects of specific human activities or do both, and to investigate and propose means of ameliorating those effects. The sequence of environmental impact assessment events: a) baseline study phase; b) interpretive, predictive and evaluative phase; and c) post-construction assessment phase. Beanlands and Duinker (1983)

environmental management system
organizational structure, responsibilities, practices, procedures, processes and resources for implementing and maintaining environmental management. Committee Draft of the International Organization for Standardization (ISO) Environmental Management Systems - General Guidelines on Principles, Systems and Supporting Techniques (ISO 14000) Standard (February 1995)

equivalent capability (land)
the ability of the land to support various land uses after reclamation is similar to the ability that existed prior to any activity being conducted on the land, but the ability to support individual land uses will not necessarily be equal after reclamation. Powter (1994)

equivalent sound pressure level (Leq)
the level of a steady sound having the same time integral of the squared sound pressure, in the measurement interval, as the observed sound. Health and Welfare Canada (1989)

erodibility
a measure of the susceptibility of a soil to particle detachment and transport by rainfall and runoff. Powter (1994)

erosion
the wearing away of the land surface by running water, wind, ice, other geological agents, activities of man or animals, and including such processes as gravitational creep. Erosion may be either normal or accelerated; the latter being brought about by changes in the natural cover or ground conditions, including those due to human activity. Powter (1994)

eutrophic
term referring to peatlands that are relatively nutrient-rich; also refers to soils and waters with high nutrient content and high biological activity. Powter (1994)

evapotranspiration
potential evapotranspiration is the maximum transpiration that can occur in a given weather situation with a low-growing crop that is not short of water and does not completely shade the ground. The process of evaporation of water from a soil surface together with transpiration by plants. Powter (1994)

exceedance.
An emission or ambient concentration whose measured value is more than that allowed by government regulations

exposure characterization
identification of the conditions of contact between a substance and an individual or population. It may involve identification of concentration, routes of uptake, target sources, environmental pathways, and the population at risk. Powter (1994)

exposure
contact between a substance and an individual or population. It may occur via different pathways including oral, dermal

and inhalation. Powter (1994)

fault
a break in the earth's crust caused by forces which have moved the rock on one side with respect to the other; faults may extend for miles, or be only a few inches in length; similarly the movement or displacement along the fault may vary widely; ore deposits are commonly associated with faults, as the movement frequently provides a channel for the passage of ore-bearing solutions. Carrington (1971)

FEFLOW.
A finite element numerical model used for predicting three-dimensional characteristics of groundwater and porous media. FEFLOW can predict a multitude of characteristics including fluid flow, groundwater age, contaminant and heat transport under fully- or variably-saturated conditions at local to regional scales.

fen
a peat-covered or peat-filled wetland with a high water table that is usually at or above the surface. The waters are mainly nutrient-rich, minerotrophic waters from mineral soils. The dominant peat materials are shallow to deep, well to moderately decomposed fen peat. The associated soils are Mesisols, Humisols, and Organic Cryosols. The vegetation consists dominantly of sedges, grasses, reeds, and brown mosses, with some shrub cover and, at times, a scanty tree layer. Powter (1994)

filter pack.
Sand or gravel that is smooth, uniform (or a mixture of grain sizes), clean, well-rounded and siliceous and placed in the annulus of the well between the borehole wall and the well screen to prevent formation material from entering the screen.

final cut (end cut)
last cut or line of excavation made on a specific property or area. Powter (1994)

fine texture (soil)
consisting of or containing large quantities of the fine fractions, particularly silt and clay. Powter (1994)

fines
the small particles of coal resulting from breakage of larger pieces. Brumbaugh *et al,* (1982)

Fines settling pond
this pond serves to settle out unwanted particulates to provide a supernatant quality that meets plant processing needs and/or controlled discharge to the surrounding water shed through seepage or controlled discharge.

firm
a term describing the consistence of a moist soil that offers distinctly noticeable resistance to crushing, but can be crushed with moderate pressure between the thumb and forefinger. Powter (1994)

First Nations
a band or First Nation is defined in the Indian Act as a body of Indians for whose common use and benefit lands have been set aside of monies held by the Government of Canada or declared by the Governor in Council to be a band. Most bands prefer to be referred to as First Nations. Alberta Intergovernmental and Aboriginal Affairs (1997)

flocculation
a grouping of dispersed particles into relatively stable clumps. It is primarily a conditioning process during which some type of compound is added to a mixture of coal and other particles with water, thereby causing the solids to settle. Brumbaugh *et al*, (1982)

flora
a general term for plants, a list of the plant species present in an area Cauboue *et al*, (1996).

Flow.
the rate of water discharge from a source expressed as a volume per unit time.

fluvial (deposits)
material that has been transported and deposited by streams and rivers. Powter (1994)

fold
any bending or wrinkling of a rock strata. Carrington (1971)

footwall
the wall or rock on the underside of a vein or ore structure. Carrington (1971)

forage
unharvested plant material which can be used as feed by domestic animals. Forage may be grazed or cut for hay. Powter (1994)

forb
a herbaceous plant which is not a grass, sedge, or rush. Powter (1994)

forest land
land bearing a stand of trees at any age or stature, including seedlings and of species attaining a minimum of 6 feet average height at maturity or land from which such a stand has been removed but on which no other use has been substituted. The term is commonly limited to land not in farms, forests on farms are commonly called woodland or farm forests. Powter (1994)

Formation.
A body of rock that consists of a certain lithology or combination of lithologies; a lithologically mappable unit.

fracture
refers to a break in the rock. The opening affords the opportunity for entry of mineral bearing solutions. A cross-fracture is a minor break extending at more or less right angles to the direction of the principal fractures. Carrington (1971)

Frequency, Hz.
The number of complete pressure fluctuations per second above and below atmospheric pressure.

