



**DEFENSE LOGISTICS AGENCY**  
DEFENSE NATIONAL STOCKPILE CENTER  
8725 JOHN J. KINGMAN ROAD, SUITE 3229  
FT. BELVOIR, VIRGINIA 22060-6223

IN REPLY  
REFER TO: DNSC-C

April 27, 2006

**AMENDMENT NO. 005  
TO  
BASIC ORDERING AGREEMENT (BOA)  
FOR  
COBALT METAL  
UNDER  
DLA-COBALT-001**

The above referenced Solicitation for the sale of Cobalt Metal is hereby amended to update various sections of the BOA as follows:

**1. Amendment No. 003 to this Solicitation is deleted in its entirety.**

In addition to this Amendment, Amendment Nos. 002 and 004 to DLA-COBALT-001 remain in effect and are applicable to future contracts awarded under the BOA.

**2. The following section is added to the Solicitation.**

**Section A.8 U.S. Department of Agriculture Wood Packaging Materials  
Regulations (DEC 05)**

Wood packaging materials utilized in the storage and shipment of National Defense Stockpile materials, including, but not limited to, pallets, boxes, kegs, and dunnage lumber, do not meet the requirements of U.S. Department of Agriculture Regulations at 7 CFR 319.40. Stockpile wood packaging materials have not been heat treated or fumigated with methyl bromide and are not marked to indicate that they meet the requirements of these regulations. As a result, it will not be possible to import these wood packaging materials back into the United States or into some other countries.

3. SECTION D – PAYMENT

Delete this section in its entirety and replace with the following:

SECTION D – PAYMENT

D.1 Payment (OCT 05)

- a. Payment shall be made in U.S. dollars.
- b. Payment for material shall be made **only** by wire transfer (Fedwire). Payment for **adjustments for variations in quantity or weight of material shipped**, storage charges, interest, penalty charges, or administrative charges may be made by wire transfer, electronic funds transfer, or company or bank check. If payments for material (other than payments for adjustments for variations in quantity or weight) are made by electronic funds transfer or check, delays in shipment will result, and the payment may be returned to the sender.
- c. Payment by wire transfer (Fedwire).
  - (1) Wire transfer payment shall be made in accordance with instructions in **Section J.3**. Fees for wire transfers are the responsibility of the Contractor. Payment shall be accompanied by **identifying information including the contract number, invoice number (if applicable), and a description of the material purchased**.
  - (2) If wire transfer payment is not made in accordance with the instructions in **Section J.3**, or if identifying information is not provided, shipment of material may be delayed by up to one week, the wire transfer may be returned to the sender or a Contractor may incur charges if payments are delinquent.
- d. Payment by electronic funds transfer.
  - (1) Electronic funds transfer payment shall be made in accordance with instructions in **Section J.3**. Any fees for electronic funds transfers are the responsibility of the Contractor. Payment shall be accompanied by **identifying information including the contract number, invoice number, and a description of the material purchased**.
  - (2) If payment by electronic funds transfer is not made in accordance with the instructions in **Section J.3**, or if identifying information is not provided, payment may be returned to the sender and the Contractor may incur charges if payments are delinquent.
- e. Payment by company or bank check.
  - (1) All checks must be drawn on a U.S. domestic bank or on the United States branch of an acceptable foreign bank and must be payable in United States currency. **A service charge of \$100.00 will be applied to all returned checks.**

- (2) Payment shall be made to the **Defense Finance and Accounting Service - Columbus (DFAS-Columbus)**. If a check is not made payable to DFAS-Columbus, the check may be returned and the \$100.00 fee stated in **D.1.e.(1)** charged. Payment shall be accompanied by **identifying information including the contract number, invoice number, and a description of the material purchased**. Check payments which do not have the required identification may be returned and the Contractor may incur charges if payments are delinquent. Check payments shall be sent to:

ATTN: DNSC-R, Accounts Receivable  
Defense National Stockpile Center  
8725 John J. Kingman Road, Suite 3229  
Fort Belvoir, VA 22060-6223

- f. Invoices issued for adjustments for variations in quantity or weight, storage charges, interest, penalty charges, or administrative charges shall be paid promptly.
- g. If payment is not made in full within 30 calendar days of issuance of an invoice as specified in **D.1.f.**, the Contractor will be considered delinquent and any outstanding charges will be reduced by any subsequent payments. No material will be released until all delinquent charges are paid. (See Sections **F.1.a.** and **G.11.**)

