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

IN REPLY

REFER TO DNSC-C2

April 16, 2004

AMENDMENT NUMBER 006
TO
SOLICITATION OF OFFERS
DLA-MANGANESE, METALLURGICAL
AND CHEMICAL GRADES-002

The above referenced Solicitation of Offers, DLA- MANGANESE METALLURGICAL AND CHEMICAL GRADES MANGANESE, dated June 17, 2003, is hereby amended to offer MANGANESE DIOXIDE, SYNTHETIC BATTERY GRADE for sale. The authorities to sell Metallurgical and Chemical grades have been exhausted for Fiscal Year 2004.

1. Reference to solicitation of offers, DLA-MANGANESE METALLURGICAL AND CHEMICAL GRADES 002 is hereby amended and should read DLA-MANGANESE, METALLURGICAL, CHEMICAL AND DIOXIDE SYNTHETIC BATTERY GRADES-002.

2. Amendments Nos. 001 through 005 of the solicitation are deleted. Amendment No. 006 supercedes all prior amendments issued under this solicitation.

3. Under Section A – Solicitation, Paragraph A.1 Introduction (SEP 02), delete Subparagraph a. and substitute it with the following:

   a. The Defense Logistics Agency (DLA), Defense National Stockpile Center (DNSC), is soliciting offers for the sale of approximately 1,364 SDT of Manganese Dioxide, Synthetic Battery Grade under DLA-MANGANESE, METALLURGICAL, CHEMICAL AND DIOXIDE SYNTHETIC BATTERY GRADES-002. Starting May 24, 2004, offers may be submitted daily. Offers must be received at the address in Section B.2.a. by 2:00 pm, local time, Ft. Belvoir, VA. In the event DNSC is closed at the time set, offers will be received at 2:00 p.m., local time, Ft. Belvoir, VA on the next DNSC business day.

4. Under Section A - Solicitation, Paragraph A.2 Description (JAN 95), add the following to Subparagraph a:

   a. The Manganese, Battery Synthetic Grade is stored inside in 10 gallon fiber board drums and 55 gallon steel drums. This material is being offered from the following DNSC Depots:

Hammond, IN
New Haven, IN

5. Under Section A – Solicitation, add the following Paragraph A.5. En Route Security Plan (MAR 04)

A.5. En Route Security Plan (MAR 04)

For transportation of Manganese Dioxide, Synthetic Battery Grade within the United States the Contractor must use a carrier that has an "en route security plan" conforming to the requirements of 49 CFR 172.802.

6. Under Section C – Inspection (SEP 02), add the following Paragraph 4:

4. Offerors, or their designees, are invited, at their expense, to visually inspect the drums of synthetic manganese dioxide to be sold prior to submitting an offer. One drum of material will be made available for sampling at each location in Section J.1.a. Sampling will be permitted from designated drum at each depot. Sample size not to exceed two (2) pounds per drum per offeror.

7. Under Section F - Shipping, Paragraph F.7 Environmental Protection (JUN 95), add the following Subparagraph d:

d. Department of Transportation Regulations

(1) The Department of Transportation regulates the domestic shipment of Manganese Dioxide, Synthetic Battery Grade as an "oxidizing solid, n.o.s." Contractors and their carriers are responsible for compliance with these regulations. As packaged, this material may only be shipped as a bulk shipment in sift-proof containers in accordance with 49 CFR 173.240.

(2) Contractors shall comply with all international agreements and applicable foreign laws for shipments outside the United States, including requirements of the international Maritime Dangerous Goods Code. The Government does not warrant that the current packaging is suitable for transportation of this material overseas. It is the Contractor's responsibility to determine whether over packing or repackaging is required.

(3) Prior to submitting an offer, Offerors may make arrangements with the Operations and Logistics Division Point of Contact identified in J.2 to arrange a visit to examine the packaging.