fresh water pond
The fresh water pond is needed as a source of processing water for a short period of time during startup when return water from the fines settling pond is not available. The source of water for the fresh water pond will be from surface run off, pit dewatering and ground water wells. Once return water from the fines settling ponds is plentiful and consistent, the reliance on the fresh water pond will be minimal. Firefighting, potable, gland seal, flocculant mixing, wash down water will be provided by ground water wells.

friable
a term pertaining to the ease of crumbling of soils. Powter (1994)

Fugitive Emissions.
Substances emitted from any source except those from stacks and vents. Typical sources include gaseous leakage from valves, flanges, drains, volatilization from ponds and lagoons, and open doors and windows. Typical particulate sources include bulk storage areas, open conveyors, construction areas or plant roads

full-time equivalent
is a term applied to a full-day job which lasts for a full year, or to part-time jobs which have been converted to this standard. For example, two full-day jobs, each lasting for six months, are equal to 1 full-time equivalent job. One half-day lasting a full year is equal to one-half of a full-time equivalent job.

GeoBase.
A federal, provincial and territorial government initiative that is overseen by the Canadian Council on Geomatics (CCOG). It is undertaken to ensure the provision of, and access to, a common, up-to-date and maintained base of quality geospatial data for Canada.

geology
the science concerned with the study of the rocks which compose the earth. Carrington (1971)

gleyed soil
a soil affected by gleysation. Powter (1994)

gleysation
a soil-forming process under conditions of poor drainage resulting in reduction of iron and other elements and in grey colours and mottles. Powter (1994)

gleysolic
an order of soils developed under wet conditions and permanent or periodic reduction. These soils have low chromas, or prominent mottling, or both, in some horizons. The great groups Gleysol, Humic Gleysol, and Luvic Gleysol are included in the order. Powter (1994)

graminoid
a grass-like plant, includes both grass and sedge species.

green area
that part of Alberta shown outlined and coloured green on the map annexed to; (1) a Ministerial Order dated April 15, 1989 and made pursuant to Section 10 of the Public Lands Act, as that order is amended from time to time, or (2) any order made in substitution for that order, as amended from time to time. Powter (1994)

greenhouse gases
the gases listed in Annex A of the Kyoto Protocol to the United Nations Framework Convention on Climate Change: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF6).

ground cover
any living or dead vegetative material producing a protective mat on or just above the soil surface. Powter (1994)

groundwater
that water which at any particular time is either passing through or standing in the soil and underlying strata and is free to move under the influence of gravity. Powter (1994). All water under the surface of the ground whether in liquid or solid state; the water contained in interconnected pores located below the water table in an unconfined aquifer or located in a confined

aquifer. It originates from rainfall or snowmelt that penetrates the layer of soil just below the surface.

Groundwater Flow.
The movement of water through openings in sediment and rocks occurring below the water table in the zone of saturation.

Groundwater Recharge.
Inflow of water to a groundwater reservoir (zone of saturation) from the surface. Infiltration of precipitation and its movement to the water table is one form of natural recharge. Also, the volume of water added by this process.

growth medium
any soil material capable of supporting vegetation growth, and can be in situ or placed, native or treated. B.C. Ministry of Energy, Mines and Petroleum Resources (1990)

guideline
a) means a numerical concentration, value or narrative statement recommended to support and maintain a designated use or prevent deterioration of water/air quality. A guideline is generally derived from the lowest observable effects level obtained from biological tests of chronic toxicity. The lowest observable effects level obtained from the criteria data is then multiplied by a safety factor to provide for long term protection of important sensitive fish, plant, and animal species or other uses. A guideline for any one contaminant may suggest a range of acceptable numerical values based on multiple uses. b) a recommended or acceptable course of action which is not a regulation. Alberta Ambient Surface Water Quality Interim Guidelines and Alberta Ambient Air Quality Guidelines (1993)

habitat
the natural environment of an organism. Powter (1994)

haul road (haulroad)
roads from a pit to a loading dock, tipple, ramp, or preparation plant used for transporting mined material by truck. Powter (1994)

Headwaters.
The sources and tributaries of a stream or river.

herb
any flowering plant except those developing persistent woody bases and stems above ground. Powter (1994)

highwall
the unexcavated face of exposed overburden and mineral in a surface mine or the face or bank on the hill side of a contour strip mining excavation. Powter (1994)

horizon (soil)
a layer of soil or soil material approximately parallel to the land surface and differing from adjacent genetically related layers in physical, chemical, and biological properties or characteristics, such as colour, structure, texture, consistency, kinds and number of organisms present, degree of acidity or alkalinity. Powter (1994)

humus
(1) the fraction of the soil organic matter that remains after most of the added plant and animal residues have decomposed. It is usually dark coloured. (2) used in the broader sense to refer to forest humus forms (mor, moder, mull). (3) all the dead organic

material on and in the soil that undergoes continuous breakdown, change, and synthesis. The more or less stable fraction from the decomposed soil organic material generally amorphous, colloidal, and dark coloured. Powter (1994)

hydraulic conductivity
a measure of the ability of a rock, sediment or soil to transmit water. The capacity of a geologic material to transmit water. It is expressed as the volume of water that will move in a unit time under a unit hydraulic gradient through a unit area measured at right angles to the direction of flow.

Hydraulic gradient.
The change of hydraulic head in a particular direction; the rate of change in total head per unit of distance of flow in a given direction. Generally provided as metres per metre (m/m).

Hydraulic head
(also termed Total Hydraulic Head). Represents the total mechanical energy per unit weight of water and corresponds to the sum of the elevation head plus the pressure head (Fetter 1994). Commonly expressed as metres.

