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# CLOSURE PLAN FOR INTERIM STATUS
# PAINT STORAGE BUILDING DRUM STORAGE AREA

SAGINAW NODULAR IRON CASTING PLANT
GENERAL MOTORS CORPORATION
SAGINAW, MICHIGAN

DECEMBER 1987

~~PRIVILEGED AND CONFIDENTIAL~~

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1125.09 101:RTA:sag1204

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## 1. INTRODUCTION AND BACKGROUND

Since November 1980, the General Motors Corporation-Central Foundry Division (GMC-CFD) Saginaw Nodular Iron Casting Plant in Saginaw, Michigan has operated four hazardous waste units as follows:

- Old (original) Calcium Carbide Desulfurization Slag Treatment Area.
- Existing Calcium Carbide Desulfurization Slag Treatment Bunker.
- **Paint Storage Building Drum Storage Area.**
- 1,1,1-Trichloroethane Hazardous Waste Control Tank

These units have operated under RCRA Interim Status regulations contained in 40 CFR Part 265 and under Michigan Act 64 hazardous waste regulations. These four units have been identified on the plant's original RCRA Part A Permit Application or on subsequent revisions of the Part A. The RCRA status of the Drum Storage Area and the 1,1,1-Trichloroethane Waste Control Tank was changed to generator accumulation units in 1985. Each of these four units are addressed in a separate Closure Plan.

**This Closure Plan addresses the hazardous waste Paint Storage Building Drum Storage Area, located near the Paint Storage Building.**

The hazardous waste drum storage area is actually a 19'-0" by 19'-6" concrete area with a 4-inch curb.

This Closure Plan is based on achieving "clean closure" of the drum storage area; therefore, no post-closure activities will be required.

The Michigan Hazardous Waste Management Rules (Michigan Public Act 64) have adopted the 40 CFR Part 265 regulations by reference into the Michigan Administrative Code [R299.1103(1)(m)]. Where applicable, references will be made in this document to specific subsections of 40 CFR Part 265.

## 2. PURPOSE AND SCOPE

The purpose of this Closure Plan is to describe the closure activities that GMC-CFD Saginaw Nodular Iron will perform to close the drum storage area.

The scope of this document is limited to providing a Closure Plan for the hazardous waste drum storage area; other solid waste management units are addressed in separate closure plans. This closure plan describes the following:

- Method of closure.
- The effect closure activities will have on future maintenance and the potential for post-closure release of hazardous wastes and hazardous constituents.
- Expected maximum waste inventory.
- Decontamination methods.
- Closure schedule.
- Documentation of closure activities.

This Closure Plan is intended to fulfill the closure requirements applicable to the Interim Status hazardous waste drum storage area for containerized wastes at the GMC-CFD Saginaw Nodular Iron Plant, and to describe the key activities, tests and performance standards for closure of that waste management unit. The applicable portions of 40 CFR Part 265 Subpart G, and Michigan Act 64 have been addressed.

## 3. GENERAL FACILITY INFORMATION

### 3.1 Facility Name, Location, and Contact

Name: General Motors Corporation
Central Foundry Division
Saginaw Nodular Iron Plant
2100 Veterans Memorial Parkway
EPA ID Number: MID041793340
Saginaw, MI 48605-5073

Contact: William Hudson, Environmental Coordinator

### 3.2 Site Description

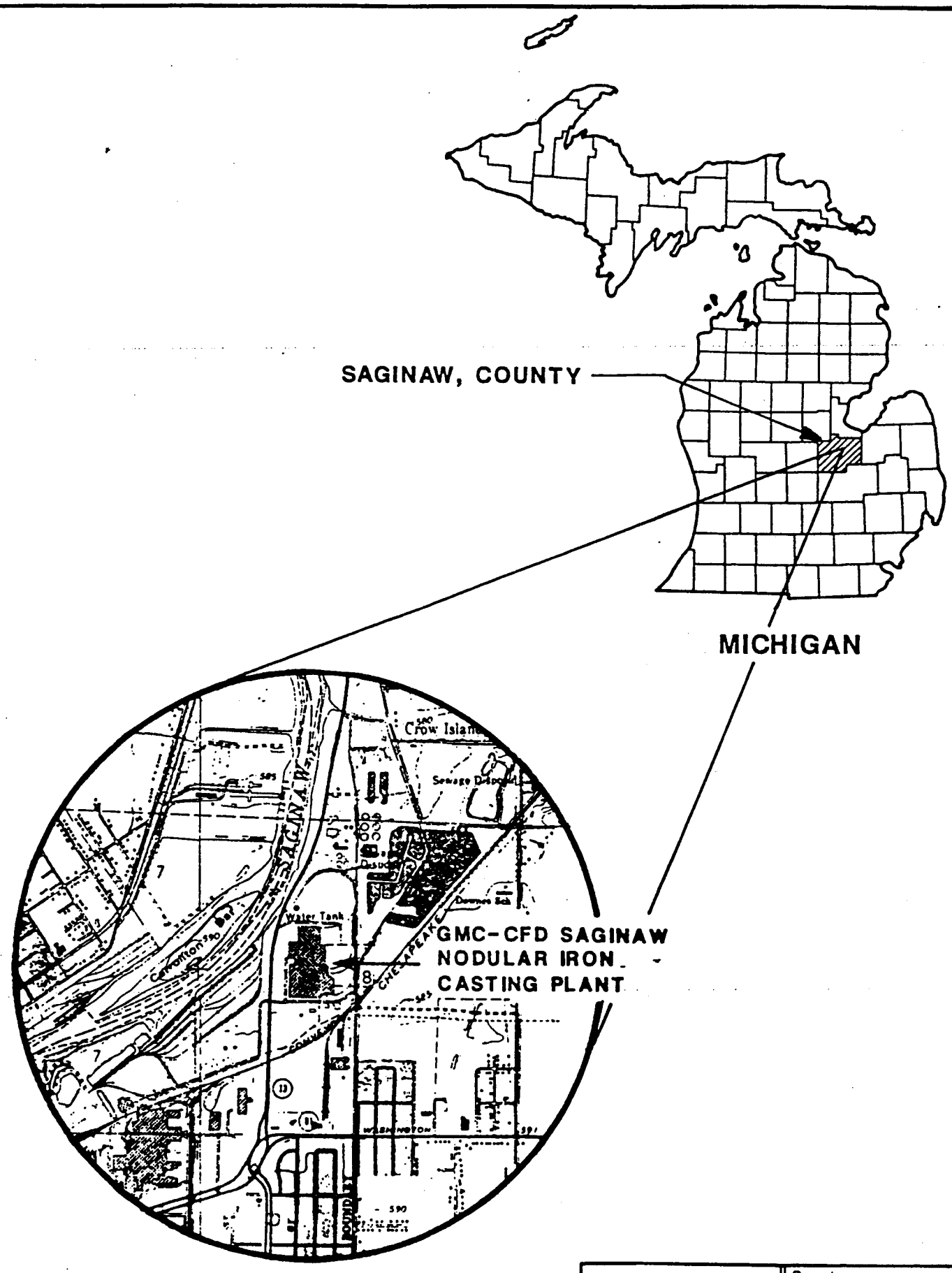
Figure 1 shows the location of the GMC-CFD Saginaw Nodular Iron Plant. The hazardous waste drum storage area consists of a steel-reinforced concrete slab with dimensions of 19'-0" by 19'-6". The slab includes a 4-inch-high curb around the perimeter, except for a 9'-6" wide entrance way which has a sloped entrance with a 3-inch curb.

The hazardous waste drum storage area is shown on Figure 2. The drum storage area is 14'-4" east of the paint storage building. The area is partially covered by a roof as shown on Figure 2, and a chain-link fence surrounds the area.

A crack on the floor of the drum storage area; has recently been repaired, and the entire concrete slab and curbed perimeter seems intact. There are no sanitary or yard drains within the paved drum storage area.

### 3.3 Waste Characterization

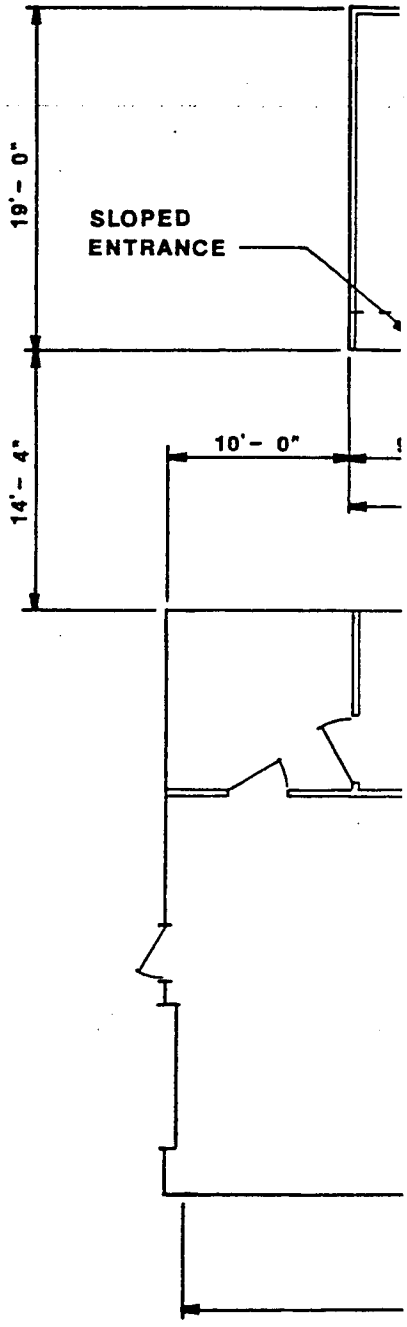
The drum storage area has been used to store spent nonhazardous and hazardous wastes that require manifesting under Michigan Acts 64 and




| | |
|---|---|
| RMT INC | Dwn. by: EAP |
| | Date: 9-9-87 |
| | Proj.# 1125.08 |



FIGURE 1




NORTH

APPROX. SCALE: 1"= 10'

# LAYOUT OF P

RMT INC

| | |
|---|---|
| Dwn. by: | EAP |
| Date: | 9-2-87 |
| Proj.#: | 1125.08 |

FIGURE 2

136. The list below describes each of the RCRA hazardous wastes (40 CFR Part 261 Subparts C & D) generated at the GMC-CFD Saginaw Nodular Iron Plant and stored within the drum storage area:

| | |
|---|---|
| D001 | Waste Petroleum Naphtha Combustible Liquid UN1255 |
| F002 | Waste Compound, Cleaning Liquid, Corrosive Material NA 1760 (Halogenated solvents) |
| F004 | Waste Compound, Cleaning Liquid, Corrosive Material NA 1760 (Non-halogenated solvents) |

In addition, three nonhazardous wastes that require manifesting under Michigan Act 136 have been generated at the plant. These wastes are described in Table 3-1.

As noted in Table 3-1, phenol/formaldehyde resin wastes have been disposed under both the 016L and 029L classifications.

Appendix A contains the Material Safety Data Sheets for some of the commonly used chemicals and solvents throughout the plant that may have been stored as wastes in the drum storage area.

TABLE 3-1

MICHIGAN ACT 136 WASTES MANIFESTED FOR
THE PAINT STORAGE BUILDING DRUM STORAGE AREA

| Michigan Act 136 Waste Classification | Description of Act 136 Classification | Identification of Wastes From Manifest Using Act 136 Classification |
|---|---|---|
| 016L | Covers industrial nonhazardous plasticizers monomers, resins and elastomers. | Phenol Formaldehyde Resin and Sand, N.O.S.(1) |
| 021L | Industrial nonhazardous waste oils not covered by any other specific declassification of oil wastes. | Waste Oil, N.O.S. |
| 029L | Industrial nonhazardous wastes not covered under any other classification. This would be the "catch all" for any miscellaneous waste. | Phenolic Hot Box Resins, N.O.S.<br>Waste Catalyst N.O.S.<br>Wastewater and Oil N.O.S.<br>Waste sand and Oil N.O.S.<br>Waste De-Icer/Hydrocarbon, N.O.S. |

(1) N.O.S. = Not Otherwise Specified

## 4. CLOSURE PERFORMANCE STANDARD

GMC-CFD Saginaw Nodular Iron must close the hazardous waste drum storage area in a manner that satisfies 40 CFR 265.111. To accomplish this, the regulations indicate that GMC-CFD Saginaw Nodular Iron must:

- minimize the need for further maintenance; and
- control, minimize or eliminate post-closure escape of hazardous waste or hazardous constituents to the environment.

These requirements will be satisfied by documenting that:

- all waste drums are removed;
- the concrete floor slab and curb are decontaminated; and
- soils directly below the waste drum area have not been impacted.

GMC-CFD Saginaw Nodular Iron proposes that the following procedures serve as the closure performance standard for "clean closure" of the hazardous waste drum storage area:

1. All drums remaining in the drum storage area at the time of plant shut-down will be removed to a permitted off-site hazardous waste disposal site.

2. The entire surface of the concrete slab and curb will be decontaminated with a mild alkaline detergent and rinsed with water from the City of Saginaw's potable water supply system. An alternative method may be used based on EPA 600/2-85-028, "Guide for Decontaminating Buildings, Structures, and Equipment at Superfund Sites." Wash and rinse water will be collected in barrels prior to discharge to the GMC-CFD Saginaw Nodular Iron wastewater treatment system. Three samples of the final rinse water will be collected from the barrels and analyzed for specified organic parameters. The wash or rinse activities will continue until the rinse water average concentrations for each parameter do not exceed 1.5 times the concentrations measured in the trip blank or the raw water (whichever is greater) as described in Section 5.5.