8. Under Section F - Shipping, Paragraph F.7 Environmental Protection (JUN 95), add the following Subparagraph c (3):

c (3) The wood pallets of materials used to package the commodity sold under this Solicitation may have been treated with a wood preservative to protect it from insect attack and decay. These preservatives penetrate and remain in the wood for a long time and may pose certain hazards if precautions are not taken during the handling, use, and disposal of these treated wood products. Treated wood products should not be burned in open fires. Contractors are encouraged to seek advice on proper disposal from the local environmental protection agency.

9. Under Section I – Submittals, Delete I.2 in its entirety and substitute the attached I.2, Item Offer Page – Manganese Dioxide, Synthetic Battery Grade (Mar 04).

10. Under Section J, add the following J.I.a, Description of Analysis (March, 04) for Manganese Dioxide, Synthetic Battery Grade, copy attached.

11. Under Section J, add the following to J.3.a, Storage Locations (MAR 04), copy attached.

12. Under Section J, add the following to J.4.a, Material Safety Data Sheet for Manganese Dioxide, Synthetic Battery Grade, copy attached.

Offerors shall acknowledge receipt of this Amendment by signing in the space provided below. 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, CHEMICAL AND DIOXIDE, SYNTHETIC BATTERY GRADES-002 remain unchanged and in full force and effect. If additional information is needed on the sale of Manganese please contact Mr. Kenrick Sawh at (703) 767-5483 or e-mail address, kenrick.sawh@dla.mil.

NAME OF FIRM _____

ADDRESS _____

TELEPHONE _____

FACSIMILE and Email _____

COMPLETED By and TITLE _____

SIGNATURE and DATE _____

DLA – MANGANESE BATTERY GRADE, SYNTHETIC
I.2 SHOPPING LIST (MAR 04)

Item	Location	Contract #	Lot #	# of Drums	Net Weight (SDT)	Unit Price Per SDT	Quantity (SDT)	Total Offer Price
1	HAMMOND, IN	0104940	001	152	9.4120	$	9.4120	$
2	HAMMOND, IN	NSP1850	001	92	39.3131	$	39.3131	$
3	HAMMOND, IN	NSP1850	002	92	39.8575	$	39.8575	$
4	HAMMOND, IN	0104940	007	488	30.1309	$	30.1309	$
5	HAMMOND, IN	0107710	030	800	49.2350	$	49.2350	$
6	HAMMOND, IN	0104940	043	80	4.9675	$	4.9675	$
7	HAMMOND, IN	NSP1850	787	12	4.9225	$	4.9225	$
8	HAMMOND, IN	NSP1850	788	12	4.8950	$	4.8950	$
9	HAMMOND, IN	NSP1850	789	11	4.8950	$	4.8950	$
10	HAMMOND, IN	NSP1850	790	12	4.9000	$	4.9000	$
11	HAMMOND, IN	NSP1850	791	11	4.8900	$	4.8900	$
12	HAMMOND, IN	NSP1850	792	12	4.9300	$	4.9300	$
13	HAMMOND, IN	NSP1850	831	11	4.9250	$	4.9250	$
14	HAMMOND, IN	NSP1850	832	12	4.9250	$	4.9250	$
15	HAMMOND, IN	NSP1850	833	11	4.9250	$	4.9250	$
16	HAMMOND, IN	NSP1850	834	11	4.9250	$	4.9250	$
17	HAMMOND, IN	NSP1850	835	12	4.9250	$	4.9250	$
18	HAMMOND, IN	NSP1850	836	11	4.9250	$	4.9250	$
		Depot Total:		**1,842**	**231.8985**			

NOTE 1: HAMMOND, IN - ITEM NUMBERS 1 - 6 ARE STORED IN 10 GALLON FIBER BOARD DRUMS ON PALLETS

NOTE 2: HAMMOND, IN - EXCEPT AS INDICATED IN NOTE 1, ITEMS ARE STORED IN 55 GALLON DRUMS AND MATERIAL IS STORED ON PALLETS.

NOTE 3: The miniumum offer quantity shall be one entire line item.