Hydraulic testing.
A test involving the withdrawal or the addition of water to a well and the measurement of resulting changes in head in the aquifer both during and after the period of discharge or addition. See also Slug Test or Pumping Test. A particular type of aquifer test where a solid slug (or in some instance water) is quickly added or removed from a groundwater well, and the change in hydraulic head is monitored through time, to determine the near-well aquifer characteristics (typically hydraulic conductivity).

Hydrograph.
A chart depicting either discharge or water level as a function of time

hydric
water removed so slowly that the water table is at or above the soil surface all year Luttmerding *et al*, (1990).

hydrophyte
a plant that grows in water, or in wet or saturated soils; water-loving. Powter (1994)

hygric
water removed slow enough to keep the soil wet for most of the growing season Cauboue *et al*, (1996).

hygrophytic
plants requiring abundant water during all its developmental stages Cauboue *et al.*, (1996).

illuviation
the process of deposition of soil material removed from one horizon to another in the soil, usually from an upper to a lower horizon in the soil profile. Illuviated compounds include silicate clays, iron and aluminum hydrous oxides, and organic matter. Powter (1994)

impact
is synonymous with effect. See definition of "Effect".

imperilled plant species
very rare, 6-20 occurrences or with many individuals in fewer occurrences; or may be susceptible to extirpation because of some factor of its biology. Argus and Pryer (1990)

impermeability
the condition of a rock, sediment, or soil that renders it incapable of transmitting fluids under pressure. Powter (1994)

indirect impacts
represent the effect of the second and subsequent rounds of expenditures by the suppliers of goods and services. Suppliers to CVM generate demand for labour and goods and services produced by other industries, and earned business income. This pattern of expenditure flow continues in the economy. Goods and services purchased in the first round ultimately become labour income, business income, and indirect taxes to government, within the area under study or, if the goods and services are imported, these effects leak out of the economy as imports.

invasive plant species
a plant that has moved into a habitat and reproduced so aggressively that it has displaced some of the original components of the vegetative community. Powter (1994)

lacustrine
material deposited in lake water and later exposed. Powter (1994)

land capability
the ability of the land to support a given land use, based on an evaluation of the physical, chemical and biological characteristics of the land, including topography, drainage, hydrology, soils and vegetation. Powter (1994)

land classification
classification of specific bodies of land according to their characteristics or to their capabilities for use. A use capability classification may be defined as one based on both physical and economic considerations according to their capabilities for man's use, with sufficient (mapping) expression to indicate those differences significant to man. Land Treatment (drilling wastes). Powter (1994)

landscape
all the natural features such as fields, hills, forests, water, *etc.*, which distinguish one part of the earth's surface from another part. Usually that portion of land or territory which the eye can see in a single view, including all its natural characteristics. Powter (1994)

leachate
used to emphasize the chemical species in an aqueous medium. Leachate may have several chemical species in varying concentrations in an aqueous medium. Leachate may also be generated by organic solvents. Powter (1994)

legume
a member of the legume or pulse family, leguminosae. One of the most important and widely distributed plant families. Includes many valuable food and forage species, such as the peas, beans, peanuts, clovers, alfalfas, sweetclovers, lespedezas, vetches and kudzu. Practically all legumes are nitrogen-fixing plants. Powter (1994)

lichens
a nonvascular plant that consists of an algae and a fungi that coexist.

lift
removal of topsoil and subsoil prior to overburden removal or pipeline installation. Lifts can be made in a series of stages, *e.g.*, one-lift or two-lift operations. Powter (1994)

lime
strictly, calcium oxide (CaO), but as commonly used in agriculture terminology

calcium carbonate (CaCO3) and calcium hydroxide (Ca(OH)2) are included. Agricultural lime refers to any of these compounds, with or without magnesia, used as an amendment for acid soils. Powter (1994)

lithic layer
bedrock under the control section of a soil. Hard, consolidated bedrock. A feature of a soil subgroup which indicates a bedrock contact within 50 cm of the soil surface. Powter (1994)

litter
the amount of previous year's plant growth left on the soil surface for nutrient recycling. Powter (1994)

LSA-MPOI.
Maximum point of impingement within the Local Study Area

luvisolic
an order of soils that have eluvial (Ae) horizons, and illuvial (Bt) horizons in which silicate clay is the main accumulation product. The soils developed under forest of forest-grassland transition in a moderate to cool climate. The Grey Luvisol great group is the most common in western Canada. Powter (1994)

marsh
a class in the Canadian wetland classification system; a marsh is a mineral or a peat-filled wetland which is periodically inundated by standing or slowly moving water. Surface water levels may fluctuate seasonally, with declining levels exposing drawdown zones of matted vegetation or mud flats. The waters are nutrient-rich. The substratum usually consists dominantly of mineral material, although some marshes are associated with peat deposits. The associated soils are dominantly Gleysols with some Humisols and Mesisols. Marshes characteristically show a zonal or mosaic surface pattern of vegetation consisting of unconsolidated grass and sedge sods, frequently interspersed with channels or pools of open water. Marshes may be bordered by peripheral bands of trees and shrubs, but the predominant vegetation consists of a variety of emergent non-woody plants such as rushes, reeds, reed-grasses, and sedges. Where open water areas occur, a variety of submerged and floating aquatic plants flourish. Powter (1994)

median (statistical)
the middle value in a set of numbers – one-half of the set is higher and one-half is lower than the median.

mesic
organic materials at a stage of decomposition between that of fibric and humic materials; peat soil material with >10% and <40% rubbed fibres; mesic material usually is classified in the von Post scale of decomposition as class 5 or 6. Powter (1994)

mesotrophic
containing a moderate amount of plant nutrients. Powter (1994)

