

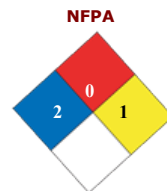
Eagle Mine

a subsidiary of **lundin mining**

SAFETY DATA SHEET

SECTION 1 : IDENTIFICATION

Product Name: Nickel Concentrate
SDS Manufacturer Number: EM002-Ni-conc
Manufacturer Name: Eagle Mine, LLC Subsidiary of Lundin Mining Corporation
Address: 4547 County Road 601
Champion, Michigan 49814
USA
General Phone Number: +1-906-339-7000
Emergency Phone Number: For Chemical Emergency Spill, Leak, Fire, Exposure, or Accident Call CHEMTREC
Day or Night Within USA and Canada: 1-800-424-9300 Outside USA and Canada:
+1 703-741-5970 (collect calls accepted) Reference Shipper: CCN710954
SDS Creation Date: March 20, 2014
SDS Revision Date: December 08, 2014
(M)SDS Format:



HMIS	
Health Hazard	2*
Fire Hazard	0
Reactivity	1
Personal Protection	X

* Chronic Health Effects

SECTION 2 : HAZARD(S) IDENTIFICATION

GHS Pictograms:



Signal Word: Danger.

GHS Class: Skin Sensitizer, Category 1.
Specific Target Organ Toxicity, Repeated Exposure, Category 1.
Carcinogenicity, Category 2.
Hazardous to the aquatic environment, long-term, chronic, Category 2.

Hazard Statements: May cause an allergic skin reaction.
Causes damage to organs.
Suspected of causing cancer.
Toxic to aquatic life with long lasting effects.

Precautionary Statements: Do not breathe dust/fume/gas/mist/vapours/spray.
Wash hands thoroughly after handling.
Do not eat, drink or smoke when using this product.
Wear protective gloves/protective clothing/eye protection/face protection.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
IF ON SKIN: Wash with plenty of water.
If skin irritation or rash occurs: Get medical advice/attention.
Take off contaminated clothing and wash it before reuse.
Contaminated work clothing should not be allowed out of the workplace.
IF exposed or concerned: Get medical advice/attention.
Avoid release to the environment.
Collect spillage.
Dispose of contents/container in accordance with Local, State, Federal and Provincial regulations.

Emergency Overview: WARNING! Potential Sensitizer Suspect Carcinogen
Prolonged or repeated inhalation may cause lung damage.

Route of Exposure: Eyes. Skin. Inhalation. Ingestion.

Potential Health Effects:

Eye: Eye contact with the dust may cause irritation.

Skin:	May cause skin irritation. May cause skin sensitization, an allergic reaction, which becomes evident on reexposure to this material.
Inhalation:	May be harmful if inhaled. Prolonged or repeated inhalation may cause lung damage.
Ingestion:	May be harmful if ingested.
Signs/Symptoms:	Overexposure can cause headaches, dizziness, nausea, and vomiting.
Target Organs:	Respiratory system.
Aggravation of Pre-Existing Conditions:	Individuals with pre-existing skin disorders, asthma, allergies or known sensitization may be more susceptible to the effects of this product.

SECTION 3 : COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS#	Ingredient Percent	EC Num.
Nickel	7440-02-0	11 - 16 by weight	
Copper	7440-50-8	1 - 10 by weight	
Iron	7439-89-6	40 - 70 by weight	
Sulfur	7704-34-9	22 - 35 by weight	

Notes: The above listed are major components of the minerals that make up Eagle Mine's Nickel-Copper Concentrate. Nickel, copper and sulfur are bound to the ore.

SECTION 4 : FIRST AID MEASURES

Eye Contact:	If dust gets into eyes. Flush eye with water for 15 minutes. Remove contact lenses, if applicable, and continue flushing. If eye irritation persists, consult a specialist.
Skin Contact:	If dust gets onto the skin. Wash skin with soap and plenty of water. Get medical attention if irritation develops or persists.
Inhalation:	If dust is inhaled, remove the affected person to fresh air. If symptoms persist, get medical attention.
Ingestion:	Accidental ingestion of this material is unlikely. If it does occur, watch the person for several days to make sure that partial or complete intestinal obstruction does not occur.