DLA – MANGANESE BATTERY GRADE, SYNTHETIC
I.2 SHOPPING LIST (MAR 04)

Item	Location	Contract #	Lot #	# of Drums	Net Weight (SDT)	Unit Price Per SDT	Quantity (SDT)	Total Offer Price
56	NEW HAVEN, IN	0107710	032	800	49.1800	$	49.1800	$
57	NEW HAVEN, IN	0107710	033	800	49.3000	$	49.3000	$
58	NEW HAVEN, IN	0107710	034	800	49.2550	$	49.2550	$
59	NEW HAVEN, IN	0107710	035	800	49.3150	$	49.3150	$
60	NEW HAVEN, IN	0107710	036	800	49.3430	$	49.3430	$
61	NEW HAVEN, IN	0107710	037	800	49.3900	$	49.3900	$
62	NEW HAVEN, IN	0107710	039	800	49.4300	$	49.4300	$
63	NEW HAVEN, IN	0107710	041	800	49.4155	$	49.4155	$
64	NEW HAVEN, IN	0107710	042	800	49.4350	$	49.4350	$
65	NEW HAVEN, IN	0107710	043	801	49.3700	$	49.3700	$
66	NEW HAVEN, IN	0107710	045	800	49.4250	$	49.4250	$
67	NEW HAVEN, IN	0107710	046	800	49.2931	$	49.2931	$
68	NEW HAVEN, IN	0107710	047	800	49.5200	$	49.5200	$
69	NEW HAVEN, IN	0107710	048	800	49.5400	$	49.5400	$
70	NEW HAVEN, IN	0107710	049	800	49.5500	$	49.5500	$
71	NEW HAVEN, IN	0107710	050	800	49.5300	$	49.5300	$
72	NEW HAVEN, IN	0107710	051	800	49.4100	$	49.4100	$
73	NEW HAVEN, IN	0107710	052	800	49.5400	$	49.5400	$
74	NEW HAVEN, IN	0107710	053	800	49.3880	$	49.3880	$
75	NEW HAVEN, IN	0107710	055	130	48.3312	$	48.3312	$
76	NEW HAVEN, IN	0107710	056	130	48.3843	$	48.3843	$
77	NEW HAVEN, IN	0107710	057	130	48.3258	$	48.3258	$
78	NEW HAVEN, IN	0107710	058	130	48.3556	$	48.3556	$
		Depot Total:		**15,721**	**1,132.0265**			
		Total Offered:		**17,563**	**1,363.9250**			

NOTE 1: NEW HAVEN, IN - ITEM NUMBERS 56-74 ARE STORED IN 10 GALLON FIBER BOARD DRUMS ON PALLETS

NOTE 2: NEW HAVEN, IN - ITEM NUMBERS 75-78 ARE STORED IN 55 GALLON DRUMS AND MATERIAL IS STORED ON PALLETS.

NOTE 3: NEW HAVEN, IN - ITEM NUMBER 79 IS STORED IN A BURLAP BAG.

NOTE 4: NEW HAVEN, IN - ITEM NUMBER 65 INCLUDES (1) 30 LB DRUM OF SWEEPINGS.

NOTE 5: The miniumum offer quantity shall be one entire line item.

DLA – MANGANESE BATTERY GRADE, SYNTHETIC
J.1.a ANALYSIS (MAR 04)

