safety-kleen®

SAFETY-KLEEN CORPORATION

REVISED
WASTE ANALYSIS PLAN
SAFETY-KLEEN CORPORATION
NORTH CAROLINA BRANCH FACILITIES

VOLUME II - APPENDICES

19 JANUARY 1993

WESTON®
MANAGERS DESIGNERS/CONSULTANTS

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Hazardous Waste
Section

REVISED DRAFT
WASTE ANALYSIS PLAN
SAFETY-KLEEN CORPORATION
NORTH CAROLINA BRANCH
FACILITIES

VOLUME II - APPENDICES

DRAFT

Prepared for

SAFETY-KLEEN CORPORATION
Elgin, Illinois

Prepared by

ROY F. WESTON, INC.
Three Hawthorn Parkway
Vernon Hills, Illinois 60061

January 1993

APPENDIX C-1

CUSTOMER INFORMATION/CERTIFICATIONS

EXHIBIT C-1-a

CUSTOMER WASTE INFORMATION PROGRAM

SAFETY-KLEEN CORPORATION
CUSTOMER WASTE STREAM CERTIFICATION PROGRAM

Company Name: _____

Customer Name: _____

Title: _____

Address: _____

_____

Phone: _____

Customer Number: _____

Customer EPA ID# _____

DESCRIPTION OF THE CERTIFICATION PROGRAM

Safety-Kleen's Customer Waste Stream Certification Program is intended to provide Safety-Kleen with information regarding the wastes generated by our customers. This information is needed by Safety-Kleen Corporation to properly and safely manage those wastes that are generated in association with the services which Safety-Kleen Corporation has agreed to furnish its customers. This information is also necessary to comply with the requirements of Safety-Kleen's operating permit issued by the North Carolina Department of Environment, Health and Natural Resources. Safety-Kleen Corporation will rely on the information provided by the customer under this program, and subsequent information provided pursuant to the agreements contained herein, in order to effect the proper and safe management of these wastes. The program requires that a waste information form be completed every third year in order for Safety-Kleen to remove waste from your facility. Safety-Kleen will continue to service your account but the waste will be left at your facility until this form has been appropriately completed and returned to Safety-Kleen. Safety-Kleen Corporation will be happy to answer any questions you may have regarding the completion of this form. In addition, a sales representative is available to provide assistance to your facility personnel on the proper use of Safety-Kleen products, and/or the proper management of waste materials which Safety-Kleen has agreed to accept from your facility.

Within this program, Safety-Kleen Corporation conducts random sampling of the wastes it receives from its customers. This sampling is intended to ensure that the wastes received are properly characterized, and that materials or other wastes that are not acceptable to Safety-Kleen have not been introduced into the waste. Safety-Kleen Corporation retains the right to refuse acceptance and return any waste materials to the Customer Facility at any time should the testing indicate that the waste was not properly characterized and or foreign materials have been introduced. Furthermore, evidence that foreign materials or wastes have been introduced into the waste stream will be grounds for termination of any and all contractual service agreements between the Customer and Safety-Kleen Corporation.

REQUIREMENTS

Safety-Kleen, under its operating permit issued by the North Carolina Department of Health Environment and Natural Resources, requires that the attached Customer Waste Information Form be completed and returned to your Sales Represenative. Safety-Kleen also requires the signature of a duly authorized customer representative on the following certification:

CERTIFICATION

I _____, of _____

Name and Title (print or type) — Customer Company Name (print or type)

do hereby warrant, represent and certify that: the information submitted within this document is true, accurate and complete, and that I am a duly authorized representative of the company listed above. I further certify that I have full knowledge of the types and typical quantities of hazardous materials used at the subject facility, and of the types and typical quantities of hazardous and non-hazardous wastes generated at the facility, and the manner in which these wastes are generated, handled, stored, treated and/or disposed.

I further warrant, represent and certify that a duly authorized representative of _____, will notify Safety-Kleen Corporation of any

Customer Company Name (print or type)

changes in the subject facility that may affect the nature of the wastes generated by the facility and/or the manner in which these wastes are managed, including changes in generator status, changes in the process(es) which generate these wastes, including changes in raw materials used in the process. This notification will be made prior to Safety-Kleen Corporation removing any wastes from the subject Customer Facility.

I further warrant, represent and certify that all wastes generated at the Subject Customer Facility which will be managed by Safety-Kleen Corporation will be free of materials and/or wastes that are foreign to normal process of generating the waste, as described above and that all wastes will be segregated according to the classifications noted above. Wastes which will be managed by Safety-Kleen Corporation will be physically segregated and separated from other hazardous waste streams generated by this facility. Generator agrees to indemnify and hold Safety-Kleen Corporation and its subsidiaries harmless for any claims, liabilities, damages, and costs, including but not limited to, attorney's fees, arising out of or in any way related to breach of this warranty by the generator.

_____	_____	_____
Name	Title	Date

SAFETY-KLEEN CORPORATION
CUSTOMER WASTE INFORMATION FORM

I. GENERATOR STATUS

Indicate with a checkmark (√) your current generator status as defined by the U.S. EPA.

(check (√) one)

Large Quantity Generator _____

Small Quantity Generator _____

Conditionally Exempt Small Quantity Generator _____

Unknown _____

My EPA ID# is _____

II. DESCRIPTION OF BUSINESS OPERATIONS (Attach additional pages if necessary. Write NA if Not Applicable to your business.)

Briefly describe the nature of your business in the space provided.

_____

_____

_____

_____

List the Safety-Kleen services used by your company.

_____

_____

_____

_____

Briefly describe the business operations that use the Safety-Kleen services listed above.

How do you use your Safety-Kleen unit or service?

List substances (solid or liquid) that are added to your Safety-Kleen unit.

What materials, liquid or solid, could be introducted into the Safety-Kleen unit?

Provide a list of the chemicals that are used in your operation.

Provide a list of chemicals used in the vicinity of your Safety-Kleen unit that may contaminate the unit.

_____

_____

_____

Provide a list of hazardous and nonhazardous wastes generated by your business.

_____

_____

_____

Have your business operations changed in the last 12 months? If yes, briefly describe.

_____

_____

_____

Will your business operations change in the next 12 months? If yes, briefly describe.

_____

_____

_____

How will changes in operations alter your use of Safety-Kleen services?

_____

_____

_____

How are employees instructed on the proper use of Safety-Kleen units or services?

_____

_____

III. WASTE TYPES

Provided below are standard waste codes for all services provided by Safety-Kleen. Please indicate with a checkmark (√) if the standard codes apply to the materials generated by your facility. Consult with your sales representative, if you need assistance with identifying your waste types.

		Check One	
		Applies	N/A
Mineral Spirits-Based Parts Washer 105 & 140 Solvents			
Standard Waste Codes:	D001 - ignitable	_____	_____
	D018 - benzene	_____	_____
	D039 - perchlorethylene (tetrachloroethylene)	_____	_____
Additional Waste Codes:	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
Immersion Cleaner 699 Solvent			
Standard Waste Codes:	D006 - cadmium	_____	_____
	D007 - chromium	_____	_____
	D018 - benzene	_____	_____
	D008 - lead	_____	_____
	D021 - chlorobenzene	_____	_____
	D027 - 1,1,1-dichlorobenzene	_____	_____
	D039 - perchloroethylene (tetrachloroethylene)	_____	_____
	D040 - trichloroethylene	_____	_____
Additional Waste Codes:	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
Spent Antifreeze/Glycol Waste - May contain traces of oil.			
Standard Waste Codes:	D008 - lead	_____	_____
	D039 - perchloroethylene (tetrachloroethylene)	_____	_____
Additional Waste Codes:	_____	_____	_____
	_____	_____	_____
	_____	_____	_____

		Check One Applies	N/A

Dry Cleaning Services - This includes dry cleaning filter collection, still bottoms collection, and powder residue collection. These wastes contain: (check all that apply).

Petroleum Naptha

Standard Code:	D001 - ignitable	_____	_____
	D039 - perchloroethylene (tetrachloroethylene)	_____	_____
Additional Waste Codes:	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____

Perchloroethylene (Perc, tetrachloroethylene)

Standard Code:	F002 - See 40 CFR 226	_____	_____
Additional Waste Codes:	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____

1,1,1-trichloroethane

Standard Code:	F002 - See 40 CFR 261	_____	_____
Additional Waste Codes:	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____

Trichlorotrifluoroethane (Freon)

Standard Code:	F002 - See 40 CFR 261	_____	_____
Additional Waste Codes:	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____

		Check One	
		Applies	N/A

Spray Gun Cleaner Waste

Standard Waste Codes:	F003 - See 40 CFR 261	_____	_____
	F005 - See 40 CFR 261	_____	_____
	D001 - ignitable	_____	_____
	D006 - cadmium	_____	_____
	D007 - chromium	_____	_____
	D008 - lead	_____	_____
Additional Waste Codes:	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____

Paint Waste - Contains paint and paint thinners.

Standard Waste Codes:	F003 - See 40 CFR 261	_____	_____
	F005 - See 40 CFR 261	_____	_____
	D001 - ignitable	_____	_____
	D006 - cadmium	_____	_____
	D007 - chromium	_____	_____
	D008 - lead	_____	_____
Additional Waste Codes:	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____

EXHIBIT C-1-b

ANNUAL CUSTOMER WASTE CERTIFICATION

Safety-Kleen Corporation
Annual Customer Waste Certificate

I, _____, am a duly authorized representative of
Name and Title (print or type)

_____ and have full knowledge of the
Customer Company Name (print or type)

types and quantities of hazardous and non-hazardous wastes generated at the indicated facility. I do hereby warrant, represent and certify that the information presented within the Safety-Kleen Customer Waste Certification Form, completed on the behalf of

_____ by _____
Customer Company Name (print of type) — Name/Title of Person Warranting Prior Form (print or type)

dated _____, remains true and accurate.
(print or type)

I further understand that pursuant to the Safety-Kleen Customer Waste Certification Program, I am obligated to inform Safety-Kleen immediately of any changes or alterations in the information presented within the referenced Customer Waste Certification Form, and that a new form reflecting this changed information must be completed prior to Safety-Kleen resuming services for the Customer Company.

Name	Company Name
	Address
Title	Address
Date	Telephone
	EPA ID #

EXHIBIT C-1-c

CESQG CERTIFICATION FORM

CONDITIONALLY EXEMPT SMALL QUANTITY GENERATOR CERTIFICATION

A conditionally exempt small quantity generator (CESQG) is defined by the United States Environmental Protection agency and the North Carolina Department of Environment Health and Natural Resources as a generator who generates no more than 200 kilograms of hazardous waste in a given calender month (40 Code of Federal Regulations 261.5).

I, _____, being a duly authorized representative of
(Name and Title)

_____, hereby certify that I am familiar with the nature
Company

of the operations which generate hazardous wastes at the facility indicated below, and that this facility consistently meets the definition of a CESQG as referenced above.

Company and Facility Name _____
Facility Address _____
_____
_____
_____

I further certify that if the generator status of this facility changes, Safety-Kleen Corporation will be promptly notified in writing. I further understand that if this status changes, Safety-Kleen Corporation cannot except hazardous wastes from this facility until such time that a Customer Waste Information Form is submitted and an EPA ID# obtained.

_____ _____
Name (signature) Date

EXHIBIT C-1-d

WASTE ACCEPTANCE FORM

SAFETY-KLEEN CORPORATION
WASTE ACCEPTANCE FORM

Customer Facility: _____
_____
_____
_____

EPA ID#: _____
if applicable,
if not enter "CESQG".
CESQG Form must be on file

Customer Number: _____

Type of Waste: _____

Does the waste meet the acceptance criteria listed in Page 4 of this form?
Yes ___ / No ___. If no, complete the remainder of this form.

Provide a description of the unacceptable criteria: _____
_____
_____
_____

The Customer has indicated that the reason the waste does not meet the acceptance criteria (as indicated in Page 4 of this form) is: _____
_____
_____
_____
_____
_____.

The _____ from this facility may normally have any of the following
(indicate waste type)
colors: _____
_____
_____.

Waste analysis performed? _____ yes _____ no
(If yes attach a copy of the results.)

Does analysis indicate compliance with Tier 2 criteria? _____ yes _____ no

Does analysis indicate compliance with Tier 3 criteria? _____ yes _____ no

Waste stream approved? _____ yes _____ no _____ _____
Branch Manager Date

Approval can only be given when Tier 2 or Tier 3 criteria are met.

Additional notations:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Note that pursuant to the existing WAP, an analysis must always be performed (even with customer certification unless a previous analysis with similar specific gravity, color, liquid level, etc., was acceptable. Records must be kept on file.

I _____ of _____ do
Name and Title Company Name

hereby certify that I am a duly authorized representative of the company named above and, based upon my knowledge and inquiries of the persons using the Safety-Kleen parts washer solvent, immersion cleaner solvent, or paint gun cleaner, or of persons responsible for collecting paint waste or spent antifreeze/glycol waste, that no other substances have been added to this waste other than those which are removed during the routine use of the machine generating the waste. Also no foreign materials/waste have been added to the collected paint waste or spent antifreeze/glycol wastes.

I further certify that at no time is the solvent used to clean equipment that is used in the formulation of ink where pigments containing lead or chromium are used nor have any other generated from the formulation of such inks been added to any spent solvent or other wastes being picked up by Safety-Kleen. I understand that:

1. Solvent washes and sludges, caustic wastes and sludges, or water washes and sludges from cleaning tubs and equipment used in the formulation of ink from pigments, driers, soaps, and stabilizers containing chromium and lead are a K086 hazardous waste, and

2. Safety-Kleen is not authorized to accept K086 waste.

_____	_____	_____	_____
Customer's Signature	Date	Sales Rep's Signature	Date

The following are the acceptance criteria for mineral spirits-based spent parts washer solvent, 699 immersion cleaner, paint waste, and spent antifreeze/ethylene glycol waste:

Parameter	Acceptance Criteria
Mineral Spirits-Based Spent Parts Washer Solvent:	
Volume	No greater than 2/3 full.
Color	Green, grading to brown or black.
Odor	Characteristic minerals spirits odor.
Spent 699 Immersion Cleaner:	
Volume	No greater than 40 percent of drum.
Color	Solvent Phase - Amber, grading to brown or black.
Odor	Characteristic naphtha odor.
Spent Paint Spray Gun Cleaner:	
Appearance	Solvent/paint appearance; no greasy, oily materials present; no unusual odors.
Paint Waste:	
Appearance	Solvent/paint appearance; no greasy, oily materials present; no unusual odors.
Spent Antifreeze/Glycol Waste:	
Color	Yellow-green or pink typical; with oil layer likely.
Appearance	Single phase of liquid; no unusual odors; may have oil layer.