#### **D.2 Payment Due Date (OCT 05)**

- a. Payment due dates will be applied as follows:
- (1) If payment terms are not extended, payment will be made before shipment of material and before the end of the contract period specified in the executed **Section I.1 Quote/Award Form**.
- (2) If payment terms are approved, the Contractor shall pay the Government the full amount of **each** shipment no later than 30 calendar days after DNSC receives current, accurate and complete Shipping Instructions. Shipping Instructions must be submitted on or before the final day of the contract period. Notwithstanding any other provision of the contract, payment is due with or without the issuance of an invoice by the Government. If the Contractor fails to make payment timely, the Contractor will be considered delinquent (see Section **D.1.g.**, **F.1.a.**, and **G.11**), and the Government, at its sole discretion, may revoke payment terms and take other appropriate action in accordance with Section **G.8**. If the Contractor fails to submit current, accurate and complete Shipping Instructions on or before the final day of the contract period, the Government will revoke payment terms and payment must be made **before** shipment of material.
- b. If payment is not received by 2:00 p.m., local time Fort Belvoir, VA, on the payment due date, payment will not be credited until the next Government business day. Interest and penalty charges will accrue accordingly.
- c. In the event the payment due date falls on a Saturday, Sunday, or holiday, then the payment due date will be extended to the next Government business day.

**D.3 Interest (MAY 04)**

- a. All amounts that become payable by the Contractor to the Government under this contract shall bear simple interest from the date due until paid. The interest rate shall be the interest rate established by the Secretary of the Treasury as provided in 41 U.S.C. 611, which is applicable to the period in which the amount becomes due, as provided in paragraph b., below.
- b. Amounts shall be due at the earliest of the following dates:
  - (1) The final day of the contract period specified in Section **I.1 Quote/Award Form** (with or without the issuance of an invoice by the Government);
  - (2) The date of the first written demand for payment under the contract, including any demand resulting from a default termination, unless paid within 30 days of becoming due; or
  - (3) If payment terms have been approved, **30** calendar days after the date that DNSC receives current, accurate and complete Shipping Instructions provided that Shipping Instructions are submitted on or before the final day of the contract period. If Shipping Instructions are not submitted on or before the final day of the contract period, amounts shall be due in accordance with the provisions of Section **D.3.b.(1)**.

**D.4 Penalty and Administrative Charges (MAY 04)**

In addition to interest charges specified in Section **D.3**, above, a penalty charge of 6 percent per annum shall be assessed on any debt principal that is delinquent more than 90 calendar days. Penalty charges shall accrue from the date the principal amount due becomes delinquent until paid. Additional administrative charges may be assessed, if needed. Administrative charges relate only to delinquent debts and will be assessed to cover expenses incurred by the Government in the recovery of such debts.

**4. Section G.11 Setoff of Funds**

Delete this section in its entirety and replace with the following:

**Section G.11 Setoff of Funds (May 04)**

The Contractor agrees that the Government may use all or a portion of any monies received by the Government to satisfy, in whole or in part, any debt (e.g., delinquent payments, interest, penalty charges, administrative charges, or storage charges), arising out of this or any other transaction.

**5. Section J.3 Fedwire Procedures**

Delete this section in its entirety and replace with the attached

**Section J.3 Fedwire and Electronic Funds Transfer Procedures (OCT 05, Rev.)**

**6. Section J.4 Material Safety Data Sheets – Cobalt**

Delete this section in its entirety and replace with the attached

**Section J.4 Material Safety Data Sheets – Cobalt (MAR 06)**

- 7. Except as provided herein, all other terms and conditions of DLA-COBALT-001, as amended by Amendment Nos. 002 and 004, remain unchanged and in full force and effect.**

8. Quoters shall acknowledge receipt of this Amendment by signing in the space provided below and returning a copy of this form along with their quote to:

ATTN: DNSC-R/Bid Custodian  
Defense National Stockpile Center  
8725 John J. Kingman Road  
Suite 3229  
Fort Belvoir, VA 22060-6223  
Facsimile No. (703) 767-5541

Failure to acknowledge receipt of this Amendment may result in the quoter being considered ineligible for award.