Métis
an Aboriginal person who received, or was entitled to receive, land grants and/or Scrip under the provisions of the Manitoba Act, 1871 or the Dominion Lands Acts, as enacted from time to time; or a person of Aboriginal descent who is accepted by the Métis Nation Accord, July 1992). (Métis Nation of Alberta Association, 1997)

micro-climate
a local climatic condition near the ground resulting from modification of the general climate by local differences in elevation, exposure, or cover. Powter (1994)

mine
any opening in, excavation in, or working of the surface or subsurface for the purpose of working, recovering, opening up, or providing coal, a coal bearing substance, oil sands or an oil sands bearing substance and includes any associated infrastructure. Powter (1994)

mine dump
any area covered with overburden and other waste materials from ore and coal mines, quarries and smelters, and usually having little or no vegetative cover prior to reclamation. Powter (1994)

mine site
an area in which facilities for extracting coal exist or are to be developed and includes: (i) a mine; (ii) a coal processing plant; (iii) a coal storage facility; (iv) a discard disposal site; (v) all connected private access roads and other related infrastructure which exist or are to be developed in connection with the mine; or (vi) a location designated by the Board as a mine site. Coal Conservation Act (Draft 12)

mineral soil
a soil consisting predominantly of, and having its properties determined predominantly by, mineral matter. It contains less than 17% organic carbon except for an organic surface layer that may be up to 40 cm (16 inches) thick if formed of mixed peat (bulk density 0.1 or more) or 60 cm (24 inches) if of fibric moss peat (bulk density less than 0.1). Powter (1994)

minesoil
soil produced by mining and reclamation activities that is capable of supporting plant growth. Powter (1994).

minesoil landscape
the post mining equivalent of a natural soil landscape, which is an area of land with a distinctive pattern of surface form, surficial geological materials, lakes and wetlands, and soils. Knapik *et al.,* (1995)

minesoil profile
the sequence of soil layers or horizons to a depth of approximately one metre. It is constructed by placing lifts of soil materials in sequence. Minesoil profiles are not reconstructions of the pre-mining soil profile; they are distinctly different and have their own characteristics. Knapik *et al* (1995)

mining operations
those activities necessary for the development, operations and abandonment of a mine and includes:

(i) the removal, storage and replacement of soils for reclamation;

(ii) the removal and disposal of discard materials;

(iii) the recovery, storage and transportation of coal between the mine and coal processing plant, power plant or shipping point; and

(iv) site and infrastructure preparation required for development of a mine site. Coal Conservation Act (Draft 12)

mitigation
in respect of a project, the elimination, reduction or control of the adverse environmental effects of the project, and

includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means. Canadian Environmental Assessment Act (CEAA) (1994)

MM5.
Fifth-Generation Penn State/NCAR Mesoscale Model. A regional mesoscale model used for creating weather forecasts and climate projections.

MMBTU.
One million, or one thousand thousand British Thermal Units (BTU). A measure of the energy content in fuel, and used in the power, steam generation, heating and air conditioning industries.

Mixing Height.
The depth of surface layer in which atmospheric mixing of emissions occurs

MOBILE6.
An U.S. EPA emission factor model for predicting gram per mile emissions of Hydrocarbons (HC), Carbon Monoxide (CO), Nitrogen Oxides (NO_X), Carbon Dioxide (CO_2), Particulate Matter (PM), and toxics from cars, trucks, and motorcycles under various conditions.

MOBILE6.2C.
The Canadian version of the U.S. EPA MOBILE6 vehicle emissions model**.**

Model Domain.
The region of interest for a numerical model.

Modelling.
A simplified representation of a relationship or system of relationships. Modelling involves calculation techniques used to make quantitative estimates of an output parameter based on its relationship to input parameters. The input parameters influence the value of the output parameters.

moderately well drained
soil moisture is in excess of field capacity for a small but significant period of the year (National Soil Survey Committee 1974).

moisture regime
refers to the available moisture supply for plant growth estimated in relative or absolute terms (Cauboue *et al.*, 1996).

monitoring
repetitive measurement of specific environmental phenomena to document change primarily for the purpose of: a) testing impact hypotheses and predictions b) testing mitigative measures. Beanlands and Duinker (1983)

Monitoring (Groundwater).
A term generally used to describe combined activities of monitoring fluid levels and collecting fluids for purpose of chemical analysis. For example, regulatory "Groundwater Monitoring" reports (*i.e.*, EPEA) typically require both under the heading "Groundwater Monitoring". Groundwater monitoring can also consist simply of collecting fluid elevation measurements manually, or via a pressure transducer.

monitoring well.
A well used to monitor groundwater levels or sample for chemistry analyses as opposed to a well used to produce water. A perforated pipe installed in a borehole, constructed of a small diameter casing and short screen in the formation of interest, to passively measure water levels, or collect groundwater samples for the purpose of

physical, chemical, or biological analysis or to determine the amounts, types, and distribution of dissolved chemicals in the groundwater beneath a site.

mottles
spots or blotches of different colour or shades of colour found in imperfectly drained soils. Powter (1994)

mottling
formation or presence of soil mottles. Powter (1994)

mycorrhiza
the association of fungi with the roots of seed plants. Powter (1994)

native species
a species that is a part of an area's original fauna or flora. Powter (1994)

NAD83.
A geodetic reference system used in surveying, cartography, and land-use planning; North American Datum of 1983**.**

natural area
a parcel of sensitive or scenic public land protected from disturbance to ensure the availability of the land in a natural state for use by the public for recreation, education or any other purpose. Province of Alberta, Wildlife Areas, Ecological Reserves and Natural Areas Act (July 14 1995)

nested monitoring wells.
A set of two or more monitoring wells set laterally close to each other but screened to different depths. The two depths and screens must be isolated by a confining unit.

nocturnal
Of, relating to, or occurring in the night; most active at night

NONROAD Model.
U.S. EPA emission modelling system to estimate emissions for nonroad engines, equipment, and vehicles.

nonvascular plant
a plant without a vascular system (*e.g.*, mosses and lichens).

