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

IN REPLY REFER TO DNSC-CC

AMENDMENT NUMBER 011
TO SOLICITATION OF OFFERS
DLA-MANGANESE, METALLURGICAL, SYNTHETIC AND NATURAL DIOXIDE BATTERY GRADES-002

The above referenced Solicitation of Offers, DLA-MANGANESE, METALLURGICAL, SYNTHETIC AND NATURAL DIOXIDE BATTERY GRADES-002, dated June 17, 2003 is hereby amended to offer metallurgical grade manganese ore for sale in FY 2007.

1. Amendments 009 and 010 are hereby deleted. Amendment 006 remains in effect.

2. Section A.1 Introduction (SEP 02) delete paragraph a. and substitute the following:

a. The Defense Logistics Agency (DLA), Defense National Stockpile Center (DNSC), is soliciting offers for the sale of approximately 28,902.95 Short Dry Tons (SDT) of metallurgical grade manganese ore under DLA-MANGANESE, METALLURGICAL, SYNTHETIC AND NATURAL DIOXIDE BATTERY GRADES-002 in Fiscal Year 2007. Offerings will be held at 1:00 p.m., local time, on the fourth Thursday of each month at Fort Belvoir, VA. Offers must be received at the address in Section B.2.a. by 1:00 p.m., local time, Fort Belvoir, VA. In the event that the fourth Thursday of any month is a holiday, or DNSC is otherwise closed at that time, offers for that day will be received at 1:00 p.m. on the next DNSC business day.

3. Add the following clause in Section A, A.5 Wood Packaging Materials Requirements (JUN 06)

A.5 Wood Packaging Materials Requirements (JUN 06)

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 or International Standards for Phytosanitary Measures (ISPM) 15, “Guidelines for Regulating Wood Packaging Materials in International Trade.” 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 and standards. As a result, it may not be possible to export or import these wood packaging materials.

4. **SECTION D – PAYMENT** is hereby deleted in its entirety and the following inserted therefor:

Section D - Payment

D.1 Payment (JUL 06)

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 attempted 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. The Contractor may incur charges if payments are delinquent.

c. Payment by wire transfer (Fedwire).

(1) Wire transfer payment shall be made in accordance with instructions in **Section J.5**. 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.5**, 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.5**. 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.5**, 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.10**.)

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 Sale of Government Property Negotiated Sales Contract (JUL 97).**

(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.10**), and the Government, at its sole discretion, may revoke payment terms and take other appropriate action in accordance with Section **G.7**. 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 Sale of Government Property Negotiated Sales Contract (JUL 97)** (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.

5. Section **F.3 Weighing (FEB 03)** is hereby deleted in its entirety and the following inserted therefor:

F.3 Weighing (APR 06)

a. Conveyance (truck, van, or railroad cars as applicable by location) shall be light (tare) and heavy weighed (gross), with the tare weight of the conveyance deducted to arrive at the net weight of the material. The stenciled tare weight of a railroad car and the actual tare weight of trucks or vans shall be used. Weighing shall be done by and at the expense of the contractor when public or rail scales are used. All weighing shall be witnessed by a Government representative, with the exception of weighing on railroad scales which will be witnessed by the railroad. Weighing shall be done on the nearest railroad scale or the depot truck scale, if available. If the depot truck scale is not available, then weighing shall be done on the nearest state certified public truck scale.

b. A Government representative shall certify the correctness of the weighing method and that the truck scales have been inspected and certified. If the depot truck scale is used for weighing, the Government will provide the certified scale tickets. If a public truck scale is used for weighing, the Contractor or its agent will provide certified scale tickets. The scale tickets will be provided by the Government or the Contractor or its agent, as applicable, within ten working days after the entire requested release quantity has been shipped, or at the end of each week's shipment, whichever is sooner.

c. Weight certificates shall be provided at the expense of the Government. The scale tickets shall be final for payment purposes.

6. Section **G.10 Setoff of Funds (JUL 98)** is deleted in its entirety and the following is inserted therefor:

G.10 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.

7. Add the following clause in Section G, **G.13 APPLICABLE LAW FOR BREACH OF CONTRACT CLAIM (JUN 06)**:

G.13 APPLICABLE LAW FOR BREACH OF CONTRACT CLAIM (JUN 06)

United States law will apply to resolve any claim of breach of this contract

8. Add the following clause in Section I, **I.9 Disputes: Agreement to Use Alternative Dispute Resolution (JUL 06).**

a. The parties agree to negotiate with each other to try to resolve any disputes that may arise. If unassisted negotiations are unsuccessful, the parties will use alternative dispute resolution (ADR) techniques to try to resolve the dispute. Litigation will only be considered as a last resort when ADR is unsuccessful or has been documented by the party rejecting ADR to be inappropriate for resolving the dispute.

b. Before either party determines ADR inappropriate, that party must discuss the use of ADR with the other party. The documentation rejecting ADR must be signed by an official authorized to bind the contractor, or, for the Agency, by the contracting officer, and approved at a level above the contracting officer after consultation with the ADR Specialist and with legal counsel. Contractor personnel are also encouraged to include the ADR Specialist in their discussions with the contracting officer before determining ADR to be inappropriate.

c. If you wish to opt out of this clause, check here (___). Alternate wording may be negotiated with the contracting officer.

9. All previous Sections **I.2 Item Offer Page** and **J.1 Description of Analysis** are deleted in their entirety and replaced with the attached Section **I.2 Item Offer Page – Manganese, Metallurgical Grade (OCT 06)** and **J.1 Description or Analysis – Manganese, Metallurgical Grade (OCT 06).**

10. All previous Sections **J.3 Storage Locations** are deleted in their entirety and replaced with the attached Section **J.3 Storage Locations (OCT 06)**.

11. All previous Sections **J.4 Material Safety Data Sheets** are deleted in their entirety and replaced with the attached Section **J.4 Material Safety Data Sheets (SEP 06) (Manganese, Metallurgical)**.

12. Delete Section **J.5 Fedwire Procedures (JAN 95)** and replace with the attached Section **J.5 Fedwire and Electronic Funds Transfer Procedures (Oct 05, Rev.)**

13. Offerors shall acknowledge receipt of this Amendment Number 011 by signing in the space provided below and returning a copy of this form along with their offer to:

ATTN: DNSC-R/Bid Custodian
Defense National Stockpile Center,
8725 John J. Kingman Road,
Suite 3229
Fort Belvoir, VA 22060-6223.
Facsimile number is (703)767-5541.

Failure to acknowledge receipt of this Amendment may result in an offeror being ineligible for award. Except as provided herein, all other terms and conditions of DLA-MANGANESE, METALLURGICAL, SYNTHETIC AND NATURAL DIOXIDE BATTERY GRADES-002 and Amendment No. 006 thereto, remain unchanged and in full force and effect.