3. The soil sampling and analysis plan, detailed in Section 5 of this Plan, will then be implemented.

4. If the results of the soil sampling and analysis plan show that the hazardous waste drum storage area has not significantly affected

the soils below the drum storage area (see Section 5.5), then closure will be considered complete, and documentation as described in Step 6 below will be provided.

5. If the soils below the drum storage area have been impacted, then that material along with the concrete will be removed (from 1 to 2 1/2 feet or beyond), and disposed at an off-site hazardous waste disposal facility. Additional samples will then be collected until all underlying material indicates no environmental impact according to the criteria set in this Closure Plan.

6. A Closure Documentation Report will be submitted to the MDNR for approval after closure has been completed. The documentation of closure shall be performed by both GMC-CFD Saginaw Nodular Iron and an independent professional engineer, registered in the State of Michigan. The report will include chain-of-custody and laboratory analytical results.

## 5. SAMPLING AND ANALYSIS PLAN

### 5.1 Approach

Decontamination

All drums and debris will be removed from the storage area prior to initiating decontaminaion activities. Wash and rinse liquids generated during decontamination will be collected in barrels. Liquid samples will be collected. The remaining liquids will be discharged. Prior to discharging these liquids to the GMC-CFD Saginaw Nodular Iron wastewater treatment system, three samples of the final decontamination rinsate will be collected and analyzed for the chemicals which are listed in Section 5.4. A trip blank, field blank, and raw water sample from the City of Saginaw potable water supply will also be analyzed. Decontamination activities will continue until the average of the three final decontamination rinsate concentrations for each parameter is less than 1.5 times the field blank or the raw water supply concentration (whichever is greater). At that point, decontamination of the storage area will be considered complete.

Soils

Borings will be advanced in the drum storage area through the concrete pad at two locations and at four background locations as shown on Figure 3. After completing the concrete corings, samples of the top 12 inches of material directly below the paving will be collected from each borehole. Background soil samples will be collected from areas that have not been affected by the drum storage area operations or by specific use of the original materials.

Empty
Plastic
Envelope

Compositional analysis (dry weight) will be performed (as described in USEPA Document SW-846) on the six soil samples. The concentrations of the chemical parameters in the two soil samples from the drum storage area will then be statistically compared (see Section 5.5) with concentrations of those same parameters in the background samples. The comparison will be used to determine if operation of the drum storage area has affected the soil beneath the concrete pad.

## 5.2 Boring Locations

Guidance from the MDNR suggests that a minimum of one soil core sample is appropriate for a storage area if there were no cracks in the area's base. Because a crack in the paving was observed, as discussed in Section 3.2, two soil core samples will be taken in the immediate area of the crack.

In addition to the above borings, four background borings will be placed as shown in Figure 3 (unless adequate data are available from previous background sample analyses). Samples from these four borings will be used to establish the range of background concentrations for the specified parameters.

## 5.3 Sample Collection, Preservation, and Shipment

### Soils

Boreholes will be drilled at each sampling location using a coring device to penetrate the concrete. A visual observation will be made of

the split-spoon samples and recorded on the boring log forms (Figure 4). Soil samples will be collected using a split-spoon sampler through hollow-stem augers as described in ASTM D1586-84.

For each soil sample, approximately 200 grams of soil will be required to conduct the volatile organic analysis. Each sample will be collected in duplicate in 40-milliliter VOA vials, by taking subsamples from the split-spoon sampler. Samples will be shipped with ice in coolers directly to the laboratory using chain-of-custody procedures. A chain-of-custody form is presented as Figure 5.

Liquids

Wash and rinse waters used in decontaminating will be collected in barrels and disposed in the GMC-CFD wastewater treatment system (based on MDNR guidance). Prior to disposal, three samples will be collected of the final rinsate. These samples will be analyzed as described in Section 5.4. In addition, one field blank, one trip blank, and one raw water sample from the City of Saginaw potable water supply system will be analyzed.

Each of the six samples described above will be collected in triplicate in 40-milliliter VOA vials with teflon septum caps. The samples will be preserved with ice and transported to the laboratory using chain-of-custody procedures.

Decontamination

In order to reduce cross-contamination during sample collection,

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F-204 (R2-81)

LOG OF TEST BORING
**RMT, INC.**

PROJECT:
LOCATION:
DRILLED BY:
LOGGED BY:
DATE:

JOB NO.:
BORING NO.:
SURFACE ELEV.:
SHEET NO.:

| SAMPLE | | | | | | VISUAL CLASSIFICATION and Remarks |
|---|---|---|---|---|---|---|
| Recovery | | Moisture | | | | |
| No. | Type | | | N | Depth | |
| | | | | | 5 | |
| | | | | | 10 | |
| | | | | | 15 | |
| | | | | | 20 | |
| | | | | | 25 | |
| | | | | | 30 | |
| | | | | | 35 | |
| | | | | | 40 | |

GENERAL NOTES

START:
COMPLETE:
RIG:
CREW CHIEF:
DRILLING METHOD:

WATER LEVEL OBSERVATIONS

WHILE DRILLING:
UPON COMPLETION:
TIME AFTER DRILLING:
DEPTH OF WATER:
DEPTH OF CAVE-IN:

# RMT, INC.

## SAMPLE RECORD FORM

CLIENT: _____
JOB NUMBER: _____
LOCATION: _____
TYPE OF SAMPLES: _____
(WATER, WASTE WATER, SOLID WASTE)

5. SAMPLING DATE: _____
6. SAMPLE COLLECTOR: _____
7. AFFILIATION: _____
8. SIGNATURE: _____
9. PURCHASE ORDER #: _____

COMMENTS _____

| SAMPLE DESCRIPTION | RMT LABORATORY NUMBER | SAMPLE LOCATION AND DATE (R, LS, PS, D)* | | | |
|---|---|---|---|---|---|
| | | | | | |
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| | | | | | |

R (REFRIGERATOR) LS (LABORATORY STORAGE) PS (PERMANENT STORAGE) D (DESTROYED)

UBSEQUENT ANALYSIS: _____ SAMPLE TEMP. ACCEPTABLE: _____ SAMPLE PRESERVED PROPERLY _____

AMPLES TRANSPORTED BY:

NAME: _____ DATE AND TIME: _____

AFFILIATION: _____ SIGNATURE: _____

AMPLES RECEIVED BY:

NAME: _____ DATE AND TIME: _____

AFFILIATION: _____ SIGNATURE: _____

AMPLE DESTRUCTION AUTHORIZATION:

SAMPLE NUMBERS: _____

PROJECT MANAGER: _____ DATE: _____

RMT PRINCIPAL: _____ DATE: _____ _____

cleaning procedures equivalent to the following will be used prior to starting and between individual borings:

- All augers, coring machines, and other tools used in sampling will be steam-cleaned, or washed with soapy water and rinsed with potable water or by similar methods prior to use for each boring.
- To avoid equipment contamination, all cleaning will be done at a site away from the sampling locations.
- While on site, none of the augers or other down-hole equipment will be allowed to come into contact with surrounding soils prior to use.

Split-spoon samplers will be cleaned prior to starting and between individual borings using the following procedures (or equivalent):

- Split-spoon samplers will be steam-cleaned, or cleaned with soapy (laboratory-grade) detergent water and scrubbed with a wire brush to remove soil.
- After being washed with soapy water, the split-spoon sampler will be rinsed with potable water.
- If oily soil is encountered, the samplers will be rinsed with hexane, methanol, or similar organic solvent.
- The split-spoon samplers will receive a final rinse with distilled water.

## 5.4 Laboratory Methods

### Soils

A total of six soil samples will be collected for analysis. The analytical parameters include the following:

Benzene
Xylene
Toluene
Methyl Ethyl Ketone (MEK)
Methyl Isobutyl Ketone (MIBK)

These organic compounds were selected based on the Material Safety Data Sheets which describe solvents containing a "blend of aromatics," MEK, and MIBK.

Analyses will be performed as recommended in USEPA Document SW-846 (Test Methods for Evaluating Solid Wastes). Method 5030 (Purge and Trap) will be used for extraction, and Methods 8015 (Non-Halogenated Volatile Organics) and 8020 (Aromatic Volatile Organics) will be used for analysis.

Liquids

Liquid samples will be analyzed using a gas chromatographic procedure described in 40 CFR Part 136 (Guidelines Establishing Test Procedures for the Analysis of Pollutants). Method 602 will be used for purgeable aromatics.

Appendix B describes the QA/QC procedures required by the above-referenced analytical methods. If GMC-CFD Saginaw Nodular Iron elects to use another laboratory, equivalent QA/QC data will be submitted for MDNR approval.

## 5.5 Statistical Comparison

Soils

In order to determine if there has been an increase in volatile organics in the soils surrounding the drum storage area, a statistical analysis of the data will be used. This analysis will be performed in accordance with the methods presented in 40 CFR 264 Appendix IV, except

that the Cochran's approximation to the Student t-test will be used to establish the upper confidence limit at the 99% confidence level for background concentrations of each parameter analyzed. This analysis will be performed for the soil data generated from the soil testing identified in Section 5.4. To determine if there has been an effect on surrounding soils, the analytical results of the soil samples from below the waste drum storage area will be compared to the upper 99% confidence level value computed from the background soil sample results.

Liquids

For rinsate liquids, if the average of the three grab samples is less than 1.5 times the highest value of either the field blank or the raw water supply, decontamination will be considered complete. Otherwise, additional rinsing will be conducted. All wash and rinse liquids will be collected in barrels and disposed in the GMC-CFD Saginaw Nodular Iron wastewater treatment system, based on MDNR guidance.

## 6. HEALTH AND SAFETY

All regulations concerning health and safety shall be rigorously abided. Prior to starting the work, a site-specific Health and Safety Plan will be developed to cover all workers on the site.

The worker's employer will be responsible for implementing the plan, directing the training of personnel, and for providing safety equipment and incidentals as required. At a minimum, the plan will address the following:

a. Hazard Evaluation, Chemical and Physical.

b. Levels of Protection

- Personal protective clothing
- Respiratory protection

c. Air Monitoring

d. Site Control

- Work zones
- Decontamination procedures; personnel and equipment
- Site security

e. Contingency Plan

f. Medical Surveillance and Certification

g. Worker Training and Certification

The plan will be developed with the objective of complying with applicable federal, state, and local requirements.

The following references may be used to assist in the development of the Health and Safety Plan.

A. "Standard Operating Safety Guides," USEPA, November 1984.

B. "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities," NIOSH/OSHA/USCG/EPA, October 1985.

C. U.S. Department of Labor, Occupational Safety and health Standards and Regulations including, but not limited to, 29 CFR 1910.120 on Hazardous Waste Operations.

## 7. ESTIMATE OF MAXIMUM WASTE INVENTORY

The RCRA regulations for closure plans, 40 CFR Part 265.112(a)(2), require that the maximum inventory of wastes in storage at any time during the life of the facility be reported. According to GMC-CFD Saginaw Nodular Iron personnel, the maximum amount of hazardous waste that was ever in storage at the drum storage area was no greater than ten 55-gallon containers.

## 8. EQUIPMENT DECONTAMINATION

The equipment used in the cleanup activities may include rubber gloves, rubber boots, brushes, a pail, and a wet vacuum. The brushes, rubber gloves, and boots will be washed with soapy water and rinsed with potable water from the City of Saginaw water supply system. Water used for decontamination will be collected and disposed in the Saginaw Nodular Iron wastewater treatment system.

Soil sampling equipment will be decontaminated as described in Section 5.3 The liquid will be managed as described above for the decontamination equipment.

## 9. ESTIMATED CLOSURE DATE AND CLOSURE SCHEDULE

GMC-CFD Saginaw Nodular Iron intends to perform closure activities based on the following RCRA requirements (40 CFR 265.113):

- Closure shall begin within 90 days after receiving the final volume of hazardous waste, or 90 days after approval of the Closure Plan, whichever is greater.
- Closure shall be complete within 180 days after receiving the final volume of hazardous waste, or 180 days after approval of the Closure Plan.

Once the GMC-CFD Saginaw Nodular Iron Plant ceases production and secures MDNR approval of this Closure Plan, GMC-CFD anticipates that the schedule outlined below will be implemented within 60 days and then completed within 180 days:

- Off-site transport and disposal of any remaining drums of wastes.
- Decontamination of storage pad and sample collection.
- Liquid and soil sample analysis.
- Preparation and submittal of Closure Documentation Report to the MDNR.

GMC-CFD estimates that closure will begin during 1988.

## 10. CLOSURE DOCUMENTATION

When closure is complete, the GMC-CFD Saginaw Nodular Iron Plant will submit a Closure Documentation Report to the MDNR for approval. The closure activities will be observed by both plant personnel and an independent professional engineer registered in the State of Michigan. The Closure Documentation Report will document that closure has taken place according to the approved Closure Plan.