Item	Location	Contract #	Lot #	# of Drums	Net Weight (SDT)	Mn	O2	Fe	Pb	Insolubles	Total Heavy Metals	Total Alkali Metals	Total Alkali Earth Metals
1	HAMMOND, IN	0104940	001	152	9.4120		87.10%	0.130%	0.020%	2.500%	0.030%	0.500%	
2	HAMMOND, IN	NSP1850	001	92	39.3131	56.18%	88.90%	0.200%	0.060%		0.300%		0.500%
3	HAMMOND, IN	NSP1850	002	92	39.8575	55.92%	88.50%	0.200%	0.050%		0.300%		0.500%
4	HAMMOND, IN	0104940	007	488	30.1309	59.50%	88.90%	0.070%	0.020%	1.980%	0.030%	0.500%	0.500%
5	HAMMOND, IN	0107710	030	800	49.2350	60.92%	88.28%	0.100%	0.020%	2.690%	0.030%	0.700%	0.350%
6	HAMMOND, IN	0104940	043	80	4.9675								
7	HAMMOND, IN	NSP1850	787	12	4.9225	56.80%	88.50%	0.210%	0.020%				0.670%
8	HAMMOND, IN	NSP1850	788	12	4.8950	57.70%	88.60%	0.130%	0.020%				0.670%
9	HAMMOND, IN	NSP1850	789	11	4.8950	58.30%	88.70%	0.150%	0.060%				0.780%
10	HAMMOND, IN	NSP1850	790	12	4.9000	57.00%	88.50%	0.140%	0.020%				0.770%
11	HAMMOND, IN	NSP1850	791	11	4.8900	58.10%	88.80%	0.100%	0.020%				0.750%
12	HAMMOND, IN	NSP1850	792	12	4.9300	58.20%	87.80%	0.120%	0.020%				0.750%
13	HAMMOND, IN	NSP1850	831	11	4.9250		90.30%	0.080%	0.020%		0.030%		0.500%
14	HAMMOND, IN	NSP1850	832	12	4.9250	59.60%	90.30%	0.080%	0.020%		0.030%		0.500%
15	HAMMOND, IN	NSP1850	833	11	4.9250	59.60%	90.30%	0.080%	0.020%		0.030%		0.500%
16	HAMMOND, IN	NSP1850	834	11	4.9250	59.60%	90.30%	0.080%	0.020%		0.030%		0.500%
17	HAMMOND, IN	NSP1850	835	12	4.9250	59.60%	90.30%	0.080%	0.020%		0.030%		0.500%
18	HAMMOND, IN	NSP1850	836	11	4.9250	59.60%	90.30%	0.080%	0.020%		0.030%		0.500%
		Depot Total:		1,842	231.8985								

DLA – MANGANESE BATTERY GRADE, SYNTHETIC
J.1.a ANALYSIS (MAR 04)