NAME OF FIRM _____

ADDRESS _____

TELEPHONE _____

FACSIMILE _____

EMAIL ADDRESS _____

COMPLETED BY_____

SIGNATURE _____

TITLE _____

DATE _____

I.2 Item Offer Page - Manganese, Metallurgical (OCT 06)								
Item No.	Location	Type	Origin	Pile	Weight (SDT)	Unit Price Per SDT	Quantity (SDT)	Total Offer Price
25	BATESVILLE, AR	TYPE II - FINES	DOMESTIC	001	**7,797.500**	**$**		
47	PUEBLO, CO	TYPE I - LUMPY	DOMESTIC	001	2,009.999	**$**		
48	PUEBLO, CO	TYPE I - LUMPY	DOMESTIC	02A	110.000	**$**		
49	PUEBLO, CO	TYPE I - LUMPY	DOMESTIC	02B	125.000	**$**		
50	PUEBLO, CO	TYPE II - FINES	DOMESTIC	02C	809.000	**$**		
51	PUEBLO, CO	TYPE II - FINES	DOMESTIC	02D	325.000	**$**		
52	PUEBLO, CO	TYPE III - NODULES	DOMESTIC	003	712.000	**$**		
53	PUEBLO, CO	TYPE I - LUMPY	DOMESTIC	004	339.000	**$**		
54	PUEBLO, CO	TYPE I - LUMPY	DOMESTIC	005	416.000	**$**		
				TOTAL	**4,845.999**			
55	SHUMAKER, AR	TYPE II - FINES	DOMESTIC	003	**2,030.504**	**$**		
56	TOOELE, UT	TYPE II - FINES	DOMESTIC	001	8,701.280	**$**		
57	TOOELE, UT	TYPE II - FINES	DOMESTIC	002	50.400	**$**		
58	TOOELE, UT	TYPE II - FINES	DOMESTIC	003	49.280	**$**		
59	TOOELE, UT	TYPE II - FINES	DOMESTIC	004	1,048.320	**$**		
60	TOOELE, UT	TYPE III - NODULES	DOMESTIC	005	161.280	**$**		
61	TOOELE, UT	TYPE II - FINES	DOMESTIC	006	77.280	**$**		
62	TOOELE, UT	TYPE II - FINES	DOMESTIC	007	4,141.104	**$**		
				TOTAL	**14,228.944**			
			TOTAL AVAILABLE		**28,902.947**			

It is highly advisable that each offeror inspect the piles before placing an offer. Some piles have limited access!

NAME OF FIRM _____

COMPLETED BY _____

SIGNATURE _____

TITLE _____

DATE _____

J.1 Description or Analysis – Manganese, Metallurgical Grade (OCT 06)

Item				Net Weight	Analysis (%)						
Number	Location	Pile	Origin	(SDT)	Mn	Fe	$Al_2O_3+SiO_2$	P	Cu+Pb+Zn	Moisture	PassNo.20*
25	Batesville, AR	1	Domestic	7,797.50	26.10	15.10	31.13	1.18		6.30	
47	Pueblo, CO	1	Domestic	2,009.99	42.12	1.51	7.90	0.04	0.04	1.58	4.52
48	Pueblo, CO	2A	Domestic	110.00	48.74	1.62	6.53	0.04	0.07	2.86	4.74
49	Pueblo, CO	2B	Domestic	125.00	49.68	2.12	5.54	0.09	0.15	2.55	2.69
50	Pueblo, CO	2C	Domestic	809.00	42.83	2.20	6.20	0.02		6.12	
51	Pueblo, CO	2D	Domestic	325.00	44.23	1.82	7.72	0.03	0.02	7.13	7.50
52	Pueblo, CO	3	Domestic	712.00	43.06	2.97	12.91	0.04	0.13	0.73	0.57
53	Pueblo, CO	4	Domestic	339.00	47.23	1.90	13.64	0.04	0.19	4.59	
54	Pueblo, CO	5	Domestic	416.00	43.64	2.78	14.48	0.02	0.51	3.98	
55	Shumaker, AR	3	Domestic	2,030.50	41.00	5.61	14.03	0.06	0.44	3.13	
56	Tooele, UT	1	Domestic	8,701.28	34.80	2.33	17.75	0.02	0.04	1.86	
57	Tooele, UT	2	Domestic	50.40	44.20	0.86	9.92	0.05	0.03	2.17	
58	Tooele, UT	3	Domestic	49.28	43.00	3.22	9.51	0.07	0.32	2.22	
59	Tooele, UT	4	Domestic	1,048.32	45.80	1.11	17.51	0.03	0.41	0.00	
60	Tooele, UT	5	Domestic	161.28	43.80	2.96	14.16	0.04	0.14	2.04	
61	Tooele, UT	6	Domestic	77.28	35.20	0.90	6.05	0.05		1.43	
62	Tooele, UT	7	Domestic	4,141.10	33.60	2.02	44.29	0.04		1.86	
		Total:		**28,902.93**							

* Percent by weight of lot passing U.S. Standard Sieve No. 20

J.3 Storage Locations (OCT 06)

Location	Operational Status	Days	Hours	Accessibility	Responsible Depot	Depot Manager
Batesville, AR	Un-Staffed	Monday - Friday	0730 - 1500	Truck Only	Hammond, IN	John Olszewski Phone: (219) 937-5383 x104 . **Storage Specialist** Nikki Horther Lois Huddlestun Phone: (260) 749-9544
Note 1: Prior arrangements must be made before shipping.						
Pueblo, CO	Un-Staffed	Monday - Friday	0700 - 1500	Truck / Rail	Hammond, IN	John Olszewski Phone: (219) 937-5383 x104 . **Storage Specialist** Wilfred Clavell Gary Porter Phone: (801) 825-2749
Note 1: Prior arrangements must be made before shipping. **Note 2:** This location is a secure site and D.O.D security regulations apply.						
Shumaker, AR	Un-Staffed	Monday - Friday	0730 - 1500	Truck Only	Hammond, IN	John Olszewski Phone: (219) 937-5383 x104 . **Storage Specialist** Nikki Horther Lois Huddlestun Phone: (260) 749-9544
Note 1: Prior arrangements must be made before shipping.						
Tooele, UT	Un-Staffed	Monday - Friday	0700 - 1500	Truck / Rail	Hammond, IN	John Olszewski Phone: (219) 937-5383 x104 . **Storage Specialist** Wilfred Clavell Gary Porter Phone: (801) 825-2749
Note 1: Prior arrangements must be made before shipping. **Note 2:** This location is a secure site and D.O.D security regulations apply.						