APPENDIX C-2

SAFETY-KLEEN RECYCLING PROCESS

APPENDIX C-2

SUMMARY OF SAFETY-KLEEN RECYCLING PROCESS

The following provides descriptions of the Recycling Process for each waste stream handled at the North Carolina Branch Facilities. This summary is intended for informational purposes only; the means by which Safety-Kleen recycles wastes at it's Recycle Centers is subject solely to the permits governing these facilities and are subject to change within the confines of said permits. The recycling procedures described herein should not be considered part of the permits that govern the operations of the North Carolina Branch Facilities, and changes in these procedures do not constitute a change in the Branch Facility permits.

As illustrated by these descriptions, almost no wastes are landfilled by Safety-Kleen. The only by-product that does not have a useful purpose is wastewater, which is treated and discharged.

Spent Mineral Spirits - The individual drums of spent mineral-spirits-based Parts Washer Solvent are composited at the Branches and transported by tanker truck to a Safety-Kleen Recycle Center. After successfully passing receipt testing, the solvent is recycled by vacuum distillation. The higher boiling contaminants are removed as distillation bottoms and are sent either for oil recovery at our re-refinery or to a cement kiln as substitute fuel. The solvent is tested for compliance with our product specifications before it is shipped back to the Branches. If the load fails the receipt testing, it is blended with other wastes destined for use as substitute fuel at a cement kiln.

Spent 699 Immersion Cleaner - The individual drums of spent 699 Immersion Cleaner (IC) are composited at the Recycle Center and pumped into a preliminary tank. After successfully passing receipt testing, the solvent is recycled by vacuum distillation. The higher boiling contaminants are removed as distillation bottoms and are sent to a cement kiln as substitute fuel. The solvent is reformulated and then tested for compliance with our product

specification before it is shipped back to the Branches. If the load fails the receipt testing, it is blended with other wastes destined for use as substitute fuel at a cement kiln.

Spent Paint Spray Gun Cleaner - The individual drums of spent paint spray gun cleaner are pumped out or emptied into a vat and transferred to a dedicated tank. After successfully passing receipt testing, the blended waste is recycled by vacuum distillation. The higher boiling contaminants are removed as distillation bottoms and are sent to a cement kiln as substitute fuel. In times of low solvent demand, the paint spray gun cleaner waste is blended directly into cement kiln fuel. Recovered solvent is reformulated and tested for compliance with our product specification before it is shipped back to the Branches.

Paint Waste - Whenever possible, the individual drums of paint waste are pumped out or emptied into a vat and transferred to a dedicated tank, or the drums are vacuumed directly into the tank. After successfully passing receipt testing, the blended waste is recycled by vacuum distillation. The higher boiling contaminants are removed as distillation bottoms and are sent to a cement kiln as substitute fuel. In times of low solvent demand, the paint waste is blended directly into cement kiln fuel. Paint waste that cannot be pumped (normally >30% solids content) is scraped into a vat and blended into kiln fuel.

Recovered solvent is reformulated and tested for compliance with our product specification before being shipped back to the Branches.

Dry Cleaner Wastes - There are several forms of dry cleaner waste: filter cartridges, still bottoms, and filter media (powder). The filter cartridges are fed into a grinder in which the metal, paper, and other solids are separated. At this point, the paper and solids can be tested for volatiles composition, although it is unlikely that anything would be detected. All products from the grinder go into the cooker, where any solvent is vaporized and recovered. The metal is sold to a smelter and the other solids are blended into cement kiln fuel.

After an initial settling to remove gross solids, the still bottoms and filter media are pumped into a cooker, which drives the solvent off as a vapor. This leaves a solid that can be

blended into cement kiln fuel. The solvent is condensed and tested for volatiles composition, then distilled, retested, and sold.

Spent Antifreeze/Glycol Waste - Spent antifreeze/glycol waste usually is brought into the Branch in tank trucks, although some drummed waste may also be accepted. This waste is pumped into a tank, loaded onto a tanker, and shipped to either a Safety-Kleen or outside recycling facility. There, the loads are tested for acceptability and vacuum-distilled to recover commercial-grade glycols.

Storage Tank Bottom Sediment and Drum Washer Bottom Sediment - Depending on equipment availability, this material is either sent to a cooker or the entire bottoms stream is blended directly into cement kiln fuel. At the cooker, the solvent is driven off the solids, recovered, and blended into cement kiln fuel.

Spill Cleanup Residues - Materials spilled and cleaned up by Safety-Kleen personnel are processed through the cooker units at Safety-Kleen Recycle Centers. Solvent is recovered for re-use, while solids are blended into cement kiln fuel. If the spill happens to involve a listed waste for which the facility is not permitted, it will be sent directly to an incinerator. If the residues are found to be nonhazardous (e.g., a characteristic waste that has lost its characteristic), it is sent to a special waste landfill.

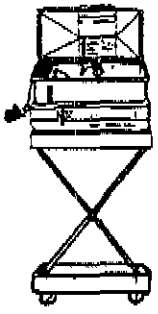
APPENDIX C-3

MATERIAL SAFETY DATA SHEETS

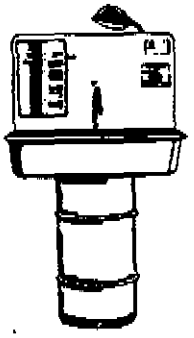
EXHIBIT C-3-a

MINERAL SPIRITS-BASED PARTS WASHER SOLVENT MSDS

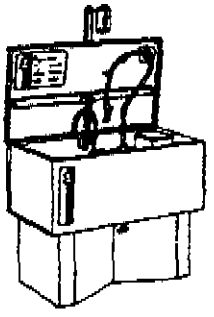
safety-kleen®



Model 14 & 60



Model 16 & 30



Model 34 & 44, COMS, and other

Material Safety Data Sheet

Safety-Kleen 105 Solvent

Part # 6617

Dear Safety-Kleen Customer,

At Safety-Kleen Corp., our material safety data sheets are more than a requirement to us. They are a commitment to our customers and their employees.

The material safety data sheet is a valuable source of information and should be readily available and compatible with your hazard communication program. With this in mind, we are providing to you, our valued customer, this important information about our products.

We would also like to take this opportunity to thank you for showing your concern for the environment by choosing Safety-Kleen Corp. products and services.

Sincerely,

Joseph F. Knott
President, Chief Operating Officer
Safety-Kleen Corp.

We use Safety-Kleen's Environmentally Friendly Fluid Recovery Service.
WE CARE.
TM

SAFETY-KLEEN 105 SOLVENT

MATERIAL SAFETY DATA SHEET FOR U.S.A. AND CANADA

SECTION I -- PRODUCT INFORMATION

Safety-Kleen Corp. - 777 Big Timber Road - Elgin, IL, U.S.A. 60123
Safety-Kleen Canada Inc. - 3090 Blvd. Le Carrefour - Suite 300 - Chomedy Laval Quebec, Canada H7T 2J7
For Product Technical Information Call 312-694-2700 (U.S.A.);
800-363-2260 (Eastern Canada); 514-686-2040 (Western Provinces/Call Collect)

24-HOUR EMERGENCY TELEPHONE	*MEDICAL:*	*TRANSPORTATION:*
These numbers are for emergency use only. If you desire non-emergency information about this product, please call a telephone number listed above.	800-752-7869 (U.S.A.) 312-942-5969 (CANADA) RUSH POISON CONTROL CENTER CHICAGO, ILLINOIS, U.S.A.	708-888-4660 (U.S.A.) SAFETY-KLEEN ENVIRONMENT, HEALTH AND SAFETY DEPARTMENT 613-996-6666 (CANADA) CANUTEC

IDENTITY (TRADE NAME): SAFETY-KLEEN 105 SOLVENT

SYNONYMS: PETROLEUM DISTILLATES, PETROLEUM NAPHTHA, MINERAL SPIRITS, STODDARD SOLVENT

SK PART NUMBER: 6617

FAMILY/CHEMICAL NAME: HYDROCARBON SOLVENT

PRODUCT USAGE: SOLVENT FOR CLEANING AND DEGREASING PARTS

SECTION II – HAZARDOUS COMPONENTS

NAME	SYNONYM	Wt. %	CAS NO.	OSHA PEL TWA (ppm)	OSHA PEL STEL (ppm)	ACGIH TLV TWA (ppm)	ACGIH TLV STEL (ppm)	LD50[a]	LC50[b]
Parts Washer Solvent (Consists predominantly of C9-C13 Saturated Hydrocarbons)	Mineral Spirits	85.0	64741-41-9	100 **	N.Av.	100 **	N.Av.	> 5000**	3400**
C8+ Aromatics		12.0	Mixture	N.Av.	N.Av.	N.Av.	N.Av.	N.Av.	N.Av.
*Toluene		0.5	108-88-3	100	150	100	150	5000	4000
*Xylene		1.0	1330-20-7	100	150	100	150	4300	5000
*Ethyl Benzene		0.5	100-41-4	100	125	100	125	3500	4000[c]
*1,1,1 Trichloroethane	Methyl Chloroform	0-0.5***	71-55-6	350	450	350	450	10300	18000
*Perchloroethylene	Tetrachloroethylene	0-0.5***	127-18-4	25	N.Av.	50	200	2629	4000[c]
Total Chlorinated Solvents		0-1.0***							

N.Av. = Not available.
* See Section X - Other Regulatory Information
**For Stoddard Solvent
***Even though the concentration range does not fall under the ranges prescribed by WHMIS, this is the actual range which varies with each batch of the product.

[a] Oral-Rat LD50 (mg/kg)
[b] Inhalation-Rat LC50 (ppm/4 hours)
[c] Inhalation-Rat LCLo (ppm/4 hours)

SECTION III – PHYSICAL DATA

PHYSICAL STATE, APPEARANCE AND ODOR:	Combustible liquid, clear, green, with characteristic hydrocarbon odor.
ODOR THRESHOLD:	Not available.
BOILING POINT:	304-435°F (151-224°C).
VAPOR PRESSURE:	2 mm Hg at 68°F (20°C).
FREEZING POINT:	Not available.
EVAPORATION RATE:	0.1 (Butyl Acetate = 1).
VOLATILE:	99.9%
VOLATILE ORGANIC COMPOUNDS:	6.4 to 6.7 lbs/gal; 770 to 800 g/l
DENSITY:	Not available.
VAPOR DENSITY:	4.9 (Air = 1).
SOLUBILITY IN WATER:	Negligible.
pH:	Not applicable.
SPECIFIC GRAVITY:	0.77 to 0.80 at 60/60°F (16/16°C) (Water = 1).
COEFFICIENT OF WATER/OIL DISTRIBUTION:	Not available.
MOLECULAR WEIGHT:	142 (Approximately).

SECTION IV – FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:	105°F (41°C) SETA
AUTOIGNITION TEMPERATURE:	473°F (245°C).
CONDITIONS OF FLAMMABILITY:	Materials must be moderately heated before ignition can occur.
FLAMMABLE LIMITS IN AIR:	*LOWER:* 0.7 Vol. % *UPPER:* 6.0 Vol. %
UNUSUAL FIRE AND EXPLOSION HAZARDS:	Decomposition and combustion products may be toxic. Heated containers may rupture, explode or be thrown into the air. Vapors are heavier than air and may travel great distances to ignition source and flash back. Not sensitive to mechanical impact. Material may be sensitive to static discharge, which could result in fire or explosion.
EXTINGUISHING MEDIA:	Carbon dioxide, foam, dry chemical, water (mist only).
FIRE FIGHTING PROCEDURES – SPECIAL:	NFPA 704 Rating 0-2-0 Keep storage containers cool with water spray. Use self-contained breathing apparatus (SCBA).
HAZARDOUS COMBUSTION PRODUCTS:	Thermal decomposition and burning may produce carbon monoxide.

SECTION V -- REACTIVITY DATA

STABILITY: Stable under normal temperatures and pressures, and not reactive with water.

INCOMPATIBILITY (MATERIALS AND CONDITIONS TO AVOID): Avoid oxidizing agents, flames, sparks and high temperatures.

HAZARDOUS POLYMERIZATION: Not known to occur under normal temperatures and pressures.

HAZARDOUS DECOMPOSITION PRODUCTS: Normally none.

SECTION VI – HEALTH HAZARD DATA AND TOXICOLOGICAL PROPERTIES

PRIMARY ROUTES OF EXPOSURE: Eye and skin contact; inhalation.

EXPOSURE LIMITS: See Section II.

SIGNS AND SYMPTOMS OF EXPOSURE:

ACUTE: *Eyes:* Contact may cause slight to moderate irritation. High vapor concentrations (> 500 ppm) are irritating to the eyes.

Skin: Prolonged or repeated contact tends to remove skin oils, possibly leading to irritation and dermatitis. No significant skin absorption hazard.

Inhalation (Breathing): High concentrations of vapor or mist may be irritating to the respiratory tract, cause headaches, dizziness, nausea, impaired coordination, anesthesia and may have other central nervous system effects.

Ingestion (Swallowing): Low order of acute oral toxicity. May cause irritation of the throat, nausea, vomiting and symptoms of central nervous system depression. Aspiration into the lungs during ingestion or vomiting may cause mild to severe pulmonary injury and possibly death.

CHRONIC: Prolonged and/or repeated skin contact may cause drying and cracking or dermatitis.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Individuals with pre-existing central nervous system dysfunction may have increased susceptibility to the effects of exposure. Contact with skin may aggravate pre-existing dermatitis.