Item	Location	Contract #	Lot #	# of Drums	Net Weight (SDT)	Mn	O2	Fe	Pb	Insolubles	Total Heavy Metals	Total Alkali Metals	Total Alkali Earth Metals
56	NEW HAVEN, IN	0107710	032	800	49.1800	59.25%	88.60%	0.200%	0.020%	2.230%	0.020%	0.400%	0.460%
57	NEW HAVEN, IN	0107710	033	800	49.3000	59.57%	88.60%	0.200%	0.020%	1.530%	0.020%	0.500%	0.460%
58	NEW HAVEN, IN	0107710	034	800	49.2550	59.00%	88.24%	0.200%	0.020%	1.660%	0.010%	0.400%	0.460%
59	NEW HAVEN, IN	0107710	035	800	49.3150	59.21%	89.38%	0.200%	0.020%	1.910%	0.020%	0.500%	0.350%
60	NEW HAVEN, IN	0107710	036	800	49.3430	58.94%	88.40%	0.100%	0.020%	1.950%	0.020%	0.500%	0.360%
61	NEW HAVEN, IN	0107710	037	800	49.3900	58.65%	87.70%	0.100%	0.020%	2.570%	0.020%	0.500%	0.360%
62	NEW HAVEN, IN	0107710	039	800	49.4300	58.87%	88.28%	0.080%	0.020%	1.510%	0.010%	0.600%	0.350%
63	NEW HAVEN, IN	0107710	041	800	49.4155	59.27%	88.25%	0.100%	0.020%	2.090%	0.020%	0.050%	0.360%
64	NEW HAVEN, IN	0107710	042	800	49.4350	58.60%	87.90%	0.100%	0.020%	2.730%	0.020%	0.400%	0.460%
65	NEW HAVEN, IN	0107710	043	801	49.3700	58.76%	88.49%	0.100%	0.020%	2.450%	0.010%	0.600%	0.360%
66	NEW HAVEN, IN	0107710	045	800	49.4250	58.98%	87.07%	0.050%	0.020%	2.670%	0.020%	0.200%	0.350%
67	NEW HAVEN, IN	0107710	046	800	49.2931	58.84%	86.91%	0.080%	0.020%	3.170%	0.020%	0.800%	0.350%
68	NEW HAVEN, IN	0107710	047	800	49.5200	59.46%	88.50%	0.040%	0.020%	2.140%	0.010%	0.500%	0.340%
69	NEW HAVEN, IN	0107710	048	800	49.5400	58.87%	87.94%	0.030%	0.020%	2.510%	0.010%	0.500%	0.340%
70	NEW HAVEN, IN	0107710	049	800	49.5500	58.45%	87.69%	0.040%	0.020%	1.970%	0.010%	0.600%	0.350%
71	NEW HAVEN, IN	0107710	050	800	49.5300	58.59%	87.80%	0.050%	0.020%	1.780%	0.010%	0.600%	0.350%
72	NEW HAVEN, IN	0107710	051	800	49.4100	58.49%	87.68%	0.030%	0.020%	2.620%	0.010%	0.600%	0.250%
73	NEW HAVEN, IN	0107710	052	800	49.5400	58.08%	87.97%	0.030%	0.020%	2.220%	0.010%	0.600%	0.350%
74	NEW HAVEN, IN	0107710	053	800	49.3880	60.20%	90.20%	0.050%	0.010%	1.720%	0.014%	0.220%	0.420%
75	NEW HAVEN, IN	0107710	055	130	48.3312	59.10%	88.70%	0.080%	0.010%	2.750%	0.012%	0.240%	0.420%
76	NEW HAVEN, IN	0107710	056	130	48.3843	59.00%	89.10%	0.070%	0.010%	2.580%	0.014%	0.230%	0.400%
77	NEW HAVEN, IN	0107710	057	130	48.3258	58.80%	88.80%	0.070%	0.010%	1.650%	0.010%	0.240%	0.440%
78	NEW HAVEN, IN	0107710	058	130	48.3556	59.00%	88.80%	0.080%	0.010%	1.920%	0.012%	0.240%	0.410%
		Depot Total:		15,721	1,132.0265								
		Total Offered:		17,563	1,363.9250								

DLA – MANGANESE BATTERY GRADE, SYNTHETIC
J.3.a STORAGE LOCATIONS (MAR 04)

Location	Operational Status	Days	Hours	Accessibility	Responsible Depot	Depot Manager
Hammond, IN	Staffed	Monday - Friday	0730 - 1530	Truck / Rail	Hammond, IN	John Olszewski Phone: (219) 937-5383 x104 **Storage Specialist** Eric Deal Phone: (219) 937-5383 x109 Frank Falgier Phone: (219) 937-5383 x110
Note 1: Prior arrangements must be made before shipping. **Note 2:** Truck & Rail Scale is available (Weight Capacity - 400,000 Lbs)						
New Haven, IN	Staffed	Monday - Thursday Friday -	0730 - 1500 0730 - 1430	Truck / Rail	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. **Note 2:** Truck & Rail Scale is available (Weight Capacity - 360,000 Lbs)						

Point of Contact

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

Telephone Number: (703) 767-7614
Facsimile Number: (703) 767-7608

MATERIAL SAFETY DATA SHEET

J.4.a

SECTION 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 DIOXIDE, SYNTHETIC BATTERY GRADE

TRADE NAMES/SYNONYMS:
MANGANESE OXIDE; MANGANESE DIOXIDE; MANGANESE OXIDE (MnO2); MANGANESE SUPEROXIDE; MANGANESE BLACK; MANGANESE(IV) OXIDE; BLACK MANGANESE OXIDE; BOG MANGANESE; CEMENT BLACK; MANGANESE BINOXIDE; MANGANESE PEROXIDE; PYROLUSITE BROWN; MnO2; DLA13610; RTECS OP0350000

CHEMICAL FAMILY: metal oxides

CREATION DATE: Jul 01 1992
REVISION DATE: Sep 18 2003

SECTION 2 COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: MANGANESE DIOXIDE
CAS NUMBER: 1313-13-9
EC NUMBER (EINECS): 215-202-6
PERCENTAGE: 100

SECTION 3 HAZARDS IDENTIFICATION

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

EMERGENCY OVERVIEW:
COLOR: gray, brown or black
PHYSICAL FORM: powder, solid
ODOR: odorless
MAJOR HEALTH HAZARDS: skin irritation, eye irritation, nerve damage
PHYSICAL HAZARDS: May ignite combustibles.

POTENTIAL HEALTH EFFECTS:
INHALATION:
SHORT TERM EXPOSURE: irritation, metal fume fever, lung damage
LONG TERM EXPOSURE: loss of appetite, headache, difficulty speaking, sleep disturbances, mood swings, loss of coordination, hearing loss, visual disturbances, lung damage, blood disorders, kidney damage, nerve damage

SKIN CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: irritation
EYE CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: irritation
INGESTION:
SHORT TERM EXPOSURE: nausea, vomiting, diarrhea
LONG TERM EXPOSURE: loss of appetite, headache, difficulty speaking, sleep disturbances, mood swings, loss of coordination, hearing loss, visual disturbances, lung damage, blood disorders, kidney damage, nerve damage

CARCINOGEN STATUS:
OSHA: No
NTP: No
IARC: No

SECTION 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.

ANTIDOTE: calcium disodium edetate/dextrose, intravenous; calcium disodium edetate/procaine, intramuscular.

SECTION 5 FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Negligible fire hazard. Oxidizer. May ignite or explode on contact with combustible materials.

EXTINGUISHING MEDIA: water

Large fires: Flood with water. Apply water from a protected location or from a safe distance.

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. Flood with water. Cool containers with water spray until well after the fire is out. Apply water from a protected location or from a safe distance. Avoid inhalation of material or combustion by-products. Evacuate if fire gets out of control or containers are directly exposed to fire. Evacuation radius: 800 meters (1/2 mile).

SECTION 6 ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE:
Avoid contact with combustible materials. Do not touch spilled material. Small dry spills: Move containers away from spill to a safe area. Small liquid spills: Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Large spills: Dike for later disposal. Keep unnecessary people away, isolate hazard

area and deny entry.

SECTION 7 HANDLING AND STORAGE

STORAGE: Store and handle in accordance with all current regulations and standards. NFPA 430 Code for the Storage of Liquid and Solid Oxidizing Materials. See original container for storage recommendations. Keep separated from incompatible substances.

HANDLING: Use methods to minimize dust.

SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:
MANGANESE DIOXIDE, SYNTHETIC BATTERY GRADE:
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)
1 mg/m3 UK OES TWA (metal) (fume) (Chemical Hazard Alert Notice issued)
5 mg/m3 UK OES TWA (compounds) (Chemical Hazard Alert Notice issued)
3 mg/m3 UK OES STEL (metal) (fume) (Chemical Hazard Alert Notice issued)
0.5 mg/m3 UK MEL TWA (metal and inorganic compounds)

MEASUREMENT METHOD: Particulate filter; Acid; Inductively coupled plasma; NIOSH IV # 7300, Elements

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

EYE PROTECTION: Wear splash resistant safety goggles with a faceshield. 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:
Manganese (Mn)
10 mg/m3
Any dust and mist respirator except single-use and quarter-mask respirators.
Any supplied-air respirator.
25 mg/m3
Any supplied-air respirator operated in a continuous-flow mode.
Any powered, air-purifying respirator with a dust and mist filter.
50 mg/m3
Any air-purifying respirator with a full facepiece and a high-efficiency particulate filter.
Any supplied-air respirator with a tight-fitting facepiece that is operated in a continuous-flow mode.
Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter.
Any self-contained breathing apparatus with a full facepiece.

Any supplied-air respirator with a full facepiece.
500 mg/m3
Any supplied-air respirator 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.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: solid
COLOR: gray, brown or black
PHYSICAL FORM: powder, solid
ODOR: odorless
MOLECULAR WEIGHT: 86.94
MOLECULAR FORMULA: Mn-O2
BOILING POINT: Not applicable
MELTING POINT: Not available
DECOMPOSITION POINT: 995 F (535 C)
VAPOR PRESSURE: Not applicable
VAPOR DENSITY: Not applicable
SPECIFIC GRAVITY (water=1): 5.026
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:
Insoluble: nitric acid, sulfuric acid, acetone

SECTION 10 STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: Avoid contact with combustible materials. May ignite or explode on contact with combustible materials. Keep out of water supplies and sewers.

INCOMPATIBILITIES: metals, oxidizing materials, halogens, acids, peroxides, reducing agents, amines, combustible materials, metal carbide, bases

MANGANESE DIOXIDE:
ALUMINUM: Violent reaction when heated.
ANILINIUM PERCHLORATE: Explodes.
BARIUM CHLORATE: May explode.
CALCIUM CHLORATE: May explode.
CALCIUM HYDRIDE: Incandesces when warmed.
CHLORATES: May explode.
CHLORINE TRIFLUORIDE: Incandescent reaction.
COMBUSTIBLE MATERIALS: May increase the burning rate or cause ignition on contact; contact with finely

divided materials may result in an explosion.
DIBORON TETRAFLUORIDE: Violent reaction at 15 C.
HYDROCHLORIC ACID: Releases chlorine fumes.
HYDROGEN PEROXIDE: May explode.
HYDROGEN SULFIDE: May ignite.
HYDROXYLAMINIUM CHLORIDE (20% SOLN): Vigorous reaction.
HYPOPHOSPHITES: Fire and explosion hazard.
ORGANIC MATERIALS: May increase the burning rate or cause ignition on contact; finely divided materials may result in an explosion.
PERMONOSULFURIC ACID (92%): Explosive decomposition.
PHOSPHIDES: Fire and explosion hazard.
POTASSIUM AZIDE: Violent reaction when heated.
REDUCING MATERIALS: Fire and explosion hazard.
RUBIDIUM CARBIDE: Incandescent reaction at 350 C.
SODIUM PEROXIDE: Violent decomposition.
SULFIDES: Fire and explosion hazard.
SULFUR: Fire and explosion hazard.

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: oxides of manganese

POLYMERIZATION: Will not polymerize.

SECTION 11 TOXICOLOGICAL INFORMATION

MANGANESE DIOXIDE, SYNTHETIC BATTERY GRADE:
TOXICITY DATA:
>3478 mg/kg oral-rat LD50; 50 mg/kg intratracheal-rat LDLo; 422 mg/kg subcutaneous-mouse LD50; 45 mg/kg intravenous-rabbit LDLo; 1800 ug/m3/24 hour(s)-35 day(s) continuous inhalation-rat TCLo; 21 ug/m3/5.3 year(s) intermittent intramuscular-human TDLo
LOCAL EFFECTS:
Irritant: skin, eye
ACUTE TOXICITY LEVEL: Insufficient Data.
TARGET ORGANS: nervous system
REPRODUCTIVE EFFECTS DATA:
49 mg/m3 inhalation-mouse TCLo/7 hour(s) 75 day(s) pre pregnancy/1-18 day(s) pregnant female continuous

HEALTH EFFECTS:
INHALATION:
MANGANESE DIOXIDE: See information on metal fume fever and manganese compounds.

ACUTE EXPOSURE:
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.

MANGANESE COMPOUNDS: No data available.

CHRONIC EXPOSURE:

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.

MANGANESE COMPOUNDS: Repeated or prolonged exposure to manganese compounds may result in systemic poisoning known as "manganism", a Parkinsonian-like syndrome. 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.

SKIN CONTACT:
ACUTE EXPOSURE:
MANGANESE DIOXIDE: May cause irritation with redness and pain.

CHRONIC EXPOSURE:
MANGANESE DIOXIDE: Repeated or prolonged contact may cause dermatitis.

EYE CONTACT:
ACUTE EXPOSURE:
MANGANESE DIOXIDE: May cause redness, pain, tearing and irritation.

CHRONIC EXPOSURE:
MANGANESE DIOXIDE: Repeated or prolonged contact may cause conjunctivitis.

INGESTION:
MANGANESE DIOXIDE: See information on manganese compounds.

ACUTE EXPOSURE:
MANGANESE COMPOUNDS: Ingestion of extremely large doses of manganese compounds may cause gastrointestinal irritation, resulting in nausea, vomiting, and diarrhea, so that less is available for absorption.

CHRONIC EXPOSURE:
MANGANESE COMPOUNDS: Manganese poisoning, as described in chronic inhalation, has been reported in persons drinking manganese-contaminated well water.

SECTION 12 ECOLOGICAL INFORMATION

Not available

SECTION 13 DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262.

Hazardous Waste Number(s): D001.

SECTION 14 TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:
PROPER SHIPPING NAME: Oxidizing solid, n.o.s. (MANGANESE DIOXIDE)
ID NUMBER: UN1479
HAZARD CLASS OR DIVISION: 5.1
PACKING GROUP: III
LABELING REQUIREMENTS: 5.1

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:
SHIPPING NAME: Oxidizing solid, n.o.s. (MANGANESE DIOXIDE)
UN NUMBER: UN1479
CLASS: 5.1
PACKING GROUP/RISK GROUP: III

LAND TRANSPORT ADR:
PROPER SHIPPING NAME: Oxidizing solid, n.o.s. (MANGANESE DIOXIDE)
UN NUMBER: UN1479
CLASS: 5.1
CLASSIFICATION CODE: O2
PACKING GROUP: III
LABELS: 5.1

LAND TRANSPORT RID:
PROPER SHIPPING NAME: Oxidizing solid, n.o.s. (MANGANESE DIOXIDE)
UN NUMBER: UN1479
CLASS: 5.1
CLASSIFICATION CODE: O2
PACKING GROUP: III
LABELS: 5.1

AIR TRANSPORT IATA:
PROPER SHIPPING NAME: Oxidizing solid, n.o.s. (MANGANESE DIOXIDE)
UN/ID NUMBER: UN1479
CLASS OR DIVISION: 5.1
HAZARD LABELS: 5.1
PACKING GROUP: III

AIR TRANSPORT ICAO:
PROPER SHIPPING NAME: Oxidizing solid, n.o.s. (MANGANESE DIOXIDE)
UN NUMBER: UN1479
CLASS OR DIVISION: 5.1
LABELS: 5.1
UN PACKING GROUP: III

MARITIME TRANSPORT IMDG:
PROPER SHIPPING NAME: Oxidizing solid, n.o.s. (MANGANESE DIOXIDE)
UN NUMBER: UN1479
CLASS OR DIVISION: 5.1
PACKING GROUP: III

SECTION 15 REGULATORY INFORMATION

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: Yes
REACTIVE: No
SUDDEN RELEASE: No

SARA TITLE III SECTION 313 (40 CFR 372.65):
MANGANESE AND COMPOUNDS (as Mn)

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

STATE REGULATIONS:
California Proposition 65: Not regulated.

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: Not determined.

EUROPEAN REGULATIONS:
EC CLASSIFICATION (ASSIGNED):

Xn	Harmful

EC Classification may be inconsistent with independently-researched data.

DANGER/HAZARD SYMBOL:

Xn

EC RISK AND SAFETY PHRASES:

R 20/22	Harmful by inhalation and if swallowed.
S 2	Keep out of reach of children.
S 25	Avoid contact with eyes.

GERMAN REGULATIONS:
WATER HAZARD CLASS (WGK):
STATE OF CLASSIFICATION: Annex 3
CLASSIFICATION UNDER HAZARD TO WATER: 1

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

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

SECTION 16 OTHER INFORMATION