# APPENDIX A

# MATERIAL SAFETY DATA SHEETS

# MATERIAL SAFETY DATA SHEET

H 870

## SECTION I

| | |
|---|---|
| JCT NAME OR NUMBER<br>)UER THINNER | EMERGENCY TELEPHONE NO.<br>313-239-8606 |
| FACTURER'S NAME<br>3. PAINT CORP. | MANUFACTURER'S D-U-N-S NO. |
| SS (Number, Street, City, State and Zip Code)<br>)1 N. DORT H'WAY, FLINT, MICH. 43506 | |
| DOUS MATERIALS DESCRIPTION AND PROPER SHIPPING NAME(49 CFR 172.101)<br>QUER THINNING COMPOUND | HAZARD CLASS (49 CFR 172.101)<br>FLAMMABLE LIQUID |
| CAL FAMILY<br>END OF AROMATIC, ALIPHTIC & ACTIVE SOLVENTS | FORMULA |

## SECTION II — INGREDIENTS (list all ingredients)

| | CAS REGISTRY NO. | % |
|---|---|---|
| IPHATIC SOLVENT | 8030-30-6 | 6.0 |
| LUOL | 108-88-3 | 41.8 |
| LOL | 1330-20-7 | 2.7 |
| THYL ISOBUTYL KETONE | 108-10-1 | 1.5 |
| OPROPYL ALCOHOL | 67-30-0 | 3.0 |
| TYL ALCOHOL | 71-36-3 | 10.8 |
| TYL ACETATE | 123-86-4 | 23.7 |
| THYL ETHYL KETONE | 78-93-3 | 7.5 |

## SECTION III — PHYSICAL DATA

| | | | | | |
|---|---|---|---|---|---|
| NG POINT ( °F) ( °C) | 174 | SPECIFIC GRAVITY ($H_2O$=1) | 0.83 | | |
| PRESSURE (mm Hg) (psi) | 70.6 | PERCENT VOLATILE BY VOLUME (%) | 100 | | |
| DENSITY (AIR=1) | 4 | EVAPORATION RATE ( =1) | | | |
| BILITY IN WATER | MODERATE | pH= N/A | | | |

ARANCE AND ODOR: CLEAR - AROMATIC ODOR

IS MATERIAL: (LIQUID) SOLID GAS PASTE POWDER

## SECTION IV-FIRE AND EXPLOSION HAZARD DATA

| | | | |
|---|---|---|---|
| POINT (method used) ( °F) ( °C) SEE ATTACHED | FLAMMABLE LIMITS | LEL | UEL |

GUISHING MEDIA: FOAM, $CO_2$, DRY CHEMICAL

AL FIRE FIGHTING PROCEDURES: WEAR SELF CONTAINED BREATHING EQUIPMENT; EXCLUDE AIR; NOT USE STREAM OF WATER.

UAL FIRE AND EXPLOSION HAZARDS: VAPORS MAY CAUSE EXPLOSIVE MIXTURE WITH AIR.

## SECTION V-HEALTH HAZARD DATA

SSIVE INHALATION MAY CAUSE ANESTHESIA, | THRESHOLD LIMIT VALUE ☐ PERMISSIBLE EXPOSURE LIMIT ☐ SEE ATTACHED ☐

INESS, NAUSEA, UPPER RESPIRATORY IRRITATION, TO SKIN, IRRITATING TO EYES.

GENCY AND FIRST AID PROCEDURES: REMOVE TO FRESH AIR - RESTORE BREATHING IF NECESSARY, CALL DOR, WASH SKIN WITH WATER, APPLY EMOLIENT CREAM, FLUSH EYES WITH COPIOUS AMOUNTS OF R - SEE DOCTOR. IF TAKEN INTERNALLY SEE DOCTOR IMMEDIATELY.

## SECTION VI-REACTIVITY DATA

| | | |
|---|---|---|
| UNSTABLE | | CONDITIONS TO AVOID: EXCESSIVE HEAT, SPARKS, OPEN FLAMES. |
| STABLE | X | |

IBILITY (materials to avoid): STRONG OXIDIZING AGENTS

JS DECOMPOSITION PRODUCTS: ACID FUMES, SMOKE CO, $CO_2$

| | | | |
|---|---|---|---|
| JS ZATION | MAY OCCUR | | CONDITIONS TO AVOID |
| | WILL NOT OCCUR | X | |

## SECTION VII-SPILL OR LEAK PROCEDURES

DE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: REMOVE ALL SOURCES OF IGNITION, WIPE UP.

ISGARD ABSORBENTS IN PROPER CONTAINER AND WET DOWN WITH WATER.

SPOSAL METHOD: DO NOT INCINERATE IN CLOSED CONTAINERS - DISPOSE IN ACCORDANCE WITH

OCAL, STATE, AND FEDERAL REGULATIONS

## SECTION VIII-SPECIAL PROTECTION INFORMATION

DRY PROTECTION (specify type)

ING UPON CONCENTRATION ABOVE TLV-CARTRIDGE RESPIRATOR OR SELF CONTAINED

| | | |
|---|---|---|
| ION | LOCAL EXHAUST (Specify Rate) | SPECIAL: EXPLOSION PROOF |
| | MECHANICAL (General) (Specify Rate): MAINTAIN BELOW TLV / EXPLOSIVE LIMITS | OTHER |

| | |
|---|---|
| VE GLOVES: IMPERMEABLE | EYE PROTECTION: CHEMICAL SAFETY GOGGLES OR FACE MASK |

OTECTIVE EQUIPMENT: IMPERMEABLE APRON

## SECTION IX-SPECIAL PRECAUTIONS

ONS TO BE TAKEN IN HANDLING AND STORING: KEEP AWAY FROM EXCESSIVE HEAT, SPARKS, OPEN FLAMES.

PROLONGED CONTACT WITH SKIN & BREATHING OF VAPOR OR MIST.

ECAUTIONS: PROVIDE ADEQUATE VENTILATION. DO NOT TAKE INTERNALLY.

CLOSE CONTAINER AFTER EACH USE.

Seller agrees not to assert any claim (other than a claim for a patent infringement) against General Motors Corporation for any use or disclosure of any technical data or information disclosed in connection with this questionnaire.

| | |
|---|---|
| OMPLETE QUESTIONNAIRE ON TO: | Name (print) |
| | Signature |
| | Title |
| | Date |

## FOR GM USE ONLY

ON CISCO CODE

ITIFICATION CODES USED AT THIS LOCATION.

1 0 5

9 9 8

OMMON CODE

L CODE ☐, NON-CODED ITEM ☐, OR PRODUCTION PART NUMBER ☐

SIFICATION OF USE:

| | | | | |
|---|---|---|---|---|
| SOLVENT | ☐ FLUX | ☐ ABSORBANT | ☐ INSULATOR | ☐ |
| COATING | ☐ FUEL | ☐ ABRASIVE | ☐ LUBRICANT | ☐ |
| DEODORANT | ☐ INSECTICIDE | ☐ ADHESIVE | ☐ POLISH | ☐ |
| DISINFECTANT | ☐ COOLANT | ☐ CLEANER | ☐ FILLER | ☐ |

# GENERAL MOTORS CORPORATION
# MATERIAL SAFETY DATA SHEET H292

## SECTION I

ODUCT NAME OR NUMBER
LACQUER THINNER

ANUFACTURER'S NAME
B.B. PAINT CORP.

EMERGENCY TELEPHONE NO.
CE-9-8606

DRESS (Number, Street, City, State and Zip Code)
2201 N. DORT H'WAY, FLINT, MICH. 48506

MFG. D-U-N-S NO. - 00-532-2094

ZARDOUS MATERIALS DESCRIPTION AND PROPER SHIPPING NAME(49 CFR 172.101)
LACQUER THINNING COMPOUND

HAZARD CLASS (49 CFR 172.101)
FLAMMABLE LIQUID

EMICAL FAMILY
BLEND OF AROMATIC, ALIPHATIC & ACTIVE SOLVENTS

FORMULA

## SECTION II — INGREDIENTS (list all ingredients)

| | TLV | BOILING POINT °F | VAPOR PRESSURE mm Hg | VAPOR DENSITY AIR = 1 | FLASH POINT °F | EVAPORATION RATE | LEL | UEL |
|---|---|---|---|---|---|---|---|---|
| MATIC PROCARBON | 500 PPM | 195 | 38 @ 63°F | 3.65 | 16 c.c. | 2.5 BUT. AC. = 1 | 1.2 | |
| UOL | 100 PPM | 230 | 38 @ 20°C | 3.1 | 45 c.c. | 1.5 BUT. AC. = 1 | 1.2 | 7.0 |
| LOL | 100 PPM | 281 | 9.5 @ 20°C | 3.7 | 81 c.c. | 0.7 BUT. AC. = 1 | 1.0 | 7.0 |
| ISOBUTYL TONE | 100 PPM | 237 | 16 @ 20°C | 3.5 | 60 c.c. | 1.6 BUT. AC. = 1 | 1.4 | 7.5 |
| BUTYL TONE | 200 PPM | 174 | 70.6 @ 20°C | 2.5 | 16 c.c. | 4.6 BUT. AC. = 1 | 1.8 | 10.0 |
| ATE | 400 PPM | 180 | 33 @ 63°F | 2.07 | 53 c.c. | 1.7 BUT. AC. = 1 | 2 | 12 |
| SOL | 100 PPM | 243 | 4.4 @ 20°C | 2.55 | 97 c.c. | 0.46 BUT. AC. = 1 | 1.4 | 11.2 |
| ATE | 150 PPM | 248 | 7.8 @ 20°C | 4.0 | 76 c.c. | 1.0 BUT. AC. = 1 | 1.7 | 7.6 |

| | | | | | |
|---|---|---|---|---|---|
| LING POINT ( ✓°F) ( °C) | 174 | SPECIFIC GRAVITY ($H_2O$ 1) | .783 | | |
| OR PRESSURE (mm Hg) @ 20°C | 70.6 | PERCENT VOLATILE BY VOLUME (%) | 100 | | |
| OR DENSITY (AIR=1) | 4 | EVAPORATION RATE ( -1) ATTACHED ITEMIZED | | | |
| UBILITY IN WATER | MODERATE | PH = N/A | | | |

EARANCE AND ODOR
CLEAR - AROMATIC ODOR

IS MATERIAL: (LIQUID) SOLID GAS PASTE POWDER

## ☐ SECTION IV-FIRE AND EXPLOSION HAZARD DATA

| SH POINT (method used) | FLAMMABLE LIMITS | LEL | UEL |
|---|---|---|---|
| AS PER ITEMIZED ATTACHED | AS PER ITEMIZED ATTACHED | | |

NGUISHING MEDIA
FOAM, $CO_2$, DRY CHEMICAL

CIAL FIRE FIGHTING PROCEDURES
WEAR SELF CONTAINED BREATHING EQUIPMENT. EXCLUDE AIR. DO NOT E STREAM OF WATER. CONSULT LOCAL FIRE MARSHALL

SUAL FIRE AND EXPLOSION HAZARDS
SOLVENT VAPORS MAY CAUSE EXPLOSIVE MIXTURE WITH AIR.

## ☐ SECTION V-HEALTH HAZARD DATA

CTS OF OVEREXPOSURE
EXCESSIVE INHALATION MAY CAUSE ANESTHESIA, HEADACHE, DIZZINESS, NAUSEA, UPPER RESPIRATORY IRRITATION. DEFATTING TO SKIN. IRRITATING TO EYES.

THRESHOLD LIMIT VALUE (OF MIXTURE) UNKNOWN ITEMIZED ATTACHED

RGENCY AND FIRST AID PROCEDURES REMOVE TO FRESH AIR. RESTORE BREATHING IF NECESSARY. CALL DOCTOR H SKIN WITH SOAP & WATER. APPLY EMOLLIENT CREAM OR LOTION. FLUSH EYES WITH COPIOUS NTS OF WATER. SEE DOCTOR. IF TAKEN INTERNALLY SEE DOCTOR IMMEDIATELY

## ☐ SECTION VI-REACTIVITY DATA

| | | | |
|---|---|---|---|
| TABILITY | UNSTABLE | | CONDITIONS TO AVOID Excessive Heat, sparks, open flame. |
| | STABLE | X | |

COMPATIBILITY (materials to avoid) Strong oxidizing agents.

AZARDOUS DECOMPOSITION PRODUCTS Acrid Fumes, Smoke, CO, $CO_2$

| | | | |
|---|---|---|---|
| AZARDOUS OLYMERIZATION | MAY OCCUR | | CONDITIONS TO AVOID |
| | WILL NOT OCCUR | X | |

## ☐ SECTION VII-SPILL OR LEAK PROCEDURES

EPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Remove all sources of ignition, Wipe up.

Discard absorbents in proper container and wet down with water.

ASTE DISPOSAL METHOD In accordance with Local, State and Federal Regulations -

Do not incinerate in closed containers.

## ☐ SECTION VIII-SPECIAL PROTECTION INFORMATION

SPIRATORY PROTECTION (specify type)
epending on concentration above TLV - Cartridge respirator or self contained.

| | | |
|---|---|---|
| VENTILATION | LOCAL EXHAUST (Specify Rate) Maintain concentration below | SPECIAL Explosion proof |
| | MECHANICAL (general) (Specify Rate) TLV & explosive limits | OTHER |

OTECTIVE GLOVES Impermeable | EYE PROTECTION Chemical Safety Goggles or Face Mask.

HER PROTECTIVE EQUIPMENT Impermeable Apron

## ☐ SECTION IX-SPECIAL PRECAUTIONS

ECAUTIONS TO BE TAKEN IN HANDLING AND STORING Keep away from excessive heat, sparks, open flame. Treat flammable liquid. Avoid prolonged contact with skin & breathing of vapor or spray mist.