**NAME OF FIRM:** \_\_\_\_\_

**ADDRESS:** \_\_\_\_\_

**TELEPHONE:** \_\_\_\_\_

**FACSIMILE:** \_\_\_\_\_

**EMAIL:** \_\_\_\_\_

**BY:** \_\_\_\_\_

**SIGNATURE:** \_\_\_\_\_

**TITLE:** \_\_\_\_\_

**DATE:** \_\_\_\_\_

**Section J.3 Fedwire and Electronic Funds Transfer Procedures (OCT 05, Rev.)**

**Fedwire (wire transfer)**

The Sender must use a bank that offers Fedwire funds transfer capability. Information regarding Fedwire, including listings of Fedwire funds transfer participants, may be found at <http://www.frbservices.org>.

To ensure the funds are credited to the Defense National Stockpile Center the following information is required for any wire transfer of funds.

1. Bank Name, Location, and Routing Number.

Bank Name:	TREAS NYC
Location:	New York, NY
Routing Number:	021030004

2. Amount of funds to be transferred.

3. Beneficiary Name: 6355  
DFAS/DNSC

4. Third Party Information – Contractor’s Name, Commodity, and Contract Number.

**NOTE:** Under Item 3, the number 6355 is the ALC = Agency Location Code (this is the same as account number)

**Electronic Funds Transfer**

The following information is required for payments made through electronic funds transfer.

1. Bank Name, Location, Bank Number, SWIFT Code, and Account Number.

Bank Name:	Mellon Bank
Location:	Pittsburgh, PA
Bank Number:	043000261
Bank SWIFT Code:	MELNUS3P
Account Number:	910-1027

2. Amount of funds to be transferred.

3. Beneficiary Name: Department of Defense DFAS

4. Addendum Information: Payment for DNSC Contract No. \_\_\_\_\_  
Invoice No. \_\_\_\_\_



## MATERIAL SAFETY DATA SHEET

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**DEFENSE LOGISTICS AGENCY  
DEFENSE NATIONAL STOCKPILE CENTER  
8725 JOHN J. KINGMAN ROAD  
SUITE 3339  
FORT BELVOIR, VA 22060-6223**

**EMERGENCY TELEPHONE NUMBER:  
1-800-424-9300 (NORTH AMERICA)  
1-703-527-3887 (INTERNATIONAL)**

**SUBSTANCE: COBALT**

**TRADE NAMES/SYNONYMS:**

C.I.77320; COBALT-59; C-363; COBALT ELEMENT; Co; DLA05251; RTECS GF8750000

**CHEMICAL FAMILY:** metal

**CREATION DATE:** Mar 27 1995

**REVISION DATE:** Mar 16 2006

### 2. COMPOSITION, INFORMATION ON INGREDIENTS

**COMPONENT:** COBALT  
**CAS NUMBER:** 7440-48-4  
**EC NUMBER (EINECS):** 231-158-0  
**EC INDEX NUMBER:** 027-001-00-9  
**PERCENTAGE:** 100.0

### 3. HAZARDS IDENTIFICATION

**NFPA RATINGS (SCALE 0-4):** HEALTH=2 FIRE=0 REACTIVITY=0



**EMERGENCY OVERVIEW:**

**PHYSICAL DESCRIPTION:** Odorless, silver-gray or bluish-white metal in pig, ingot or tub form.

**MAJOR HEALTH HAZARDS:** respiratory tract irritation, skin irritation, eye irritation, allergic reactions, suspect cancer hazard (in animals)

**PHYSICAL HAZARDS:** Negligible fire and explosion hazard in bulk form. Dust/air mixtures may ignite or explode.

**POTENTIAL HEALTH EFFECTS:**

**INHALATION:**

**SHORT TERM EXPOSURE:** irritation, allergic reactions, lung damage, tumors

**LONG TERM EXPOSURE:** digestive disorders, chest pain, difficulty breathing, headache, lung damage, paralysis, reproductive effects