nutrient regime
the relative level of nutrients available for plant growth (Cauboue *et al.*, 1996).

objective
[1]a numerical concentration or narrative statement which has been established to support and protect the designated uses (*e.g.* water, air) at a specific area. Site specific conditions determine how an objective would be developed. An objective for a specific area will depend on existing and future uses and the most sensitive organisms that are present. [2]A numerical limit or narrative statement that has been established to protect and maintain a specified use of soil, water or land at a particular site by taking account site-specific conditions. [1]Alberta Ambient Surface Water Quality Interim Guidelines and Alberta Air Quality Guidelines (1993); [2]Powter (1994)

oligotrophic
(1) designation for peatlands that are poor to extremely poor in nutrients and with low biological activity; (2) containing a small amount of plant nutrients; refers to water slow in nutrient loading with low primary production of organic material by algae and/or macrophytes. Growth in an

oligotrophic water is often limited by low levels of phosphorus and nitrogen. Powter (1994)

organic matter
the organic fraction of the soil; includes plant and animal residues at various stages of decomposition, cells and tissues of soil organisms, and substances synthesized by the soil population. It is usually determined on soils that have been sieved through a 2.0 mm sieve. Powter (1994)

organic soils
an order of soils that have developed dominantly from organic deposits. The majority of Organic soils are saturated for most of the year, unless artificially drained, but some of them are not usually saturated for more than a few days. Includes the Fibrisol, Mesisol, Humisol, and Folisol great groups. They contain 17% or more organic carbon, and: (1) if the surface layer consists of fibric organic material and the bulk density is less than 0.1 Mg m3 (with or without a mesic or humic Op less than 15 cm thick), the layer must extend to a depth of at least 60 cm; or (2) if the surface layer consists of organic material with a bulk density of 0.1 Mg m^3 or more, the organic material must extend to a depth of at least 40 cm; or (3) if a lithic contact occurs at a depth shallower than stated in (1) or (2) above, the organic material must extend to a depth of at least 10 cm. Powter (1994)

organic carbon (soil)
the percent by weight of carbon in organic forms in soil materials, determined by the difference between total carbon (determined by dry combustion) and in organic carbon (determined by acid dissolution). Powter (1994)

outcrop
an exposure of rock or a mineral deposit that can be seen on surface, i.e., it is not covered by overburden or water. Carrington (1971)

overburden
materials of any nature, consolidated or unconsolidated, that overlie a deposit of useful materials. Overburden includes all geologic material below the soil profile and, above, between, and below the coal and is handled as either Regolith or Spoil. Powter (1994)

PAH(s).
Polycyclic Aromatic Hydrocarbon. A chemical by-product of petroleum-related industry. Aromatics are considered to be highly toxic components of petroleum products. PAHs, many of which are potential carcinogens, are composed of at least two fused benzene rings. Toxicity increases along with molecular size and degree of alkylation of the aromatic nucleus.

PAI.
The Potential Acid Input is a composite measure of acidification determined from the relative quantities of deposition from background and industrial emissions of sulphur, nitrogen and base cations.

parent material
the unconsolidated and more or less chemically weathered mineral organic matter from which the solum of a soil is developed by pedogenic processes. Powter (1994)

particle density
mass per unit volume of the soil solid particles. Also referred to as bulk specific gravity. Powter (1994)

particle size
the effective diameter of a particle measured by sedimentation, sieving, or micrometric methods. Sand: a soil particle between 0.05 and 2.00 mm in diameter. Silt: a soil separate consisting of particles between 0.05 and 0.002 mm in diameter. Clay: a size fraction less than 0.002 mm in diameter. Powter (1994)

particulate matter
any material, other than uncombined water, which is suspended in or discharged into the atmosphere as a solid or liquid at standard conditions. Particulate (stack) emissions shall be determined by the appropriate monitoring procedure (*e.g.*, 40 CFR 60, Method 5).

peat
material constituting peatlands, exclusive of the live plant cover, consisting largely of organic residues accumulated as a result of incomplete decomposition of dead plant constituents under conditions of excessive moisture (submergence in water and/or waterlogging). Powter (1994)

peatland
a generic term including all types of peat-covered terrain. Powter (1994)

permeable (permeability)
a measure of the ability of a rock, sediment or soil to transmit a fluid. Frequently used incorrectly as a synonym for hydraulic conductivity. Hackbarth (1999)

pH (soil)
the negative logarithm of the hydrogen-ion activity of a soil. The degree of acidity (or alkalinity) of a soil as determined by means of glass, quinhydrone, or other suitable electrode or indicator at a specific moisture content of soil-water ratio, and expressed in terms of the pH scale. Powter (1994)

pH (Water). A measure of the acidity of a solution, based upon the negative logarithm of the hydrogen ion concentration.

physiographic region
topographically similar landscapes with similar relief, structural geology, and elevation at a mapping scale of 1:1,000,000 to 1:3,000,000 (Cauboue *et al.*, 1996).

piezometer
an instrument for measuring pressure head in a conduit, tank, soil, *etc.* It usually consists of a small pipe or tube tapped into the side of the container, connected with a manometer pressure gage, mercury or water column, or other device for indicating pressure head. See observation well. Powter (1994)

pit
an excavation in the surface made for the purpose of removing, opening up, or proving coal, and includes any associated infrastructure, but does not include a mine. Powter (1994)

plant
[1]a group of buildings, and especially to their contained equipment, in which a process or function is carried out; on a mine it will include warehouses, hoisting equipment, compressors, repair shops, offices, mill or concentrator. [2]Preparation plant refers to a facility where coal is prepared for market or other usage. It consists of a rather elaborate collection of facilities where coal is separated from its impurities, washed, thermally or mechanically dried, sized, stored and loaded for shipment or conveyed to use point. [1]Carrington (1971), [2]Brumbaugh *et al* (1982)

plant community
a combination of plants that are dependent on their environment and influence one another and modify their own environment. Mueller-Dombois and Ellenberg (1974)

plot
a vegetation sampling unit used to delineate a fixed amount of area for the purposes of estimating plant cover (Cauboue *et al.*, 1996).