Point of Contact

Defense Logistics Agency
Defense National Stockpile Center
Attn: Charles Harder
8725 John J Kingman Road, Suite 3229
Fort Belvoir, VA 22060-6223

Telephone Number: (703) 767-1163
Facsimile Number: (703) 767-7608

J.4 MATERIAL SAFETY DATA SHEET (SEP 06)

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: MANGANESE, METALLURGICAL

TRADE NAMES/SYNONYMS:
DLA13623

CREATION DATE: Jul 01 1992
REVISION DATE: Sep 14 2006

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: MANGANESE
CAS NUMBER: 7439-96-5
EC NUMBER (EINECS): 231-105-1
PERCENTAGE: >48.00

COMPONENT: IRON
CAS NUMBER: 7439-89-6
EC NUMBER (EINECS): 231-096-4
PERCENTAGE: <4.00

COMPONENT: ALUMINUM OXIDE
CAS NUMBER: 1344-28-1
EC NUMBER (EINECS): 215-691-6
PERCENTAGE: <15.00

COMPONENT: SILICON DIOXIDE
CAS NUMBER: 7631-86-9
EC NUMBER (EINECS): 231-545-4
PERCENTAGE: <9.00

COMPONENT: LEAD
CAS NUMBER: 7439-92-1
EC NUMBER (EINECS): 231-100-4
PERCENTAGE: <0.20

COMPONENT: PHOSPHORUS, WHITE
CAS NUMBER: 7723-14-0
EC NUMBER (EINECS): 231-768-7
PERCENTAGE: <0.05

COMPONENT: ARSENIC
CAS NUMBER: 7440-38-2
EC NUMBER (EINECS): 231-148-6
PERCENTAGE: <0.05

COMPONENT: COPPER
CAS NUMBER: 7440-50-8
EC NUMBER (EINECS): 231-159-6
PERCENTAGE: <0.20

COMPONENT: CHROMIUM
CAS NUMBER: 7440-47-3
EC NUMBER (EINECS): 231-157-5
PERCENTAGE: <0.30

COMPONENT: ZINC
CAS NUMBER: 7440-66-6
EC NUMBER (EINECS): 231-175-3
PERCENTAGE: <0.20

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=1 FIRE=0 REACTIVITY=0

EMERGENCY OVERVIEW:
PHYSICAL DESCRIPTION: Reddish-gray or silvery, brittle, metallic solid
MAJOR HEALTH HAZARDS: nerve damage, cancer
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, changes in body temperature, metal fume fever, nausea, vomiting, diarrhea, chest pain, difficulty breathing, headache
LONG TERM EXPOSURE: irritation, cough, loss of appetite, weight loss, chest pain, difficulty breathing, disorientation, difficulty speaking, sleep disturbances, emotional disturbances, hallucinations, mood swings, tremors, muscle cramps, loss of coordination, hearing loss, visual disturbances, bluish skin color, lung congestion, lung damage, blood disorders, kidney damage, liver damage, nerve damage, cancer
SKIN CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: irritation, skin disorders
EYE CONTACT:
SHORT TERM EXPOSURE: irritation, eye damage
LONG TERM EXPOSURE: irritation, eye damage
INGESTION:
SHORT TERM EXPOSURE: irritation, nausea, vomiting, diarrhea
LONG TERM EXPOSURE: drowsiness

CARCINOGEN STATUS:
OSHA: No

NTP: Yes
IARC: Yes

4. FIRST AID MEASURES

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.

5. FIRE FIGHTING MEASURES

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

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

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.

6. ACCIDENTAL RELEASE MEASURES

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

OCCUPATIONAL RELEASE:
Collect spilled material in appropriate container for disposal. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

7. HANDLING AND STORAGE

STORAGE: Store and handle in accordance with all current regulations and standards. See original container for storage recommendations. Keep separated from incompatible substances.

HANDLING: Use methods to minimize dust.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:
MANGANESE, METALLURGICAL:
If an employee is exposed to lead for more than 8 hours in any work day, the permissible exposure limit, as a time weighted average (TWA) for that day, shall be reduced according to the following formula: Maximum permissible limit (in ug/m3) = 400 divided by hours worked in the day.

MANGANESE AND COMPOUNDS (as Mn):
5 mg/m3 OSHA ceiling (metal) (fume) (compounds)
1 mg/m3 OSHA TWA (particulate) (vacated by 58 FR 35338, June 30, 1993)
3 mg/m3 OSHA STEL (particulate) (vacated by 58 FR 35338, June 30, 1993)
0.2 mg/m3 ACGIH TWA (metal and inorganic compounds)
1 mg/m3 NIOSH recommended TWA 10 hour(s) (metal) (fume) (compounds)
3 mg/m3 NIOSH recommended STEL (metal) (fume) (compounds)
0.5 mg/m3 DFG MAK (peak limitation category - I, with excursion factor of 1) (inhalable fraction) (metal and inorganic compounds)
0.5 mg/m3 UK WEL TWA (metal) (inorganic compounds)
0.5 mg/m3 UK WEL TWA (metal and inorganic compounds)

MEASUREMENT METHOD: NIOSH IV # 7300, 7301, 7303, 9102; OSHA # ID121, ID125G

IRON OXIDE DUST AND FUME (as Fe):
10 mg/m3 OSHA TWA
5 mg(FeO3)/m3 ACGIH TWA (respirable fraction)
5 mg/m3 NIOSH recommended TWA 10 hour(s) (total particulate)
1.5 mg/m3 DFG MAK (respirable fraction)
5 mg/m3 UK WEL TWA
10 mg/m3 UK WEL STEL

MEASUREMENT METHOD: NIOSH IV # 7300, 7301, 7303, 9102; OSHA ID121, ID125G

ALUMINUM OXIDE (ALUMINA):
5 mg/m3 OSHA TWA (respirable dust fraction)
15 mg/m3 OSHA TWA (total dust)
10 mg/m3 OSHA TWA (total particulate) (vacated by 58 FR 35338, June 30, 1993)
10 mg/m3 ACGIH TWA
1.5 mg/m3 DFG MAK (respirable fraction) (peak limitation category - II, with excursion factor of 8) (fume)
0.25 fibers/cc AGS TRK (fibrous forms) (effective 1 Jan 2005 no longer valid per amendment)
10 mg/m3 UK WEL TWA (total inhalable dust)
4 mg/m3 UK WEL TWA (respirable dust)