**SKIN CONTACT:**

**SHORT TERM EXPOSURE:** irritation, allergic reactions, rash

**LONG TERM EXPOSURE:** same as effects reported in short term exposure

**EYE CONTACT:**

**SHORT TERM EXPOSURE:** irritation

**LONG TERM EXPOSURE:** same as effects reported in short term exposure

**INGESTION:**

**SHORT TERM EXPOSURE:** vomiting, diarrhea

**LONG TERM EXPOSURE:** rash, ringing in the ears, digestive disorders, difficulty breathing, hearing loss, bluish skin color

**CARCINOGEN STATUS:**

**OSHA:** No

**NTP:** No

**IARC:** Yes

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#### 4. FIRST AID MEASURES

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**INHALATION:** If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

**SKIN CONTACT:** Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

**EYE CONTACT:** Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

**INGESTION:** If a large amount is swallowed, get medical attention.

**ANTIDOTE:** calcium disodium edetate/dextrose, intravenous; calcium disodium edetate/procaine, intramuscular. Get medical attention immediately.

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#### 5. FIRE FIGHTING MEASURES

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**FIRE AND EXPLOSION HAZARDS:** Negligible fire and explosion hazard in bulk form. Dust/air mixtures may ignite or explode. Finely divided material may ignite spontaneously.

**EXTINGUISHING MEDIA:** dolomite, dry powder for metal fires, dry sand, graphite, soda ash, sodium chloride

Do not get water directly on material.

**FIRE FIGHTING:** Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate

hazard area and deny entry. Let the fire burn. Use extinguishing agents appropriate for surrounding fire. Avoid inhalation of material or combustion by-products.

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## 6. ACCIDENTAL RELEASE MEASURES

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### **WATER RELEASE:**

Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Keep out of water supplies and sewers.

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## 7. HANDLING AND STORAGE

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**STORAGE:** Store and handle in accordance with all current regulations and standards. Store in a cool, dry place. Store in a well-ventilated area. Store in a tightly closed container. Keep separated from incompatible substances.

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## 8. EXPOSURE CONTROLS, PERSONAL PROTECTION

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### **EXPOSURE LIMITS:**

#### **COBALT:**

#### **COBALT METAL, DUST, AND FUME (as Co):**

0.1 mg/m<sup>3</sup> OSHA TWA

0.05 mg/m<sup>3</sup> OSHA TWA (vacated by 58 FR 35338, June 30, 1993)

0.02 mg/m<sup>3</sup> ACGIH TWA

0.05 mg/m<sup>3</sup> NIOSH recommended TWA 10 hour(s)

DFG MAK (airway and skin sensitizer) (inhalable fraction)

0.5 mg/m<sup>3</sup> AGS TRK (inhalable fraction) (production) (effective 1 Jan 2005 no longer valid per amendment)

0.1 mg/m<sup>3</sup> AGS TRK (inhalable fraction) (others) (effective 1 Jan 2005 no longer valid per amendment)

0.1 mg/m<sup>3</sup> UK WEL TWA (sensitization)

**MEASUREMENT METHOD:** Particulate filter; Acid; Flame atomic absorption spectrometry; NIOSH IV # 7027

**VENTILATION:** Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

**EYE PROTECTION:** Wear splash resistant safety goggles. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

**CLOTHING:** Wear appropriate chemical resistant clothing.

**GLOVES:** Wear appropriate chemical resistant gloves.

**RESPIRATOR:** The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.

Measurement Element:

Cobalt (Co)

**0.25 mg/m<sup>3</sup>**

Any dust and mist respirator.

**0.5 mg/m<sup>3</sup>**

Any dust and mist respirator except single-use and quarter-mask respirators.

Any dust, mist, and fume respirator.

Any supplied-air respirator.

**1.25 mg/m<sup>3</sup>**

Any supplied-air respirator operated in a continuous-flow mode.

Any powered, air-purifying respirator with a dust and mist filter.

Any powered, air-purifying respirator with a dust, mist, and fume filter.

**2.5 mg/m<sup>3</sup>**

Any air-purifying respirator with a full facepiece and a high-efficiency particulate filter.

Any self-contained breathing apparatus with a full facepiece.

Any supplied-air respirator with a full facepiece.

**20 mg/m<sup>3</sup>**

Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode.

**Escape -**

Any air-purifying respirator with a full facepiece and a high-efficiency particulate filter.

Any appropriate escape-type, self-contained breathing apparatus.