HER PRECAUTIONS Provide adequate ventilation. Do not take internally.

Close container after each use.

Seller agrees not to assert any claim (other than a claim for a patent infringement) against General Motors Corporation for any use or disclosure of any technical data or information disclosed in connection with this questionnaire

EASE COMPLETE QUESTIONNAIRE
D RETURN TO.

CHEV SAGINAW MFG.

Name (print) N. Kany

Signature N. Kany

Title Chemist

Date 10-22-79

## FOR GM USE ONLY

OCATION CISCO CODE ☐☐☐☐☐

M IDENTIFICATION CODES USED AT THIS LOCATION

M – ☐☐☐☐☐☐☐☐☐ | 1 0 5 ☐☐☐☐☐☐☐☐☐ | 9 9 8 ☐☐☐☐☐☐☐☐☐

☐☐☐☐☐☐☐☐☐ | ☐☐☐☐☐☐☐☐☐ | ☐☐☐☐☐☐☐☐☐

THIS SUBSTANCE CRITICAL TO CURRENT PRODUCTION? ☐ YES ☐ NO

THIS SUBSTANCE CRITICAL TO FUTURE PRODUCTION? ☐ YES ☐ NO

ASSIFICATION OF USE.

| | | | | |
|---|---|---|---|---|
| ☐ SOLVENT | ☐ FLUX | ☐ ABSORBANT | ☐ INSULATOR | ☐ ☐☐☐☐☐☐☐☐☐☐☐☐ |
| ☐ COATING | ☐ FUEL | ☐ ABRASIVE | ☐ LUBRICANT | ☐ ☐☐☐☐☐☐☐☐☐☐☐☐ |
| ☐ DEODORANT | ☐ INSECTICIDE | ☐ ADHESIVE | ☐ POLISH | ☐ ☐☐☐☐☐☐☐☐☐☐☐☐ |
| ☐ DISINFECTANT | ☐ COOLANT | ☐ CLEANER | ☐ FILLER | ☐ ☐☐☐☐☐☐☐☐☐☐☐☐ |

# MATERIAL SAFETY DATA SHEET

H 374

## SECTION I

| | |
|---|---|
| DUCT NAME OR NUMBER: VM&P NAPHTHA | EMERGENCY TELEPHONE NO.: 239-8606 |
| UFACTURER'S NAME: B. B. PAINT CORP. | MANUFACTURER'S D-U-N-S NO. |
| RESS (Number, Street, City, State and Zip Code): 2201 N. DORT HWY, FLINT MICH 48506 | |
| ARDOUS MATERIALS DESCRIPTION AND PROPER SHIPPING NAME(49 CFR 172.101): PAINT THINNER, FLAMMABLE LIQUID | HAZARD CLASS (49 CFR 172.101): FLAMMABLE LIQUID |
| MICAL FAMILY: ALIPHATIC HYDROCARBON | FORMULA |

## SECTION II — INGREDIENTS (list all ingredients)

| | CAS REGISTRY NO. | % |
|---|---|---|
| V.M.&P NAPHTHA | 8032-32-4 | 100 |

## SECTION III -- PHYSICAL DATA

| | | | | | |
|---|---|---|---|---|---|
| LING POINT (X°F) ( °C) | 212 | SPECIFIC GRAVITY ($H_2O$=1) | 0.75 | | |
| OR PRESSURE (mm Hg) ☑ (psi) ☐ | 10.5 | PERCENT VOLATILE BY VOLUME (%) | 100 | | |
| OR DENSITY (AIR=1) | 4.1 | EVAPORATION RATE (BUT. Ac=1) | 1.2 | | |
| UBILITY IN WATER NEGLIGIBLE | | pH= NA | | | |

EARANCE AND ODOR: COLORLESS LIQUID - SOLVENT ODOR

IS MATERIAL: (LIQUID) SOLID GAS PASTE POWDER

## SECTION IV-FIRE AND EXPLOSION HAZARD DATA

| | | | | |
|---|---|---|---|---|
| SH POINT (method used) (°F) (°C) | 50°F TCC | FLAMMABLE LIMITS | LEL 0.9 | UEL 6.0 |

INGUISHING MEDIA: FOAM, $CO_2$, DRY CHEMICAL, WATER MIST

CIAL FIRE FIGHTING PROCEDURES: WEAR SELF CONTAINED BREATHING EQUIPMENT, EXCLUDE AIR, DO NOT USE STREAM = WATER, CONSULT LOCAL FIRE MARSHALL

USUAL FIRE AND EXPLOSION HAZARDS: SOLVENT VAPOR MAY PORM EXPLOSIVE MIXTURE WITH AIR

## SECTION V-HEALTH HAZARD DATA

| | |
|---|---|
| ECTS OF OVEREXPOSURE: EXCESSIVE INHALATION MAY CAUSE ESTHESIA, HEADACHE, NAUSEA, UPPER RESPIRATORY IRRITATION, DEFATTING TO SKIN, IRRITATING TO EYES | THRESHOLD LIMIT VALUE ☑ 150 PPM PERMISSIBLE EXPOSURE LIMIT ☐ |

ERGENCY AND FIRST AID PROCEDURES: REMOVE VICTIM TO FRESH AIR, RESTORE BREATHING, IF NECESSARY CALL DOCTOR. WASH SKIN WITH SOAP & WATER - APPLY EMOLLIENT CREAM OR LOTION USE EYES WITH COPIOUS AMOUNTS OF WATER - SEE DOCTOR. IF TAKEN INTERNALLY SEE DOCTOR IMMEDIATELY.

## ☐ SECTION VI-REACTIVITY DATA

| | | | |
|---|---|---|---|
| STABILITY | UNSTABLE | | CONDITIONS TO AVOID: Excessive Heat, sparks, open flame. |
| | STABLE | X | |

INCOMPATIBILITY (materials to avoid): Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS: Acrid Fumes, Smoke, CO, $CO_2$

| | | | |
|---|---|---|---|
| HAZARDOUS POLYMERIZATION | MAY OCCUR | | CONDITIONS TO AVOID |
| | WILL NOT OCCUR | X | |

## ☐ SECTION VII-SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Remove all sources of ignition, Wipe up. Discard absorbents in proper container and wet down with water.

WASTE DISPOSAL METHOD: In accordance with Local, State and Federal Regulations - Do not incinerate in closed containers.

## ☐ SECTION VIII-SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type): Depending on concentration above TLV - Cartridge respirator or self contained.

| | | |
|---|---|---|
| VENTILATION | LOCAL EXHAUST (Specify Rate): Maintain concentration below | SPECIAL: Explosion proof |
| | MECHANICAL (general) (Specify Rate): TLV & explosive limits | OTHER |

PROTECTIVE GLOVES: Impermeable

EYE PROTECTION: Chemical Safety Goggles or Face Mask.

OTHER PROTECTIVE EQUIPMENT: Impermeable Apron

## ☐ SECTION IX-SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Keep away from excessive heat, sparks, open flame. As flammable liquid. Avoid prolonged contact with skin & breathing of vapor or spray mist

OTHER PRECAUTIONS: Provide adequate ventilation. Do not take internally. Close container after each use.

Seller agrees not to assert any claim (other than a claim for a patent infringement) against General Motors Corporation for any use or disclosure of any technical data or information disclosed in connection with this questionnaire.

PLEASE COMPLETE QUESTIONNAIRE AND RETURN TO:

Name (print): B.S.RAO

Signature: BSRao

Title: Chemist

Date: FEB. 3, 1981

## FOR GM USE ONLY

LOCATION CISCO CODE: ☐☐☐☐☐

GM IDENTIFICATION CODES USED AT THIS LOCATION:

GM– ☐☐☐☐☐☐☐☐☐☐ 105 ☐☐☐☐☐☐☐☐ 998 ☐☐☐☐☐☐☐☐☐☐

☐☐☐☐☐☐☐☐☐☐ ☐☐☐☐☐☐☐☐☐☐ ☐☐☐☐☐☐☐☐☐☐

IS THIS SUBSTANCE CRITICAL TO CURRENT PRODUCTION? ☐ YES ☐ NO

IS THIS SUBSTANCE CRITICAL TO FUTURE PRODUCTION? ☐ YES ☐ NO

CLASSIFICATION OF USE

| | | | | | |
|---|---|---|---|---|---|
| ☐ SOLVENT | ☐ FLUX | ☐ ABSORBANT | ☐ INSULATOR | ☐ | ☐☐☐☐☐☐☐☐☐☐ |
| ☐ COATING | ☐ FUEL | ☐ ABRASIVE | ☐ LUBRICANT | ☐ | ☐☐☐☐☐☐☐☐☐☐ |
| ☐ DEODORANT | ☐ INSECTICIDE | ☐ ADHESIVE | ☐ POLISH | ☐ | ☐☐☐☐☐☐☐☐☐☐ |
| ☐ | ☐ COOLANT | ☐ CLEANER | ☐ FILLER | ☐ | ☐☐☐☐☐☐☐☐☐☐ |

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

# MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

## SECTION I

| MANUFACTURER'S NAME | EMERGENCY TELEPHONE NO. |
|---|---|
| DYKEM COMPANY | (314)423-0100 |
| ADDRESS: 8501 Delport Drive, St. Louis, Missouri 63114 | |
| CHEMICAL NAME AND SYNONYMS: Does not apply | TRADE NAME AND SYNONYMS: DYKEM STAINING COLORS |
| CHEMICAL FAMILY: Specialty Lacquers | FORMULA: Does not apply |

## SECTION II - HAZARDOUS INGREDIENTS

| PAINTS, PRESERVATIVES & SOLVENTS | CAS REGISTRY NO. | % | TLV (Units) |
|---|---|---|---|
| Pigments (average) | N/A | 5 | --- |
| or Dyes | N/A | 1 | --- |
| Vehicle Wet Nitrocellulose | 9004-67-63.0 | 3 | --- |
| Solvents Denatured Alcohol | 64-17-5 | up to 40 | 1000 |
| Solvents Butyl Alcohol | 71-36-3 | up to 20 | 100 |
| Solvents Butyl Acetate | 123-86-4 | up to 42 | 150 |

"DYKEM" is the Registered Trade-mark of a line of Proprietary Products used by Industry since 1920. Never any harm to any of our employees who handle daily large volumes of raw materials and finished products. Containers are labeled with Caution Notices regarding flammability and use with adequate ventilation.

## SECTION III - PHYSICAL DATA

| | | | |
|---|---|---|---|
| BOILING POINT (°F.) 167°F (Average) | | SPECIFIC GRAVITY ($H_2O$=1) .86 to .91 | |
| VAPOR PRESSURE (mm Hg.) 36.1mm@20°C | | PERCENT, VOLATILE BY VOLUME (%) 78 to 90 | |
| VAPOR DENSITY (AIR=1) Heavier than | air | EVAPORATION RATE (_____=1) Faster than Butyl | Acetate |
| SOLUBILITY IN WATER: Partially | | | |
| APPEARANCE AND ODOR: Intense color, mild odor | | | |

## SECTION IV - FIRE AND EXPLOSION HAZARD DATA

| FLASH POINT (Method used) | FLAMMABLE LIMITS | Lel | Uel |
|---|---|---|---|
| 61°F Cleveland Open Cup | | | |

EXTINGUISHING MEDIA: Carbon Dioxide, Regular Foam, Dry Chemical

SPECIAL FIRE FIGHTING PROCEDURES: Wear self-contained breathing apparatus in enclosed areas.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Vapors are heavier than air and may travel along ground, and may be ignited by sparks, flame, or other ignition sources.


(Continued on reverse side)


PROPER SHIPPING NAME: DOT: Paint Flammable Liquid in Quart containers or larger; CONSUMER COMMODITY, ORM-D for Spray cans and Smaller than 1 Quart containers.

HAZARD CLASS: FLAMMABLE LIQUID I.D. NUMBER: UN-1263

## SECTION V - HEALTH HAZARD DATA

**IRESHOLD LIMIT VALUE**
830 (Estimated)

**FECTS OF OVEREXPOSURE**
Irritation of nose and throat. Reddness and irritation of
ves. Excessive breathing of vapors can cause nausia and respiratory irritation.

**IERGENCY AND FIRST AID PROCEDURES**
If swallowed, contact local Poison Control Center or
ıysician immediately. Flush eye or skin contact with large amounts of water.
f exposed to excessive vapors, remove to fresh air.

## SECTION VI - REACTIVITY DATA

| | | | |
|---|---|---|---|
| ABILITY | UNSTABLE | | CONDITIONS TO AVOID |
| | STABLE | X | None |

**COMPAT IBILITY** *(Materials to avoid)*
Strong oxidizing materials

**ZARDOUS DECOMPOSITION PRODUCTS**
Carbon monoxide or carbon dioxide

| | | | |
|---|---|---|---|
| ZARDOUS LYMERIZATION | MAY OCCUR | | CONDITIONS TO AVOID |
| | WILL NOT OCCUR | X | None |

## SECTION VII - SPILL OR LEAK PROCEDURES

**EPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED**
Absorb in waste material that can
e burned. Remove stain (color) with DYKEM REMOVER & THINNER 138.

**ASTE DISPOSAL METHOD**
No waste normally, incinerate or normal disposal for
lammables, in accordance with local, state and federal regulations.