MEASUREMENT METHOD: NIOSH IV # 0500, 0600; OSHA ID109SG, ID198SG

SILICON DIOXIDE, AMORPHOUS (SILICA, AMORPHOUS):
20 mppcf OSHA TWA (<1% crystalline silica)
OSHA TWA (<1% crystalline silica) (80 mg/m3 divided by %SiO2)
6 mg/m3 NIOSH recommended TWA 10 hour(s)
4 mg/m3 DFG MAK (inhalable fraction)
0.3 mg/m3 DFG MAK (respirable fraction)
6 mg/m3 UK WEL TWA (total inhalable dust)
2.4 mg/m3 UK WEL TWA (respirable dust)

MEASUREMENT METHOD: NIOSH IV # 7501

LEAD, INORGANIC FUMES AND DUST (as Pb):
50 ug/m3 OSHA TWA 8 hour(s)
30 ug/m3 OSHA action level 8 hour(s)
0.05 mg/m3 ACGIH TWA
0.050 mg/m3 NIOSH recommended TWA 10 hour(s) (metal and compounds)
0.15 mg/m3 EC OEL TWA (BOELV)

MEASUREMENT METHOD: NIOSH IV # 7082, 7105, 7300, 7301, 7303, 7700, 7701, 7702, 9102, 9105; OSHA ID121, ID125G, ID206

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: Under conditions of frequent use or heavy exposure, respiratory protection may be needed. Respiratory protection is ranked in order from minimum to maximum. Consider warning properties before use.
Any dust, mist, and fume respirator.
Any air-purifying respirator with a high-efficiency particulate filter.
Any powered, air-purifying respirator with a dust, mist, and fume filter.
Any powered, air-purifying respirator with a high-efficiency particulate filter.
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.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DESCRIPTION: Reddish-gray or silvery, brittle, metallic solid
BOILING POINT: Not applicable
MELTING POINT: Not available
VAPOR PRESSURE: Not applicable
VAPOR DENSITY: Not applicable
SPECIFIC GRAVITY: Not available
WATER SOLUBILITY: insoluble
PH: Not applicable
VOLATILITY: Not applicable
ODOR THRESHOLD: Not available
EVAPORATION RATE: Not applicable
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available
SOLVENT SOLUBILITY:
Soluble: mineral acids

10. STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: None reported.

INCOMPATIBILITIES: metals, oxidizing materials, halogens, peroxides, combustible materials, acids, bases, halo carbons, metal salts

MANGANESE:
ALUMINUM (DUST): Forms explosive mixtures with air.
AMMONIUM NITRATE (FUSED): Violent or explosive reaction.
BROMINE PENTAFLUORIDE: Violent reaction and possible ignition.
CARBON DIOXIDE: Ignites.
CHLORINE: Ignites.
FLUORINE: Incandescent reaction.
HYDROGEN PEROXIDE: Violent decomposition and/or ignition.
NITRIC ACID: Incandescent reaction and feeble explosion.
NITROGEN DIOXIDE: Ignition.
OXIDIZERS (STRONG): Fire and explosion hazard.
PHOSPHORUS: Incandescent reaction when heated.
SULFUR DIOXIDE: Burns brilliantly on warming.

IRON:
ACETALDEHYDE: Polymerizes readily.
AMMONIUM NITRATE: Violent or explosive reaction.
AMMONIUM PEROXODISULFATE: Violent reaction.
BROMINE PENTAFLUORIDE: Violent reaction and possible ignition.
CHLORIC ACID: Forms explosive compound.
CHLORINE (GAS): Ignites.
CHLORINE TRIFLUORIDE: Violent reaction and possible ignition.
CHLOROFORMAMIDINIUM NITRATE: Explosive ignition.
DINITROGEN TETRAOXIDE: Ignites.
FLUORINE: Ignites.
HYDROGEN PEROXIDE: Violent decomposition.
MINERAL ACIDS: Readily attacked.
NITROGEN DIOXIDE: Incandescent reaction.
NITRYL FLUORIDE: Incandesces when heated.
ORGANIC ACIDS: Attacked or dissolved.
PEROXYFORMIC ACID: Incompatible.
PHOSPHORUS: Incandesces when heated.
POLYSTYRENE BEADS: Possible static ignition.
POTASSIUM DICHROMATE: Ignites on contact.
POTASSIUM PERCHLORATE + MANGANESE DIOXIDE: Ignites.
SODIUM ACETYLIDE: Possible violent reaction.
SODIUM PEROXIDE: Ignites under friction @ 240 C.
SULFURIC ACID: Possible explosion hazard.

ALUMINUM OXIDE (ALUMINA):
CHLORINATED RUBBER (HOT): Incompatible.
CHLORINE TRIFLUORIDE: Violent reaction and possible ignition.
ETHYLENE OXIDE: May initiate explosive polymerization.
HALOCARBONS: Exothermic reaction above 200 C.

HALOCARBONS + METALS: Exothermic reaction at ambient temperatures.
OXYGEN DIFLUORIDE: Exothermic reaction.
SODIUM NITRATE: May form explosive mixture.
VINYL ACETATE: Possible vigorous reaction.

SILICON DIOXIDE:
CHLORINE TRIFLUORIDE: Fire hazard.
FLUORINE: Fire hazard.
HYDROCHLORIC ACID + WATER: Explosion hazard with gel form.
HYDROFLUORIC ACID: Dissolves, releasing silicon tetrafluoride.
HYDROGEN FLUORIDE: Incompatible.
HYDROGENATED VEGETABLE OILS: Incompatible.
MAGNESIUM (POWDERED): Explosion hazard on heating in the presence of moisture.
MANGANESE TRIFLUORIDE: May react violently on heating, releasing silicon tetrafluoride.
OXIDIZERS (STRONG): Fire and explosion hazard.
OXYGEN DIFLUORIDE: Explosion hazard under certain conditions and in the presence of moisture.
OZONE: Potential explosion hazard at low temperatures if organic material is present.
PHOSPHORIC ACID (CONCENTRATED): Attacks on heating.
SODIUM (BURNING): Reacts with finely divided silica.
VINYL ACETATE (VAPOR): May react vigorously with gel form.
XENON HEXAFLUORIDE: May react explosively by forming xenon trioxide.

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: miscellaneous decomposition products

POLYMERIZATION: Will not polymerize.