CARCINOGENICITY: IARC classifies chemicals by their carcinogenic risk, including agents that are known, probable, or possible carcinogens. NTP classifies chemicals as either known carcinogens or for which there is a limited evidence of carcinogenicity in humans or sufficient evidence of carcinogenicity in experimental animals.

Perchloroethylene is listed by IARC as a possible carcinogen and is classified by NTP as having limited evidence of carcinogenicity in humans or sufficient evidence of carcinogenicity in experimental animals.

OTHER POTENTIAL HEALTH HAZARDS: The following information is required by Canadian WHMIS regulations. Irritancy is covered in Signs and Symptoms of Exposure in Section VI. There is no known human sensitization or toxicologically synergistic product. Xylene has demonstrated experimental effects for reproductive toxicity, mutagenicity and teratogenicity. Studies indicate Ethylbenzene and 1,1,1-Trichloroethane are experimental teratogens.

SECTION VII -- EMERGENCY AND FIRST AID PROCEDURES

EYES: For direct contact, flush eyes with water for 15 minutes lifting upper and lower lids occasionally. If irritation or redness from exposure to vapors or mists develops, move victim away from exposure into fresh air. Consult physician if irritation or pain persists.

SKIN: Remove contaminated clothing. Wash skin twice with soap and water. If irritation or pain develops and persists, consult a physician.

INHALATION: (Breathing)	Remove to fresh air immediately. Use oxygen if there is difficulty breathing or artificial respiration if breathing has stopped. Do not leave victim unattended. Seek immediate medical attention if necessary.
INGESTION: (Swallowing)	If conscious, drink 4 to 8 ounces of water and seek immediate medical attention. DO NOT induce vomiting.

SECTION VIII – PRECAUTIONS FOR SAFE USE AND HANDLING AND PREVENTIVE MEASURES

SPILL PROCEDURES:	Remove all ignition sources. Ventilate area and avoid breathing vapors. For large spills, isolate area and deny entry. If possible, contain as a liquid for possible re-refining. Absorb with compatible absorbent material. Shovel into closable container for disposal. Wear protective equipment specified in Section IX. Contain away from surface waters and sewers.
WASTE DISPOSAL METHODS:	Dispose in accordance with Federal, State, Provincial and local regulations. Contact Safety-Kleen regarding recycling or proper disposal.
HANDLING PRECAUTIONS:	Avoid contact with eyes, skin or clothing. Use in well ventilated area and avoid breathing vapors or mists. Keep away from heat, sparks and flames.
SHIPPING AND STORING PRECAUTIONS:	Keep container tightly closed when not in use and during transport. Empty product containers may contain product residue. Do not pressurize, cut, heat, weld, grind or expose containers to flame or other sources of ignition.
PERSONAL HYGIENE:	Use good personal hygiene. Wash thoroughly with soap and water after handling and before eating, drinking or using tobacco products. Launder contaminated clothing and clean protective equipment before reuse.

SECTION IX – CONTROL MEASURES AND OTHER PREVENTIVE MEASURES

EYE PROTECTION:	Where there is likelihood of spill or splash, wear chemical goggles and faceshield. Contact lenses should not be worn.
PROTECTIVE GLOVES:	Use nitrile or neoprene gloves to prevent contact with skin.
RESPIRATORY PROTECTION:	Use NIOSH/MSHA-approved respiratory protective equipment when concentration of vapors or mists exceeds applicable exposure limit. Depending on the airborne concentration, use a respirator or gas mask with appropriate cartridges and canisters. A self-contained breathing apparatus (SCBA) is required for large spills and emergencies. Selection and use of respiratory protective equipment should be in accordance in the U.S.A. with OSHA General Industry Standard 29 CFR 1910.134 and in Canada with CSA Standard Z94.4-M1982.
ENGINEERING CONTROLS:	Provide local exhaust or general dilution ventilation needed to maintain concentrations of vapors or mists below applicable exposure limits. Where explosive mixtures may be present, systems safe for such locations should be used.
OTHER PROTECTIVE EQUIPMENT:	Wear appropriate solvent-resistant boots, apron or other protective clothing where spills and splashes are possible. A source of clean water should be available in work areas for flushing the eyes and skin.

SECTION X – OTHER REGULATORY INFORMATION

DOT PROPER SHIPPING NAME:	PETROLEUM NAPHTHA
DOT CLASS:	COMBUSTIBLE LIQUID
DOT ID NUMBER:	UN1255

SARA TITLE III:

Product contains toxic chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372. Toxic constituents are listed with an asterisk in Section II of this Material Safety Data Sheet.

Product poses the following physical and/or health hazards as defined in 40 CFR 370.3 (Sections 311, 312 of SARA Title III):

Immediate (Acute) Health Hazard
Delayed (Chronic) Health Hazard
Fire Hazard

TDGA:

NAPHTHA, PETROLEUM
CLASS 3.3, UN1255, P.G. III

WHMIS CLASSIFICATION:

Class B3, Combustible Liquid;
Class D2A, Other Toxic Effects, Very Toxic Material;
Class D2B, Other Toxic Effects, Toxic Material

SECTION XI -- PREPARATION INFORMATION

PREPARED BY: Product MSDS Coordinator

FORM PART NO. 82310

ORIGINAL ISSUE DATE: July 20, 1989 *REVISED:* December 14, 1990 *SUPERSEDES:* March 12, 1990

User assumes all risks incident to the use of this product. To the best of our knowledge, the information contained herein is accurate. However, Safety-Kleen assumes no liability whatsoever for the accuracy or completeness of the information contained herein. No representations or warranties, either expressed or implied, or merchantability, fitness for a particular purpose or of any other nature are made hereunder with respect to information or the product to which information refers. The data contained on this sheet apply to the material as supplied to the user.

SAFETY-KLEEN 140 SOLVENT-MS

MATERIAL SAFETY DATA SHEET

SECTION I -- PRODUCT INFORMATION

Safety-Kleen Corporation - 777 Big Timber Road - Elgin, IL 60123
For Product/Sales Information Call 708/697-8460

EMERGENCY TELEPHONE	*MEDICAL:*	*TRANSPORTATION:*
These numbers are for emergency use only. If you desire non-emergency information about this product, please call the telephone number listed above.	800/942-5969 or 312/942-5969 RUSH POISON CONTROL CENTER CHICAGO, ILLINOIS (24 HOURS)	800/424-9300 CHEMTREC

IDENTITY (TRADE NAME): SAFETY-KLEEN 140 SOLVENT-MS

SYNONYMS: PETROLEUM DISTILLATES, PETROLEUM NAPHTHA

SK PART NUMBER: 6616

FAMILY/CHEMICAL NAME: HYDROCARBON SOLVENT

PRODUCT USAGE: SOLVENT FOR CLEANING AND DEGREASING PARTS

SECTION II -- HAZARDOUS COMPONENTS

NAME	SYNONYM	%	CAS NO.	OSHA PEL (ppm)	ACGIH TLV (ppm)
Mineral Spirits	Petroleum Distillates	99.9	64742-88-7	100 (Stoddard Solvent)	100 (Stoddard Solvent)
*Dye (contains Xylene)		.003	1330-20-7	100 150 STEL	100 150 STEL
*Anti-Static Agent (contains Xylene)		0.0001	1330-20-7	100 150 STEL	100 150 STEL

* See Section X - Other Regulatory Information

SECTION III -- PHYSICAL DATA

PHYSICAL STATE, APPEARANCE AND ODOR: Combustible liquid - clear, green, with characteristic hydrocarbon odor.

BOILING POINT: 360° - 400° F

MELTING POINT: Not Available

EVAPORATION RATE: (Butyl Acetate = 1) 0.08

PERCENT VOLATILE: 99.9%

VAPOR DENSITY: 5.48 (Air = 1)

VAPOR PRESSURE: 0.5 mm of Hg at 68° F

SOLUBILITY IN WATER: Negligible

pH: Not Applicable

SPECIFIC GRAVITY: 0.770 to 0.811

MOLECULAR WEIGHT: Approximately 142

VOLATILE ORGANIC COMPOUNDS: 770 g/L

SECTION IV -- FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: 140° F (TCC)

AUTOIGNITION TEMPERATURE: 473° F

CONDITIONS OF FLAMMABILITY: Materials must be moderately heated before ignition can occur.

FLAMMABLE LIMITS IN AIR - LOWER: 1.0% *UPPER:* 7.0%

EXTINGUISHING MEDIA: Carbon dioxide, foam, dry chemical, water (mist only).

FIRE FIGHTING PROCEDURES – SPECIAL: NFPA 704 Rating 0-2-0

Keep storage tanks cool with water spray. Use self-contained breathing apparatus (SCBA).

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Decomposition and combustion products may be toxic. Heated tanks may rupture, explode or be thrown into the air. Vapors are heavier than air and may travel great distances to ignition source and flashback.

HAZARDOUS COMBUSTION PRODUCTS:

Thermal decomposition and burning may produce carbon monoxide.

SECTION V -- REACTIVITY DATA

STABILITY: Normally stable even under fire exposure conditions and is not reactive with water. Normal firefighting procedures may be used.

INCOMPATIBILITY (CONDITIONS TO AVOID): Strong oxidizing agents (e.g. chlorine, peroxides, strong acids).

HAZARDOUS POLYMERIZATION: Not known to occur under normal conditions.

HAZARDOUS DECOMPOSITION PRODUCTS: Normally none; however, incomplete burning may yield carbon monoxide.

SECTION VI -- HEALTH HAZARD DATA

PRIMARY ROUTES OF EXPOSURE: Skin and eye contact; inhalation.

HEALTH HAZARD DATA/SIGNS AND SYMPTOMS OF EXPOSURE:

ACUTE: *Skin*: Prolonged or repeated contact tends to remove skin oils, possibly leading to irritation and dermatitis. No significant skin absorption hazard.

Eyes: Contact may cause slight to moderate irritation. High vapor concentrations (> 500 ppm) are irritating to the eyes.

Inhalation: High concentrations of vapor or mist may be irritating to the respiratory tract, cause headaches, dizziness, nausea, impaired coordination, anesthesia anesthetic and may have other central nervous system effects.

Ingestion: Low order of acute oral toxicity. May cause irritation of the throat, nausea, vomiting and symptoms of central nervous system depression. Aspiration into the lungs during ingestion or vomiting may cause mild to severe pulmonary injury and possibly death.

CHRONIC: Prolonged and/or repeated contact may cause drying and cracking of the skin or dermatitis.

OTHER POTENTIAL HEALTH HAZARDS: None Known

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Individuals with pre-existing central nervous system dysfunction may have increased susceptibility to the effects of exposure. Contact with skin may aggravate pre-existing dermatitis.

CARCINOGENICITY: None of the ingredients are known or suspected carcinogens.

SECTION VII -- EMERGENCY AND FIRST AID PROCEDURES

EYES: For direct contact, flush eyes with water for 15 minutes lifting upper and lower lids occasionally. Consult physician if irritation or pain persists. If irritation or redness from exposure to vapors or mists develop, move victim away from exposure into fresh air.

SKIN: Remove contaminated clothing. Wash skin twice with soap and water. If irritation develops and persists, consult a physician.

INGESTION: If conscious, dilute with 4 to 8 ounces of water and seek immediate medical attention. DO NOT induce vomiting.

INHALATION: Remove to fresh air immediately. Use oxygen if there is difficulty breathing or artificial respiration if respiration has stopped. Do not leave victim unattended. Seek immediate medical attention if necessary.

SECTION VIII -- PRECAUTIONS FOR SAFE USE AND HANDLING

SPILL PROCEDURES: Remove all ignition sources. Ventilate area and avoid breathing vapors. For large spills, isolate area and deny entry. If possible, contain as a liquid for possible re-refining. Absorb onto sand or other absorbent material. Shovel into closable container for disposal. Wear protective equipment specified below. Contain away from surface waters and sewers.

WASTE DISPOSAL METHODS: Dispose in accordance with Federal, State, and local regulations. Contact Safety-Kleen regarding recycling.

HANDLING PRECAUTIONS: Avoid contact with eyes, skin or clothing. Use in well ventilated area and avoid breathing vapors or mists. Keep away from heat, sparks and open flames.

SHIPPING AND STORING PRECAUTIONS: Empty product containers may contain product residue. Do not pressurize, cut, heat, weld, grind or expose containers to flame or other sources of ignition. Keep container tightly closed when not in use and during transport.

PERSONAL HYGIENE: Use good personal hygiene. Wash thoroughly with soap and water after handling and before eating, drinking or using tobacco products. Launder contaminated clothing and clean protective equipment before reuse.

SECTION IX -- CONTROL MEASURES

VENTILATION: Provide local exhaust or general dilution ventilation as determined necessary to maintain concentrations of vapors or mists below applicable exposure limits. Where explosive mixtures may be present, systems safe for such locations should be used.

PROTECTIVE GLOVES: Use nitrile or neoprene gloves to prevent contact with skin.

EYE PROTECTION: Where there is likelihood of spill or splash, wear chemical goggles or faceshield. Contact lenses should not be worn.

RESPIRATORY PROTECTION: Use NIOSH-approved respiratory protective equipment when concentration of vapors or mists exceeds applicable exposure limit. Depending on the airborne concentration, use a respirator or gas mask with appropriate cartridges and canisters (for organic vapor with mist prefilter). A self-contained breathing apparatus (SCBA) is required for large spills and emergencies. Selection and use of respiratory protective equipment should be in accordance with OSHA General Industry Standard 29 CFR 1910.134 - Respiratory Protection.

OTHER PROTECTIVE EQUIPMENT: Wear solvent-resistant boots, apron or other protective clothing where spills and splashes are possible. A source of clean water should be available in work areas for flushing the eyes and skin.