## SECTION VIII - SPECIAL PROTECTION INFORMATION

**ESPIRATORY PROTECTION** *(Specify type)*
None needed

| | | |
|---|---|---|
| ENTILATION | LOCAL EXHAUST: Preferred (ordinary) | SPECIAL: None |
| | MECHANICAL *(General)*: Acceptable | OTHER: None |

**OTECTIVE GLOVES**
None needed

**EYE PROTECTION**
None needed under normal conditions

**THER PROTECTIVE EQUIPMENT**
None needed

## SECTION IX - SPECIAL PRECAUTIONS

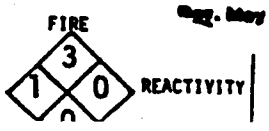
**RECAUTIONS TO BE TAKEN IN HANDLING AND STORING**
Keep away from heat and flames.
Use with adequate ventilation.

**THER PRECAUTIONS**
None



Information furnished by: DYKEM COMPANY
R. Belleville
(314)423-0100
DATE: 7-21-86

HAZARD RATING
4 - EXTREME
3 - HIGH
2 - MODERATE



# MATERIAL SAFETY DATA SHEET

NPCA 1-72

FOR COATINGS, RESINS AND RELATED MATERIALS

(Approved by U.S Department of Labor "Essentially Similar" to Form OSHA-20)

#305

PREP. 2/22/77

## Section I

CTURER'S NAME Naz-Dar Company

ADDRESS 1087 N. NorthBranch St CITY, STATE, AND ZIP CODE Chicago, Illinois 60622

ENCY TELEPHONE NO. 943-8338

T CLASS Solvent, Mixed MANUFACTURERS CODE IDENTIFICATION VF-180

AME Solvent, Thinner

## Section II — HAZARDOUS INGREDIENTS

| IENT | PERCENT | TLV PPM | TLV mg/M³ | LEL | VAPOR PRESSURE |
|---|---|---|---|---|---|
| | By Weight | | | | |
| horone | 23.5 | 25 | | .08 | @68°F. 1 |
| 28 (Aromatic hydrocarbon) | 53 | 100 | | 1.0 | @100°F. 5.5 |
| cetone Alcohol | 23.5 | 50 | | 1.8 | @68°F. 0.8 |

## Section III — PHYSICAL DATA

RANGE 330°F - 420°F. VAPOR DENSITY [XX] HEAVIER. [ ] LIGHTER, THAN AIR

ATION RATE [ ] FASTER [XX] SLOWER, THAN ETHER PERCENT VOLATILE BY VOLUME 100 WEIGHT PER GALLON 7.40 lbs.

## Section IV — FIRE AND EXPLOSION HAZARD DATA

EGORY Not regulated - Combustible Greater than 80 F. FLASH POINT Lowest Flashing Component TS-28 - 122 F TCC LEL SEE II

UISHING MEDIA -Use National Fire Protection Association (NFPA) Class B extinguishers, (carbon xide, dry chemical or foam) designed to extinguish NFPA Class 1B flammable liquid fires.

L FIRE AND EXPLOSION HAZARDS -Keep containers tightly closed. Isolate from heat, electrical equipt, sparks and open flame. Closed container may explode when exposed to extreme heat. Do apply to hot surfaces.

. FIRE FIGHTING PROCEDURES -Water spray may be ineffective. Water may be used to cool closed tainers to prevent pressure buildup and possibel autoignition or explosion when exposed to reme heat. If water is used, fog nozzles are preferable.

H 305

## Section V — HEALTH HAZARD DATA

VF. 1.5C

SHOLD LIMIT VALUE See II

TS OF OVEREXPOSURE- Inhalation: Anesthetic. Irritation of the respiratory tract or acute nervous system. Depression characterized by headache, dizziness, staggerisng gait, confusion unconsciousness or coma.

Skin or Eyé Contact: Primary irritation

ENCY AND FIRST AID PROCEDURES -Fumes: Remove from exposure. Restore breathing. Keep warm and quiet. Notify a physician. Splash (eyes): Flush immediately with copious quantities of running water for at least 15 minutes. Take to a physician for definitive medical treatment. Splash (skin): Remove with soap and water. Remove contaminated clothing.

## Section VI — REACTIVITY DATA

TY ☐ UNSTABLE ☒ STABLE CONDITIONS TO AVOID NA

PATABILITY (Materials to avoid) NA

DOUS DECOMPOSITION PRODUCTS -May produce hazardous fumes when heated to decomposition as in welding. Fumes may contain carbon monoxide and oxides of nitrogen.

DOUS POLYMERIZATION ☐ MAY OCCUR ☒ WILL NOT OCCUR

IONS TO AVOID NA

## Section VII — SPILL OR LEAK PROCEDURES

O BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Remove all sources of ignition (Flames, hot surfaces, and electrical, static or frictional sparks). Avoid breathing vapors. Ventilate area. Remove with inert absorbent and non-sparking tools.

DISPOSAL METHOD- Dispose of in accordance with local, state and federal regulations. Do not incinerate closed containers.

## Section VIII — SPECIAL PROTECTION INFORMATION

ATORY PROTECTION -In outdoor or open areas use Bureau of Mines approved mechanical filter respirator to remove solid airborne particles of overspray during spray application. In restricted ventilation areas use Bureau of Mines approved chemical-mechanical filters designed to remove acombination of particulate and gas and vapor. In confined areas use Bureau of Mines approved air line type respirators or hoods.

TION -Provide general dilution or local exhaust ventilation in volume and pattern to keep TLV of most hazardous ingredient in Section II below acceptable limit, LEL in Section IV below stated limit, and to remove decomposition products during welding or flame cutting on surfaces coated with this product.

TIVE GLOVES - Required for prolonged or repeated contact.

TECTION-Use safety eyewear designed to protect against splash of liquids.

ROTECTIVE EQUIPMENT -Prevent prolonged skin contact with contaiminated clothing.

## Section IX — SPECIAL PRECAUTIONS

TIONS TO BE TAKEN IN HANDLING AND STORING -Do not store above 120°F. Store large quantities in buildings designed for storage of NFPA Class II flammable liquids.

RECAUTIONS- Do not take internally. Containers should be grounded when pouring. Avoid free fall of liquid in excess of a few inches. Do not flame cut, braze or weld without U.S. Bureau of Mines approved respirator or appropriate ventilation.

**penetone** CORPORATION
A Subsidiary of West Chemical Products, Inc.

74 HUDSON AVENUE, TENAFLY, NJ 07670
EMERGENCY TEL. NO. (201) 567-3000

# MATERIAL SAFETY DATA SHEET

(Confidential Formula – Information not to be disclosed to other than recipient and other regulatory agencies.)

DATE March 7, 1986

## SECTION I. PRODUCT IDENTIFICATION

TRADE NAME: DE-ICER 818

FORMULA: Naphthenic hydrocarbon, silicone, dye

CHEMICAL FAMILY: Anti-icing fluid

## SECTION II. HAZARDOUS INGREDIENTS

| COMPONENT OR MATERIAL CHEMICAL NAMES | CAS NO. | % by | TLV (Units) |
|---|---|---|---|
| 40 Vis Naphthenic hydrocarbon | 64742-53-6 | 94 | 5 $mg/m^3$ (oil mist) |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

## SECTION III. PHYSICAL DATA

| | |
|---|---|
| BOILING POINT (°F): 500 | VAPOR PRESSURE, mm Hg @ 20°C (68°F): at 20°C 0.008 |
| EVAPORATION RATE (ETHER =1): n-butyl acetate=1 Less than 0.01 | VAPOR DENSITY (AIR=1) @ 60-90°F: Approximately 8 |
| SOLUBILITY IN $H_2O$, % by wt @ 20°C (68°F): None | % VOLATILES by VOL. @ 70°F: Less than 0.1% |
| SPECIFIC GRAVITY $H_2O$ = 1 @ 75°F: 0.858 | pH: Not applicable |

APPEARANCE & ODOR: Clear, blue liquid

## SECTION IV. FIRE AND EXPLOSION HAZARD DATA

| FLASH POINT (Method Used) | FLAMMABLE EXPLOSIVE LIMITS | UPPER | LOWER |
|---|---|---|---|
| 255°F (P.M.C.C.) | | 1% | 7% |

EXTINGUISHING MEDIA: Foam, dry chemical, $CO_2$, fog

SPECIAL FIRE FIGHTING PROCEDURES: Use air supplied rescue equipment. Treat as Class B (oil) fire.

UNUSUAL FIRE & EXPLOSION HAZARDS: None Known

## SECTION V. EMERGENCY AND FIRST AID PROCEDURES

EYES: In case of contact with eyes, flush with water until irritation subsides.

SKIN: Wash skin with soap and water after contact.

INHALATION: Remove to fresh air.

INGESTION: Do not induce vomiting. Call a physician.

## SECTION VI. HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

5 mg./$m^3$ for oil mist

EFFECTS OF OVEREXPOSURE:
INHALATION

Not determined

SKIN

Prolonged or repeated contact with skin may cause mild irritation.

EYES

May cause irritation upon contact.

CHRONIC OVEREXPOSURE EFFECTS

Not ascertained

## SECTION VII. REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

Product is stable.

INCOMPATIBILITY Strong oxidizers, such as liquid chlorine and concentrated oxygen.

HAZARDOUS DECOMPOSITION PRODUCTS

Carbon monoxide in the case of incomplete combustion.

CONDITIONS CONTRIBUTING TO POLYMERIZATION

Will not occur.

## SECTION VIII. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

Recover free product. Add absorbent to spill area. Keep product out of streams.

NEUTRALIZING CHEMICALS

Not applicable

WASTE DISPOSAL METHOD

Obtain the services of a licensed disposal company as per RCRA.

## SECTION IX. VENTILATION AND PERSONAL PROTECTIVE EQUIPMENT

VENTILATION REQUIREMENTS

Local exhaust recommended.

SPECIAL PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY

Normally not needed.

EYE

Splash proof goggles.

GLOVES

Oil-proof gloves.

OTHER CLOTHING & EQUIPMENT

None required under normal usage.

## SECTION X. SPECIAL PRECAUTIONS INCLUDING STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING & STORAGE (Always refer to label directions when using.)

Keep away from heat and open flame.

Avoid prolonged or repeated contact with skin.

D.O.T. SHIPPING CLASSIFICATION

Lubricant N.O.S.

 8/85

# APPENDIX B

# RMT., LABORATORY QUALITY CONTROL PROGRAM

RMT, Inc.
Suite 124
1406 East Washington Ave.
Madison, WI 53703-3009
Phone: 608-255-2134

# RMT, INC. LABORATORY QUALITY CONTROL PROGRAM

Prepared by:

Kenneth C. Brunner
Acting Laboratory Director

Signed: Kenneth C Brunner

Asst. Laboratory Director

Signed: _____

LF-289 (R11/87)

# RMT, INC. LABORATORY QUALITY CONTROL PROGRAM

## I. PERSONNEL

| STAFF MEMBER | TITLE | ACADEMIC |
|---|---|---|
| KENNETH C. BRUNNER | LABORATORY DIRECTOR, ACTING | M.S. |
| OPEN | ASST. LAB DIRECTOR | |
| SUSAN E. WELLS | ADMINISTRATIVE SUPERVISOR | B.S. |
| ERIC L. THOMAS | INORGANICS SUPERVISOR | B.S. |
| OPEN | ORGANICS SUPERVISOR | |
| KARLA HALL | LEAD WORKER - METALS | B.S. |
| OPEN | LEAD WORKER - ORGANICS | |
| SYED ALAM | LABORATORY ANALYST | M.S. |
| KATHLEEN ARNOLD | LABORATORY AIDE | B.S. |
| JOE CEBE | LABORATORY AIDE | A.D. |
| MARIJANE CURRY | LABORATORY ANALYST | B.S. |
| LAURIE DUNN | LABORATORY AIDE | M.S. |
| MARCIA ECKMEYER | LABORATORY AIDE | HIGH SCHOOL |
| ROSANNE GATES | SAMPLE ENTRY TECHNICIAN | HIGH SCHOOL |
| JEFF GEARHART | LABORATORY ANALYST | B.S. |
| JULIE HECKL | LABORATORY ANALYST | WORKING ON B.S. |
| SHARON KOCH | ADMINISTRATIVE ASSISTANT | HIGH SCHOOL |
| PAUL KORGER | LABORATORY ANALYST | B.S. |
| MICHAEL MILLER | LABORATORY ANALYST | A.D. |
| BRIAN MINIX | LABORATORY ANALYST | WORKING ON B.S. |
| DIANE MOXLEY | LABORATORY ANALYST | B.S. |
| MELANIE NIESEN | LABORATORY AIDE | HIGH SCHOOL |
| SANDRA RILEY | LABORATORY ANALYST | B.S. |

| | | |
|---|---|---|
| BARBARA RUBIO | LABORATORY ANALYST | M.S. |
| KIM WERNER | LABORATORY ANALYST | WORKING ON B.S. |
| MAL GROSS | ANALYTICAL SERVICES SALES & MARKETING | B.S. |

## II. LABORATORY FACILITIES

### LAB SPACE

TOTAL SQUARE FEET = 7,500

### BENCH SPACE

TOTAL LINEAR FEET = 200

### SINKS

3- HOT AND COLD RUNNING WATER
5- COLD WATER SINKS FOR CONDENSING WATER

### ELECTRICAL SERVICES

110 AND 220 VOLT SUPPLIES AVAILABLE

### EXHAUST HOOD

FOUR HOODS EIGHT FEET IN LENGTH AVAILABLE.
100 FEET/MIN FACE VELOCITY EXHAUSTING.
COLD WATER, SINKS, AND GAS AVAILABLE IN HOODS.