11. TOXICOLOGICAL INFORMATION

MANGANESE:
IRRITATION DATA:
500 mg/24 hour(s) skin-rabbit mild; 500 mg/24 hour(s) eyes-rabbit mild
TOXICITY DATA:
2300 ug/m3 inhalation-man TCLo; 9 gm/kg oral-rat LD50; 3709 mg/m3/6 hour(s)-13 week(s) intermittent inhalation-rat TCLo; 180 mg/kg/30 day(s) intermittent intraperitoneal-rat TDLo; 210 ug/m3/5 year(s) intermittent inhalation-man TCLo; 0.3 mg/m3/5 hour(s)-26 week(s) intermittent inhalation-rat TCLo; 0.3 mg/m3/5 hour(s)-26 week(s) intermittent inhalation-monkey TCLo; 0.7 mg/m3/24 hour(s)-22 week(s) continuous inhalation-rat TCLo; 0.7 mg/m3/24 hour(s)-22 week(s) continuous inhalation-mouse TCLo; 250 mg/m3/1 year(s) intermittent inhalation-human TCLo; 0.5 mg/m3/39 week(s) intermittent inhalation-human TCLo; 200 mg/kg/20 day(s) intermittent oral-rat TDLo; 216 mg/kg/15 week(s) intermittent intraperitoneal-rat TDLo; 144 mg/kg/5 week(s) intermittent intraperitoneal-rat TDLo; 24 mg/kg/5 week(s) intermittent unreported-rat TDLo; 72 mg/kg/5 week(s) intermittent unreported-rat TDLo; 57.6 mg/kg/4 week(s) intermittent intraperitoneal-rat TDLo
ACUTE TOXICITY LEVEL:
Slightly Toxic: ingestion
TARGET ORGANS: nervous system
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: history of alcoholism, blood system disorders, liver disorders, nervous system disorders, respiratory disorders
TUMORIGENIC DATA:
400 mg/kg intramuscular-rat TDLo/1 year(s) intermittent

MUTAGENIC DATA:
dominant lethal test - rat intraperitoneal 25 mg/kg
REPRODUCTIVE EFFECTS DATA:
50 mg/kg oral-rat TDLo 20 day(s) post pregnancy continuous; 322.5 mg/kg oral-mouse TDLo 43 day(s) male; 1290 mg/kg oral-mouse TDLo 43 day(s) male
ADDITIONAL DATA: Symptoms may depend on a combination of contributing factors including genetic predisposition, age, nutrition, anemia or alcohol.

IRON:
TOXICITY DATA:
77 mg/kg oral-child TDLo; 30 gm/kg oral-rat LD50; 20 mg/kg intraperitoneal-rabbit LDLo; 20 gm/kg oral-guinea pig LD50; 200 mg/kg oral-human LD50; 63 gm/kg/6 week(s) continuous oral-rat TDLo; 250 mg/m3/6 hour(s)-4 week(s) intermittent inhalation-rat TCLo; 105 mg/kg/5 week(s) continuous oral-rat TDLo
CARCINOGEN STATUS: Iron itself has not been evaluated by IARC. However iron and steel founding has been evaluated as IARC Group 1 (Human Sufficient Evidence). Studies have shown that certain exposures in iron and steel founding can cause lung cancer in humans. Excesses of leukemia and urogenital and digestive system cancers have also been reported.
ACUTE TOXICITY LEVEL:
Relatively Non-toxic: ingestion
TUMORIGENIC DATA:
450 mg/kg intratracheal-rat TDLo/15 week(s) intermittent

ALUMINUM OXIDE:
TOXICITY DATA:
>3600 mg/kg intraperitoneal-mouse LD50; 200 mg/m3/5 hour(s)-28 week(s) intermittent inhalation-rat TCLo; 200 mg/m3/5 hour(s)-28 week(s) intermittent inhalation-rabbit TCLo
CARCINOGEN STATUS: ACGIH: A4 -Not Classifiable as a Human Carcinogen
ACUTE TOXICITY LEVEL: Insufficient Data.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: respiratory disorders
TUMORIGENIC DATA:
90 mg/kg intrapleural-rat TDLo; 200 mg/kg implant-rat TDLo; 200 mg/kg implant-rat TD

SILICON DIOXIDE:
TOXICITY DATA:
>200 gm/m3/1 hour(s) inhalation-rat LC; 1 mg/kg intratracheal-rat TDLo; 224 mg/kg/4 week(s) continuous oral-dog TDLo
CARCINOGEN STATUS: IARC: Human Inadequate Evidence, Animal Inadequate Evidence, Group 3 (Amorphous silica)
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: respiratory disorders

QUARTZ:
TOXICITY DATA:
16 mppcf/8 hour(s)-17.9 year(s) intermittent inhalation-human TCLo; 300 ug/m3/10 year(s) intermittent inhalation-human LCLo; 90 mg/kg intravenous-rat LDLo; 200 mg/kg intratracheal-rat LDLo; 40 mg/kg intravenous-mouse LDLo; >20 mg/kg intratracheal-mouse LD; 20 mg/kg intravenous-dog LDLo; 200 mg/kg inhalation-rat TCLo; 250 mg/kg intratracheal-rat LDLo; 240 mg/kg/1 hour(s) intratracheal-rat TDLo; 1.5 mg/kg intratracheal-rat TDLo; 120 gm/kg oral-rat TDLo; 15.69 mg/kg intratracheal-rat TDLo; 16.7 mg/kg intratracheal-mouse TDLo; 40 mg/kg inhalation-mouse TCLo; 25 mg/kg intratracheal-rat TDLo; 20 mg/kg implant-rabbit TDLo; 80 mg/kg intratracheal-mouse TDLo; 150 mg/kg intratracheal-rat TDLo; 40 mg/kg inhalation-mouse TCLo; 80 mg/kg intratracheal-mouse TDLo; 100 mg/kg intratracheal-mouse TDLo; 1 mg/kg inhalation-rat TCLo; 10 mg/kg intratracheal-rat TDLo; 1250 ug/kg intratracheal-rat TDLo; 100 mg/kg intratracheal-rat TDLo; 30 mg/kg intratracheal-rat TDLo; 50 mg/kg intratracheal-rat TDLo; 10 mg/kg intratracheal-rat TDLo; 5 mg/kg intratracheal-rat TDLo; 5 mg/kg intratracheal-rat TDLo; 80 mg/m3/26 week(s) intermittent inhalation-rat TCLo; 108 mg/m3/6 hour(s)-3 day(s) intermittent inhalation-rat TCLo; 58 mg/m3/13 week(s)

intermittent inhalation-rat TCLo; 1475 ug/m3/8 hour(s)-21 week(s) intermittent inhalation-mouse TCLo; 4932 ug/m3/24 hour(s)-39 week(s) continuous inhalation-mouse TCLo; 28 mg/m3/3 week(s) intermittent inhalation-guinea pig TCLo; 3 mg/m3/6 hour(s)-78 week(s) intermittent inhalation-hamster TCLo; 1000 gm/m3/10 day(s) intermittent inhalation-domestic animal TCLo; 2.88 mg/kg/12 week(s) intermittent intratracheal-rat TDLo; 11.52 mg/kg/12 week(s) intermittent intratracheal-rat TDLo; 15 mg/m3/26 week(s) intermittent inhalation-rat TCLo; 0.74 mg/m3/2 year(s) intermittent inhalation-rat TCLo; 10 mg/m3/75 day(s) intermittent inhalation-rat TCLo; 10 mg/m3/818 day(s) intermittent inhalation-monkey TCLo; 240 ug/kg/12 week(s) intermittent intratracheal-rat TDLo; 960 ug/kg/12 week(s) intermittent intratracheal-rat TDLo; 160 mg/kg/2 week(s) intermittent inhalation-mouse TCLo; 6.2 mg/m3/6 hour(s)-6 week(s) intermittent inhalation-rat TCLo; 15 mg/m3/79 day(s) intermittent inhalation-rat TCLo; 300 ug/kg/12 week(s) intermittent intratracheal-rat TDLo

CARCINOGEN STATUS: NTP: Known Human Carcinogen; IARC: Human Sufficient Evidence, Animal Sufficient Evidence, Group 1; ACGIH: A2 -Suspected Human Carcinogen; EC: Category 2

Adenocarcinomas and squamous-cell carcinomas of the lung in rats were produced after inhalation or repeated intratracheal instillation of various forms of crystalline silica. Malignant lymphomas developed in rats after intrapleural and intraperitoneal injections of quartz suspensions and intrapleural injection of cristobalite and tridymite. Epidemiologic studies indicate lung cancer occurs more frequently among silicotics than in the general population.

ACUTE TOXICITY LEVEL: Insufficient Data.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: respiratory disorders

TUMORIGENIC DATA:

50 mg/m3 inhalation-rat TCLo/6 hour(s)-71 week(s) intermittent; 45 mg/kg intraperitoneal-rat TDLo; 90 mg/kg intravenous-rat TDLo; 90 mg/kg intrapleural-rat TDLo; 111 mg/kg intratracheal-rat TDLo; 100 mg/kg intratracheal-rat TDLo/19 week(s) intermittent; 900 mg/kg implant-rat TDLo; 4000 mg/kg implant-mouse TDLo; 83 mg/kg intrapleural-hamster TDLo; 90 mg/kg intraperitoneal-rat TD/4 week(s) intermittent; 450 mg/kg intraperitoneal-rat TD/4 week(s) intermittent; 4554 mg/kg implant-rat TD; 200 mg/kg intrapleural-rat TD; 100 mg/kg intrapleural-rat TD; 100 mg/kg intrapleural-rat TD; 100 mg/kg intrapleural-rat TD

MUTAGENIC DATA:

micronucleus test - human lung 40 ug/cm2; micronucleus test - hamster lung 160 ug/cm2; DNA damage - rat intratracheal 3 mg/kg

ADDITIONAL DATA: Smoking may enhance the toxic effects.

LEAD:

TOXICITY DATA:

450 mg/kg/6 year(s) oral-woman TDLo; 10 ug/m3 inhalation-human TCLo; 1 gm/kg intraperitoneal-rat LDLo; 160 mg/kg oral-pigeon LDLo; 271 mg/m3 inhalation-human LCLo; 155 mg/kg oral-human LDLo; 50 mg/kg intraperitoneal-rabbit TDLo; 1050 ug/kg/30 week(s) intermittent oral-rat TDLo; 6879 mg/kg/5 week(s) continuous oral-mouse TDLo; 20 mg/m3/6 hour(s)-30 day(s) intermittent inhalation-guinea pig TCLo; 200 ug/m3/6 hour(s)-26 week(s) intermittent inhalation-guinea pig TCLo; 582 mg/kg/30 day(s) continuous oral-non-mammalian species TDLo; 4099.2 mg/kg/8 week(s) intermittent oral-mouse TDLo; 10248 mg/kg/20 week(s) intermittent oral-mouse TDLo; 9.9 mg/m3/122 day(s) intermittent inhalation-human TCLo; 0.011 mg/m3/26 week(s) intermittent inhalation-human TCLo; 0.012 mg/kg/10 day(s) intermittent unreported-rat TDLo; 0.012 mg/kg/10 day(s) intermittent unreported-rat TDLo; 120 mg/kg/60 day(s) intermittent unreported-horse, donkey TDLo; 93.6 mg/kg/30 day(s) continuous oral-rat TDLo; 0.03 mg/m3/1 year(s) intermittent inhalation-man TCLo; 0.03 mg/m3/5 year(s) intermittent inhalation-man TCLo; 0.109 mg/m3/5 year(s) intermittent inhalation-man TCLo; 43.75 mg/kg/1 week(s) continuous oral-rat TDLo

CARCINOGEN STATUS: IARC: Human Inadequate Evidence, Animal Sufficient Evidence, Group 2B (Lead and inorganic lead compounds); ACGIH: A3 -Animal Carcinogen (Lead and inorganic lead compounds)

Renal tumors were produced in animals by lead acetate, subacetate and phosphate given orally, subcutaneously or intraperitoneally. No evaluation could be made of the carcinogenicity of powdered lead.

ACUTE TOXICITY LEVEL: Insufficient Data.

TARGET ORGANS: nervous system, kidneys, teratogen
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: blood system disorders, gastrointestinal disorders, nervous system disorders, respiratory disorders
MUTAGENIC DATA:
cytogenetic analysis - human unreported 50 ug/m3; cytogenetic analysis - rat inhalation 23 ug/m3 16 week(s); cytogenetic analysis - monkey oral 42 mg/kg 30 week(s); DNA damage - human inhalation 4.2 ng/L 6 year(s)-intermittent
REPRODUCTIVE EFFECTS DATA:
790 mg/kg oral-rat TDLo multigenerations; 1140 mg/kg oral-rat TDLo 14 day(s) pre pregnancy/21 day(s) post pregnancy continuous; 520 mg/kg oral-rat TDLo 7-22 day(s) pregnant female/10 day(s) post pregnancy continuous; 1100 mg/kg oral-rat TDLo 1-22 day(s) pregnant female continuous; 10 mg/m3 inhalation-rat TCLo/24 hour(s) 1-21 day(s) pregnant female continuous; 3 mg/m3 inhalation-rat TCLo/24 hour(s) 1-21 day(s) pregnant female continuous; 1120 mg/kg oral-mouse TDLo multigenerations; 6300 mg/kg oral-mouse TDLo 1-21 day(s) pregnant female continuous; 300 mg/kg oral-mouse TDLo 1-2 day(s) pregnant female continuous; 4800 mg/kg oral-mouse TDLo 1-16 day(s) pregnant female continuous; 662 mg/kg oral-domestic animal TDLo 1-21 week(s) pregnant female continuous; 814 mg/kg oral-domestic animal TDLo 5 week(s) pre pregnancy/1-21 week(s) pregnant female continuous; 2118 mg/kg oral-mammal TDLo 15 day(s) post pregnancy continuous; 4099.2 mg/kg oral-mouse TDLo 56 day(s) male; 24 ug/kg oral-mouse TDLo multigenerations
ADDITIONAL DATA: May cross the placenta. Smoking may result in higher blood lead levels. May be excreted in breast milk.

HEALTH EFFECTS:
INHALATION:
ALUMINUM OXIDE (ALUMINA): Inhalation of high concentrations may cause coughing, shortness of breath, respiratory tract irritation due to mechanical action, unpleasant deposits in the nasal passages, and exacerbation of symptoms in persons with impaired pulmonary function. Humans exposed chronically to aluminum oxide, particle size approximately 1.2 microns, did not experience either systemic or respiratory adverse effects. Hydrated aluminum oxide, injected intratracheally, produced dense and numerous nodules of advanced fibrosis in rats, a reticulin network with occasional collagen fibers in mice and guinea pigs, and only a slight reticulin network in rabbits. A production process in which aluminum oxide (bauxite), iron, coke, and silica are fused at 2000 C poses a threat of Shaver's disease, a rapidly progressive and often fatal interstitial fibrosis of the lungs. See information on metal fume fever.

ACUTE EXPOSURE:
MANGANESE: Dust or fumes may be irritating to the mucous membranes. Occupational exposure to dust or fumes has been reported to cause upper respiratory tract problems, black mucous membrane discharge from the nose, and neurological damage. Metal fume fever, an influenza-like illness, may occur due to the inhalation of freshly formed metal oxide particles sized below 1.5 microns and usually between 0.02-0.05 microns. Symptoms may be delayed 4-12 hours and begin with a sudden onset of thirst, and a sweet, metallic or foul taste in the mouth. Other symptoms may include upper respiratory tract irritation accompanied by coughing and a dryness of the mucous membranes, lassitude and a generalized feeling of malaise. Fever, chills, muscular pain, mild to severe headache, nausea, occasional vomiting, exaggerated mental activity, profuse sweating, excessive urination, diarrhea and prostration may also occur. Tolerance to fumes develops rapidly, but is quickly lost. All symptoms usually subside within 24-36 hours.

IRON: Dust may cause mucous membrane and respiratory irritation due to mechanical action. Metal fume fever, an influenza-like illness, may occur due to the inhalation of freshly formed iron oxide particles sized below 1.5 microns and usually between 0.02-0.05 microns. Symptoms may be delayed 4-12 hours and begin with a sudden onset of thirst, and a sweet, metallic or foul taste in the mouth. Other symptoms may include upper respiratory tract irritation accompanied by coughing and a dryness of the mucous membranes. Lassitude and a generalized feeling of malaise. Fever, chills, muscular pain, mild to severe headache, nausea, occasional vomiting, exaggerated mental activity, profuse sweating, excessive urination, diarrhea and prostration may also occur. Tolerance to fumes develops rapidly, but is quickly lost. All symptoms usually subside within 24-36 hours.

METAL FUME FEVER: Metal fume fever, an influenza-like illness, may occur due to the inhalation of freshly formed metal oxide particles sized below 1.5 microns and usually between 0.02-0.05 microns. Symptoms may be delayed 4-12 hours and begin with a sudden onset of thirst, and a sweet, metallic or foul taste in the mouth.

Other symptoms may include upper respiratory tract irritation accompanied by coughing and a dryness of the mucous membranes, lassitude and a generalized feeling of malaise. Fever, chills, muscular pain, mild to severe headache, nausea, occasional vomiting, exaggerated mental activity, profuse sweating, excessive urination, diarrhea and prostration may also occur. Tolerance to fumes develops rapidly, but is quickly lost. All symptoms usually subside within 24-36 hours.

SILICON DIOXIDE: Dusts may cause irritation of the respiratory tract and coughing.

QUARTZ: Exposure to high concentrations may cause physical discomfort of the upper respiratory tract.

CHRONIC EXPOSURE:
MANGANESE: If sufficient quantities of manganese dust or fumes are inhaled and absorbed, systemic poisoning known as "manganism", a Parkinsonian-like syndrome may occur. It is characterized initially by anorexia, asthenia, headache, insomnia or somnolence, irritability, restlessness, and spasm or pain in the muscles. Manganese psychosis may follow with uncontrollable behavior, unaccountable laughing or crying, visual hallucinations, confusion and euphoria. Sexual excitement followed by impotence may occur. These symptoms may disappear with the onset of true neurological manifestations of slow, slurred and irregular speech, monotonous tone, double vision, impaired hearing, difficulty with fine motor movements, and disturbances in gait and balance with frequent propulsion or retropulsion. Mask-like face, decreased movement of the eyelids and eyes and tremors of the upper extremities and head may also occur. Other signs and symptoms may include urinary bladder disturbances, excessive salivation and sweating, hematological changes, vasomotor disorders, decreased pulmonary function, kidney and possibly liver damage. Removal from exposure shortly after onset of symptoms usually results in improvement, although there may be residual disturbances in gait and speech. Once manganism is well established it becomes irreversible and progressive, but not fatal. An increased incidence of bronchitis and pneumonitis has been reported in studies of workers exposed to manganese dust and fume, and although these effects have been confirmed by animal experiments, they may represent an aggravation of a pre-existing condition. Allergic diseases of the respiratory tract have also been reported in one study.

IRON: Prolonged or repeated exposure may cause a mottling of the lungs, a condition called siderosis which is considered to be a benign pneumoconiosis that does not cause significant physiologic impairment. Symptoms may include chronic bronchitis, emphysema, and dyspnea on exertion.

METAL FUME FEVER: There is no form of chronic metal fume fever, however, repeated bouts with symptoms as described above are quite common. Resistance to the condition develops after a few days of exposure, but is quickly lost in 1 or 2 days.

SILICON DIOXIDE: Exposure to dusts of crystalline or amorphous silica for 6 months to 30 years may result in silicosis with symptoms of cough, chest pain, dyspnea, tachypnea, marked weakness and weight loss. This pulmonary insufficiency may be characterised by diffuse nodular fibrosis, distortion of bronchi, diminished chest expansion, decreased vital capacity and compensatory and bullous emphysema. Although pulmonary fibrosis has been reported from workers exposed to amorphous silica, the crystalline form is the established cause of fibrotic response in the lung. However, the amorphous form has been reported fibrogenic to a lesser extent. As the disease progresses, cor pulmonale, cardiorespiratory failure, and death may occur. Various forms and preparations of crystalline silica produced adenocarcinomas and squamous cell carcinomas of the lungs in rats.

QUARTZ: Inhalation of very high concentrations of finely divided crystalline silica dust, exposure ranging from a few weeks to 4-5 years, may cause a rapidly developing silicosis, characterized by pulmonary insufficiency with severe dyspnea, violent coughing, tachypnea, weight loss, and cyanosis leading to the development of cor pulmonale and death within a relatively short period of time. A slowly developing silicosis may result from exposure for 6 months-30 years

to relatively low levels of the dust. The first symptom is usually a slowly increasing, non-disabling, exertional dyspnea due to pulmonary fibrosis and the emphysema associated with it. Continued exposure may increase the rate of progression of the disease. Also, the fibrogenic action may continue when exposure ceases. As the fibrosis advances, other symptoms may include shortness of breath, productive cough, wheezing, chest tightness or pain, marked weakness, decreased capacity for work, and repeated non-specific chest illnesses. Cyanosis, clubbing of digits, orthopnea, or serious weight loss are not usually evident until the disease is advanced. Pulmonary infections, which may be indicated by hemoptysis, and cardiac decompensation may exacerbate the symptoms. Three major complications, which are the most frequent causes of death, are pulmonary tuberculosis, respiratory insufficiency which is due to the massive emphysematous and fibrotic changes and is sometimes accompanied by chronic cor pulmonale, and acute bronchopulmonary infection. A number of studies have shown that persons diagnosed as having silicosis have an increased risk for dying from lung cancer.

This increase has been seen among miners, quarry workers, foundry workers, ceramic workers, granite workers, and stone cutters. In some of these studies, the risk of lung cancer increased with the duration of employment. Various forms and preparations of crystalline silica produced adenocarcinomas and squamous cell carcinomas of the lungs in rats.

SKIN CONTACT:
ACUTE EXPOSURE:
MANGANESE: 500 mg applied to the skin of rabbits caused mild irritation.

IRON: Dust may cause irritation. Penetration of iron particles in the skin may cause an exogenous siderosis which may be characterized by a red-brown pigmentation of the affected area.

ALUMINUM OXIDE (ALUMINA): Contact may cause an irritant dermatitis accompanied by pruritis.

SILICON DIOXIDE: Prolonged skin contact with dry particulate may cause drying of the skin.

QUARTZ: May cause irritation of intact skin due to mechanical abrasion. If the skin is abraded, a heavy growth of scar tissue may be induced.

CHRONIC EXPOSURE:
MANGANESE: Sensitization has been reported in guinea pigs.

IRON: May cause same effects as reported in acute exposure.

ALUMINUM OXIDE (ALUMINA): No data available.

SILICON DIOXIDE: No data available.

QUARTZ: No data available.

EYE CONTACT:
ACUTE EXPOSURE:
MANGANESE: Dust or fumes may be irritating to the eyes. 500 mg applied to the eyes of rabbits caused mild irritation.

IRON: May cause irritation due to mechanical action. Iron particles imbedded in the eye may cause ocular siderosis. Effects may include discoloration of the cornea and iris, and pupillary effects including poor reaction to light and accomodation. If a particle enters the lens there may be cataract formation. Glaucoma occurs rarely in some cases of ocular siderosis.

ALUMINUM OXIDE (ALUMINA): Dust may cause mechanical irritation with redness and possibly swelling of the

conjunctiva.

SILICON DIOXIDE: Dusts may cause irritation with redness and pain.

QUARTZ: May cause irritation due to mechanical action. Particles of silica in the range of 2-3 micrometers introduced into the corneal stroma of rabbit eyes caused very little reaction. These same particles introduced into the anterior chamber resulted in an inflammatory reaction in 3-5 weeks with the formation of fibrotic nodules in the iridocorneal angle. Finely divided silica injected into the vitreous of rabbit eyes has caused necrosis of the retina and atrophy of the choroid.

CHRONIC EXPOSURE:
MANGANESE: Fumes may cause conjunctivitis.

IRON: Repeated and prolonged contact may cause conjunctivitis and other effects reported in acute exposure.

ALUMINUM OXIDE (ALUMINA): No data available.

SILICON DIOXIDE: No data available.

QUARTZ: An abnormally high silicon content in the cornea, and a gradual decrease in visual acuity due to corneal opacities in the pupillary area, have been reported in a group of foundry workers.

INGESTION:
ACUTE EXPOSURE:
MANGANESE: Extremely large doses may cause gastrointestinal irritation and possibly systemic toxicity.

IRON: There are no reports available on poisoning from metallic iron, which is poorly absorbed. The principal manifestations of poisoning with iron compounds are vomiting, diarrhea, and circulatory collapse.

ALUMINUM OXIDE (ALUMINA): No data available.

SILICON DIOXIDE: The effects of ingestion are purely mechanical as the substance is inert chemically and biologically.

QUARTZ: Effects of ingestion are due to mechanical action as crystalline silicas are biologically inert.

CHRONIC EXPOSURE:
MANGANESE: Manganese poisoning has been reported in persons drinking manganese-contaminated well water. Prolonged ingestion of manganese in water has produced lethargy, edema, and decreased movement of the eyes and eyelids.

IRON: Repeated or prolonged exposure may cause hemosiderosis or hemochromatosis.

ALUMINUM OXIDE (ALUMINA): Some aluminum compounds cause constipation.

SILICON DIOXIDE: No data available.

QUARTZ: No data available.

12. ECOLOGICAL INFORMATION

Not available

13. DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations. Hazardous Waste Number(s): D008. Dispose of in accordance with U.S. EPA 40 CFR 262 for concentrations at or above the Regulatory level. Regulatory level- 5.0 mg/L.

14. TRANSPORT INFORMATION

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.

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):
LEAD: 10 LBS RQ (solid metal particles < 100 micrometer diameter (0.004 inches))

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):
MANGANESE AND COMPOUNDS (as Mn)
ALUMINUM OXIDE (ALUMINA): fibrous forms
LEAD
LEAD COMPOUNDS

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

STATE REGULATIONS:
California Proposition 65:
Known to the state of California to cause the following:
LEAD
Cancer (Oct 01, 1992)
Developmental toxicity (Feb 27, 1987)
Male reproductive toxicity (Feb 27, 1987)
Female reproductive toxicity (Feb 27, 1987)
LEAD COMPOUNDS
Cancer (Oct 01, 1992)
Developmental toxicity (Feb 27, 1987)
Male reproductive toxicity (Feb 27, 1987)
Female reproductive toxicity (Feb 27, 1987)

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: Not determined.

EUROPEAN REGULATIONS:
EC CLASSIFICATION (CALCULATED): Not determined.

NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): Listed on inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

16. OTHER INFORMATION

MSDS SUMMARY OF CHANGES
11. TOXICOLOGICAL INFORMATION

J.5 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._____