point source
an emission source which emits over such a small area that it can be considered a point (*e.g.* stack).

poor drainage
soil moisture is in excess of field capacity in all horizons for a large part of the year (National Soil Survey Committee 1974).

porosity
the volume percentage of the total bulk not occupied by solid particles. The ratio of volume of voids in a soil mass to the total volume of the mass. Powter (1994)

Pressure head (Groundwater)
The (water) pressure at the point of measurement (the bottom of the well) expressed as metres of water.

profile (soil)
a vertical section of the soil through all its horizons and extending into the parent material. Powter (1994)

propagule
a part of a plant that implants a new individual. Powter (1994)

Pumping Test.
A test conducted to determine aquifer or well characteristics. The primary purpose of a pumping test is to provide data from which aquifer properties, such as transmissivity and storativity can be calculated. The pumping test is conducted by measuring the lowering of the water level (drawdown) in a water well for a certain length of time while the well is pumped at a known rate, followed by measuring the water level recovery for a certain length of time after the pumping has stopped.

rapidly drained
soil moisture content that seldom exceeds field capacity in any horizon except immediately after water addition (National Soil Survey Committee 1974).

receptor
the person or organism subjected to a chemical exposure. CanTox (1988). For air quality evaluation, receptor means location where ambient air concentrations are calculated using a dispersion model.

Recharge
The addition of water to the zone of saturation, the process by which water enters the groundwater system or, more precisely, enters the phreatic zone.

reforestation
the natural or artificial restocking of an area with forest trees. Powter (1994)

regolith
the unconsolidated mantle of weathered rock and soil material overlying solid rock. Unconsolidated overburden that lies above bedrock. It includes glacial drift and colluvial and fluvial deposits that occur below the premine soil but does not include soft (paralithic) weathered-in-place bedrock. Powter (1994)

reject
the material extracted from the feed coal during cleaning for retreatment or discard. The stone or dirt discarded from a coal preparation plant, washery or other process, is of no value. Powter (1994)

residual impact
those predicted impacts that remain after mitigating measures have been applied and mine abandonment operations have been completed. Tilleman (1994)

restoration
the process of restoring site condition as they were before the land disturbance. Powter (1994)

revegetation
the establishment of vegetation which replaces original ground cover following land disturbance. Powter (1994)

rip rap
broken rock, cobbles, or boulders placed on earth surfaces, such as the face of a dam, bank of a stream or lining drainage channels, for protection against the action of water. Powter (1994)

riparian
terrain directly created by channelized flowing water or within its direct zone of influence (Dunster and Dunster 1996).

RMT/BCM
raw metric tonne (of coal) per bank cubic metre (of overburden and/or interburden).

root zone (rootzone)
the part of the soil that is penetrated or can be penetrated by plant roots. Powter (1994)

runoff
the portion of the total precipitation on an area that flows away through stream channels. Surface runoff does not enter the soil. Groundwater runoff or seepage flow from groundwater enters the soil before reaching the stream. Powter (1994)

saline soil
a nonalkali soil containing soluble salts in such quantities that they interfere with the growth of most crop plants. The conductivity of the saturation extract is greater than 4 dS/m, the exchangeable-sodium percentage is less than 15, and the pH is usually less than 8.5. State in soil caused by the presence of soluble salt (ions such as Na, Ca, K, Mg, Cl, SO_4) yielding an electrical conductivity of 2 dS/m. Powter (1994).

sand
a soil particle between 0.05 and 2.0 mm in diameter. Powter (1994)

sandstone
a sedimentary rock composed of fine grains of quartz, *etc.* which have been cemented together. Carrington (1971)

sediment
the solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its surface of origin by air, water, gravity, or ice and has come to rest on the earth's surface either above or below sea level. Powter (1994)

seepage
a spot or zone where water oozes from the earth, often forming the source of a small spring. It is the slow flow of water into or from a soil. Seepage usually involves the lateral flow of water. It can also mean the emergence of water from the soil over an extensive area in contrast to a spring where it emerges from a local spot.

seral
recognizably different successional stages along a successional pathway (Cauboue *et al.*, 1996).

settling pond
a water reservoir constructed for the confinement and retention of silt, gravel, rock, or other debris from a sediment-producing area. Powter (1994)

short-term exposure
an exposure to a contaminant in a medium lasting a short time and usually severe enough to rapidly induce an effect. Often referred to as an acute exposure. Absolute definitions for this term vary from study to study. Powter (1994)

shrub
a woody perennial plant differing from a tree by its low stature and by generally producing several basal shoots instead of a single trunk. Powter (1994)

significance (significantly)
refers to both context and intensity. In terms of context, the significance of an action must be analyzed in several contexts - society as a whole (human, national), the affected region, the affected interests, and the locality. In terms of intensity, the significance of an action refers to the severity of impact. Significance varies with the setting of the proposed action. *e.g.*, in the case of a site-specific action, significance usually depends on the effects in the locale rather than in the world as a whole. Both short-term and long-term effects are relevant. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. Tilleman (1994).

significant environment effects
either (1) any irreversible damage to biological, commercial, or agricultural resources of importance to society, (2) any reversible damage to biological, commercial, or agricultural resources of importance to society if the damage persists beyond a single generation of the damaged resource or beyond a single year, or (3) any known or reasonably anticipated loss of members of an endangered or threatened species. Tilleman (1994)

silt
a soil separate consisting of particles between 0.05 to 0.002 mm in equivalent diameter. Powter (1994)

slope
the degree of deviation of a surface from horizontal, measured in a numerical ratio, percent, or degrees. Expressed as a ratio or percentage, the first number is the vertical distance (rise) and the second is the horizontal distance (run), as 2:1 or 200 percent. Expressed in degrees, it is the angle of the slope from the horizontal plane with a 90^{o} slope being vertical (maximum) and 45^{o} being a 1:1 slope. Powter (1994)

socio-economic
includes employment, population, housing requirements, service, community land and infrastructure, and social adjustment considerations. Alberta Energy and Natural Resources (1980)

sodic soil
(1) a soil having a pH greater than 8.5 or an exchangeable sodium percentage greater than 15 or both. (2) a soil that contains enough alkali (sodium) to interfere with the growth of most crop plants.

sodicity
a measure of the amount of sodium on the exchange complex (often expressed as sodium adsorption ratio -SAR). Powter (1994)

soil
(1) the unconsolidated material on the immediate surface of the earth that serves as a natural medium for the growth of land plants. (2) the naturally occurring unconsolidated material on the surface of the earth that has been influenced by parent material, climate (including the effects of moisture and temperature), macro- and micro-organisms, and relief, all acting over a period of time to produce soil that may differ from the material from which it was derived in many physical, chemical, mineralogical, biological, and morphological properties. (3) for the purpose of the Canadian taxonomic system, the earth's surface (the material that is to be classified) is divided into soil and nonsoil. Soil is the naturally occurring, unconsolidated, mineral or organic material at the earth's surface that is capable of supporting plant growth. It extends from the surface to 15 cm (6 inches) below the depth at which properties produced by soil-forming processes can be detected. These properties differ from those found in any underlying unconsolidated material. The soil-forming processes are defined as an interaction between climate, living organisms, and relief acting on soil and soil parent material. Unconsolidated material includes material cemented or compacted by soil-forming processes. Soil may have water covering its surface to a depth of 60 cm (24 inches) or less in the driest part of the year. Nonsoil is the collection of soil material or soil-like material that does not meet the preceding definition of soil. It includes soil displaced by un-natural processes and unconsolidated material unaffected by soil-forming processes, except for the material that occurs within 15 cm (6 inches) below soil as defined. Nonsoil also includes unconsolidated mineral or organic material thinner than 10 cm (4 inches) overlying bedrock; organic material thinner than 40 cm (16 inches) overlying a hydric layer; and soil covered by more than 60 cm (24 inches) of water in the driest part of the year. Powter (1994)

soil horizon
a layer of soil or soil material approximately parallel to the land surface distinguishable from adjacent layers by colour, structure, consistence, chemical, biological, and mineralogical composition. Powter (1994)

soil landscape model
a defined and named repetitive grouping of soil bodies occurring together in an individual and natural characteristic pattern over the soil landscape. The attributes of a soil landscape model vary within more or less narrow limits that are determined by the intensity of the survey. A soil landscape model comprises all the map delineations that have the same name. A soil landscape model is conceptual; a map delineation is real. Powter (1994)

soil structure
the combination or arrangement of primary soil particles into secondary particles, units, or peds. These peds may be, but usually are not, arranged in the profile in such a manner as to give a distinctive characteristic pattern. The peds are characterized and classified on the basis of size, shape, and degree of distinctness into classes, types, and grades. Structural units include: Blocky: Cube-like blocks of soil up to 10 cm in size, sometimes

angular with well-defined planar faces, sometimes with curved surfaces and corners (subangular blocky). Columnar: Vertically oriented pillars, often six-sided, up to 15 cm in diameter with rounded tops. Such structures are common in B horizons of clayey soils in semiarid regions. Granular: Rounded aggregates, generally not much larger than 2 cm in diameter, often found in a loose condition in the A horizon. Where particularly porous, such units are called crumbs. Platy: Horizontally layered, thin and flat aggregates resembling wafers. Such structures occur, for example, in recently deposited clay soils. Prismatic: Vertically oriented pillars, often six-sided, up to 15 cm in diameter, with flat tops to the pillars; common in the B horizon of clayey soils in semiarid regions. Powter (1994)

soil survey
a general term for the systematic examination of soils in the field and in the laboratory, their description and classification, the mapping of kinds of soil, and the interpretation of soils for many uses, including their suitabilities or limitations for growing various crops, grasses and trees, or for various engineering uses and predicting their behaviour under different management systems. Powter (1994)

soil texture
the relative proportions of sand, silt or clay contained in a soil sample. Powter (1994)

soil quality
the capacity of a soil to function within ecosystem boundaries to sustain biological productivity, maintain environmental quality, and promote plant and animal health. Doran and Parkin (1994)

spawning period
the period of fertilization and subsequent deposition of eggs. CN Engineering (1996)

spoil
the overburden or non-coal material removed in gaining access to the coal in surface mining. It is the debris or waste material from a mine. Powter (1994)

spoil pile
a pile of spoiled overburden on a minesite. Powter (1994)

spring.
A discharge (or issue) of groundwater from the earth. A few examples of springs include:

- Contact Spring – A spring that forms at a lithologic contact where a more permeable unit overlies a less permeable unit.
- Fault Spring – A spring created by the movement of two rock units on a fault

Stability
A measure of the atmosphere's capability to disperse emissions. Stable atmospheric conditions create poorer dispersion of plumes and increased concentrations. Unstable conditions promote dispersion and result in lower concentrations.

strata or stratum
a distinct layer within a plant community (Cauboue *et al.*, 1996).

strip
to remove the overburden or barren rock overlying the orebody. Carrington (1971)

strip mine
a procedure of mining which entails the complete removal of all material from over

the product to be mined in a series of rows or strips. Powter (1994)

study area
that area in which the proposed development may have measurable or otherwise significant physical, environmental, or socio-economic impacts. Alberta Environmental Protection (Jan. 23, 1995)

subhydric
water removed from soil slowly enough to keep the water table at or near the surface for most of the year (Luttmerding *et al.*, 1990).

subhygric
water removed from soil slowly enough to keep the soil wet for a significant part of the growing season (Luttmerding *et al.*, 1990).

submesic
water removed readily in relation to supply (Luttmerding *et al.*, 1990).

subsoil
the soil material found beneath the topsoil but above the bedrock. Technically, the B horizon; broadly, the part of the profile below plough depth. Powter (1994)

subxeric
water removed rapidly in relation to supply, soil is moist for short periods following precipitation (Luttmerding *et al,* 1990).

succession
the natural sequence or evolution of plant communities, each stage dependent on the preceding one, and on environmental and management factors. Powter (1994)

surface mine
a mine in which the coal lies near the surface and can be extracted by removing the covering layer of soil (overburden). The Coal Association of Canada (1985)

surface mining
surface excavation for the purpose of removal of minerals. Techniques for surface mining include several operations: open pit, dredging, hydraulic mining, strip mining, and auger mining. Powter (1994)

surface water
water in the hydrological cycle that is held or moves on the surface of the ground in lakes, rivers, streams, *etc.* and is subject to pollution from direction contamination or surface run-off. Hodgson *et al* (1988)

surface water management
the proposed methods of collection, treatment, and discharge of all waters within the affected drainage area(s). ERCB (1981)

syncline
a downarched fold in bedded or stratified rocks. Carrington (1971)

tailings
a) mineral refuse from a milling operation usually deposited from a water medium. b) refers to the coal refuse material generated from coal processing operations. It is generally deposited in a water medium. Powter (1994)

till
an unstratified, non-sorted deposit of gravel, boulders, sand and finer materials which has been transported by a glacier. Powter (1994)

topography
the shape of the ground surface, such as hills, mountains, or plains. Steep topography indicates steep slopes or hilly land; flat topography indicates flat land with minor undulations and gentle slopes. Powter (1994)

topsoil
the salvaged surface soil layers, consisting of A and B horizons plus roots and forest duff layer. Powter (1994)

total dissolved solids
the total concentration of dissolved material in a water sample.

trace element
chemical element present in a minor amount in water or soil. Powter (1994)

traditional land use
the continual use of an area over a long period of time by people for gathering, hunting and spiritual use. (Oil Sands Mining - End Land Use Committee, 1997)

transect
a sampling system that involves the measurement or recording of data along a line (Cauboue *et al* 1996).

trophic level
position in the food chain determined by the number of energy transfer steps to that level. Powter (1994)

ungulate
meaning roughly "being hoofed" or "hoofed animal are several groups of mammals, most of which use the tips of their toes, usually hoofed, to sustain their whole body weight while moving. Examples include deer, elk, and moose.

undulating
a regular sequence of gentle slopes that produce a wavelike pattern of low local relief with slope gradients of 2 to 5% (Expert Committee on Soil Survey 1987).

valued environmental component
the component or attribute identified as a result of the scoping exercise. Attributes may be determined on the basis of perceived public concerns related to social, cultural, economic or aesthetic values. They may also reflect scientific concerns identified by the professional community. Attributes are identified throughout the environmental impact assessment process. Beanlands and Duinker (1983)

vascular plant
plant with a vascular or conductive system such as grasses and trees.

vegetation
the general cover of plants growing on the landscape (Cauboue *et al*, 1996).

very poorly drained
free water remains at or within 30 cm of the ground surface most of the year (National Soil Survey Committee 1974).

Vibrating wire piezometer.
A device grouted in place in a borehole for the measurements of water pressure.

Volatile Organic Compound.
Volatile Organic Compounds include aldehydes and all of the hydrocarbons except for ethane and methane. VOCs represent the airborne organic compounds likely to undergo or have a role in the chemical transformation of pollutants in the atmosphere.

watercourse
any natural stream or source of water, whether usually containing water or not, and includes any lake, river, creek, spring, ravine, swamp, and gulch. B.C. Ministry of Energy, Mines and Petroleum Resources (1990)

water-holding capacity
the ability of soil to hold water. The water-holding capacity of sandy soils is usually considered to be low while that of clayey soils is high. Powter (1994)

Water level.
The distance either from the top of casing or ground level to the surface of water within a well and is used to determine total hydraulic head

Water Licence.
A government of Alberta document providing the authority of diverting and using surface water or groundwater. The licence identifies the water source, the location of the diversion site. And amount of water to be diverted and used from that source, the priority or the "water right" established by the licence, and the condition under which the diversion and use must take place.

water table
elevation at which the pressure in the water is zero with respect to the atmospheric pressure. The upper limit of the soil or underlying rock material that is wholly saturated with water. Powter (1994)

weathering
the physical and chemical disintegration, alteration, and decomposition of rocks and minerals at or near the earth's surface by atmospheric agents. Powter (1994)

well drained
soil moisture content that does not normally exceed field capacity in any horizon for a significant part of the year (National Soil Survey Committee 1974).

wetland
land having the water table at, near, or above the land surface or which is saturated for long enough periods to promote wetland or aquatic processes as indicated by hydric soils, hydrophytic vegetation, and various kinds of biological activity that are adapted to the wet environment. Wetlands include peatlands and areas that are influenced by excess water but which, for climatic, edaphic or biotic reasons, produce little or no peat. Shallow open water, generally less than 2 m deep, is also included in wetlands. Powter (1994)

xeric
describes a dry site (Cauboue *et al.*, 1996). Water in soil removed very rapidly in relation to supply (Luttmerding *et al.*, 1990).

Yield.
The volume of water discharged from a well. The units of yield are volume per time [L3t-1].