### HIGH PURITY WATER SUPPLY

CONTINENTAL WATER SYSTEM USING CARBON ABSORPTION, WATER SOFTENING, REVERSE OSMOSIS AND CATION/ANION EXCHANGE IN SERIES. FINAL WATER QUALITY IS 18 MEGOHM-CM. WATER QUALITY IS MONITORED DAILY AND INFORMATION IS USED TO DETERMINE THE NEEDS TO REGENERATE RESIN TANKS, WATER SOFTENER AND R/O SYSTEM.

### COMPRESSED AIR

COMPRESSOR DELIVERS 1.8 CFM (50 L/MIN.) @ 60 PSI OF AIR FOR ATOMIC ABSORPTION INSTRUMENT AND IN-HOUSE AIR. COMPRESSOR IS MOUNTED ON 38 LITER TANK BUILT TO A.S.M.E. SPECIFICATIONS. AIR SUPPLY IS FILTERED TO REMOVE PARTICULATES AND OIL.

### VACUUM

DIRECT DRIVE PUMP WITH AN EVACUATION RATE OF 50 LITERS/MIN IS USED FOR FILTRATION AND DESSICATION.

## III. LABORATORY PRACTICES

### GLASSWARE

All glassware used in the laboratory is borosilicate based KIMAX or PYREX. All volumetric flasks and pipets are Class A and meet NBS criteria.

### SAMPLE BOTTLES

GLASS - Borosilicate glass with teflon lined screw caps

PLASTIC - Linear polyethylene with polypropylene screw caps

VOA VIALS - Glass with Teflon lined septa

### GLASSWARE CLEANING

GENERAL - Glassware is cleaned in phosphate-free detergent, rinsed three times with tap water, and rinsed three times with deionized water.

PIPETS - Metal Pipets are soaked in a $HNO_3$ solution, wet chemical pipets are soaked in a soap solution, and rinsed 1 hour with deionized water in automatic pipet washer.

### SPECIAL CLEANING

PHOSPHORUS - All glassware used in phosphorus test is washed with 1:1 hydrochloric acid and rinsed three times with deionized water.

METALS - All glassware used for metals testing is washed with 1:1 nitric acid and rinsed five times with deionized water.

Organics - All glassware is rinsed with acetone and high purity water.

### CHEMICALS AND REAGENTS

All chemicals used in the laboratory are "Analytical Reagent Grade" unless another grade is specified in the methodology. Chemicals are dated upon receipt and discarded after shelf life is exceeded. Reagents made in the lab are stored in containers specified in methods. All purchased reagents, buffers, and standards are traceable to National Bureau of Standards.

## IV. LABORATORY EQUIPMENT

| ITEM | MAKE/MODEL | SPECIFICATIONS |
|---|---|---|
| ANALYTICAL BALANCES (2) | METTLER H 35 AR | 160 gram capacity, (0.1 mg sensitivity) |
| TOP LOADING BALANCES (5) | METTLER PC 4400, PJ400 | DUAL RANGE<br>4000 grams (0.1 gram sensitivity)<br>400 grams (0.01 gram sensitivity) |
| VISIBLE SPECTROPHOTOMETERS (2) | PYE/UNICAM<br>-MODEL 330;<br>-MODEL 8650 | SINGLE BEAM,<br>350-900 MM,<br>DIGITAL DISPLAY,<br>ABSORBANCE OR CONCENTRATION |
| pH METERS (2) | -CORNING #130;<br>-ORION RESEARCH | SENSITIVITY OF 0.001 PH UNIT, TEMPERATURE COMPENSATING |
| SPECIFIC ION METERS (2) | -CORNING #130<br>-ORION RESEARCH | SENSITIVITY OF 0.1 MV<br>SENSITIVITY OF 0.01 MV |
| ATOMIC ABSORPTION SPECTROPHOTOMETERS (2) | PERKIN-ELMER #2380; #5000 | -DOUBLE BEAM<br>-MICROPROCESSOR CONTROL<br>-BACKGROUND CORRECTOR |
| AA ATTACHMENTS | HGA-400 #023 | -GRAPHITE FURNACE<br>-RECORDER<br>-ELECTRODELESS DISCHARGE SUPPLY |
| | MHS-10 | -HYDRIDE SYSTEM<br>MERCURY ANALYSIS SYSTEM |
| | #7300 WORKSTATION | MICROPROCESSOR COMPUTER |
| INDUCTIVELY COUPLED PLASMA SPECTROPHOTOMETER | PERKIN-ELMER #6500 WITH #7300 COMPUTER | SEQUENTIAL ANALYZER |
| AUTOANALYZER | LACHAT/QUIKCHEM | FLOW INJECTION ANALYSIS (FIA) SYSTEM |
| CONDUCTIVITY METER | YSI 33 | |
| DRYING OVENS (3) | BLUE M#OV-510A-2 | MECHANICAL CONVECTION, 50-260°C |
| | AMERICAN SCIENTIFIC | 40-200°C |
| DESSICATORS (2) | LABCONCO 55300 | - |

| | | |
|---|---|---|
| HOT PLATES (2) | -LINDBERG 53014<br>-THERMOLYNE 2200 | -<br>- |
| MUFFLE FURNACE | BLUE M#M25A-2A | 30-2000°F |
| STEAM BATHS (3) | PRECISION #66738 | ELECTRICALLY HEATED |
| WATER BATHS (2) | BLUE M#MW1120A1 | UP TO 100°C CONSTANT TEMPERATURE |
| VACUUM PUMP | PRECISION DD-50 | DIRECT DRIVE, 50 LITERS/MIN |
| CENTRIFUGE | IEC SIZE 2, MODEL K | CAPACITY OF FOUR LITERS |
| REFRIGERATORS (7) | JORDAN FT-2-TR | 47 CUBIC FOOT CAPACITY |
| SHAKER | EBERBACH 6000 | UP TO 260 OSCILLATIONS/MIN. |
| THERMOMETER | | NBS CERTIFIED |
| FLASH POINT TESTER | GCA/PRECISION SCIENTIFIC | |
| OXYGEN BOMB CALORIMETER | PARR BOMB #1341 PLAIN | |
| TOC INSTRUMENT | DOHRMANN DC-80 WITH AUTO SAMPLER | UV PROMOTED OXIDATION METHOD WITH IR DETECTOR FOR $CO_2$ |
| GAS CHROMATOGRAPHS (4) (WITH AUTO SAMPLERS) | HEWLETT-PACKARD 5880 A, 5990,5890A | ECD AND FID DETECTORS |
| | TRACOR 540 | HALL AND PID DETECTORS |
| PURGE AND TRAPS (2) | TEKMAR 4000,4200 | AUTO SAMPLER ATTACHMENTS |
| TOH INSTRUMENT | DOHRMANN ANALYZER | MICROCOULOMETRIC TITRATION |

EQUIPMENT MAINTENANCE

**All equipment is maintained according to manufacturer's recommendations. Ten major pieces of equipment are under the special maintenance programs detailed below.**

ANALYTICAL BALANCES

The analytical balances are covered by a service contract. Once a year the instruments are completely cleaned and checked for accuracy by the manufacturer's service representative. In addition to the yearly service, a set of Class S-1 weights are available for periodic accuracy checks performed according to the guidelines given in ASTM, PART 41, 1976 entitled "Single Arm Balances Testing".

INDUCTIVELY COUPLED PLASMA (ICP), ATOMIC ABSORPTION (AA) AND GAS CHROMATOGRAPHS (GC)

The, ICP, AA, and GC instruments are covered by a manufacturer's service contract which calls for one to three visits per year for routine maintenance, cleaning, optics alignment, etc.

VISIBLE SPECTROPHOTOMETERS

The spectrophotometers are maintained according to manufacturer's guidelines. The wavelength alignment is checked monthly with colored reference solutions.

## V. METHODOLOGY

ALL METHODS USED IN THE LABORATORY ARE USEPA APPROVED PROCEDURES OR STANDARD METHODS PROCEDURES DEPENDING ON THE REGULATORY REQUIREMENTS. REFERENCES ARE GIVEN BELOW:

1. "METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES" EPA-600/4-79-020 MARCH 1979 WITH TECHNICAL ADDITIONS EPA-600/4-82-055 DECEMBER 1982 AND EPA-600/4-84-017 MARCH 1984

2. USEPA TEST METHODS FOR ORGANIC POLLUTANTS. FEDERAL REGISTER OCTOBER 26, 1984. 40 CFR 136

3. "STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER" 16TH EDITION; APHA, AWWA, WPCF 1985.

4. "TEST METHODS FOR EVALUATING SOLID WASTES" SW-846, USEPA, 3RD EDITION, VOLUMES 1-A, B,C. AND D., NOVEMBER 1986

The following table summarizes each parameter run in the lab along with methods and references.

| PARAMETER | METHOD USED | REFERENCE |
|---|---|---|
| ACID EXTRACTABLE ORGANICS | GAS CHROMATOGRAPHY | EPA #604, 40 CFR 136 |
| ACIDITY | TITRIMETRIC | EPA 305.1 |
| ALKALINITY | -TITRIMETRIC | EPA 310.1 |
| | -COLORIMETRIC | EPA 310.2 |
| ALUMINUM | -FLAME AA | EPA 200.1 |
| | -ICP | EPA 200.7 |
| AMMONIA NITROGEN | DISTILLATION, NESSLERIZATION | EPA 350.2 |
| ANTIMONY | -FLAME AA | EPA 204.1 |
| | -ICP | EPA 200.7 |
| ARSENIC | GRAPHITE FURNACE AA | EPA 206.2 |
| BARIUM | -FLAME AA | EPA 208.1 |
| | -ICP | EPA 200.7 |
| BERYLLIUM | -FLAME AA | EPA 210.1 |
| | -ICP | EPA 200.7 |
| BORON | CURCUMIN, COLORIMETRIC | EPA 213.3 |
| CADMIUM* | -FLAME AA | EPA 213.1 |
| | -ICP | EPA 200.7 |
| | -GRAPHITE FURNACE AA | EPA 213.2 |
| CALCIUM | -FLAME AA | EPA 215.1 |
| | -ICP | EPA 200.7 |
| CHLORIDE | COLORIMETRIC, FERRICYANIDE | EPA 325.2 |
| CHROMIUM, HEXAVALENT | COLORIMETRIC | EPA 7196, SW-846 |
| CHROMIUM, TOTAL* | -FLAME AA | EPA 218.1 |
| | -ICP | EPA 200.7 |
| | -GRAPHITE FURNACE AA | EPA 218.2 |
| C.O.D. | COLORIMETRIC | EPA 410.4 |
| COBALT | -FLAME AA | EPA 219.1 |
| | -ICP | EPA 200.7 |
| CONDUCTIVITY | WHEATSTONE BRIDGE | EPA 120.1 |

| | | |
|---|---|---|
| COPPER | -FLAME AA | EPA 220.1 |
| | -ICP | EPA 200.7 |
| CYANIDE, TOTAL | DISTILLATION, COLORIMETRIC | EPA 335.2 |
| FLASH POINT | PENSKY-MARTENS, CLOSED CUP | EPA 1010, SW-846 |
| FLUORIDE | SPECIFIC ION | EPA 340.2 |
| HARDNESS, TOTAL | EDTA TITRIMETRIC | EPA 130.2 |
| | -COLORIMETRIC | EPA 130.1 |
| HERBICIDES | GAS CHROMATOGRAPHY | STANDARD METHODS 509B |
| IRON | -FLAME AA | EPA 236.1 |
| | -ICP | EPA 200.7 |
| LEAD* | -FLAME AA | EPA 239.1 |
| | -ICP | EPA 200.7 |
| | -GRAPHITE FURNACE | EPA 239.2 |
| LITHIUM | FLAME AA | STANDARD METHODS 303A |
| MAGNESIUM | -FLAME AA | EPA 242.1 |
| | -ICP | EPA 200.7 |
| MANGANESE | -FLAME AA | EPA 243.1 |
| | -ICP | EPA 200.7 |
| MERCURY | COLD VAPOR FLAMELESS AA | EPA 245.1 |
| MOLYBDENUM | FLAME AA | EPA 246.1 |
| NICKEL | -FLAME AA | EPA 249.1 |
| | -ICP | EPA 200.7 |
| NITRATE NITROGEN | COLORIMETRIC, Cd REDUCTION | EPA 353.2 |
| NITRITE NITROGEN | COLORIMETRIC | EPA 354.1 |
| OIL & GREASE | GRAVIMETRIC, | EPA 413.1 |
| pH | ELECTROMETRIC | EPA 150.1 |
| PCB'S AND PESTICIDES | GAS CHROMATOGRAPHY | EPA #608 - 40 CFR 136 |
| PHENOLS | DISTILLATION, COLORIMETRIC | EPA 420.2 |
| PHOSPHORUS, ORTHO | ASCORBIC ACID COLORIMETRIC | EPA 365.2 |
| PHOSPHORUS, TOTAL | PERSULFATE DIGESTION, ASCORBIC ACID COLORIMETRIC | EPA 365.2 |
| POTASSIUM | FLAME AA | EPA 258.1 |

| | | |
|---|---|---|
| SELENIUM | GRAPHITE FURNACE AA | EPA 270 |
| SILVER | -FLAME AA<br>-ICP | EPA 272.1<br>EPA 200.7 |
| SODIUM | FLAME AA | EPA 273.1 |
| SOLIDS, DISSOLVED | GRAVIMETRIC, DRIED AT 180°C | EPA 160.1 |
| SOLIDS, SUSPENDED | GRAVIMETRIC, DRIED AT 105°C | EPA 160.2 |
| SOLIDS, TOTAL | GRAVIMETRIC, DRIED AT 105°C | EPA 160.3 |
| SOLIDS, VOLATILE | GRAVIMETRIC, IGNITE AT 550°C | EPA 160.4 |
| SULFATE | COLORIMETRIC, METHYLTHYMOL | EPA 375.2 |
| SULFIDE | TITRIMETRIC | EPA 376.1 |
| SURFACTANTS (MBAS) | COLORIMETRIC | EPA 425.1 |
| THALLIUM | -FLAME AA<br>-ICP | EPA 279.1<br>EPA 200.7 |
| TIN | -FLAME AA<br>-ICP | EPA 282.1<br>EPA 200.7 |
| TOTAL KJELDAHL NITROGEN | DISTILLATION, NESSLERIZATION | EPA 351.3 |
| TOTAL ORGANIC CARBON | UV OXIDATION | EPA 415.1 |
| TOTAL ORGANIC HALOGEN | MICROCOULOMETRIC TITRATION | EPA 9020, SW-846 |
| VANADIUM | FLAME AA | EPA 286.1 |
| VOLATILE ORGANICS | PURGE AND TRAP, GAS CHROMATOGRAPHY | EPA #601, 602, 603-<br>40 CFR 136 |
| ZINC | -FLAME AA<br>-ICP | EPA 289.1<br>EPA 200.7 |