SECTION X -- OTHER REGULATORY INFORMATION

DOT PROPER SHIPPING NAME: Petroleum Naphtha

DOT CLASS: Combustible Liquid

DOT NUMBER: UN 1255

SARA TITLE III: Product does not contain a toxic chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

Product poses the following physical and/or health hazard(s) as defined in 40 CFR 370.3 (Sections 311, 312 of SARA Title III):

Immediate (Acute) Health Hazard
Delayed (Chronic) Health Hazard
Fire Hazard

SECTION XI -- PREPARATION INFORMATION

PREPARED BY: SK Product Review Committee *FORM NO.* 900-14-004

ORIGINAL ISSUE DATE: July 20, 1989 *REVISED:* December 1, 1989 *SUPERSEDES:* July 20, 1989

User assumes all risks incident to the use of this product. To the best of our knowledge, the information contained herein is accurate. However, Safety-Kleen assumes no liability whatsoever for the accuracy or completeness of the information contained herein. No representations or warranties, either express or implied, or merchantability, fitness for a particular purpose or of any other nature are made hereunder with respect to information or the product to which information refers. The data contained on this sheet applies to the material as supplied to the user.

EXHIBIT C-3-b

699 IMMERSION CLEANER MSDS

SAFETY-KLEEN IMMERSION CLEANER AND COLD PARTS CLEANER 699

MATERIAL SAFETY DATA SHEET

SECTION I -- PRODUCT INFORMATION

Safety-Kleen Corporation - 777 Big Timber Road - Elgin, IL 60123
For Product/Sales Information Call 708/697-8460

EMERGENCY TELEPHONE	*MEDICAL:*	*TRANSPORTATION:*
These numbers are for emergency use only. If you desire non-emergency information about this product, please call the telephone number listed above.	**800/942-5969 or 312/942-5969** **RUSH POISON CONTROL CENTER** **CHICAGO, ILLINOIS (24 HOURS)**	**800/424-9300** **CHEMTREC**

IDENTITY (TRADE NAME): **SAFETY-KLEEN IMMERSION CLEANER AND COLD PARTS CLEANER 699**

SK PART NUMBER: **6861, 699**

FAMILY/CHEMICAL NAME: **N/A**

PRODUCT USAGE: **REMOVING CARBON RESIDUE FROM PARTS**

SECTION II -- HAZARDOUS COMPONENTS

NAME	SYNONYM	TYPICAL % BY WT.	CAS NO.	OSHA PEL (ppm)	ACGIH TLV (ppm)
Aromatic 150	Heavy Aromatic Naphtha		64742-94-5	100 (Exxon)	100 (Exxon)
*(May contain up to 5% Naphthalene)			91-20-3	10 15 STEL	10 15 STEL
N-Methyl-2-Pyrrolidone	NMP		872-50-4	100 (BASF)	100 (BASF)
Dipropylene Glycol Methyl Ether	Dipropylene Glycol Monomethyl Ether		34590-94-8	100 150 STEL	100 150 STEL
Monoethanolamine	Ethanolamine		141-43-5	3 6 STEL	3 6 STEL
Oleic Acid	Red Oil		112-80-1	N/E	N/E
Water			7732-18-5	—	—
**(Total chlorinated solvents)		0.2 (Max)			

N/E = Not Established
* See Section X - Other Regulatory Information
**No individual chlorinated solvent > 0.1%

SECTION III -- PHYSICAL DATA

PHYSICAL STATE, APPEARANCE AND ODOR: Clear, reddish brown liquid with hydrocarbon odor.

BOILING RANGE: 210° - 439° F

MELTING POINT: < 10° F

EVAPORATION RATE: 1.0 (Water = 1)

PERCENT VOLATILE:	92 Wt. %
VAPOR DENSITY:	2.6 (Air = 1.0)
VAPOR PRESSURE:	10.9 mm Hg at 25° C
SOLUBILITY IN WATER:	Completely miscible in all proportions.
pH:	10.8, 50/50 (Water/Solvent)
SPECIFIC GRAVITY:	0.95 (Water = 1.0)
MOLECULAR WEIGHT:	127, Average molecular weight of components.
VOLATILE ORGANIC COMPOUNDS:	N/E

SECTION IV -- FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:	SETA, 142° F (Min.)
AUTOIGNITION TEMPERATURE:	Not Known
CONDITIONS OF FLAMMABILITY:	Ignitable, if material is heated above its flash point.
FLAMMABLE LIMITS IN AIR - LOWER:	0.8 ***UPPER:*** 7.0
EXTINGUISHING MEDIA:	None Special
FIRE FIGHTING PROCEDURES - SPECIAL:	NFPA 704 Rating 2-2-1

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Decomposition and combustion products may be toxic. Heated tanks may rupture, explode or be thrown into the air. Vapors are heavier than air and may travel great distances to ignition source and flashback.

HAZARDOUS COMBUSTION PRODUCTS:

Thermal decomposition and burning may produce carbon monoxide, oxides of nitrogen and acrid smoke.

SECTION V -- REACTIVITY DATA

STABILITY:	Normally stable.
INCOMPATIBILITY: (CONDITIONS TO AVOID)	Strong oxidizing agents (e.g. chlorine, peroxides, strong acids)
HAZARDOUS POLYMERIZATION:	Not known to occur under normal conditions, oxides of nitrogen and acrid smoke. Glycol ethers have been shown to form explosive peroxides.
HAZARDOUS DECOMPOSITION PRODUCTS:	Normally none; however, incomplete burning may yield carbon monoxide.

SECTION VI -- HEALTH HAZARD DATA

PRIMARY ROUTES OF EXPOSURE: Inhalation, skin and eye contact, skin absorption.

HEALTH HAZARD DATA/SIGNS AND SYMPTOMS OF EXPOSURE:

ACUTE: ***Skin:*** Corrosive to living tissue and is absorbed through the skin causing systemic poisoning. Contact with unprotected skin can cause discoloration, irritation, blistering and slow healing chemical burns.

Eyes: Contact with liquid may cause severe chemical burns and produce permanent damage.

Inhalation: May result in severe respiratory irritation; gastrointestinal distress (nausea, vomiting), central nervous system depression (headache, drowsiness, dizziness, confusion) and tingling or numbness of the extremities. Severe exposures may lead to respiratory failure, coma and death.

Ingestion: May produce burning pain in the mouth and stomach, severe abdominal pain with nausea, vomiting, slow respiration and irregular pulse. Symptoms similar to those for inhalation also may occur.

CHRONIC: Exposure to high concentrations may lead to damage to the liver, kidneys and lungs. Contact with skin may cause dermatitis, gastrointestinal disorders and produce symptoms similar to those for inhalation.

OTHER POTENTIAL HEALTH HAZARDS:

Dipropylene glycol methyl ether is a mild allergen.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Individuals with pre-existing liver, kidney, lung or cardiovascular dysfunction may have increased susceptibility to the effects of exposure. Contact with skin may aggravate pre-existing dermatitis.

CARCINOGENICITY: Naphthalene is an experimental tumorigen. Mutagenic data exists and Naphthalene is included in EPA Genetic Toxicology Program. Oleic acid is an experimental tumorigen.

SECTION VII -- EMERGENCY AND FIRST AID PROCEDURES

EYES: For direct contact, flush eyes with clean water for 20 minutes lifting upper and lower lids occasionally. Consult physician if irritation persists. If irritation or redness from exposure to vapors or mists develop, move victim away from exposure and into fresh air.

SKIN: Remove contaminated clothing. Wash skin twice with soap and water. If irritation develops and persists, consult a physician.

INGESTION: Aspiration hazard. If conscious, dilute with 4 to 8 ounces of water and seek immediate medical attention. DO NOT induce vomiting.

INHALATION: Remove to fresh air immediately. Use oxygen if there is difficulty breathing or artificial respiration if respiration has stopped. Do not leave victim unattended. Seek immediate medical attention if necessary.

SECTION VIII -- PRECAUTIONS FOR SAFE USE AND HANDLING

SPILL PROCEDURES: Ventilate area and avoid breathing vapors. Absorb spill with oil absorbent or soda ash. Catch and collect for recovery as soon as possible. Shovel into closable container for disposal. Wear protective equipment specified below. Contain away from surface waters and sewers.

WASTE DISPOSAL METHODS: Dispose in accordance with Federal, State and local regulations. Contact Safety-Kleen regarding recycling.

HANDLING PRECAUTIONS: Keep away from heat, sparks and open flames. Use adequate ventilation. Avoid contact with skin, eyes and clothing. Avoid breathing vapors.

SHIPPING AND STORING PRECAUTIONS: Empty product containers may contain product residue. Do not pressurize, cut, heat, weld, grind or expose containers to flame or other sources of ignition. Keep container tightly closed when not in use and during transport.

PERSONAL HYGIENE: Use good personal hygiene. Wash thoroughly with soap and water after handling and before eating, drinking or using tobacco products.

SECTION IX - CONTROL MEASURES

VENTILATION: Provide local exhaust or general dilution ventilation, as determined necessary, to maintain concentrations of vapors below applicable exposure limits.

PROTECTIVE GLOVES: Wear neoprene gloves to prevent skin contact.

EYE PROTECTION: Where there is a likelihood of contact with the face and/or eyes, wear a faceshield and chemical goggles. Contact lenses should not be worn.

RESPIRATORY PROTECTION: Use NIOSH-approved respiratory protective equipment when concentration of vapors exceeds applicable exposure limit. Depending on the airborne concentration, use a respirator or gas mask with appropriate cartridges or canisters (for organic vapors). A self-contained breathing apparatus (SCBA) is required for large spills and emergencies. Selection and use of respiratory protective equipment should be in accordance with OSHA General Industry Standard 29 CFR 1910.134 - Respiratory Protection.

OTHER PROTECTIVE EQUIPMENT: A source of clean water should be available in the work area for flushing eyes and skin. Wear solvent-resistant boots, apron or other protective clothing where spills or splashes are possible.

SECTION X -- OTHER REGULATORY INFORMATION

DOT PROPER SHIPPING NAME: Compound, Cleaning Liquid

DOT CLASS: Corrosive Liquid

DOT ID NUMBER: NA1760

SARA TITLE III: Product contains a toxic chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372. Toxic constituents are listed with an asterisk in Section II of this Material Safety Data Sheet.

Product poses the following physical and/or health hazard(s) as defined in 40 CFR 370.3 (Sections 311, 312 of SARA Title III):

Immediate (Acute) Health Hazard
Delayed (Chronic) Health Hazard
Fire Hazard
Reactivity Hazard

SECTION XI -- PREPARATION INFORMATION

PREPARED BY: SK Technical Services ***FORM NO.*** 900-14-057

ORIGINAL ISSUE DATE: December 1, 1989 ***REVISED:*** April 6, 1990 ***SUPERSEDES:*** December 1, 1989

User assumes all risks incident to the use of this product. To the best of our knowledge, the information contained herein is accurate. However, Safety-Kleen assumes no liability whatsoever for the accuracy or completeness of the information contained herein. No representations or warranties, either express or implied, or merchantability, fitness for a particular purpose or of any other nature are made hereunder with respect to information or the product to which information refers. The data contained on this sheet applies to the material as supplied to the user.

EXHIBIT C-3-c

PAINT SPRAY GUN CLEANER MSDS

SAFETY-KLEEN MULTI-USE LACQUER THINNER 6801

MATERIAL SAFETY DATA SHEET

SECTION I -- PRODUCT INFORMATION

Safety-Kleen Corporation - 777 Big Timber Road - Elgin, IL 60123
For Product/Sales Information Call 708/697-8460

EMERGENCY TELEPHONE	*MEDICAL:*	*TRANSPORTATION:*
These numbers are for emergency use only. If you desire non-emergency information about this product, please call the telephone number listed above.	800/942-5969 or 312/942-5969 RUSH POISON CONTROL CENTER CHICAGO, ILLINOIS (24 HOURS)	800/424-9300 CHEMTREC

IDENTITY (TRADE NAME): SAFETY-KLEEN MULTI-USE LACQUER THINNER 6801

SK PART NUMBER: 6801

FAMILY/CHEMICAL NAME: N/A

PRODUCT USAGE: LACQUER THINNER

SECTION II -- HAZARDOUS COMPONENTS

NAME	SYNONYM	%	CAS NO.	OSHA PEL (ppm)	ACGIH TLV (ppm)
*Toluene	Toluol	11-43	108-88-3	100 150 STEL	100 150 STEL
*Xylene	Xylol	3-4	1330-20-7	100 150 STEL	100 150 STEL
*Methyl Ethyl Ketone	MEK	~5	78-93-3	200 300 STEL	200 300 STEL
*Methyl Isobutyl Ketone	MIBK	~3	108-10-1	50 75 STEL	50 75 STEL
*Acetone	2-Propanone	20-30	67-64-1	750 1000 STEL	750 1000 STEL
*Isopropanol	Isopropyl Alcohol	5-15	67-63-0	400 500 STEL	400 500 STEL
Special Lactol Spirits	VM & P Naphtha	0.5-32	8030-30-6	300 400 STEL	300 STEL
Isobutyl Acetate	Isobutyl Ester Acetic Acid	0.1-15	110-19-0	150	150
Ethyl 3-Ethoxypropionate	3-Ethoxypropionic Acid Ethyl Ester	~5	763-69-9	N/E	N/E

N/E = Not Established
* See Section X - Other Regulatory Information

SECTION III -- PHYSICAL DATA

PHYSICAL STATE, APPEARANCE AND ODOR: Liquid - colorless, clear, with a characteristic solvent odor.

BOILING POINT: ~131 - 347° F

MELTING POINT: Not Applicable

EVAPORATION RATE: 3.30 (N-Butyl = 1)

PERCENT VOLATILE:	100%
VAPOR DENSITY:	3.02 (Air = 1)
VAPOR PRESSURE:	78.6 mm Hg @ 20° C
SOLUBILITY IN WATER:	Appreciable
pH:	Not Applicable
SPECIFIC GRAVITY:	~ 0.8000 - 0.8438 (Water = 1)
MOLECULAR WEIGHT:	Use molecular weight of individual components.
VOLATILE ORGANIC COMPOUNDS:	800 - 844 g/L

SECTION IV -- FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: < 20° F (TCC)

AUTOIGNITION TEMPERATURE: Not Available

CONDITIONS OF FLAMMABILITY: Normal temperatures and pressures.