**For Unknown Concentrations or Immediately Dangerous to Life or Health -**

Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.

Any self-contained breathing apparatus with a full facepiece.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

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**PHYSICAL DESCRIPTION:** Odorless, silver-gray or bluish-white metal in pig, ingot or tub form.

**MOLECULAR WEIGHT:** 58.93

**MOLECULAR FORMULA:** Co

**BOILING POINT:** 5198 F (2870 C)

**MELTING POINT:** 2723 F (1495 C)

**VAPOR PRESSURE:** Not applicable

**VAPOR DENSITY:** Not applicable

**SPECIFIC GRAVITY (water=1):** 8.92

**WATER SOLUBILITY:** insoluble

**PH:** Not applicable

**VOLATILITY:** 0%

**ODOR THRESHOLD:** Not available

**EVAPORATION RATE:** 0 (butyl acetate=1)

**COEFFICIENT OF WATER/OIL DISTRIBUTION:** Not available

**SOLVENT SOLUBILITY:**

**Soluble:** dilute nitric acid, hydrochloric acid, sulfuric acid

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## 10. STABILITY AND REACTIVITY

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**REACTIVITY:** Stable at normal temperatures and pressure.

**CONDITIONS TO AVOID:** None reported.

**INCOMPATIBILITIES:** combustible materials, acids, oxidizing materials, halogens

**COBALT:**

ACETYLENE: Incandescent reaction.

ACIDS (STRONG): Incompatible.

AMMONIUM NITRATE: Violent or explosive reaction.

BROMINE PENTAFLUORIDE: Violent reaction with possible ignition.

BROMINE TETRAFLUORIDE: Violent reaction with possible ignition.

HYDRAZINIUM NITRATE: Possible explosion above 70 C.

NITRATES: Incompatible.

NITRYL FLUORIDE: Incandescent reaction.

OXIDIZERS (STRONG): Fire and explosion hazard.

1,3,4,7-TETRAMETHYLISOINDOLE: Possible explosion on heating.

**HAZARDOUS DECOMPOSITION:**

Thermal decomposition products: oxides of cobalt

**POLYMERIZATION:** Will not polymerize.

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## 11. TOXICOLOGICAL INFORMATION

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**COBALT:**

**TOXICITY DATA:**

6171 mg/kg oral-rat LD50; 100 mg/kg intraperitoneal-rat LD50; 100 mg/kg intravenous-rat LDLo; 25 mg/kg intratracheal-rat LDLo; 100 mg/kg intraperitoneal-mouse LDLo; 750 mg/kg oral-rabbit LDLo; 100 mg/kg intravenous-rabbit LDLo; 250 mg/kg intratracheal-rat TDLo; 50 mg/kg intratracheal-rat TDLo; 25 mg/kg intratracheal-rat LDLo; 0.28 mg/kg oral-human LDLo; 200 mg/m<sup>3</sup>/17 week(s) intermittent inhalation-rat TCLo; 100 ug/m<sup>3</sup>/6 hour(s)-13 week(s) intermittent inhalation-pig TCLo; 360 mg/kg/36 day(s) continuous oral-rabbit TDLo; 0.1 mg/m<sup>3</sup>/4 week(s) intermittent inhalation-human TCLo

**CARCINOGEN STATUS:** IARC: Human Inadequate Evidence, Animal Sufficient Evidence, Group 2B; ACGIH: A3 -Animal Carcinogen (Cobalt and cobalt compounds); TRGS 905: K 3

A significant increase in the risk for lung cancer was reported among workers in cobalt production who were also exposed to nickel and arsenic and hard-metal workers with documented exposure to cobalt-containing dusts. A significant increase in lung cancer risk was seen in people exposed for more than 10 years whose exposure had begun more than 20 years previously. A number of single cases of malignant tumors, mostly sarcomas, have been reported at the site of orthopaedic implants containing cobalt. Intramuscular and intrathoracic injections of cobalt metal powder in rats produced sarcomas at the injection site.

**LOCAL EFFECTS:**

Irritant: inhalation, skin, eye

**ACUTE TOXICITY LEVEL:**

Slightly Toxic: ingestion

**TARGET ORGANS:** immune system (sensitizer)

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** respiratory disorders, skin disorders and allergies

**TUMORIGENIC DATA:**

126 mg/kg intramuscular-rat TDLo; 75 mg/kg implant-rabbit TDLo; 126 mg/kg intramuscular-rat TD

**MUTAGENIC DATA:**

micronucleus test - human leukocyte 600 ug/L; DNA damage - human leukocyte 3 mg/L; micronucleus test - human leukocyte 0.6 mg/L 15 minute(s)

**ADDITIONAL DATA:** Alcohol may enhance the toxic effects.

**HEALTH EFFECTS:**

**INHALATION:**

**ACUTE EXPOSURE:**

COBALT: May cause upper respiratory tract irritation, rhinitis, conjunctivitis, and tracheitis. Sensitization reactions may occur in previously exposed individuals. An obliterative bronchiolitis adenomatosis has been produced in guinea pigs intratracheally injected with the dust at doses of 50, 25, and 10 mg. Intratracheal administration of 12.5 mg/kg caused lethargy and death in rats in 15 minutes to 6 hours.

**CHRONIC EXPOSURE:**

COBALT: Prolonged or repeated exposure may cause respiratory irritation, discharge from respiratory or digestive mucous membranes, nasal obstruction, sneezing, clear secretions sometimes containing blood, an intense burning sensation when swallowing, exertional dyspnea, gastrointestinal distress, appetite and weight loss, peripheral neuritis, headache, weakness, irritability, partial or complete loss of the sense of smell, auditory nerve problems, and an increased incidence of spontaneous abortions in women workers and in the wives of men workers. Several cases of cardiomyopathy have been reported in workers. The onset of the disease may begin gradually with steadily increasing chest discomfort and sharp pains near the heart. Other symptoms may include dry cough, mucoid sputum, general malaise, drop in blood pressure, right sided hemiparesis, sleeplessness, and weight loss. Fragmented myocardial fibers, vacuolar change, diffused thickening of the endocardium and absence of an inflammatory reaction were signs of cardiomyopathy. Studies from workers chronically exposed to cobalt in tungsten carbide manufacturing of hard metal revealed three types of respiratory disease: Airways obstruction may occur from simple irritation and appears to be related to an allergic response. It has been reported to occur at a level of 0.06 mg/m<sup>3</sup> and is characterized by wheezing, cough, and shortness of breath while at work with symptoms improving when exposure ceases. This syndrome may not develop until 6 to 18 months of exposure has occurred and is not thought to be progressive. However once sensitized a worker could probably not tolerate inhalation of even small amounts; interstitial pneumonitis, a syndrome similar to extrinsic allergic alveolitis has been reported in workers. The signs and symptoms are compatible with transient pneumonitis. Basal crackles and radiographic abnormalities occur but symptoms improve and respiratory impairment is decreased or resolved once the subject is removed from exposure for a period of time; interstitial fibrosis has been observed to occur in workers exposed to 0.1 to 0.2 mg/m<sup>3</sup> for usually 10 years. Symptoms included cough, scanty mucoid sputum, and shortness of breath which progressively worsens. Tachypnea is frequent, and clubbing of the digits, and basal crackles are late features of this condition. Pulmonary function is decreased and death is usually due to pulmonary hypertension and cor pulmonale.

**SKIN CONTACT:**

**ACUTE EXPOSURE:**

COBALT: May cause irritation. Sensitization dermatitis may occur in persons who have been previously exposed. Both urticarial eruptions and erythematous papular types have been described and usually occur in skin areas subjected to friction, such as the elbow flexures, ankles, and neck.

**CHRONIC EXPOSURE:**

COBALT: Repeated or prolonged contact may lead to sensitization dermatitis.

**EYE CONTACT:**

**ACUTE EXPOSURE:**

COBALT: May cause irritation. Workers in the cobalt-cemented tungsten industry have not experienced eye irritation at concentrations below 1 mg/m<sup>3</sup>.

**CHRONIC EXPOSURE:**

COBALT: Repeated or prolonged exposure may cause conjunctivitis.

**INGESTION:**

**ACUTE EXPOSURE:**

COBALT: Vomiting, diarrhea, and a sensation of hotness may occur after the ingestion of large amounts.