*GRAPHITE FURNACE METHOD USED FOR LOW LEVEL DRINKING WATER ANALYSIS

## VI. SAMPLE COLLECTION, HANDLING AND PRESERVATION

| PARAMETER | CONTAINER AND VOLUME REQUIRED | PRESERVATIVE | HOLDING TIME* |
|---|---|---|---|
| ACID EXTRACTABLE ORGANICS | AMBER GLASS, 1,000 ML | COOL, 4°C | 7 DAYS, EXTRACTION 40 DAYS, AFTER EXTRACTION |
| ACIDITY | PLASTIC, 100 ML | COOL, 4°C | 14 DAYS |
| ALKALINITY | PLASTIC, 100 ML | COOL, 4°C | 14 DAYS |
| ALUMINUM | PLASTIC, 100 ML | $HNO_3$ TO pH<2 | 6 MONTHS |
| AMMONIA NITROGEN | PLASTIC, 500 ML | $H_2SO_4$ TO pH<2 | 28 DAYS |
| ANTIMONY | PLASTIC, 100 ML | $HNO_3$ TO pH<2 | 6 MONTHS |
| ARSENIC | PLASTIC, 100 ML | $HNO_3$ TO pH<2 | 6 MONTHS |
| BARIUM | PLASTIC, 100 ML | $HNO_3$ TO pH<2 | 6 MONTHS |
| BERYLLIUM | PLASTIC, 100 ML | $HNO_3$ TO pH<2 | 6 MONTHS |
| BORON | PLASTIC, 100 ML | COOL, 4°C | 28 DAYS |
| CADMIUM | PLASTIC, 100 ML | $HNO_3$ TO pH<2 | 6 MONTHS |
| CALCIUM | PLASTIC, 100 ML | $HNO_3$ TO pH<2 | 6 MONTHS |
| CHLORIDE | PLASTIC, 100 ML | COOL, 4°C | 28 DAYS |
| CHLORINATED ORGANICS | AMBER GLASS, 1,000 ML | COOL, 4°C | 7 DAYS-EXTRACTION 40 DAYS-ANALYSIS |
| CHROMIUM, HEXAVALENT | PLASTIC, 200 ML | COOL, 4°C | 24 HOURS |
| CHROMIUM, TOTAL | PLASTIC, 100 ML | $HNO_3$ to pH<2 | 6 MONTHS |
| C.O.D. | GLASS, 50 ML | $H_2SO_4$ TO pH<2 | 28 DAYS |
| COBALT | PLASTIC, 100 ML | $HNO_3$ TO pH<2 | 6 MONTHS |
| CONDUCTIVITY | PLASTIC, 100 ML | COOL, 4°C | 28 DAYS |
| COPPER | PLASTIC, 100 ML | $HNO_3$ TO pH<2 | 6 MONTHS |
| CYANIDE, TOTAL | PLASTIC, 500 ML | NaOH TO pH>12 | 14 DAYS |
| FLASHPOINT | GLASS, 500 ML | COOL, 4°C | 14 DAYS |
| FLUORIDE | PLASTIC, 100 ML | COOL, 4°C | 28 DAYS |

| | | | |
|---|---|---|---|
| HARDNESS, TOTAL | PLASTIC, 100 ML | $HNO_3$ TO pH<2 | 6 MONTHS |
| HERBICIDES | AMBER GLASS, 1,000 ML | COOL, 4°C | 7 DAYS, EXTRACTION 40 DAYS, AFTER EXTRACTION |
| IRON | PLASTIC, 100 ML | $HNO_3$ TO pH<2 | 6 MONTHS |
| LEAD | PLASTIC, 100 ML | $HNO_3$ TO pH<2 | 6 MONTHS |
| LITHIUM | PLASTIC, 100 ML | $HNO_3$ TO pH<2 | 6 MONTHS |
| MANGNESIUM | PLASTIC, 100 ML | $HNO_3$ TO pH<2 | 6 MONTHS |
| MANGANESE | PLASTIC, 100 ML | $HNO_3$ TO pH<2 | 6 MONTHS |
| MERCURY | GLASS, 200 ML | $HNO_3$ TO pH<2 | 28 DAYS |
| MOLYBDENUM | PLASTIC, 100 ML | $HNO_3$ TO pH<2 | 6 MONTHS |
| NICKEL | PLASTIC, 100 ML | $HNO_3$ TO pH<2 | 6 MONTHS |
| NITRATE NITROGEN | PLASTIC, 50 ML | Cool, 4°C | 48 HRS |
| NITRITE NITROGEN | PLASTIC, 50 MLS | COOL, 4°C | 48 HOURS |
| OIL & GREASE | GLASS, 500 ML | $H_2SO_4$ TO pH<2 | 28 DAYS |
| pH | PLASTIC, 50 ML | NONE | ANALYZE IMMEDIATELY |
| PCB'S AND PESTICIDES | AMBER GLASS, 1000 ML | COOL, 4°C | 7 DAYS, EXTRACTION 40 DAYS, AFTER EXTRACTION |
| PHENOLS | GLASS, 500 ML | $H_2SO_4$ TO pH<2 | 28 DAYS |
| PHOSPHORUS, ORTHO | PLASTIC, 100 ML | COOL, 4°C | 48 HOURS |
| PHOSPHORUS, TOTAL | PLASTIC, 100 ML | $H_2SO_4$ TO pH<2 | 28 DAYS |
| POTASSIUM | PLASTIC, 100 ML | $HNO_3$ TO pH<2 | 6 MONTHS |
| SELENIUM | PLASTIC, 100 ML | $HNO_3$ TO pH<2 | 6 MONTHS |
| SILVER | PLASTIC, 100 ML | $HNO_3$ TO pH<2 | 6 MONTHS |
| SODIUM | PLASTIC, 100 ML | $HNO_3$ TO pH<2 | 6 MONTHS |
| SOLIDS, DISSOLVED | PLASTIC, 100 ML | COOL, 4°C | 48 HOURS |
| SOLIDS, SUSPENDED | PLASTIC, 100 ML | COOL, 4°C | 7 DAYS |
| SOLIDS, TOTAL | PLASTIC, 100 ML | COOL, 4°C | 14 DAYS |

| | | | |
|---|---|---|---|
| SOLIDS, TOTAL | PLASTIC, 100 ML | COOL, 4°C | 7 DAYS |
| SOLIDS, VOLATILE | PLASTIC, 100 ML | COOL, 4°C | 7 DAYS |
| SULFATE* | PLASTIC, 100 ML | COOL, 4°C | 28 DAYS |
| SULFIDE | PLASTIC, 200 ML | ZINC ACETATE AND NaOH TO pH>9 | 7 DAYS |
| SURFACTANTS | GLASS, 500 ML | COOL, 4°C | 48 HOURS |
| THALLIUM | PLASTIC, 100 ML | $HNO_3$ TO pH<2 | 6 MONTHS |
| TIN | PLASTIC, 100 ML | $HNO_3$ TO pH<2 | 6 MONTHS |
| TOTAL KJELDAHL NITROGEN | PLASTIC, 500 ML | $H_2SO_4$ TO pH<2 | 28 DAYS |
| TOTAL ORGANIC CARBON | GLASS, 100 ML | $H_2SO_4$ TO pH<2 | 28 DAYS |
| TOTAL ORGANIC HALOGEN | AMBER GLASS, 1000 ML | COOL, 4°C | 28 DAYS |
| VANADIUM | PLASTIC, 100 ML | $HNO_3$ TO pH<2 | 6 MONTHS |
| VOLATILE ORGANICS | GLASS SEPTA VIAL 3 X 40 ML | COOL, 4°C | 14 DAYS |
| ZINC | PLASTIC, 100 ML | $HNO_3$ TO pH<2 | 6 MONTHS |

*In the October 26, 1984 (40 CFR 136), Federal Register, the EPA proposed these holding times for preserved samples.

## Toxicity Leaching Tests

Methods used to perform EP toxicity tests correspond directly with EPA Method 1310 contained in SW-846. Quality control procedures which require duplicate and blank analysis every 20 samples are used. In addition, spiked and duplicate samples of the leachates are analyzed as required in RMT's quality control program.

The USEPA's new proposed Toxicity Characteristic Leaching Procedure or TCLP can be performed by the Laboratory. The procedures, equipment and analyses outlined in the June 13, 1986 Federal Register are followed. A quality control program of duplicates and blanks has been established to monitor the leaching procedure and USEPA methods are used in the analysis of all leachates.

## VII. QUALITY CONTROL

The following quality control techniques are used to insure accurate results. All quality control data are documented and kept on file for inspection. More detailed information on each technique is found in the EPA Handbook for Analytical Quality Control in Water and Wastewater Labs, 1979.

### REFERENCE SAMPLES

Quality control samples from the EPA are analyzed twelve times per year. The correct results are sent in sealed envelopes with the samples. The envelopes are opened only after the analysis is complete. The laboratory results are compared with the correct results and are available for inspection. The performance of the laboratory is reviewed after the analyses and any problem areas are defined and corrected.

### STANDARD CURVES

With each new batch of reagents, a new standard curve is established using at least seven concentration levels and a blank. The new standard curve is compared to the existing curve and must agree within ±10%. The curve is kept on file for verification until a new curve is required. In each subsequent analysis run, the standard curve must be verified by a blank and two standards. The acceptance criteria for standard curve verification is ±10% for both standards.

The only exception to the above is atomic absorption work which uses three standards and a blank each time an analysis is run.

### SPIKED ANALYSIS

Spikes are used to determine the accuracy of a given analysis. For each ten or less analyses performed, one sample is spiked and the percent recovery determined. The percent recovery data are compared to the quality control chart developed for each analysis (see below). The acceptance criteria for percent recovery is ± one standard deviation. The percent recovery is calculated as follows:

STANDARDS) $$\text{PERCENT RECOVERY} = 100 \frac{\text{OBSERVED VALUE}}{\text{KNOWN VALUE}}$$

SPIKES) $$\text{PERCENT RECOVERY} = 100 \frac{\text{OBSERVED VALUE-BACKGROUND VALUE}}{\text{SPIKE VALUE}}$$

## DUPLICATE ANALYSIS

Duplicate analyses are used to determine the precision of each analysis. For each ten or less samples, one duplicate is run. The range between the duplicates is compared to the critical range value. The range must be below or equal to the critical range for acceptance. The critical range value is concentration dependent and determined by a large number of duplicate analyses.

## STANDARD ADDITIONS

The method of standard additions is used primarily in furnace atomic absorption to determine interferences in different sample matrixes. Known amounts of a metal are added to the unknown sample at zero, one, two, and three times the expected amount. The results are plotted on a graph of absorbance vs. concentration and the value of the point of interception of the abscissa is the unknown concentration.

All furnace work requires the verification of matrix interferences before the need for standard additions can be determined. The unknown is spiked at a 1:4 dilution and compared to the unspiked result. If agreement is ±10%, then no interference exists, If it is greater than ±10%, then standard additions is required.

## EP LEACH TEST

One out of every ten EP leach tests will have one duplicate and one blank analysis. The duplicate and blank data will be kept on file for inspection. It is difficult to establish acceptance criteria. A criteria of ±20% will be used until enough data is generated to determine higher or lower limits.

## QUALITY CONTROL CHARTS

Charts are kept on each parameter and analyst. Accuracy and precision charts are available for inspection.

### ACCURACY

When the results fall outside ±1 standard deviation or seven consecutive results are on the same side of the average percent recovery line, then the analysis is stopped and problem corrected. Then, the number of checks is doubled and all analyses in question are repeated or discarded.

### PRECISION

When the precision of duplicate analyses is outside the critical range, the analysis is stopped and the problem corrected. The number of checks is doubled and all analyses in question are repeated or discarded.