SECTION 5 : FIRE FIGHTING MEASURES

Flammable Properties:	Under normal conditions this material is non-combustible. Finely powdered material may form explosive dust-air mixtures under certain conditions.
Flash Point:	Not determined.
Auto Ignition Temperature:	Not determined.
Lower Flammable/Explosive Limit:	Not determined.
Upper Flammable/Explosive Limit:	Not determined.
Fire Fighting Instructions:	Advice for Fire-Fighters: Treat as per requirements for Surrounding Fires: Evacuate area and contact emergency services. Remain upwind and notify those downwind of the hazard. Wear full protective equipment including Self Contain Breathing Apparatus (SCBA) when combating fires. Use water fog to cool intact containers, superstructures and nearby storage areas.
Extinguishing Media:	Use any extinguishing media appropriate for the surrounding fires. Dike to control run-on/run-off if water is used to fight fires
Unusual Fire Hazards:	In the event of a fire or heating, the product should be extinguished/cooled by depriving the concentrate of air. Use DRY chemical, CO2, water spray or foam. Use appropriate extinguishing media for surrounding fires. Whilst non-flammable, very finely divided nickel metal in a fully reduced state can smolder in the presence of oxygen and air. May form nickel/iron/sulfur oxides, hydrogen sulfide (H2S) and sulfur dioxide (SO2) when strongly heated to decomposition. Atmospheric Controls: Always check enclosed storage containers, cargo holds and sumps for the presence of hydrogen sulfide (H2S) and sulfur dioxide (SO2) as well as adequate oxygen (O2) levels prior to entry.
<u>NFPA Ratings:</u>	
NFPA Health:	2
NFPA Flammability:	0
NFPA Reactivity:	1


SECTION 6 : ACCIDENTAL RELEASE MEASURES

Personnel Precautions:	Evacuate area and keep unnecessary and unprotected personnel from entering the spill area. Persons responding to an accidental release should wear coveralls, gloves, safety glasses or other protective clothing as required. Close-fitting goggles may be necessary in some circumstances to prevent eye contact with dust. Workers should wash and change clothing following cleanup of a spill to prevent personal contamination.
Environmental Precautions:	Avoid runoff into storm sewers, ditches, and waterways.
Methods for containment:	Collect spillage and prevent from spreading by covering, diking, berming or other means. Minimize dust generation.
Methods for cleanup:	Control source of spillage if possible to do so safely. Restrict access to the area until completion of clean up. Contain spilled material immediately and control run-on and run-off. Clean up spilled material observing precautions listed in Section 8, Personal Protection and using methods that will minimize dust generation. Uncontaminated materials can be recovered for return to process. Contaminated materials should be placed in suitable labeled containers for later recovery or disposal. Waste material must be treated and disposed of in accordance with all local, regional, and national requirements.

SECTION 7 : HANDLING and STORAGE

Handling:	No special handling procedures are required for this material. Avoid dust formation.
Storage:	Store in a dry, well ventilated area away from sources of combustion, acids and strong oxidizers. When stored or shipped in bulk, compact the concentrate to minimize air gaps and slack air space. Some sulfide concentrates may slowly oxidize when in storage, causing heating of the material and generation of sulfur dioxide (SO ₂). The atmosphere within confined spaces containing concentrate, such as a ships hold, should be tested for SO ₂ and oxygen depletion before entry and the space ventilated if necessary. Avoid dust formation when handling and storing concentrate.
Hygiene Practices:	Wash hands with water as a precaution. Do not breathe dust.

SECTION 8 : EXPOSURE CONTROLS, PERSONAL PROTECTION - EXPOSURE GUIDELINES

Engineering Controls:	Use appropriate engineering control such as process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Good general ventilation should be sufficient to control airborne levels. Where such systems are not effective wear suitable personal protective equipment, which performs satisfactorily and meets OSHA or other recognized standards. Consult with local procedures for selection, training, inspection and maintenance of the personal protective equipment.
Eye/Face Protection:	Wear appropriate protective glasses or splash goggles as described by 29 CFR 1910.133, OSHA eye and face protection regulation, or the European standard EN 166. Close-fitting goggles may be necessary in some circumstances to prevent eye contact with dust.
Skin Protection Description:	Coveralls or other work clothing, safety glasses, and gloves are recommended to prevent prolonged or repeated direct skin and eye contact.
Hand Protection Description:	Wear appropriate protective gloves and other protective apparel to prevent skin contact. Consult manufacturer's data for permeability data.
Respiratory Protection:	No personal respiratory protective equipment normally required. When workers are facing airborne particulate/dust concentrations above the exposure limit they must use appropriate certified respirators.
PPE Pictograms:	

EXPOSURE GUIDELINES

Nickel :

Guideline ACGIH:	TLV-TWA: 1.5 mg/m ³ Inhalable fraction (I) TLV-TWA: 0.2 mg/m ³ Inhalable fraction (I) TLV-TWA: 0.1 mg/m ³ Inhalable fraction (I)
Guideline OSHA:	PEL-TWA: 1 mg/m ³ PEL-TWA: 1 mg/m ³ PEL-TWA: 1 mg/m ³

Copper :

Guideline ACGIH:	TLV-TWA: 1 mg/m ³ TLV-TWA: 0.2 mg/m ³
Guideline OSHA:	PEL-TWA: 1 mg/m ³ PEL-TWA: 0.1 mg/m ³

SECTION 9 : PHYSICAL and CHEMICAL PROPERTIES

Physical State:	Granular.
Color:	Dark.
Odor:	Not determined.
Boiling Point:	Not determined.
Melting Point:	Not determined.
Specific Gravity:	>1
Solubility:	Negligible solubility in water.
Vapor Pressure:	Not determined.
Percent Volatile:	Not determined.
Evaporation Rate:	Not determined.
pH:	Not determined.
Flash Point:	Not determined.
Auto Ignition Temperature:	Not determined.
VOC Content:	Not determined.

SECTION 10 : STABILITY and REACTIVITY

Chemical Stability:	None under normal use.
Hazardous Polymerization:	Will not occur.
Conditions to Avoid:	Dust dispersion in air.
Incompatible Materials:	None during normal use.

SECTION 11 : TOXICOLOGICAL INFORMATION

Nickel :

RTECS Number:	QR5950000
Inhalation:	Inhalation - Mouse TCLo - Lowest published toxic concentration : 10 mg/m ³ /2H [Immunological Including Allergic - Decrease in cellular immune response] Inhalation - Mouse TCLo - Lowest published toxic concentration : 10 mg/m ³ /2H [Immunological Including Allergic - Decrease in cellular immune response] (RTECS)
Ingestion:	Oral - Rat LDLo - Lowest published lethal dose : 5 gm/kg [Details of toxic effects not reported other than lethal dose value] Oral - Rat LDLo - Lowest published lethal dose : 5 gm/kg [Details of toxic effects not reported other than lethal dose value] Oral - Rat TDLo - Lowest published toxic dose : 200 mg/kg [Nutritional and Gross Metabolic - Weight loss or decreased weight gain Behavioral - Somnolence (general depressed activity)] Oral - Rat TDLo - Lowest published toxic dose : 200 mg/kg [Nutritional and Gross Metabolic - Weight loss or decreased weight gain Behavioral - Somnolence (general depressed activity)] Oral - Mouse TDLo - Lowest published toxic dose : 200 mg/kg [Nutritional and Gross Metabolic - Weight loss or decreased weight gain Behavioral - Somnolence (general depressed activity)] Oral - Mouse TDLo - Lowest published toxic dose : 200 mg/kg [Nutritional and Gross Metabolic - Weight loss or decreased weight gain Behavioral - Somnolence (general depressed activity)] Oral - Rat LDLo - Lowest published lethal dose : 500 mg/kg [Gastrointestinal - Other changes](RTECS)

Copper :

Ingestion:	Oral - Mouse LD50 - Lethal dose, 50 percent kill : 413 mg/kg [Details of toxic effects not reported other than lethal dose value] Oral - Mouse LD50 - Lethal dose, 50 percent kill : >5000 mg/kg [Behavioral - Food intake (animal) Gastrointestinal - Hypermotility, diarrhea Gastrointestinal - Nausea or vomiting] (RTECS)
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Iron :

Inhalation:	Inhalation - Rat TCLo - Lowest published toxic concentration : 150 mg/m ³ /4H/78W (Intermittent) [Lungs, Thorax, or Respiration - Other changes Liver - Other changes Nutritional and Gross Metabolic - Weight loss or decreased weight gain] Inhalation - Rat TCLo - Lowest published toxic concentration : 250 mg/m ³ /6H/4W (Intermittent) [Lungs, Thorax, or Respiration - Chronic pulmonary edema Lungs, Thorax, or Respiration - Other changes] (RTECS)
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Ingestion: Oral - Rat LD50 - Lethal dose, 50 percent kill : 30 gm/kg [Nutritional and Gross Metabolic - Weight loss or decreased weight gain]
Oral - Rat LD50 - Lethal dose, 50 percent kill : 750 mg/kg [Blood - Changes in serum composition (e.g., TP, bilirubin, cholesterol) Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - Transaminases] (RTECS)

Sulfur :

Inhalation: Inhalation - Rat TCLo - Lowest published toxic concentration : 1.76 mg/m³/4H/15D (Intermittent) [Liver - Other changes Kidney/Ureter/Bladder - Changes in tubules (including acute renal failure, acute tubular necrosis)]
Inhalation - Rat TCLo - Lowest published toxic concentration : 12.68 mg/m³/4H/15D (Intermittent) [Liver - Hepatitis (hepatocellular necrosis), diffuse Kidney/Ureter/Bladder - Changes in tubules (including acute renal failure, acute tubular necrosis)] (RTECS)

Ingestion: Oral - Rabbit LDLo - Lowest published lethal dose : 175 mg/kg [Details of toxic effects not reported other than lethal dose value] (RTECS)

SECTION 12 : ECOLOGICAL INFORMATION

Ecotoxicity: Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Nickel :

Effect of Material On Aquatic Life: LC50 - Cyprinus carpio (Carp) - 1.3 mg/l - 96 h
EC50 - Daphnia magna (Water flea) - 1 mg/l - 48

Copper :

Bioaccumulation: Bioconcentration factor (BCF) : 108

Effect of Material On Aquatic Life: LC50 - Channa punctata (snake-head catfish) - 0.387 mg/l - 96 h
LC50 - Cirrhinus mrigala (Carp, Hawk Fish) - 0.110 mg/l - 96 h
EC50 - Daphnia magna (Water flea) - 0.04 - 0.05 mg/l - 48 h

SECTION 13 : DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose of contents/container in accordance with Local, State, Federal and Provincial regulations.

RCRA Number: Not determined.

SECTION 14 : TRANSPORT INFORMATION

DOT Shipping Name: Environmentally hazardous substances, solid, n.o.s., (Copper, Nickel)

DOT UN Number: UN3077

DOT Hazard Class: 9

DOT Packing Group: III

IMDG UN Number : UN3077

IMDG Shipping Name : Environmentally hazardous substances, solid, n.o.s., (Copper, Nickel)

IMDG Hazard Class : 9

IMDG Packing Group : III

Marine Pollutant: Yes

Marine Shipment Environmental Hazards: Marine Pollutant

Bulk Cargo Shipping Name: Nickel Concentrate

MARPOL Annex V: The concentrate is harmful to the marine environment (Acute Category 2, Chronic Category 2)

IMSBC/MHB: Groups A&B

SECTION 15 : REGULATORY INFORMATION

Canada WHMIS: Controlled - Class: D2B Toxic
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by the Controlled Products Regulations.

Nickel :

TSCA Inventory Status: Listed

Section 313: EPCRA - 40 CFR Part 372 - (SARA Title III) Section 313 Listed Chemical.

California PROP 65: Listed: cancer.

Canada DSL: Listed

Copper :

TSCA Inventory Status: Listed

Section 313: EPCRA - 40 CFR Part 372 - (SARA Title III) Section 313 Listed Chemical.

Canada DSL: Listed

Iron :

TSCA Inventory Status: Listed

Canada DSL: Listed

Sulfur :

TSCA Inventory Status: Listed

Canada DSL: Listed

WHMIS Pictograms:



SECTION 16 : ADDITIONAL INFORMATION

HMIS Health Hazard: 2*

HMIS Fire Hazard: 0

HMIS Reactivity: 1

HMIS Personal Protection: X

SDS Creation Date: March 20, 2014

SDS Revision Date: December 08, 2014

MSDS Author: Actio Corporation

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