**CHRONIC EXPOSURE:**

COBALT: Cardiomyopathy has been caused by excessive intake of cobalt. Symptoms include gastrointestinal irritation with nausea, vomiting, diarrhea, shortness of breath, dry and persistent cough, thoracic and right upper quadrant abdominal pain, ankle edema, cyanosis, lowered blood pressure, heart enlargement, pericardial effusion, rapid heart rate, electrocardiographic abnormalities, and death. Sequela following this illness include recurrent chronic heart failure and neurological and mental deterioration. Therapeutic administration has caused nausea, vomiting, skin rash, tinnitus, nerve deafness, thyroid hyperplasia, myxedema, polycythemia, congestive heart failure, and death. Administration to humans of 1 mg daily for three days resulted in prolonged time for blood clot formation. Degenerative changes have occurred in the liver, kidneys, and pancreas of animals. Administration in drinking water produced erythropoietic effects, immunosuppression, and inhibited reflex learning in rats.

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## 12. ECOLOGICAL INFORMATION

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**ECOTOXICITY DATA:**

**FISH TOXICITY:** 112.5 ug/L 30 hour(s) (Growth) Fathead minnow (*Pimephales promelas*)

**INVERTEBRATE TOXICITY:** 10 ug/L 14 week(s) (Growth) Pacific oyster (*Crassostrea gigas*)

**ALGAL TOXICITY:** 58900 ug/L 0.5 hour(s) (Biochemical) Blue-green algae (*Anabaena variabilis*)

**FATE AND TRANSPORT:**

**BIOCONCENTRATION:** 4000 M 24 week(s) BCF (Residue) Blue-green algae (*Coccochloris* sp) 1E-8.4 M

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## 13. DISPOSAL CONSIDERATIONS

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Dispose in accordance with all applicable regulations.

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## 14. TRANSPORT INFORMATION

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**U.S. DEPARTMENT OF TRANSPORTATION:** No classification assigned.

**CANADIAN TRANSPORTATION OF DANGEROUS GOODS:** No classification assigned.

**LAND TRANSPORT ADR:** No classification assigned.

**LAND TRANSPORT RID:** No classification assigned.

**AIR TRANSPORT IATA:** No classification assigned.

**AIR TRANSPORT ICAO:** No classification assigned.

**MARITIME TRANSPORT IMDG:** No classification assigned.

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## 15. REGULATORY INFORMATION

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### **U.S. REGULATIONS:**

**CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):** Not regulated.

**SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30):**  
Not regulated.

**SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40):**  
Not regulated.

**SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):**

ACUTE: Yes

CHRONIC: Yes

FIRE: No

REACTIVE: No

SUDDEN RELEASE: No

**SARA TITLE III SECTION 313 (40 CFR 372.65):**

**Cobalt**

**OSHA PROCESS SAFETY (29CFR1910.119):** Not regulated.

### **STATE REGULATIONS:**

**California Proposition 65:**

Known to the state of California to cause the following:

**Cobalt**

Cancer (Jul 01, 1992)

### **CANADIAN REGULATIONS:**

**WHMIS CLASSIFICATION:** Not determined.

### **EUROPEAN REGULATIONS:**

**EC CLASSIFICATION (ASSIGNED):**

<input type="checkbox"/>	Sensitizing
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EC Classification may be inconsistent with independently-researched data.

### **EC RISK AND SAFETY PHRASES:**

R 42/43	May cause sensitization by inhalation and skin contact.
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R 53	May cause long-term adverse effects in the aquatic environment.
S 2	Keep out of the reach of children.
S 22	Do not breathe dust.
S 24	Avoid contact with skin.
S 37	Wear suitable gloves.
S 61	Avoid release to the environment. Refer to special instructions/Safety data sheets.

**GERMAN REGULATIONS:**

**WATER HAZARD CLASS (WGK):**

**STATE OF CLASSIFICATION:** V<sub>w</sub>V<sub>w</sub>S

**CLASSIFICATION UNDER HAZARD TO WATER:** 0

**NATIONAL INVENTORY STATUS:**

**U.S. INVENTORY (TSCA):** Listed on inventory.

**TSCA 12(b) EXPORT NOTIFICATION:** Not listed.

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**16. OTHER INFORMATION**

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**MSDS SUMMARY OF CHANGES**

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

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