Precision and accuracy data will be recorded daily on quality control charts. These charts will provide an easy evaluation of our work. We will use two types of charts for both precision and accuracy: cusum charts and Shewhart charts. One duplicate and spike should be run for each set of ten samples or less. The data will be recorded immediately after finishing the analyses, in both a table (see examples) and on the four quality control charts. Initially the data will have to be recorded in the table alone until there is sufficient data to prepare the charts, about 20 to 25 sets.

Cusum charts are based on a cumulative sum of the square of the difference between duplicates or the known and observed values of a spiked sample. The following equations are needed to prepare the charts for both precision and accuracy:

$$S_d^2 = \frac{\sum_{i=1}^{n} di^2 - \frac{\left(\sum_{i=1}^{n} di\right)^2}{N}}{N-1}$$

$$S_d = \sqrt{S_d^2}$$

$$S_o^2 = (0.8S_d)^2 = 0.64S_d^2$$

$$S_1^2 = (1.2S_d)^2 = 1.44S_d^2$$

$$UL(M) = \frac{2\log_e\left[\frac{1-\beta}{\alpha}\right]}{\frac{1}{S_o^2} - \frac{1}{S_1^2}} + M\frac{\log_e\left[\frac{S_1^2}{S_o^2}\right]}{\frac{1}{S_o^2} - \frac{1}{S_1^2}}$$

$$LL(M) = \frac{2\log_e\left[\frac{\beta}{1-\alpha}\right]}{\frac{1}{S_o^2} - \frac{1}{S_1^2}} + M\frac{\log_e\left[\frac{S_1^2}{S_o^2}\right]}{\frac{1}{S_o^2} - \frac{1}{S_1^2}}$$

Where di = the difference between the ith set of duplicates or spiked samples

N = the total number of sets of duplicates or spiked samples used to construct the chart

$S_d^2$ = the variance of the differences

$S_d$ = the standard deviation

$S_o^2$ = the minimum amount of variation allowed in the system

$S_1^2$ = the maximum amount of variation allowed in the system

$\alpha$ = the percent (in decimal fraction) of time we are willing to judge the procedure out of control when it is in control

$\beta$ = the precent (in decimal fraction) of time we are willing to judge the precedure in control when it is out of control. The parameters $\alpha$ and $\beta$ should be set between 0.05 and 0.15. A value of 0.05 gives a wide allowable range while a value of 0.15 gives a smaller range.

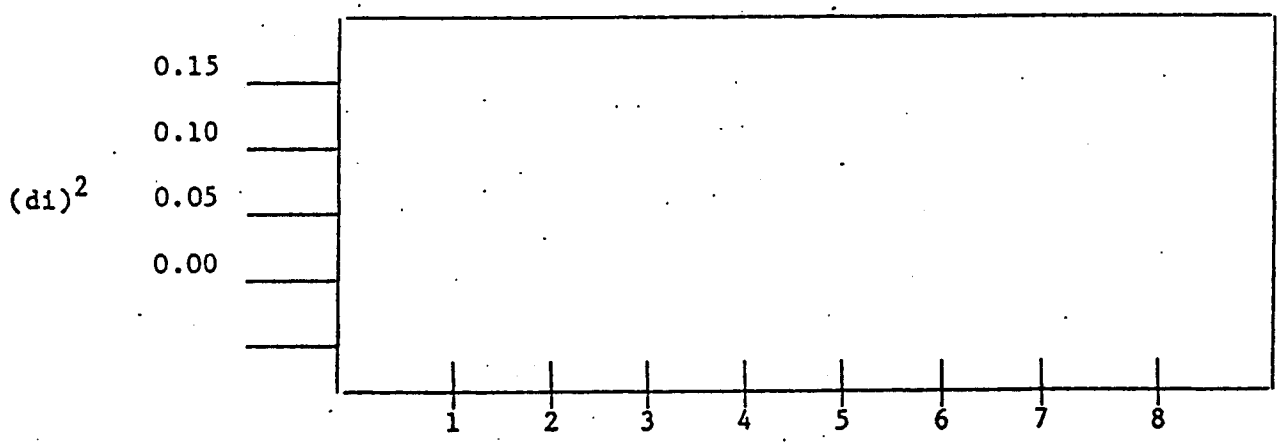
M = the number of sets of duplicates or spikes used in calculating the value to be plotted on the chart

UL (M) = the upper limit at M sets of samples

LL (M) = the lower limit at M sets of samples

The following is an example of the daily calculations used for precision data. For accuracy charts the same procedure is used except di is the difference between the known value of the spike and the observed value.

| No. of duplicates (M) | Value 1 | Value 2 | di | $di^2$ | $\Sigma(di)^2$ |
|---|---|---|---|---|---|
| 1 | 5.4 | 5.2 | 0.2 | 0.04 | 0.04 |
| 2 | 4.8 | 4.7 | 0.1 | 0.01 | 0.05 |
| 3 | 6.1 | 5.8 | 0.3 | 0.09 | 0.14 |




If a $di^2$ value falls out of control by the upper limit, the analysis will be stopped, the problem corrected, and the samples represented by the out of control value rerun sum. Data that falls out of control on the lower limit may be due to false reporting or an increase in precision. Analyses will be continued unless the trend changes. New control charts will be constructed based on recent data.

Shewhart charts use different calculations for accuracy and precision. The accuracy charts are based on percent recovery data. Percent recovery is calculated as

$$P = 100 \quad \frac{\text{observed value}}{\text{known value}}$$

for standards

and

$$P = 100 \quad \frac{\text{observed} - \text{background}}{\text{spike}}$$

for spikes of real samples

The standard deviation for percent recovery is then calculated:

$$\bar{P} = \frac{\sum_{I=1}^{N} P_I}{N}$$

$$S_p = \sqrt{\frac{\sum_{I=1}^{n} P_I^2 - \left(\sum_{I=1}^{n} P_I\right)^2 / N}{N-1}}$$

where N = the number of standards or spikes used

$\bar{P}$ = the average percent recovery

Sp = the standard deviation

Upper and lower control limits can be calculated from the following equations:

$UCL = \bar{P} + xS_p$ for the upper limit

$LCL = \bar{P} - xS_p$ for the lower limit

The value x determines how many standard deviations from the mean we are willing to call in control. To start our charts will have two sets of limits:

$UCL = \bar{P} + 1S_p$

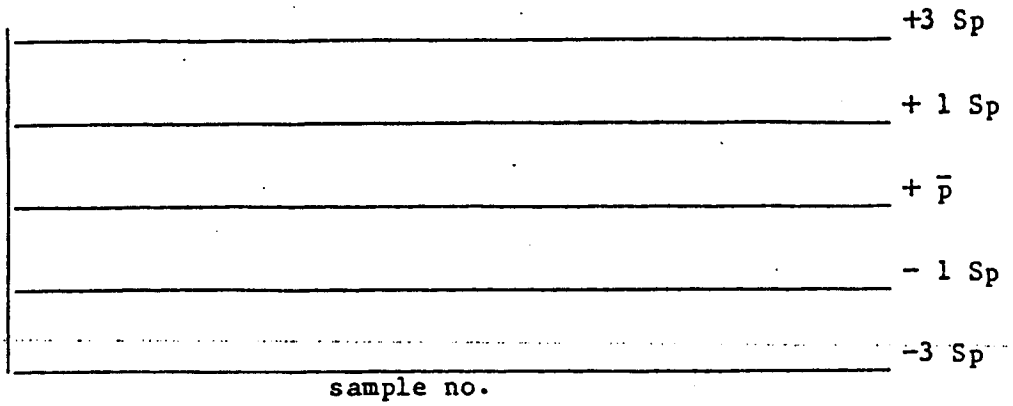
$UCL = \bar{P} - 1S_p$

and

$UCL = \bar{P} + 3S_p$

$LCL = \bar{P} - 3S_p$

On a daily basis the percent recovery of each spike is calculated and plotted on the chart.




The inside control limits (± 1Sp) will be used as a warning line. If data falls outside the outer control lines, the analyses will be stopped until the problem is corrected and the samples under question rerun.

The Shewhart chart for precision is based on the absolute value of the difference between each set of duplicate samples or their range. The average of a group of duplicates is calculated by

$$\bar{R} = \frac{\sum_{i=1}^{n} R_i}{N}$$

where N = the number of duplicates
R = the range of each set of duplicates (R is equal to di on the cusum charts)

The upper control limit can then be calculated

$$UCL_R = D_4\bar{R}$$

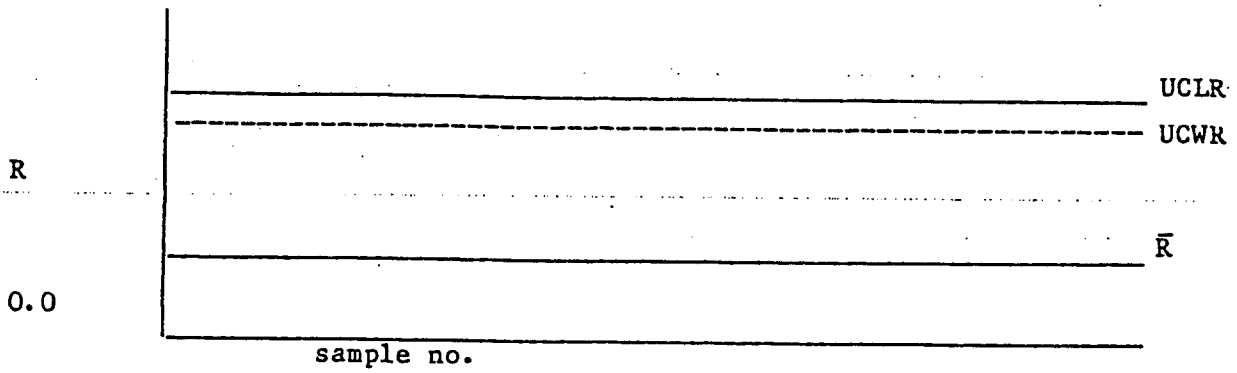
and the upper warning limit

$$UWL_R = 2/3\ (D_4\bar{R} - \bar{R}) + \bar{R}$$

where D4 is a constant dependent on the number of units in the subgroup. For duplicate samples there are two units, so D4 is equal to 3.27.

The upper warning limit ($UWL_R$) corresponds to the 95% confident level.

After the chart has been prepared, the range of each set of duplicates is calculated and plotted after every analysis.




The analysis will be stopped if the range of a set of duplicates exceeds the upper control limit

Precision For

Test: _____

Method: _____

| Date | Set No. M | Value 1 | Value 2 | Range R or di | $di^2$ | $\Sigma(di)^2$ | Analyst | Comments |
|---|---|---|---|---|---|---|---|---|
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Accuracy For

Test: _____

Method: _____

| Date | Set No. M | Conc. Added | Obs. Value | Backgrd Value | Obs.- Backgrd | % Recovery P | di | $di^2$ | $\Sigma(di)^2$ | Analyst | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
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## VIII. DATA HANDLING

All samples are recorded when they arrive at the laboratory. Samples are numbered and dated, and the required analyses are listed. Samples collected by RMT are labelled in the field. The labels contain the following information.

COLLECTION DATE:
COLLECTION TIME:
PLACE:
COLLECTOR:
SAMPLE DESCRIPTION:

A data sheet is written for each laboratory analysis. These data sheets contain the following information:

ANALYST:
ANALYTICAL METHOD:
RESULTS AND DATA:

All data and reports are kept on file for a minimum of three years. The data collected from quality control checks for each parameter are kept in a separate file.

### CHAIN OF CUSTODY

All samples received in the lab must be accompanied by a sample record form (copy attached). This form is sent to the sampling site and is completed by sample collector. The chain of custody form is sealed inside the box containing the samples. The box is then shipped to the lab. All individuals who handle samples before shipment must sign off on a custody form. The sample shipper (UPS, etc.) does not sign the chain of custody. When the samples are received in the lab, the shipping container is inspected for signs of a broken seal. If a sample container has been opened before receipt by the lab, the sample will be refused and the chain of custody broken. If a sample container is still sealed, the chain of custody form will be completed by the lab and kept on permanent file.

nc.
(D224)

# RESIDUALS MANAGEMENT TECHNOLOGY, INC.
## SAMPLE RECORD FORM

IENT: _____
B NUMBER: _____
CATION: _____
PE OF SAMPLES: _____
ATER, WASTE WATER,
OLID WASTE)
OMMENTS _____

5. SAMPLING DATE: _____
6. SAMPLE COLLECTOR: _____
7. AFFILIATION: _____
8. SIGNATURE: _____
9. PURCHASE ORDER #: _____

| SAMPLE DESCRIPTION | RMT LABORATORY NUMBER | SAMPLE LOCATION AND DATE (R, LS, PS, D)* | | | |
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EFRIGERATOR) LS (LABORATORY STORAGE) PS (PERMANENT STORAGE) D (DESTROYED)

QUENT ANALYSIS: _____ SAMPLE TEMP. ACCEPTABLE: _____ SAMPLE PRESERVED PROPERLY _____

ES TRANSPORTED BY:

NAME: _____ DATE AND TIME: _____

AFFILIATION: _____ SIGNATURE: _____

ES RECEIVED BY:

NAME: _____ DATE AND TIME: _____

AFFILIATION: _____ SIGNATURE: _____

E DESTRUCTION AUTHORIZATION:

SAMPLE NUMBERS: _____

PROJECT MANAGER: _____ DATE: _____

RMT PRINCIPAL: DATE: