



Department of Energy
 Albuquerque Operations Office
 Los Alamos Area Office
 Los Alamos, New Mexico 87544



NOV 30 1999

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CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. John Kieling, Acting Program Manager
 RCRA Permits Management Program
 Hazardous and Radioactive Materials Bureau
 New Mexico Environment Department
 2044 Galisteo St., Building A
 P. O. Box 26110
 Santa Fe, NM 87505

Dear Mr. Kieling:

Subject: Los Alamos National Laboratory (LANL), Proposed Waste Generator
 Treatment and Waste Analysis Plan

The purpose of this letter is to submit a waste analysis plan for a proposed waste generator treatment activity to be conducted by University of California (UC) staff at LANL. A written waste analysis plan and this submittal is required under Title 20 of the New Mexico Administrative Code, Chapter 4, Part I (20 NMAC 4.1), Subpart VIII and incorporating by reference 40 CFR 268.7 (a)(4) and 268.7 (a)(4)(ii).

The Actinide Process Chemistry Group (NMT-2) at LANL plans to conduct waste generator treatment on elemental mercury contaminated with transuranic levels of plutonium. The technology-based treatment standard for elemental mercury contaminated with radioactive materials is amalgamation as required by 20 NMAC 4.1, Subpart VIII and incorporating by reference 40 CFR 268.40. This treatment will occur in a less than 90-day storage area at Technical Area (TA) 55, Building PF-4, Room 208. This storage area will be established and activated 30 days after this notification.

UC staff have developed a written plan describing the procedures they will carry out to comply with the 40 CFR 268.40 treatment standard. The enclosed waste analysis plan details the amalgamation procedure and UC staff's intent to manage the amalgamated mercury as mixed waste.



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RED LANL TA-55/99

TC

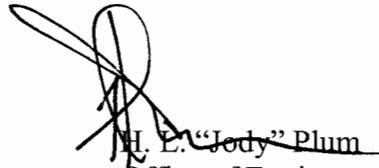
John Kieling

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NOV 30 1999

If you have questions or need additional information, please call me at (505) 665-5042.

Sincerely,



M. E. "Jody" Plum
Office of Environment

LAAME:6JP-171

Enclosure

cc w/enclosure:

James Bearzi, Chief

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New Mexico Environment Department
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Robert S. Dinwiddie, Ph.D.

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Los Alamos
NATIONAL LABORATORY

Actinide Chemistry (NMT-2)
P.O. Box 1663, MS E511
Los Alamos, New Mexico 87545
(505) 665-2505

Waste Analysis Plan
For
Radioactive Contaminated Mercury
Treated in Less Than 90-Day Storage Area

Generator:
Los Alamos National Laboratory
Nuclear Material Technology Division
NMT-2 Actinide Chemistry

November 8, 1999, 1999

1.0 Introduction

This waste analysis plan (WAP) presents information on the chemical and physical nature of mixed waste to be treated in a less than 90-day storage area at Los Alamos National Laboratory's (LANL) Technical Area (TA-55), Building PF-4, Room 208. This plan fulfills the requirements listed in Title 20 of the New Mexico Administrative Code, Chapter 4, Part I (20 NMAC 4.1), Subpart VIII and incorporating by reference 40 CFR 268.7 (a)(4), that a generator treating prohibited wastes in tank or containers must develop and follow a written plan.

The Actinide Process Chemistry Group (NMT-2), of LANL proposes to treat elemental mercury by amalgamation as required by 20 NMAC 4.1, Subpart VIII and incorporating by reference 40 CFR 268.40. The waste to be treated contains a transuranic radioactive component making the mercury a mixed transuranic (MTRU) waste. The specific sections of the plan are bulleted below.

- Description of Waste Generating Activities
- Pre-and Post-Treatment Waste Characterization
- Treatment Process
- Verification of Land Disposal Restriction Compliance
- Process Knowledge Discussion

2.0 Description of Waste Generating Activities

The waste streams to be treated are elemental mercury from two sources. Source one, is unused unspent mercury and source two, is mercury from a broken thermometer. Source one is made up of unused elemental mercury that supplied the mercury used in an analytical technique called dropping mercury electrode. The dropping mercury electrode technique was conducted in a Plutonium (Pu) contaminated glovebox. Forty-five milliliters of unused mercury still remains. Source two is approximately 5 milliliters of mercury contained in two halves of a broken thermometer. Both mercury waste streams are Pu contaminated and at MTRU waste levels.

3.0 Pre-and Post-Treatment Waste Characterization

Process knowledge indicates that the mercury from both sources are not contaminated with other hazardous constituents. Process knowledge information has been provided in Section 6.0. In addition, the material safety data sheets for the unused mercury indicate that the supplier added no additional hazardous constituents to the mercury.

The waste stream for the unused unspent mercury has the EPA Hazardous Waste Number of U151 and the mercury from the thermometer has an EPA Hazardous Waste Number of D009. After amalgamation and the commingling of the two waste streams, the amalgamated waste will retain both EPA Hazardous Waste Numbers. The purpose of this treatment is to remove the dangerous mercury vapors emitted by the untreated elemental mercury by converting the mercury from a liquid phase to an amalgamated solid and to comply with the required treatment standard for radioactive contaminated mercury.

4.0 Treatment Process

The mercury amalgamation process will be conducted in a hazardous waste less than 90-day storage area to be established in TA-55, PF-4, Room 208, in Glovebox 223. Currently, both mercury waste streams are stored in a Satellite Accumulation Area (SAA).

NMT-2 will use the components of two mercury spill kits, purchased from SPILFYTER Innovative Spill Control for the amalgamation process. The amalgamating mediator is zinc. Each spill kit absorbency capacity is 25 ml of mercury. Therefore, 2 mercury spill kits will be used to amalgamate the mercury.

4.1 Process Steps

1. All work will be done in a glovebox equipped with high-efficiency particulate air/adsorption filters.
2. The mercury from the broken thermometer will be extracted by moderately heating the broken thermometer halves. The mercury will be collected in a beaker. If necessary the broken thermometer will be further sized reduced to allow complete capture of the mercury.
3. Activate the MERCSORB Powder by putting 270 grams of MERCSORB Powder into a 1-quart wide-mouth polyethylene jar.
4. Apply 4.8 oz. of water to form a paste.
5. Mix the MERCSORB Powder and water with a long stir spatula.
6. Add 25 ml of the MTRU waste mercury to the paste.
7. Mix until all the all the mercury has been absorbed ensuring that no small droplets of mercury remain visible.
8. Repeat steps 3 through 7 until all the mercury is treated.
9. The stir spatula will be wiped clean with cheesecloth.
10. The cheesecloth will be placed into the 1-quart wide-mouth polyethylene jar. The stir spatula will be reused or wrapped in plastic and managed as a MTRU mercury waste.

4.1 Process Steps Continued

11. Any spilled material from this procedure will be wiped from the bottom of the glovebox and placed into the 1-quart wide-mouth polyethylene jar.
12. As a precautionary measure to ensure that the amalgamated mercury does not emit any amounts of dangerous mercury vapors, the remaining space in the 1-quart wide-mouth polyethylene jar will be filled with activated carbon.
13. The 1-quart wide-mouth polyethylene jar will then be sealed with a screw lid and taped.
14. Within the 90-day period the treated mercury will be removed from the glovebox and transfer to one of the TA-55's mixed waste interim status storage units.

5.0 Verification of Land Disposal Restriction Compliance

These two mercury waste streams once amalgamated will meet the Land Disposal Restrictions treatment standard for mercury contaminated with radioactive materials for non-wastewater. Because this treatment standard is not concentration based this waste will be managed, as mixed waste and no analysis will be performed. This treated waste will meet the Waste Isolation Pilot Plant (WIPP) Waste Acceptance Criteria.

6.0 Process Knowledge Discussion

6.1 Current Usage of Gloveboxes Where Waste Is Stored and To Be Treated

Glovebox 240 in TA-55, PF-4, Room 208 primary use is to store product solvents toluene and hexane, actinide metals, and one corner of the box to serve as an SAA. The waste stored in the SAA is segregated from the rest of the material stored in the glovebox by a secondary containment tray. No processing or research activities are carried out in the box.

The waste treatment process will be conducted in Room 208, in Glovebox 223. The current research activity that occurs in this glovebox is the burning and brushing of plutonium metal. The major activities in this procedure include (1) brushing and segregating plutonium metal; (2) calcining plutonium metal; (3) screening and blending plutonium oxide; and (4) calcining and sampling of plutonium oxide. This activity is conducted under an NMT-2 Standard Operating Procedure 433-REC-R04. This procedure is available for evaluation upon request. No 20 NMAC 4.1, regulated metals or solvents are used in this procedure. Mercury is not used in this procedure.

6.2 Past Activities in Glovebox Where Waste Is Stored

In the past mercury was used in the dropped mercury electrode technique; and this technique is used in electroanalytical chemistry. The dropped mercury electrode technique was used as a method to capture trace amounts of heavy metals for analysis.

6.3 Elemental Mercury Appearance

Although elemental mercury is used in the dropped mercury electrode technique to capture heavy metals the researcher indicate that the mercury to be treated is believed to be unused unspent. The 45 milliliters of elemental mercury appears clean and free of visible contamination. The mercury in the broken thermometer is still retained in the thermometer and will not be removed until the day of treatment.

6.4 Material Safety Data Sheets

The Material Safety Data Sheets on the elemental mercury from both mercury waste streams indicates the mercury is 100% pure. The only EPA Hazardous Waste Numbers associated with these mercury waste streams are U151 and D009.

7.0 Enclosures:

Calculation Sheet, Material Safety Data Sheets, and SPILFYTER Innovative Spill Control Information Sheets

Calculation Sheet

One bottle of MERCSORB Powder = 270 grams

1 oz = 28.3 grams

270 grams of MERCSORB Power will amalgamate 25 ml of mercury.

- The amalgamation instructions call for 2 oz of MERCSORB Power to be mixed with 1 oz. of water to produce an amalgamation paste.
- $270 \text{ grams of MERCSORB Power} / 28.3 \text{ grams} = 9.54 \text{ oz.}$
- If 2 oz of MERCSORB Power needs to be mixed with 1 oz. of water, then 9.54 oz. of MERCSORB Power needs to be mixed with 4.8 oz. of water to produce an amalgamation paste that can be mixed with 25 ml of mercury.

MSDS: MERCURY

SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MDL INFORMATION SYSTEMS, INC.
1281 Murfreesboro Road, Suite 300
Nashville, TN 37217-2423
1-615-366-2000

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

SUBSTANCE: MERCURY

TRADE NAMES/SYNONYMS:

COLLOIDAL MERCURY; METALLIC MERCURY; NCI-C60399; QUICKSILVER; INORGANIC MERCURY; HYDRARGYRUM; ELEMENTAL MERCURY; RCRA U151; UN 2809; Hg; OHS14020; RTECS OV4550000

CHEMICAL FAMILY: metal

CREATION DATE: Jan 31 1985
REVISION DATE: Dec 09 1997

SECTION 2 COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: MERCURY
CAS NUMBER: 7439-97-6
EC NUMBER (EINECS): 231-106-7
EC INDEX NUMBER: 080-001-00-0
PERCENTAGE: 100.0

SECTION 3 HAZARDS IDENTIFICATION

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

EC CLASSIFICATION (ASSIGNED):

T Toxic

R 23-33

EC Classification may be inconsistent with independently-researched data.



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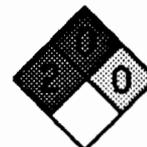
EMERGENCY OVERVIEW:

COLOR: gray

PHYSICAL FORM: liquid

ODOR: odorless

MAJOR HEALTH HAZARDS: allergic reactions



POTENTIAL HEALTH EFFECTS:**INHALATION:**

SHORT TERM EXPOSURE: irritation, allergic reactions, metallic taste, metal fume fever, nausea, vomiting, diarrhea, chest pain, difficulty breathing, headache, impotence, lung damage, kidney damage, effects on the brain

LONG TERM EXPOSURE: blue lines on the gums, loosening of the teeth, nerve damage

SKIN CONTACT:

SHORT TERM EXPOSURE: irritation, allergic reactions, metallic taste, digestive disorders, kidney damage, nerve damage, effects on the brain

LONG TERM EXPOSURE: same as effects reported in long term inhalation

EYE CONTACT:

SHORT TERM EXPOSURE: irritation

LONG TERM EXPOSURE: no information on significant adverse effects

INGESTION:

SHORT TERM EXPOSURE: nausea, vomiting, kidney damage, nerve damage

LONG TERM EXPOSURE: same as effects reported in long term inhalation

CARCINOGEN STATUS:

OSHA: N

NTP: N

IARC: N

SECTION 4 FIRST AID MEASURES

INHALATION: When safe to enter area, remove from exposure. Use a bag valve mask or similar device to perform artificial respiration (rescue breathing) if needed. Keep warm and at rest. Get medical attention immediately.

SKIN CONTACT: Remove contaminated clothing, jewelry, and shoes immediately. Wash with soap or mild detergent and large amounts of water until no evidence of chemical remains (at least 15-20 minutes). Get medical attention, if needed.

EYE CONTACT: Wash eyes immediately with large amounts of water or normal saline, occasionally lifting upper and lower lids, until no evidence of chemical remains. Get medical attention immediately.

INGESTION: If vomiting occurs, keep head lower than hips to help prevent aspiration. If person is unconscious, turn head to side. Get medical attention immediately.

ANTIDOTE: dimercaprol/oil, intramuscular; hemodialysis; penicillamine, oral; chelating agent.

NOTE TO PHYSICIAN: For inhalation, consider oxygen. For ingestion, consider gastric lavage. Consider oxygen.

SECTION 5 FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Negligible fire hazard.

EXTINGUISHING MEDIA: regular dry chemical, carbon dioxide, water, regular foam

Large fires: Use regular foam or flood with fine water spray.

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.

FLASH POINT: No data available.

SECTION 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:

Reportable Quantity (RQ): 1 pound. 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).

SECTION 7 HANDLING AND STORAGE

Store and handle in accordance with all current regulations and standards. Keep separated from incompatible substances.

SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:

MERCURY:

MERCURY, ALL FORMS EXCEPT ALKYL (as Hg):

0.1 mg/m³ OSHA ceiling

0.05 mg/m³ OSHA TWA (vapor) (skin) (vacated by 58 FR 35338, June 30, 1993)

0.10 mg/m³ ACGIH TWA (aryl) (skin)

0.025 mg/m³ ACGIH TWA (metal and inorganic compounds) (skin)

0.05 mg/m³ NIOSH recommended TWA 10 hour(s) (vapor) (skin)

0.1 mg/m³ NIOSH recommended ceiling (skin)

MEASUREMENT METHOD: Hydrar(R) sorbent tube; Acid; Atomic absorption spectrometry (cold); NIOSH III # 6009, Mercury

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.

0.5 mg/m³

Any chemical cartridge respirator with cartridge(s) providing protection against this substance.

End of service life indicator required (ESLI).

Any supplied-air respirator.

1.25 mg/m³

Any supplied-air respirator.

Any powered, air-purifying respirator with cartridge(s) providing protection against this substance.

End of service life indicator required (ESLI).

2.5 mg/m³

Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against this substance.

End of service life indicator required (ESLI).

Any air-purifying respirator with a full facepiece and a canister providing protection against this substance.

End of service life indicator required (ESLI).

Any powered, air-purifying respirator with a full facepiece and cartridge(s) providing protection against this substance.

Any self-contained breathing apparatus with a full facepiece.

Any supplied-air respirator with a full facepiece.

10 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 canister providing protection against this substance.

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: liquid

COLOR: gray

ODOR: odorless

MOLECULAR WEIGHT: 200.59

MOLECULAR FORMULA: Hg

BOILING POINT: 675 F (357 C)

FREEZING POINT: -38 F (-39 C)

VAPOR PRESSURE: 0.002 mmHg @ 25 C

VAPOR DENSITY (air=1): 7.0

SPECIFIC GRAVITY (water=1): 13.5939

WATER SOLUBILITY: insoluble

PH: Not available

VOLATILITY: Not available

ODOR THRESHOLD: Not available

EVAPORATION RATE: Not available

VISCOSITY: 1.55 cP @ 20 C

COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available

SOLVENT SOLUBILITY:

Soluble: hot sulfuric acid, nitric acid, lipids

Insoluble: alcohol, ether, hydrochloric acid, hydrogen bromide, hydrogen iodide

SECTION 10 STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition. Dangerous gases may accumulate in confined spaces. May ignite or explode on contact with combustible materials.

INCOMPATIBILITIES: combustible materials, metals, amines, halogens, oxidizing materials, acids, metal carbide

MERCURY:

ACETYLENE: Formation of explosive compound.

ACETYLINIC COMPOUNDS: Formation of explosive compound.

ALUMINUM: Corrodes.

AMINES: May form explosive compounds.

AMMONIA + MOISTURE: Forms explosive compound.

BORON DIODPHOSPHIDE: Ignites in contact with mercury vapors.

BROMINE: Violent reaction.

3-BROMOPROPYNE: Explosion hazard.

CALCIUM: Amalgam formation @ 390 C is violent.

CHLORINE: Ignites @ 200-300 C.

CHLORINE DIOXIDE: Explodes.

COPPER (AND ALLOYS): May be attacked.

ETHYLENE OXIDE + TRACES OF ACETYLENE: May form explosive acetylides.

LITHIUM: Amalgam formation is violently exothermic and may be explosive.

METHYL AZIDE: Produces shock sensitive mixture.

METHYLSILANE + OXYGEN: Produces shock sensitive mixture.

NITRIC ACID + ALCOHOLS: Forms fulminates capable of detonation.

OXALIC ACID: Forms shock sensitive compound.

OXIDANTS: Violent reaction.

PEROXYFORMIC ACID: Explosive reaction.

POTASSIUM: Amalgam formation is vigorously exothermic and may be explosive.

RUBIDIUM: Violent exothermic reaction.

SILVER PERCHLORATE + 3-HEXYNE: Explodes.

SILVER PERCHLORATE + 2-PENTYNE: Explodes.

SODIUM: Amalgam formation is violently exothermic.

SODIUM CARBIDE: Vigorous reaction.

SULFURIC ACID (HOT): Reacts.

TETRACARBONYLNICKEL + OXYGEN: Produces shock sensitive mixture.

HAZARDOUS DECOMPOSITION:

Thermal decomposition products: mercury, oxides of mercury

POLYMERIZATION: Will not polymerize.

SECTION 11 TOXICOLOGICAL INFORMATION

MERCURY:

TOXICITY DATA:

254 mg/kg subcutaneous-man TDLo; 43 mg/kg oral-man TDLo; 44300 ug/m³/8 hour(s) inhalation-man TCLo; 150 ug/m³/46 day(s) inhalation-woman TCLo; 129 mg/kg/5 hour(s) continuous skin-man TDLo; 29 mg/m³/30 hour(s) inhalation-rabbit LCLo; 1 mg/m³/24 hour(s)-5 week(s) continuous inhalation-rat TCLo; 8 ug/m³/6.5 hour(s)-41 week(s) intermittent inhalation-rat TCLo; 17 mg/m³/2 hour(s)-30 day(s) continuous inhalation-rat TCLo

CARCINOGEN STATUS: IARC: Human Inadequate Evidence, Animal Inadequate

Evidence, Group 3; AC : A4 -Not Classifiable as a Hur Carcinogen

LOCAL EFFECTS:

Irritant: inhalation

ACUTE TOXICITY LEVEL: Insufficient Data.

TARGET ORGANS: immune system (sensitizer), nervous system, kidneys

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: kidney disorders, nervous system disorders, respiratory disorders

TUMORIGENIC DATA:

400 mg/kg intraperitoneal-rat TDLo/14 day(s) intermittent

MUTAGENIC DATA:

cytogenetic analysis - man unreported 150 ug/m3

REPRODUCTIVE EFFECTS DATA:

890 ng/m3 inhalation-rat TCLo/24 hour(s) 16 week(s) male; 7440 ng/m3 inhalation-rat TCLo/24 hour(s) 16 week(s) male; 1 mg/m3 inhalation-rat TCLo/24 hour(s) 1-20 day(s) pregnant female continuous

HEALTH EFFECTS:

INHALATION:

ACUTE EXPOSURE:

MERCURY: Inhalation of high levels of mercury vapor may cause almost immediate dyspnea, cough, fever, nausea, vomiting, diarrhea, headache, stomatitis, salivation, gingivitis, a metallic taste, and cardiac abnormalities. Respiratory irritation may occur with chest pain and tightness. Symptoms may resolve or may progress to necrotizing bronchiolitis, pneumonitis, pulmonary edema, pneumothorax, interstitial fibrosis, and death. Acidosis and renal damage may also occur. Allergic reactions that may occur in previously exposed persons include dermatitis, encephalitis, and death. Loss of libido and impotence have been reported in men acutely exposed to metallic mercury vapor. 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.

CHRONIC EXPOSURE:

MERCURY: Inhalation of mercury vapor over a long period may cause mercurialism, which is characterized by fine tremors and erethism. Tremors may affect the hands first, but may also become evident in the face, arms, and legs. Erethism may be manifested by abnormal shyness, blushing, self-consciousness, depression or despondency, resentment of criticism, irritability or excitability, headache, fatigue, and insomnia. In severe cases, hallucinations, loss of memory, and mental deterioration may occur. Concentrations as low as 0.03 mg/m3 have induced psychiatric symptoms in humans. Renal involvement may be indicated by proteinuria, albuminuria, enzymuria, and anuria. Other effects may include salivation, gingivitis, stomatitis, loosening of the teeth, blue lines on the gums, diarrhea, weight loss, anorexia, speech and sensory disorders, unsteady gait, chronic pneumonitis and mild anemia. Repeated exposure to mercury and its compounds may result in sensitization. Women occupationally exposed have reported menstrual disturbances, reduced ovulation and an increased risk of spontaneous abortion. Intrauterine exposure may result in tremors and involuntary movements in the infants. Mercury is excreted in breast milk. Reproductive effects have been reported in animals.

SKIN CONTACT:

ACUTE EXPOSURE:

MERCURY: Direct contact with liquid may cause irritation and redness. Small amounts of mercury may be absorbed through intact skin. Allergic

reactions that may occur in previously exposed persons include dermatitis, encephalitis, and death. Subcutaneous introduction, from handling broken thermometers, may result in local inflammation, granulomatous skin reactions, and slight signs of mercury poisoning including digestive disorders, metallic taste in the mouth, and neuropsychic disorders.

CHRONIC EXPOSURE:

MERCURY: Prolonged or repeated exposure may result in dermal sensitization and systemic effects as detailed in chronic inhalation exposure.

EYE CONTACT:**ACUTE EXPOSURE:**

MERCURY: Direct contact with liquid may cause irritation and redness. Animal studies indicate diffusion and absorption of mercury into the tissues of the eye may occur. No clinical signs of conjunctivitis or inflammation occurred.

CHRONIC EXPOSURE:

MERCURY: Mercury exposure from inhalation, ingestion, or skin contact may be indicated by mercurialentis, discoloration of the crystalline lens, on slit lamp examination of the eye.

INGESTION:**ACUTE EXPOSURE:**

MERCURY: May cause burning of the mouth and throat, thirst, nausea and vomiting. Metallic mercury is not usually absorbed sufficiently from the gastrointestinal tract to induce an acute toxic response. Rarely, a large single dose may result in signs and symptoms of chronic inhalation if sufficient amounts of mercury are retained in the body.

CHRONIC EXPOSURE:

MERCURY: Repeated ingestion of small amounts of mercury may result in the absorption of sufficient amounts to produce toxic effects as detailed in chronic inhalation exposure.

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY DATA:

FISH TOXICITY: 180 ug/L 96 hour(s) LC50 (Mortality) Common, mirror, colored, carp (*Cyprinus carpio*)

INVERTEBRATE TOXICITY: 158 ug/L 96 hour(s) LC50 (Mortality) Calanoid copepod (*Eurytemora affinis*)

PHYTOTOXICITY: 1200 ug/L 32 week(s) EC50 (Growth) Water-milfoil (*Myriophyllum spicatum*)

FATE AND TRANSPORT:

BIOCONCENTRATION: 2500-4300 ug/L 30 day(s) BCF (Residue) Mosquitofish (*Gambusia affinis*) 1 ug/L

SECTION 13 DISPOSAL CONSIDERATIONS

Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): U151. Hazardous Waste Number(s): D009. Dispose of in accordance with U.S. EPA 40 CFR 262 for concentrations at or above the Regulatory level. Regulatory level- 0.2 mg/L. Dispose in accordance with all

applicable regulator

SECTION 14 TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101 SHIPPING NAME-UN NUMBER:
Mercury-UN2809

U.S. DOT 49 CFR 172.101 HAZARD CLASS OR DIVISION:
8

U.S. DOT 49 CFR 172.101 PACKING GROUP:
III

U.S. DOT 49 CFR 172.101 AND SUBPART E LABELING REQUIREMENTS:
CORROSIVE

U.S. DOT 49 CFR 172.101 PACKAGING AUTHORIZATIONS:
EXCEPTIONS: 49 CFR 173.164
NON-BULK PACKAGING: 49 CFR 173.164
~~BULK~~ BULK PACKAGING: 49 CFR 173.240

U.S. DOT 49 CFR 172.101 QUANTITY LIMITATIONS:
PASSENGER AIRCRAFT OR RAILCAR: 35 kg
CARGO AIRCRAFT ONLY: 35 kg

LAND TRANSPORT ADR/RID:
SUBSTANCE NAME: Mercury
UN NUMBER: UN2809
ADR/RID CLASS: 8
ITEM NUMBER: 66(c)
WARNING SIGN/LABEL: 8
HAZARD ID NUMBER: 80

AIR TRANSPORT IATA/ICAO: No classification assigned.

MARITIME TRANSPORT IMDG:
CORRECT TECHNICAL NAME: Mercury, metal
UN/ID NUMBER: UN2809
IMDG CLASS: 8
PACKAGING GROUP: III
Ems No.: 8-12
MFAG Table No.: none
MARINE POLLUTANT: N

SECTION 15 REGULATORY INFORMATION

U.S. REGULATIONS:
TSCA INVENTORY STATUS: Y

TSCA 12(b) EXPORT NOTIFICATION: Not listed.
CERCLA SECTION 103 (40CFR302.4): Y
MERCURY: 1 LBS RQ

SARA SECTION 302 (40CFR355.30): N
SARA SECTION 304 (40CFR355.40): N
SARA SECTION 313 (40CFR372.65): Y

Mercury and mercury compounds
SARA HAZARD CATEGORIES, SARA SECTIONS 311/312 (40CFR370.21):

ACUTE: Y

CHRONIC: Y

FIRE: N

REACTIVE: N

SUDDEN RELEASE: N

OSHA PROCESS SAFETY (29CFR1910.119): N

STATE REGULATIONS:

California Proposition 65: Y

Known to the state of California to cause the following:

Mercury and mercury compounds

Developmental toxicity (Jul 01, 1990)

EUROPEAN REGULATIONS:

EC NUMBER (EINECS): 231-106-7

EC RISK AND SAFETY PHRASES:

R 23 Toxic by inhalation.

R 33 Danger of cumulative effects.

S 1/2 Keep locked-up and out of reach of children.

S 7 Keep container tightly closed.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

GERMAN REGULATIONS:

WATER HAZARD CLASS (WGK): 3 (Official German Classification)

WATER HAZARD CLASS (WGK): 3 (Self Classification by Manufacturers and Distributors)

SECTION 16 OTHER INFORMATION

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PALMER INSTRUMENTS -- MERCURY IN GLASS-THERMOMETER - THERMOMETER, SELF-INDICATING, LIQUID IN
SERIAL SAFETY DATA SHEET
ID #: 6685008944514
Manufacturer's CAGE: 23471
Part No. Indicator: A
Part Number/Trade Name: MERCURY IN GLASS-THERMOMETER

General Information

Item Name: THERMOMETER, SELF-INDICATING, LIQUID IN GLASS
Company's Name: PALMER INSTRUMENTS INC
Company's Street: 234 WEAVERVILLE HWY
Company's City: ACHEVILLE
Company's State: NC
Company's Country: US
Company's Zip Code: 28804
Company's Emerg Ph #: 704-658-3131
Company's Info Ph #: 704-658-0728, 704-658-3131
Distributor/Vendor # 1: D.F.GOLDSMITH CHEMICAL & METAL CORP.
Distributor/Vendor # 1 Cage: 27368
Record No. For Safety Entry: 002
Tot Safety Entries This Stk#: 004
Status: SE
Date MSDS Prepared: 01MAY94
Safety Data Review Date: 09FEB98
Supply Item Manager: CX
MSDS Preparer's Name: NONE
MSDS Serial Number: CCHWC
Specification Number: NONE
Hazard Characteristic Code: C1
Unit Of Issue: EA
Unit Of Issue Container Qty: EACH
Type Of Container: UNKNOWN
Net Unit Weight: 6.7 GMS HG

Ingredients/Identity Information

Proprietary: NO
Ingredient: MERCURY (SARA III)
Ingredient Sequence Number: 01
Percent: 100
NIOSH (RTECS) Number: OV4550000
CAS Number: 7439-97-6
OSHA PEL: S, C, 0.1 MG/M3
ACGIH TLV: S, 0.05 MG/M3; 9293
Other Recommended Limit: NONE RECOMMENDED

Physical/Chemical Characteristics

Appearance And Odor: GLASS THERMOMETER CONTAINING MERCURY. PHYSICAL
PROPERTIES ARE FOR MERCURY.
Boiling Point: 675F, 357C
Melting Point: -38F, -39C
Vapor Pressure (MM Hg/70 F): NEGLIGIBLE
Vapor Density (Air=1): 7.0
Specific Gravity: 13.6
Decomposition Temperature: UNKNOWN
Evaporation Rate And Ref: UNKNOWN
Solubility In Water: INSOLUBLE
Corrosion Rate (IPY): UNKNOWN

Fire and Explosion Hazard Data

Flash Point: NONE
Extinguishing Media: NON-FLAMMABLE. USE EXTINGUISHING MEDIA APPROPRIATE FOR
SURROUNDING FIRE; DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR FOAM.
Special Fire Fighting Proc: LARGER FIRES: USE WATER SPRAY, FOG OR ALCOHOL
FOAM. MOVE CONTAINERS FROM AREA. COOL FIRE EXPOSED CONTAINERS WITH WATER

7/13/99 8:30 AM

SPILFYTER®

Specialty Products

MERCURY SPILL KIT

Kit contains materials to collect
up to a 25ml (337.5g) mercury spill.

Dispose of used product in accordance
with local, state and federal regulations.

JV
MANUFACTURING
COMPANY, INC.

1-800-334-9092

963 Ashwaubenon St., Green Bay, WI 54304
920-337-4944 • FAX 920-337-6282
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No. 520250

INSTRUCTION SHEET
Mercury Spill Kit

To Be Used By Personnel Trained in Cleaning-up Mercury Spills.

CAUTION

- Mercury Spills are Toxic;
- Mercury vaporizes; Mercury is absorbed directly through the skin, and by inhalation;
- Threshold Limit Values (TLVs) for Mercury and Mercury Vapors are low.

1. Evacuate employees from the spill area.
2. Personal Protective Equipment for exposure to Mercury should be worn.
3. Ventilate the contaminated area.
4. Collect all visible Mercury, using the wooded spatula and Mercury Aspirator bottle: empty the aspirator into the Mercury Waste bottle.

USE OF MERCSORB™ Powder

5. Follow the directions on the MERCSORB™ Powder Instruction Sheet.

USE OF MERCURY INDICATOR (CONTROL) Powder

6. Follow the directions on the MERCURY INDICATOR (CONTROL) Powder Instruction Sheet.

USE OF MERCURY VAPOR SUPPRESSOR

7. Sprinkle MERCURY VAPOR SUPPRESSOR on all contaminated areas. No area contaminated by Mercury should be left untreated. If left untreated, Mercury Vapors will continue to be given off.

All used articles are contaminated, including the used MERCSORB™ Powder, MERCURY INDICATOR (CONTROL) Powder, and the used MERCURY VAPOR SUPPRESSOR: as well as: any other articles which were used during the clean-up process of the Mercury spill.

All contaminated articles are considered as toxic waste and must be disposed of in accordance with all local, state, and federal regulations.

Kit Absorbency Capacity: 25ml (337 g) of Mercury.

Note: Depending on the size, the extent, and the type of spill, additional equipment may be needed.

WARNING: Once this product is used in picking-up a mercury spill, this product will take on the characteristics of the mercury absorbed and should be handled accordingly.

For additional information on this product or any other SPILFYTER Products write or call:

J.V. Manufacturing Company, Inc.

963 Ashwaubenon Street, Green Bay, WI 54304 920-337-4944 Customer Service 1-800-334-9092 Fax 920-337-6282

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Form No. PL-I520250

INSTRUCTION SHEET MERCORB™ Powder

To Be Used By Personnel Trained In Cleaning -up Mercury Spills.

MERCORB™ Powder was designed to make cleaning up mercury spills from work surfaces, cracks, and other hard-to-reach areas easier and safer by converting elemental mercury into an amalgam which removes the dangerous mercury vapors.

MERCORB Powder

<u>Product Nos.</u>	<u>Sorbency/Case*</u>	<u>Qty/Case</u>
520270	25 ml (0.75 lbs.)	25 ml (0.75 lbs.)
521000	92 ml (2.75 lbs.)	92 ml (2.75 lbs.)
522500	230 ml (6.90 lbs.)	230 ml (6.90 lbs.)

Note: Mercury has a density of 13.55g/ml at 20° C (68° F).

APPLICATION INSTRUCTIONS

CAUTION

Mercury Spills are Toxic.

Mercury vaporizes; Mercury is absorbed directly through the skin, and by inhalation.
Threshold Limit Values (TLVs) for Mercury and Mercury Vapors are low.

1. Evacuate employees from the spill area.
2. Personal Protective Equipment for exposure to mercury should be worn.
3. Ventilate the contaminated area.

The balance of these instructions are directed to cleaning-up mercury droplets too small to be picked up as visible mercury.

USE OF MERCORB™ POWDER

WARNING: Do not apply dry MERCORB™ Powder to a Mercury Spill.

4. Activate the MERCORB™ Powder by putting 2 ounces of MERCORB™ Powder in a 9 ounce plastic mixing cup.
5. Apply just enough water to form a paste (about 1 ounce). Mix the MERCORB™ Powder and water with a wooden spatula.
6. Apply a strip of the MERCORB™ paste across the edge of the mercury contaminated area. Push the strip slowly across the contaminated surface with a wooden spatula. Apply the MERCORB™ paste in one direction only. Small droplets of mercury will be absorbed into the MERCORB™ paste.
7. Apply a second strip of the MERCORB™ paste to the area and push the strip across the area a second time.
8. Put the contaminated MERCORB™ paste into a sealed plastic container.
9. Scrub the contaminated area using a moist sponge and warm soapy water.
10. Dispose of the used MERCORB™ paste, the wooden spatula, the mixing container, Personal Protective Equipment, and the temporary disposal container according to all local, state, and federal regulations.

WARNING: The used MERCORB™ paste is still considered a toxic contaminant and should be handled accordingly.

Note: Depending on the size, the extent, and the type of spill, additional equipment may be needed.

WARNING: Once this product is used in picking-up a mercury spill, this product will take on the characteristics of the mercury absorbed and should be handled accordingly.

For additional information on this product or any other SPILFYTER Products write or call:

J.V. Manufacturing Company, Inc.

963 Ashwaubenon Street, Green Bay, WI 54304 920-337-4944 Customer Service 1-800-334-9092 Fax 920-337-6282

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Form No. PL-1520270

INSTRUCTION SHEET**Mercury Indicator (Control) Powder****To Be Used By Personnel Trained In Cleaning-up Mercury Spills.****CAUTION**

- Mercury Spills are Toxic;
- Mercury vaporizes; Mercury is absorbed directly through the skin, and by inhalation;
- Threshold Limit Values (TLVs) for Mercury and Mercury Vapors are low.

1. Evacuate employees from the spill area.
2. Personal Protective Equipment for exposure to Mercury is recommended.
3. Ventilate the contaminated area.

The balance of these instructions are directed towards checking for the presence of Mercury once all visible Mercury has been properly collected.

USE OF MERCURY INDICATOR (CONTROL) POWDER**To check for the presence Mercury:**

4. a. **FOR HORIZONTAL SURFACES:** Sprinkle MERCURY INDICATOR (CONTROL) Powder over the contaminated area.
- b. **FOR VERTICAL SURFACES:** Mix 1 part MERCURY INDICATOR (CONTROL) Powder with 4 parts water, to form a slurry. Paint the slurry onto the contaminated vertical surface.
- c. The MERCURY INDICATOR (CONTROL) Powder should be left on the contaminated surface for 24-hours.
- d. A color change of pink to reddish-brown spots indicate point contamination. Large black spots, or black areas, indicate fresh or extensive Mercury contamination.
- e. Collect the MERCURY INDICATOR (CONTROL) Powder and place in a temporary disposal bag.
5. Clean-up remaining Mercury contaminated area by physical and chemical means.
6. Repeat Step #4 and #5.
7. All used articles are contaminated, including the used MERCURY INDICATOR (CONTROL) Powder, plastic mixing tub, paint brush, Personal Protective Equipment, temporary disposal bag, etc. all must be disposed of as toxic waste in accordance with all local, state, and federal regulations.

Note: Depending on the size, the extent, and the type of spill, additional equipment may be needed.

WARNING: Once this product is used in picking-up a mercury spill, this product will take on the characteristics of the mercury absorbed and should be handled accordingly.

For additional information on this product or any other SPILFYTER Products write or call:

J.V. Manufacturing Company, Inc.

963 Ashwaubenon Street, Green Bay, WI 54304 920-337-4944 Customer Service 1-800-334-9092 Fax 920-337-6282

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