FLAMMABLE LIMITS IN AIR - LOWER: 1.0% ***UPPER:*** 13.2%

EXTINGUISHING MEDIA: Carbon dioxide, foam, dry chemical, water (mist only)

FIRE FIGHTING PROCEDURES -- SPECIAL: NFPA 704 Rating 2-3-0

Water may be used to cool containers and fire fighters. However, water could cause free solvent to float and spread fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Flammable liquid. Most components are Class 1B with flash point below 73° F and boiling point above 100° F.

HAZARDOUS COMBUSTION PRODUCTS: Carbon Monoxide

SECTION V -- REACTIVITY DATA

STABILITY: Stable under normal temperatures and conditions.

INCOMPATIBILITY: (CONDITIONS TO AVOID) Heat sparks, flames, fire, strong oxidizing agents.

HAZARDOUS POLYMERIZATION: Not known to occur under normal conditions.

HAZARDOUS DECOMPOSITION PRODUCTS: Normally none. Incomplete burning may yield carbon monoxide.

SECTION VI -- HEALTH HAZARD DATA

PRIMARY ROUTES OF EXPOSURE: Inhalation, skin and eye contact.

HEALTH HAZARD DATA/SIGNS AND SYMPTOMS OF EXPOSURE:

ACUTE: ***Skin:*** Contact may cause irritation, dryness and cracking. Prolonged or repeated contact may remove skin oils, possibly leading to irritation and dermatitis. Material is readily absorbed through skin.

Eyes: Direct contact may cause severe irritation and temporary corneal damage. Vapors may cause noticeable redness, tearing, irritation and pain. Conjunctivitis may occur upon chronic exposure.

Inhalation: Can cause headache, dizziness, confusion, nausea, vomiting, irritation of the respiratory system and other central nervous system effects including unconsciousness in extreme cases.

Ingestion: Can cause burning of the mouth, throat and abdomen, nausea, vomiting, diarrhea, symptoms of the central nervous system depression, including weakness, dizziness, slow and shallow respiration, unconsciousness and convulsions. Aspiration into the lungs during ingestion or vomiting may cause mild to severe pulmonary injury and possible death.

CHRONIC: *Inhalation*: Prolonged overexposure may cause damage to the liver, kidney, spleen, lungs or nervous system.

OTHER POTENTIAL HEALTH HAZARDS:

Reports have associated prolonged and repeated occupational exposure to solvents with permanent brain and/or central nervous system damage. Intentional misuse by deliberately concentrating and inhaling this material may be harmful or fatal. Observe all appropriate control measures.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

Individuals with pre-existing liver, kidney, spleen, lungs, skin or nervous system dysfunction may have increased susceptibility to the effects of the exposure. Contact with skin may aggravate pre-existing dermatitis.

CARCINOGENICITY: No components are known or suspected carcinogens.

SECTION VII -- EMERGENCY AND FIRST AID PROCEDURES

EYES: For direct contact, flush eyes with clean water for 15 minutes lifting upper and lower lids occasionally. Consult physician if irritation persists. If irritation or redness from exposure to vapors or mists develop, move victim away from exposure and into fresh air.

SKIN: Remove contaminated clothing. Wash skin twice with soap and water. If irritation develops and persists, consult a physician.

INGESTION: Aspiration hazard. If conscious, dilute with 4 to 8 ounces of water and seek immediate medical attention. DO NOT induce vomiting.

INHALATION: Remove to fresh air immediately. Use oxygen if there is difficulty breathing or artificial respiration if respiration has stopped. Do not leave victim unattended. Seek immediate medical attention if necessary.

SECTION VIII -- PRECAUTIONS FOR SAFE USE AND HANDLING

SPILL PROCEDURES: Remove all ignition sources. Isolate area and deny entry. If possible, contain as a liquid for possible recycling. Absorb onto sand or other absorbent material. Shovel into closable container for disposal. Wear protective equipment specified below. Contain away from surface waters and sewers.

WASTE DISPOSAL METHODS: Dispose in accordance with Federal, State and local regulations. Contact Safety-Kleen regarding recycling.

HANDLING PRECAUTIONS: Do not get into eyes, on skin or clothing. Avoid breathing vapors. DO NOT smoke when handling this product.

SHIPPING AND STORING PRECAUTIONS: Empty product containers may contain product residue. Do not pressurize, cut, heat, weld, grind or expose containers to flame or other sources of ignition. Keep container tightly closed when not in use and during transport.

PERSONAL HYGIENE: Use good personal hygiene. Wash thoroughly with soap and water after handling and before eating, drinking or using tobacco products.

SECTION IX - CONTROL MEASURES

VENTILATION: Provide local exhaust or general dilution ventilation as determined necessary, when concentrations of vapors exceed applicable exposure limits. Where explosive mixtures may be present, systems safe for such locations should be used.

PROTECTIVE GLOVES: To protect against contact with skin, wear nitrile gloves.

EYE PROTECTION: Where there is likelihood of eye contact, wear chemical goggles. Contact lenses should not be worn.

RESPIRATORY PROTECTION: Use NIOSH-approved respiratory protective equipment when concentration of vapors exceeds applicable exposure limit. Depending on the airborne concentration, use a respirator or gas mask with appropriate cartridges and canisters (for organic vapors). A self-contained breathing apparatus (SCBA) is required for large spills and emergencies. Selection and use of respiratory protective equipment should be in accordance with OSHA General Industry Standard 29 CFR 1910.134 - Respiratory Protection.

OTHER PROTECTIVE EQUIPMENT: A source of clean water should be available in the work area for flushing eyes and skin. Wear rubber apron or other protective clothing as needed to protect against spills or splash.

SECTION X -- OTHER REGULATORY INFORMATION

DOT PROPER SHIPPING NAME: Paint-Related Material

DOT CLASS: Flammable Liquid

DOT ID NUMBER: NA1263

SARA TITLE III: Product contains a toxic chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372. Toxic constituents are listed with an asterisk in Section II of this Material Safety Data Sheet.

Product poses the following physical and/or health hazard(s) as defined in 40 CFR 370.3 (Sections 311, 312 of SARA Title III):

Immediate (Acute) Health Hazard
Delayed (Chronic) Health Hazard
Fire Hazard

SECTION XI -- PREPARATION INFORMATION

PREPARED BY: SK Product Review Committee ***FORM NO.*** 900-14-056

ORIGINAL ISSUE DATE: July 20, 1989 ***REVISED:*** December 1, 1989 ***SUPERSEDES:*** July 20, 1989

User assumes all risks incident to the use of this product. To the best of our knowledge, the information contained herein is accurate. However, Safety-Kleen assumes no liability whatsoever for the accuracy or completeness of the information contained herein. No representations or warranties, either express or implied, or merchantability, fitness for a particular purpose or of any other nature are made hereunder with respect to information or the product to which information refers. The data contained on this sheet applies to the material as supplied to the user.

EXHIBIT C-3-d

PERCHLOROETHYLENE (DRY CLEANER FLUID) MSDS

SAFETY-KLEEN PERCHLOROETHYLENE

MATERIAL SAFETY DATA SHEET

SECTION I -- PRODUCT INFORMATION

Safety-Kleen Corporation - 777 Big Timber Road - Elgin, IL 60123
For Product/Sales Information Call 708/697-8460

EMERGENCY TELEPHONE	*MEDICAL:*	*TRANSPORTATION:*
These numbers are for emergency use only. If you desire non-emergency information about this product, please call the telephone number listed above.	800/942-5969 or 312/942-5969 RUSH POISON CONTROL CENTER CHICAGO, ILLINOIS (24 HOURS)	800/424-9300 CHEMTREC

IDENTITY (TRADE NAME): SAFETY-KLEEN PERCHLOROETHYLENE

SK PART NUMBER: 775, 778, 10778, 30778

FAMILY/CHEMICAL NAME: CHLORINATED HYDROCARBON

PRODUCT USAGE: DRY CLEANING SOLVENT

SECTION II -- HAZARDOUS COMPONENTS

NAME	SYNONYM	%	CAS NO.	OSHA PEL (ppm)	ACGIH TLV (ppm)
*Perchloroethylene (Stabilized)	1,1,2,2 - Tetra-chloroethylene	100	127-18-4	25	50 200 STEL

* See Section X - Other Regulatory Information

SECTION III -- PHYSICAL DATA

PHYSICAL STATE, APPEARANCE AND ODOR: Liquid - colorless, clear liquid with mildly sweet odor.

BOILING POINT: 250° F

MELTING POINT: - 9° F

EVAPORATION RATE: 0.09 (Toluene = 1)

PERCENT VOLATILE: Approximately 100%

VAPOR DENSITY: 5.83

VAPOR PRESSURE: 13 mm Hg @ 20° C (Concentrate)

SOLUBILITY IN WATER: 0.015 mg/100 gm @ 25° C

pH: Not Applicable

SPECIFIC GRAVITY: 1.6 (Water = 1.0)

MOLECULAR WEIGHT: 164

VOLATILE ORGANIC COMPOUNDS: None

SECTION IV -- FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: Non-Flammable

AUTOIGNITION TEMPERATURE: Not Applicable

CONDITIONS OF FLAMMABILITY: Non-Flammable

FLAMMABLE LIMITS IN AIR - LOWER: Non-Flammable *UPPER:* Non-Flammable

EXTINGUISHING MEDIA: Non-Flammable

FIRE FIGHTING PROCEDURES -- SPECIAL: NFPA 704 Rating 2-0-0

Self-contained breathing apparatus (SCBA) should be used by fire fighters in buildings where perchloroethylene is stored. Keep containers cool.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Concentrated vapors will decompose on contact with high intensity heat source and produce hydrogen chloride or phosgene.

HAZARDOUS COMBUSTION PRODUCTS:

Exposure to flames, an electric arc or other high energy sources will result in thermal decomposition forming toxic gases (e.g. phosgene and hydrogen chloride).

SECTION V -- REACTIVITY DATA

STABILITY: Stable under normal temperatures and pressures.

INCOMPATIBILITY (CONDITIONS TO AVOID): Open flames, hot surfaces, emissions from welding arcs. Strong alkalis and oxidizing materials. Reacts violently with barium, beryllium and lithium.

HAZARDOUS POLYMERIZATION: Does not normally occur under normal temperatures and pressures.

HAZARDOUS DECOMPOSITION PRODUCTS: Decomposition produces phosgene and hydrogen chloride and other highly toxic substances.

SECTION VI -- HEALTH HAZARD DATA

PRIMARY ROUTES OF EXPOSURE: Inhalation, skin and eye contact, skin absorption.

HEALTH HAZARD DATA/SIGNS AND SYMPTOMS OF EXPOSURE:

ACUTE:

Skin: May cause irritation, discomfort or pain. May be absorbed through the skin, although it is not expected to produce toxicity by this route.

Eyes: Contact with liquid may cause slight to moderate irritation resulting in pain, tearing and general inflammation.

Inhalation: May result in respiratory irritation, gastrointestinal distress (nausea, vomiting), central nervous system depression, headaches, drowsiness, dizziness, confusion, loss of coordination and equilibrium and more severe central nervous system effects at much higher concentrations. Overexposure can cause unconciousness and even death in extreme cases.

Ingestion: May produce irritation of the mouth and gastrointestinal tract and cause effects similar to those of "Inhalation". Aspiration into the lungs during ingestion or vomiting may cause mild to severe pulmonary injury and possible death.

CHRONIC: Prolonged and repeated exposure to high concentrations may result in damage to the liver, kidneys and central nervous system. Prolonged or repeated contact with skin may cause skin to become reddened, rough and dry and may result in dermatitis.

OTHER POTENTIAL HEALTH HAZARDS:

Animals exposed to high levels have shown cardiac sensitization.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

Individuals with pre-existing liver, kidney or central nervous system dysfunction may have increased susceptibility to effects of the exposure. Contact with skin may aggravate pre-existing dermatitis.

CARCINOGENICITY: Perchloroethylene is listed by OSHA, NTP and IARC as a suspected carcinogen.

SECTION VII -- EMERGENCY AND FIRST AID PROCEDURES

EYES: Flush eyes with water for 20 minutes lifting upper and lower lids occasionally. Consult physician if irritation persists. If irritation or redness from exposure to vapors or mists develop, move victim away from exposure and into fresh air.

SKIN: Remove contaminated clothing. Wash skin twice with soap and water. If irritation persists, consult a physician.

INGESTION: Aspiration hazard. If conscious, dilute with 4 to 8 ounces of water and seek immediate medical attention. DO NOT induce vomiting.

INHALATION: Remove to fresh air immediately. Use oxygen if there is difficulty breathing or artificial respiration if breathing has stopped. Do not leave victim unattended. Seek immediate medical attention if necessary.

SECTION VIII -- PRECAUTIONS FOR SAFE HANDLING AND USE

SPILL PROCEDURES: Isolate area and deny entry. Ventilate area and avoid breathing vapors. Absorb onto sand or other absorbent material. Shovel into closable container for disposal. Wear protective equipment specified below. Contain away from surface waters and sewers.

WASTE DISPOSAL METHODS: Dispose in accordance with Federal, State and local regulations. Contact Safety-Kleen regarding recycling.

HANDLING PRECAUTIONS: Do not get into eyes, on skin or clothing. Avoid breathing vapors. DO NOT smoke when using this product.

SHIPPING AND STORING PRECAUTIONS: Empty product containers may contain product residue. Do not pressurize, cut, heat, weld, grind or expose containers to flame or other sources of ignition. Keep container tightly closed when not in use and during transport. Because vapors are much heavier than air, do not store in basements, pits or depressions without ventilation at floor level.

PERSONAL HYGIENE: Use good personal hygiene. Wash thoroughly with soap and water after handling and before eating, drinking or using tobacco products. Clothing which becomes soaked with solvent should be removed immediately and must not be worn until it is thoroughly laundered and dried.

SECTION IX -- CONTROL MEASURES

VENTILATION: Provide local exhaust or general dilution ventilation as determined appropriate to maintain concentrations of vapors below applicable exposure limits.

PROTECTIVE GLOVES: Wear solvent-resistant gloves such as nitrile or neoprene to prevent contact with skin.

EYE PROTECTION: Use protective eyewear such as chemical goggles or faceshield to prevent contact from splash, spray or mist. Contact lenses should not be worn.

RESPIRATORY PROTECTION: Use NIOSH-approved respiratory protective equipment when concentration of vapors exceeds applicable exposure limit. Depending on the airborne concentration, use a respirator or gas mask with appropriate cartridges and canisters (for organic vapors). A self-contained breathing apparatus (SCBA) is required for large spills and emergencies. Selection and use of respiratory protective equipment should be in accordance with OSHA General Industry Standard 29 CFR 1910.134 - Respiratory Protection.

OTHER PROTECTIVE EQUIPMENT: A source of clean water should be available in work area for flushing eyes and skin. Wear boots, apron and other protective clothing as need to protect against contact with skin.

SECTION X -- OTHER REGULATORY INFORMATION

DOT PROPER SHIPPING NAME: Perchloroethylene

DOT CLASS: ORM-A

DOT ID NUMBER: UN 1897

SARA TITLE III: Product contains a toxic chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372. Toxic constituents are listed with an asterisk in Section II of this Material Safety Data Sheet.

Product poses the following physical and/or health hazard(s) as defined in 40 CFR 370.3 (Sections 311, 312 of SARA Title III):

Immediate (Acute) Health Hazard
Delayed (Chronic) Health Hazard

OTHER: State of California Safe Drinking Water and Toxic Enforcement Act (Proposition #65)

Warning: Perchloroethylene is known to the State of California to cause cancer.

California South Coast Air Quality Management District Rule 443.1:

Maximum Volatile Organic Carbon (VOC):	1620 grams/liter
VOC Vapor Pressure at 20° C:	13 mm Hg

SECTION XI -- PREPARATION INFORMATION

PREPARED BY: SK Product Review Committee ***FORM NO.*** 900-14-022

ORIGINAL ISSUE DATE: July 20, 1989 ***REVISED:*** December 1, 1989 ***SUPERSEDES:*** July 20, 1989

User assumes all risks incident to the use of this product. To the best of our knowledge, the information contained herein is accurate. However, Safety-Kleen assumes no liability whatsoever for the accuracy or completeness of the information contained herein. No representations or warranties, either express or implied, or merchantability, fitness for a particular purpose or of any other nature are made hereunder with respect to information or the product to which information refers. The data contained on this sheet applies to the material as supplied to the user.

APPENDIX C-4

WASTE AND RECYCLED PRODUCT ANALYSES

EXHIBIT C-4-a

1990 AND 1991 ANNUAL WASTE RECHARACTERIZATION

Exhibit C-4-a

Safety-Kleen Corporation

Results of 1990 and 1991 Annual Waste Recharacterization

The enclosed data summarizes the results of the annual waste recharacterization studies completed by Safety-Kleen in 1990 and 1991 (1991 data is denoted by the "Enesco" logo). These studies incorporate the random selection and analyses of bulk waste loads received by Safety-Kleen Recycle Centers in the United States.

Parts Washer Solvent Wastes

Volatile Organics (EPA 8240) Analysis, ppm

Parameter		CH3Cl	CH3Br	C2H3Cl	C2H5Cl	CH2Cl2	acetone	CS2	1.1-DCE	1.1-DCA	1.2-DCE	CHCl3
LAB	SITE											
M	CL	< 100	< 100	< 100	< 100	< 50	< 1000	< 50	< 50	< 50	< 50	< 50
W	DE	< 12000	< 12000	< 12000	< 12000	< 6100	< 120000	< 6100	< 6100	< 6100	< 6100	< 6100
W	EL	< 120	< 120	< 120	< 120	< 62	< 1200	< 62	< 62	< 62	< 62	< 62
W	HE	< 120	< 120	< 120	< 120	69	< 1200	< 62	< 62	< 62	< 62	< 62
M	LE	< 100	< 100	< 100	< 100	< 50	< 1000	< 50	< 50	< 50	< 50	< 50
M	MA	< 250	< 250	< 250	< 250	120	< 2500	< 120	< 120	< 120	< 120	< 120
C	RE	< 600	< 600	< 600	< 600	< 300	< 6000	< 300	< 300	< 300	< 300	< 300

Parameter		1,2-DCA	MEK	1.1.1-TCA	CCl4	v-acetate	CHBrCl2	1.2-DCPA	1.3-DCPE	TCE	CHBr2Cl	1.1.2-TCA
LAB	SITE											
M	CL	< 50	< 1000	< 50	< 50	< 500	< 50	< 50	< 50	410	< 50	< 50
W	DE	< 6100	< 120000	36000	< 6100	< 61000	< 6100	< 6100	< 6100	< 6100	< 6100	< 6100
W	EL	< 62	< 1200	750	< 62	< 620	< 62	< 62	< 62	< 62	< 62	< 62
W	HE	< 62	< 1200	480	< 62	< 620	< 62	< 62	< 62	< 62	< 62	< 62
M	LE	< 50	< 1000	300	< 50	< 500	< 50	< 50	< 50	61	< 50	< 50
M	MA	< 120	< 2500	< 120	< 120	< 1200	< 120	< 120	< 120	< 120	< 120	< 120
C	RE	< 300	< 6000	2300	< 300	< 3000	< 300	< 300	< 300	< 300	< 300	< 300

Parameter		benzene	2-CVE	1.3-DCPE	CHBr3	Me-2-pen	2-hex'one	PCE	1.1.2.2PCA	toluene	Cl-benz	eth-benz
LAB	SITE											
M	CL	< 50	< 100	< 50	< 50	< 500	< 500	96	< 50	180	< 50	67
W	DE	< 6100	< 12000	< 6100	< 6100	< 61000	< 61000	72000	< 6100	48000	< 6100	32000
W	EL	< 62	< 120	< 62	< 62	< 620	< 620	930	< 62	540	< 62	310
W	HE	< 62	< 120	< 62	< 62	< 620	< 620	1900	< 62	340	< 62	390
M	LE	< 50	< 100	< 50	< 50	< 500	< 500	140	< 50	290	< 50	150
M	MA	< 120	< 250	< 120	< 120	< 1200	< 1200	< 120	< 120	420	< 120	140
C	RE	< 300	< 600	< 300	< 300	< 3000	< 3000	1500	< 300	1500	< 300	580

Parts Washer Solvent Wastes

Volatile Organics (EPA 8240) Analysis, ppm

Parameter		styrene	xylenes	1.2-DCIB	1.3-DCIB	1.4-DCIB
LAB	*SITE*					
M	*CL*	< 50	660	< 100	< 100	< 100
W	*DE*	< 6100	410000	79000	29000	< 6100
W	*EL*	< 62	2500	< 62	< 62	< 62
W	*HE*	90	3400	340	< 62	90
M	*LE*	< 50	1300	140	< 100	< 100
M	*MA*	< 120	920	< 250	< 250	< 250
C	*RE*	17000	3900	1900	380	1500

Parts Washer Solvent Wastes

Semivolatile Organics (EPA 8270) Analysis, ppm

Parameter		phenol	b-2Cl-ethr	2Cl-phenol	1.3-DClB	1.4-DClB	benzyl 'ol	1.2-DClB	2Me-pheno	b-2Cl-IPE	4Me-pheno	N-nitroso
LAB	SITE											
M	CL	< 1	< 1	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1
W	DE	< 100	< 100	< 100	< 100	< 100	< 100	< 100	280	< 100	< 100	< 100
W	EL	< 1200	< 1200	< 1200	< 1200	< 1200	< 2500	< 1200	< 1200	< 1200	< 1200	< 1200
W	HE	< 1200	< 1200	< 1200	< 1200	< 1200	< 2500	< 1200	< 1200	< 1200	< 1200	< 1200
M	LE	< 50	< 50	< 50	< 50	< 50	< 100	< 50	< 50	< 50	< 50	< 50
M	MA	< 100	< 100	< 100	< 100	< 100	< 200	< 100	< 100	< 100	< 100	< 100
C	RE	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100

Parameter		C2Cl6	nitrobenz	Isophorone	2ntroph'ol	2.4Meph'ol	benz acid	b-2Clethox	2.4-dClph	1.2.4-TClB	Naph'ene	4-Clanilline
LAB	SITE											
M	CL	< 1	< 1	< 1	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 2
W	DE	< 100	< 100	< 100	< 100	< 100	< 500	< 100	< 100	< 100	1100	< 100
W	EL	< 1200	< 1200	< 1200	< 1200	< 1200	< 6200	< 1200	< 1200	< 1200	< 1200	< 2500
W	HE	< 1200	< 1200	< 1200	< 1200	< 1200	< 6200	< 1200	< 1200	< 1200	< 1200	< 2500
M	LE	< 50	< 50	< 50	< 50	< 50	< 250	< 50	< 50	< 50	1300	< 100
M	MA	< 100	< 100	< 100	< 100	< 100	< 500	< 100	< 100	< 100	920	< 200
C	RE	< 100	< 100	< 100	< 100	< 100	< 500	< 100	< 100	< 100	1900	< 100

Parameter		Cl6buladien	4Cl3Mephnl	2-Menaph	Cl6cycpent	2.4.6tClph	2.4.5tClph	2-Clnaph	2-ntroanil	Me2phthal	acenaphthy	2.6-DNT
LAB	SITE											
M	CL	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 5	< 1	< 1	< 1
W	DE	< 100	< 100	330	< 100	< 100	< 500	< 100	< 500	< 100	< 100	< 100
W	EL	< 1200	< 1200	< 1200	< 1200	< 1200	< 1200	< 1200	< 6200	< 1200	< 1200	< 1200
W	HE	< 1200	< 1200	< 1200	< 1200	< 1200	< 1200	< 1200	< 6200	< 1200	< 1200	< 1200
M	LE	< 50	< 100	420	< 50	< 50	< 50	< 50	< 250	< 50	< 50	< 50
M	MA	< 100	< 200	570	< 100	< 100	< 100	< 100	< 500	< 100	< 100	< 100
C	RE	< 100	< 100	1900	< 100	< 100	< 500	< 100	< 500	< 100	< 100	< 100

Parts Washer Solvent Wastes

Semivolatile Organics (EPA 8270) Analysis, ppm

Parameter		3-ntroanil	acenaphthe	2.4dntrophe	4ntrophenol	dibenfuran	2.4-DNT	dethphthal	4Clphenphe	fluorene	4-ntroanil	4.6dn2Mep
LAB	SITE											
M	CL	< 5	< 1	< 5	< 5	< 1	< 1	< 1	< 1	< 1	< 5	< 5
W	DE	< 500	< 100	< 500	< 500	< 100	< 100	< 100	< 100	< 100	< 500	< 500
W	EL	< 6200	< 1200	< 6200	< 6200	< 1200	< 1200	< 1200	< 1200	< 1200	< 6200	< 6200
W	HE	< 6200	< 1200	< 6200	< 6200	< 1200	< 1200	< 1200	< 1200	< 1200	< 6200	< 6200
M	LE	< 250	< 50	< 250	< 250	< 50	< 50	< 50	< 50	< 50	< 250	< 250
M	MA	< 500	< 100	< 500	< 500	< 100	< 100	< 100	< 100	< 100	< 500	< 500
C	RE	< 500	< 100	< 500	< 500	< 100	< 100	< 100	< 100	< 100	< 500	< 500

Parameter		N-nitroso	4Brphenph	Cl6benzene	Cl5phenol	phenanthre	anthracene	d-n-butpht	fluoranthen	pyrene	butbenphth	3.3'Cl2benz
LAB	SITE											
M	CL	< 1	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 2
W	DE	< 100	< 100	< 100	< 500	< 100	< 100	< 100	< 100	< 100	< 100	< 200
W	EL	< 1200	< 1200	< 1200	< 6200	< 1200	< 1200	< 1200	< 1200	< 1200	< 1200	< 2500
W	HE	< 1200	< 1200	< 1200	< 6200	< 1200	< 1200	< 1200	< 1200	< 1200	< 1200	< 2500
M	LE	< 50	< 50	< 50	< 250	< 50	< 50	< 50	< 50	< 50	< 50	< 100
M	MA	< 100	< 100	< 100	< 500	< 100	< 100	< 100	< 100	< 100	< 100	< 200
C	RE	< 100	< 100	< 100	< 500	< 100	< 100	< 100	< 100	< 100	490	< 200

Parameter		ben[a]anthr	chrysene	b2ethhexph	d-n-octpht	ben[b]fluor	ben[k]fluor	ben[a]pyren	ind[123-cd]	dben[a.h]an	ben[ghi]per
LAB	SITE										
M	CL	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
W	DE	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
W	EL	< 1200	< 1200	< 1200	< 1200	< 1200	< 1200	< 1200	< 1200	< 1200	< 1200
W	HE	< 1200	< 1200	< 1200	< 1200	< 1200	< 1200	< 1200	< 1200	< 1200	< 1200
M	LE	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
M	MA	< 100	< 100	160	< 100	< 100	< 100	< 100	< 100	< 100	< 100
C	RE	< 100	< 100	1400	< 100	< 100	< 100	< 100	< 100	< 100	< 100

Parts Washer Solvent Wastes

	Parameter	pH	SG	FP	As	Ba	Cd	Cr	Pb	Hg	Se	Ag
	Reg. Limit	<2 or >10	na	< 100	5	100	1	5	5	0.2	1	5
LAB	*SITE*											
M	*CL*	5.5	0.79	125	< 0.5	0.51	0.041	< 0.01	0.47	< 0.001	< 0.2	< 0.01
W	*DE*	6.5	0.799	110	< 0.05	0.6	< 0.05	< 0.05	1.3	< 0.01	< 0.05	< 0.05
W	*EL*	7	0.777	151	< 0.05	0.6	0.06	< 0.05	0.5	< 0.01	< 0.05	< 0.05
W	*HE*	6.5	0.775	95	< 0.05	1.2	0.07	< 0.05	1.2	< 0.01	< 0.05	< 0.05
M	*LE*	6	0.78	115	< 0.5	0.27	0.055	< 0.01	0.74	0.002	< 0.2	< 0.01
M	*MA*	6.5	0.8	110	< 0.5	< 1.0	0.059	0.017	1.6	0.0018	< 0.2	< 0.01
C	*RE*	8	0.79	78	< 1	0.09	0.05	< 0.02	0.5	< 0.002	< 1	< 0.05

TCLP Semi Volatiles Analysis, ppm

	Parameter	cresol	2.4-DNT	Cl6-benz	Cl6-13-but	Cl6-eth	nitrobenz	Cl5-phenol	pyridine	2.4.5-TCP	2.4.6-TCP
	Reg. Limit	200	0.13	0.13	0.5	3	2	100	5	400	2
LAB	*SITE*										
M	*CL*	9	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.17	< 0.17	< 0.033	< 0.033
W	*DE*	3	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.17	< 0.17	< 0.033	< 0.033
W	*EL*	6.7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 5.0	< 1.0	< 1.0
W	*HE*	< 0.33	< 0.33	< 0.33	< 0.33	< 0.33	< 0.33	< 1.6	< 1.6	< 0.33	< 0.33
M	*LE*	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.17	< 0.17	< 0.033	< 0.033
M	*MA*	< 0.67	4.4	< 0.67	< 0.67	< 0.67	< 0.67	< 3.3	< 3.3	< 0.67	< 0.67
C	*RE*	0.21	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.17	< 0.17	< 0.033	< 0.033

TCLP Volatiles Analysis, ppm

	Parameter	benzene	CCl4	Clbenz	CHCl3	1.4-DClB	1.2-DCA	1.1-DCE	MEK	PCE	TCE	VChloride
	Reg. Limit	0.5	0.5	100	6	7.5	0.5	0.7	200	0.7	0.5	0.2
LAB	*SITE*											
M	*CL*	< 0.10	< 0.10	< 0.10	< 0.10	< 0.20	< 0.10	< 0.10	< 2.0	0.61	< 0.10	< 0.20
W	*DE*	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 2.0	0.16	< 0.10	< 0.20
W	*EL*	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	3.9	2.8	< 0.10	< 0.20
W	*HE*	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 2.0	< 0.10	0.49	< 0.20
M	*LE*	< 0.10	< 0.10	< 0.10	< 0.10	< 0.20	< 0.10	< 0.10	< 2.0	0.58	< 0.10	< 0.20
M	*MA*	0.15	< 0.10	< 0.10	0.41	< 0.20	< 0.10	< 0.10	< 2.0	0.15	< 0.10	< 0.20
C	*RE*	0.12	< 0.05	< 0.05	< 0.05	0.38	< 0.05	< 0.05	1.3	0.27	< 0.05	< 0.1

Due to the uncommon usage of 699 Immersion Cleaner before 1991, 1990 recharacterization data for spent 699 Immersion Cleaner is not available.

Paint Gun Cleaner Wastes

Volatile Organics (EPA 8240) Analysis, ppm

Parameter		CH3Cl	CH3Br	C2H3Cl	C2H5Cl	CH2Cl2	acetone	CS2	1.1-DCE	1.1-DCA	1.2-DCE	CHCl3
LAB	*SITE*											
W	*DE*	< 11000	< 11000	< 11000	< 11000	< 5600	< 120000	< 5600	< 5600	< 5600	< 5600	< 5600
W	*DO*	< 11000	< 11000	< 11000	< 11000	270000	< 110000	< 5300	< 5300	< 5300	< 5300	< 5300

Parameter		1,2-DCA	MEK	1.1.1-TCA	CCl4	v-acetate	CHBrCl2	1.2-DCPA	1.3-DCPE	TCE	CHBr2Cl	1.1.2-TCA
LAB	*SITE*											
W	*DE*	< 5600	< 120000	< 5600	< 5600	< 56000	< 5600	< 5600	< 5600	< 5600	< 5600	< 5600
W	*DO*	< 5300	< 110000	< 5300	< 5300	< 53000	< 5300	< 5300	< 5300	< 5300	< 5300	< 5300

Parameter		benzene	2-CVE	1.3-DCPE	CHBr3	Me-2-pen	2-hex'one	PCE	1.1.2.2PCA	toluene	Cl-benz	eth-benz
LAB	*SITE*											
W	*DE*	< 5600	< 11000	< 5600	< 5600	< 56000	< 56000	< 5600	< 5600	290000	< 5600	33000
W	*DO*	< 5300	< 11000	< 5300	< 5300	< 53000	< 53000	< 5300	< 5300	300000	< 5300	13000

Parameter		styrene	xylenes	1.2-DCIB	1.3-DCIB	1.4-DCIB
LAB	*SITE*					
W	*DE*	< 5600	54000	< 5600	< 5600	< 5600
W	*DO*	< 5300	55000	< 5300	< 5300	< 5300

Paint Gun Cleaner Wastes

Semivolatile Organics (EPA 8270) Analysis, ppm

Parameter		phenol	b-2Cl-ethr	2Cl-phenol	1.3-DClB	1.4-DClB	benzyl 'ol	1.2-DClB	2Me-phenol	b-2Cl-IPE	4Me-phenol	N-nitroso
LAB	*SITE*											
W	*DE*	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000
W	*DO*	< 1100	< 1100	< 1100	< 1100	< 1100	< 2100	< 1100	< 1100	< 1100	< 1100	< 1100

Parameter		C2Cl6	nitrobenz	isophorone	2nitroph'ol	2.4Meph'ol	benz acid	b-2Clethox	2.4-dClph	1.2.4-TClB	Naph'ene	4-Clanilline
LAB	*SITE*											
W	*DE*	< 1000	< 1000	< 1000	< 1000	< 1000	< 5000	< 1000	< 1000	< 1000	< 1000	< 1000
W	*DO*	< 1100	< 1100	< 1100	< 1100	< 1100	< 5300	< 1100	< 1100	< 1100	< 1100	< 2100

Parameter		Cl6butadien	4Cl3Mephnl	2-Menaph	Cl6cycpent	2.4.6tClph	2.4.5tClph	2-Clnaph	2-nitroanil	Me2phthal	acenaphthy	2.6-DNT
LAB	*SITE*											
W	*DE*	< 1000	< 1000	< 1000	< 1000	< 1000	< 5000	< 1000	< 5000	< 1000	< 1000	< 1000
W	*DO*	< 1100	< 2100	< 1100	< 1100	< 1100	< 1100	< 1100	< 5300	< 1100	< 1100	< 1100

Parameter		3-nitroanil	acenaphthe	2.4dnitrophe	4nitrophenol	dibenfuran	2.4-DNT	delthphthal	4Clphenphe	fluorene	4-nitroanil	4.6dn2Mep
LAB	*SITE*											
W	*DE*	< 5000	< 1000	< 5000	< 5000	< 1000	< 1000	< 1000	< 1000	< 1000	< 5000	< 5000
W	*DO*	< 5300	< 1100	< 5300	< 5300	< 1100	< 1100	< 1100	< 1100	< 1100	< 5300	< 5300

Parameter		N-nitroso	4Brphenph	Cl6benzene	Cl5phenol	phenanthre	anthracene	d-n-butpht	fluoranthen	pyrene	butbenphth	3.3'Cl2benz
LAB	*SITE*											
W	*DE*	< 1000	< 1000	< 1000	< 5000	< 1000	< 1000.	< 1000	< 1000	< 1000	< 1000	< 2000
W	*DO*	< 1100	< 1100	< 1100	< 5300	< 1100	< 1100	< 1100	< 1100	< 1100	1600	< 2100

Parameter		ben[a]anthr	chrysene	b2ethhexph	d-n-ocipht	ben[b]fluor	ben[k]fluor	ben[a]pyren	ind[123-cd]	dben[a.h]an	ben[ghi]per
LAB	*SITE*										
W	*DE*	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000	< 1000
W	*DO*	< 1100	< 1100	< 1100	< 1100	< 1100	< 1100	< 1100	< 1100	< 1100	< 1100

Paint Gun Cleaner Wastes

Physical Properties and TCLP Metals Analysis, ppm

	Parameter	pH	SG	FP	As	Ba	Cd	Cr	Pb	Hg	Se	Ag
	Reg. Limit	<2 or >10	na	< 100	5	100	1	5	5	0.2	1	5
LAB	*SITE*											
W	*DE*	6	0.851	75	< 0.05	1	< 0.05	0.21	0.3	< 0.01	< 0.05	< 0.05
W	*DO*	6.5	0.937	75	< 0.05	0.6	0.72	0.72	2.4	< 0.01	< 0.05	< 0.05

TCLP Semi Volatiles Analysis, ppm

	Parameter	cresol	2.4-DNT	Cl6-benz	Cl6-13-but	Cl6-eth	nitrobenz	Cl5-phenol	pyridine	2.4.5-TCP	2.4.6-TCP
	Reg. Limit	200	0.13	0.13	0.5	3	2	100	5	400	2
LAB	*SITE*										
W	*DE*	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.17	< 0.17	< 0.033	< 0.033
W	*DO*	9.7	< 2.6	< 2.6	< 2.6	< 2.6	< 2.6	< 13	< 13	< 2.6	< 2.6

TCLP Volatiles Analysis, ppm

	Parameter	benzene	CCl4	Clbenz	CHCl3	1.4-DClB	1.2-DCA	1.1-DCE	MEK	PCE	TCE	VChloride
	Reg. Limit	0.5	0.5	100	6	7.5	0.5	0.7	200	0.7	0.5	0.2
LAB	*SITE*											
W	*DE*	0.18	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	4000	< 0.10	< 0.10	< 0.20
W	*DO*	0.14	< 0.10	< 0.10	< 0.10	< 0.10	0.12	< 0.10	> 200	0.61	1.6	< 0.20

Dry Cleaner Solvent Wastes

Volatile Organics (EPA 8240) Analysis, ppm

Parameter		CH3Cl	CH3Br	C2H3Cl	C2H5Cl	CH2Cl2	acetone	CS2	1.1-DCE	1.1-DCA	1.2-DCE	CHCl3
LAB	*SITE*											
W	*DE*	< 10	< 10	< 10	< 10	< 5.0	200	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
W	*HE*	< 7700	< 7700	< 7700	< 7700	< 3900	< 77000	< 3900	< 3900	< 3900	< 3900	< 3900
M	*LE*	< 300	< 300	< 300	< 300	< 150	< 3000	< 150	< 150	< 150	< 150	< 150

Parameter		1,2-DCA	MEK	1.1.1-TCA	CCl4	v-acetate	CHBrCl2	1.2-DCPA	1.3-DCPE	TCE	CHBr2Cl	1.1.2-TCA
LAB	*SITE*											
W	*DE*	< 5.0	< 100	18	< 5.0	< 50	< 5.0	< 5.0	< 5.0	6.4	< 5.0	< 5.0
W	*HE*	< 3900	< 3900	< 3900	< 3900	< 39000	< 3900	< 3900	< 3900	< 3900	< 3900	< 3900
M	*LE*	< 150	< 3000	< 150	< 150	< 1500	< 150	< 150	< 150	< 150	< 150	< 150

Parameter		benzene	2-CVE	1.3-DCPE	CHBr3	Me-2-pen	2-hex'one	PCE	1.1.2.2PCA	toluene	Cl-benz	eth-benz
LAB	*SITE*											
W	*DE*	< 5.0	< 10	< 5.0	< 5.0	< 50	< 50	25000	< 5.0	32	< 5.0	< 5.0
W	*HE*	< 3900	< 7700	< 3900	< 3900	< 39000	< 39000	510000	< 3900	4800	< 3900	< 3900
M	*LE*	< 150	< 300	< 150	< 150	< 1500	< 1500	72000	< 150	< 150	< 150	< 150

Parameter		styrene	xylenes	1.2-DCIB	1.3-DCIB	1.4-DCIB
LAB	*SITE*					
W	*DE*	< 5.0	62	130	36	76
W	*HE*	< 3900	14000	< 3900	< 3900	< 3900
M	*LE*	< 150	< 150	< 150	< 150	< 150

Dry Cleaner Solvent Wastes

Semivolatile Organics (EPA 8270) Analysis, ppm

Parameter		phenol	b-2Cl-ethr	2Cl-phenol	1.3-DClB	1.4-DClB	benzyl 'ol	1.2-DClB	2Me-pheno	b-2Cl-IPE	4Me-pheno	N-nitroso
LAB	SITE											
W	DE	< 3.0	< 3.0	< 3.0	3.8	3.8	< 3.0	< 3.0	13	< 3.0	15	< 3.0
W	HE	< 770	< 770	< 770	< 770	< 770	< 1500	< 770	< 770	< 770	< 770	< 770
M	LE	74	< 42	< 42	< 42	< 42	< 84	< 42	< 42	< 42	< 42	< 42

Parameter		C2Cl6	nitrobenz	isophorone	2nitroph'ol	2.4Meph'ol	benz acid	b-2Clethox	2.4-dClph	1.2.4-TClB	Naph'ene	4-Clanilline
LAB	SITE											
W	DE	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 15	< 3.0	< 3.0	< 3.0	27	< 3.0
W	HE	< 770	< 770	< 770	< 770	< 770	< 3900	< 770	< 770	< 770	< 770	< 1500
M	LE	< 42	< 42	< 42	< 42	< 42	< 200	< 42	< 42	< 42	< 42	< 84

Parameter		Cl6butadien	4Cl3Mephnl	2-Menaph	Cl6cycpent	2.4.6tClph	2.4.5tClph	2-Clnaph	2-nitroanil	Me2phthal	acenaphthy	2.6-DNT
LAB	SITE											
W	DE	< 3.0	< 3.0	3.9	< 3.0	< 3.0	< 15	< 3.0	< 15	< 3.0	< 3.0	< 3.0
W	HE	< 770	< 1500	< 770	< 770	< 770	< 770	< 770	< 3900	< 770	< 770	< 770
M	LE	< 42	< 84	< 42	< 42	< 42	< 42	< 42	< 200	< 42	< 42	< 42

Parameter		3-nitroanil	acenaphthe	2.4dnitrophe	4nitrophenol	dibenfuran	2.4-DNT	dethphthal	4Clphenphe	fluorene	4-nitroanil	4.6dn2Mep
LAB	SITE											
W	DE	< 15	< 3.0	< 15	< 15	< 3.0	< 3.0	9	< 3.0	< 3.0	< 15	< 15
W	HE	< 3900	< 770	< 3900	< 3900	< 770	< 770	< 770	< 770	< 770	< 3900	< 3900
M	LE	< 200	< 42	< 200	< 200	< 42	< 42	< 42	< 42	< 42	< 200	< 200

Dry Cleaner Solvent Wastes

Semivolatile Organics (EPA 8270) Analysis, ppm

Parameter		N-nitroso	4Brphenph	Cl6benzene	Cl5phenol	phenanthre	anthracene	d-n-butpht	fluoranthen	pyrene	butbenphth	3.3'Cl2benz
LAB	*SITE*											
W	*DE*	< 3.0	< 3.0	< 3.0	< 15	< 3.0	< 3.0	28	< 3.0	< 3.0	180	< 6.0
W	*HE*	< 770	< 770	< 770	< 3900	< 770	< 770	< 770	< 770	< 770	< 770	< 1500
M	*LE*	< 42	< 42	< 42	< 200	< 42	< 42	< 42	< 42	< 42	110	< 84

Parameter		ben[a]anthr	chrysene	b2ethhexph	d-n-octpht	ben[b]fluor	ben[k]fluor	ben[a]pyren	ind[123-cd]	dben[a,h]an	ben[ghi]per
LAB	*SITE*										
W	*DE*	< 3.0	< 3.0	320	34	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
W	*HE*	< 770	< 770	< 770	< 770	< 770	< 770	< 770	< 770	< 770	< 770
M	*LE*	< 42	< 42	64	< 42	< 42	< 42	< 42	< 42	< 42	< 42

Dry Cleaner Solvent Wastes

Physical Properties and TCLP Metals Analysis, ppm

	Parameter	pH	SG	FP	As	Ba	Cd	Cr	Pb	Hg	Se	Ag
	Reg. Limit	<2 or >10	na	< 100	5	100	1	5	5	0.2	1	5
LAB	*SITE*											
W	*DE*	7	1.03	80	< 0.05	0.8	0.24	0.15	1.7	< 0.01	< 0.05	< 0.05
W	*HE*	6	1.25	85	< 0.05	0.4	0.05	0.13	0.2	< 0.01	< 0.05	< 0.05
M	*LE*	8	matrix	105	< 0.5	0.37	0.45	0.26	1.1	< 0.001	< 0.2	< 0.01

TCLP Semi Volatiles Analysis, ppm

	Parameter	cresol	2.4-DNT	Cl6-benz	Cl6-13-but	Cl6-eth	nitrobenz	Cl5-phenol	pyridine	2.4.5-TCP	2.4.6-TCP
	Reg. Limit	200	0.13	0.13	0.5	3	2	100	5	400	2
LAB	*SITE*										
W	*DE*	< 0.33	< 0.33	< 0.33	< 0.33	< 0.33	< 0.33	< 1.7	< 1.7	< 0.33	< 0.33
W	*HE*	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.30	< 0.30	< 0.060	< 0.060
M	*LE*	0.059	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.17	< 0.17	< 0.033	< 0.033

TCLP Volatiles Analysis, ppm

	Parameter	benzene	CCl4	Clbenz	CHCl3	1.4-DClB	1.2-DCA	1.1-DCE	MEK	PCE	TCE	VChloride
	Reg. Limit	0.5	0.5	100	6	7.5	0.5	0.7	200	0.7	0.5	0.2
LAB	*SITE*											
W	*DE*	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 2.0	> 4.4	< 0.10	< 0.20
W	*HE*	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.14	< 2.0	> 4.4	0.17	< 0.20
M	*LE*	< 0.10	< 0.10	< 0.10	< 0.10	< 0.20	< 0.10	< 0.10	< 2.0	> 4.4	< 0.10	< 0.20

Antifreeze Wastes

Volatile Organics (EPA 8240) Analysis, ppm

Parameter		CH3Cl	CH3Br	C2H3Cl	C2H5Cl	CH2Cl2	acetone	CS2	1.1-DCE	1.1-DCA	1.2-DCE	CHCl3
LAB	SITE											
W	BU	< 0.95	< 0.95	< 0.95	< 0.95	12	13	< 0.48	< 0.48	< 0.48	< 0.48	< 0.48
W	EL	< 9.0	< 9.0	< 9.0	< 9.0	< 4.5	< 90	< 4.5	< 4.5	< 4.5	< 4.5	< 4.5
W	WL	< 1.9	< 1.9	< 1.9	< 1.9	25	32	< 0.93	< 0.93	< 0.93	< 0.93	< 0.93

Parameter		1,2-DCA	MEK	1.1.1-TCA	CCl4	v-acetate	ClBrCl2	1.2-DCPA	1.3-DCPE	TCE	CHBr2Cl	1.1.2-TCA
LAB	SITE											
W	BU	< 0.48	35	26	< 0.48	< 4.8	< 0.48	< 0.48	< 0.48	15	< 0.48	< 0.48
W	EL	< 4.5	< 90	6.9	< 4.5	< 45	< 4.5	< 4.5	< 4.5	< 4.5	< 4.5	< 4.5
W	WL	< 0.93	< 19	1.9	< 0.93	< 9.3	< 0.93	< 0.93	< 0.93	< 0.93	< 0.93	< 0.93

Parameter		benzene	2-CVE	1.3-DCPE	CHBr3	Me-2-pen	2-hex'one	PCE	1.1.2.2PCA	toluene	Cl-benz	eth-benz
LAB	SITE											
W	BU	< 0.48	< 0.95	< 0.48	< 0.48	< 4.8	< 4.8	1.3	< 0.48	16	< 0.48	< 0.48
W	EL	< 4.5	< 9.0	< 4.5	< 4.5	< 45	< 45	< 4.5	< 4.5	6.8	< 4.5	< 4.5
W	WL	< 0.93	< 1.9	< 0.93	< 0.93	< 9.3	< 9.3	< 0.93	< 0.93	2.4	< 0.93	< 0.93

Parameter		styrene	xylenes	1.2-DClB	1.3-DClB	1.4-DClB
LAB	SITE					
W	BU	< 0.48	1.6	< 0.48	< 0.48	< 0.48
W	EL	< 4.5	< 4.5	< 4.5	< 4.5	< 4.5
W	WL	< 0.93	1.8	< 0.93	< 0.93	< 0.93

Antifreeze Wastes

Semivolatile Organics (EPA 8270) Analysis, ppm

Parameter		phenol	b-2Cl-ethr	2Cl-phenol	1.3-DClB	1.4-DClB	benzyl 'ol	1.2-DClB	2Me-phenol	b-2Cl-IPE	4Me-phenol	N-nitroso
LAB	SITE											
W	BU	< 930	< 930	< 930	< 930	< 930	< 1900	< 930	< 930	< 930	< 930	< 930
W	EL	< 910	< 910	< 910	< 910	< 910	< 1800	< 910	< 910	< 910	< 910	< 910
W	WL	< 930	< 930	< 930	< 930	< 930	< 1900	< 930	< 930	< 930	< 930	< 930

Parameter		C2Cl6	nitrobenz	Isophorone	2nitroph'ol	2.4Meph'ol	benz acid	b-2Clethox	2.4-dClph	1.2.4-TClB	Naph'ene	4-Clanilline
LAB	SITE											
W	BU	< 930	< 930	< 930	< 930	< 930	< 4700	< 930	< 930	< 930	< 930	< 1900
W	EL	< 910	< 910	< 910	< 910	< 910	< 4600	< 910	< 910	< 910	< 910	< 1800
W	WL	< 930	< 930	< 930	< 930	< 930	< 4700	< 930	< 930	< 930	< 930	< 1900

Parameter		Cl6butadien	4Cl3Mephnl	2-Menaph	Cl6cycpent	2.4.6tClph	2.4.5tClph	2-Clnaph	2-ntroanil	Me2phthal	acenaphthy	2.6-DNT
LAB	SITE											
W	BU	< 930	< 1900	< 930	< 930	< 930	< 930	< 930	< 4700	< 930	< 930	< 930
W	EL	< 910	< 1600	< 910	< 910	< 910	< 910	< 910	< 4600	< 910	< 910	< 910
W	WL	< 930	< 1900	< 930	< 930	< 930	< 930	< 930	< 4700	< 930	< 930	< 930

Parameter		3-nitroanil	acenaphthe	2.4dnitrophe	4nitrophenol	dibenfuran	2.4-DNT	dethphthal	4Clphenphe	fluorene	4-nitroanil	4.6dn2Mep
LAB	SITE											
W	BU	< 4700	< 930	< 4700	< 4700	< 930	< 930	< 930	< 930	< 930	< 4700	< 4700
W	EL	< 4600	< 910	< 4600	< 4600	< 910	< 910	< 910	< 910	< 910	< 4600	< 4600
W	WL	< 4700	< 930	< 4700	< 4700	< 930	< 930	< 930	< 930	< 930	< 4700	< 4700

Antifreeze Wastes

Semivolatile Organics (EPA 8270) Analysis, ppm

Parameter		N-nitroso	4Brphenph	Cl6benzene	Cl5phenol	phenanthre	anthracene	d-n-butpht	fluoranthen	pyrene	butbenphth	3.3'Cl2benz
LAB	*SITE*											
W	*BU*	< 930	< 930	< 930	< 4700	< 930	< 930	< 930	< 930	< 930	< 930	< 1900
W	*EL*	< 910	< 910	< 910	< 4600	< 910	< 910	< 910	< 910	< 910	< 910	< 1800
W	*WL*	< 930	< 930	< 930	< 4700	< 930	< 930	< 930	< 930	< 930	< 930	< 1900

Parameter		ben[a]anthr	chrysene	b2ethhexph	d-n-octpht	ben[b]fluor	ben[k]fluor	ben[a]pyren	ind[123-cd]	dben[a,h]an	ben[ghi]per
LAB	*SITE*										
W	*BU*	< 930	< 930	< 930	< 930	< 930	< 930	< 930	< 930	< 930	< 930
W	*EL*	< 910	< 910	< 910	< 910	< 910	< 910	< 910	< 910	< 910	< 910
W	*WL*	< 930	< 930	< 930	< 930	< 930	< 930	< 930	< 930	< 930	< 930

Antifreeze Wastes

Physical Properties and TCLP Metals Analysis, ppm

	Parameter	pH	SG	FP	As	Ba	Cd	Cr	Pb	Hg	Se	Ag
	Reg. Limit	<2 or >10	na	< 100	5	100	1	5	5	0.2	1	5
LAB	*SITE*											
W	*BU*	7.5	1.04	> 200	< 0.05	< 0.3	< 0.05	< 0.05	0.3	< 0.01	< 0.05	< 0.05
W	*EL*	8	1.13	> 200	< 0.05	0.3	< 0.05	< 0.05	< 0.1	< 0.01	< 0.05	< 0.05
W	*WL*	8.5	1.05	> 200	< 0.05	< 0.3	< 0.05	< 0.05	0.2	< 0.01	< 0.05	< 0.05

TCLP Semi Volatiles Analysis, ppm

	Parameter	cresol	2.4-DNT	Cl6-benz	Cl6-13-but	Cl6-eth	nitrobenz	Cl5-phenol	pyridine	2.4.5-TCP	2.4.6-TCP
	Reg. Limit	200	0.13	0.13	0.5	3	2	100	5	400	2
LAB	*SITE*										
W	*BU*	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.2	< 0.2	< 0.04	< 0.04
W	*EL*	0.2	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	< 0.35	< 0.35	< 0.07	< 0.07
W	*WL*	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.25	< 0.25	< 0.05	< 0.05

TCLP Volatiles Analysis, ppm

	Parameter	benzene	CCl4	Clbenz	CHCl3	1.4-DClB	1.2-DCA	1.1-DCE	MEK	PCE	TCE	VChloride
	Reg. Limit	0.5	0.5	100	6	7.5	0.5	0.7	200	0.7	0.5	0.2
LAB	*SITE*											
W	*BU*	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 2.0	0.13	0.97	< 0.20
W	*EL*	0.32	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 2.0	0.12	< 0.10	< 0.20
W	*WL*	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 2.0	0.51	< 0.10	< 0.10

Dumpster Mud Wastes

Volatile Organics (EPA 8240) Analysis, ppm

Parameter		CH3Cl	CH3Br	C2H3Cl	C2H5Cl	CH2Cl2	acetone	CS2	1.1-DCE	1.1-DCA	1.2-DCE	CHCl3
LAB	SITE											
M	CL	< 100	< 100	< 100	< 100	< 50	< 1000	< 50	< 50	< 50	< 50	29
W	DE	< 10	< 10	< 10	< 10	< 5.0	< 100	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
W	EL	< 110	< 110	< 110	< 110	< 55	< 1100	< 55	< 55	< 55	< 55	< 55
M	LE	< 330	< 330	< 330	< 330	610	< 3300	< 170	< 170	< 170	< 170	< 170
C	RE	< 1000	< 1000	< 1000	< 1000	< 500	< 10000	< 500	< 500	< 500	< 500	< 500

Parameter		1,2-DCA	MEK	1.1.1-TCA	CCl4	v-acetate	CHBrCl2	1.2-DCPA	1.3-DCPE	TCE	CHBr2Cl	1.1.2-TCA
LAB	SITE											
M	CL	< 50	< 1000	48	< 50	< 500	< 50	< 50	< 50	< 50	< 50	< 50
W	DE	< 5.0	< 100	11	< 5.0	< 50	< 5.0	< 5.0	< 5.0	6.4	< 5.0	< 5.0
W	EL	< 55	< 1100	750	< 55	< 550	< 55	< 55	< 55	< 55	< 55	< 55
M	LE	< 170	< 3300	1500	< 170	< 1700	< 170	< 170	< 170	< 170	< 170	< 170
C	RE	< 500	< 10000	2300	< 500	< 2500	< 500	< 500	< 500	< 500	< 500	< 500

Parameter		benzene	2-CVE	1.3-DCPE	CHBr3	Me-2-pen	2-hex'one	PCE	1.1.2.2PCA	toluene	Cl-benz	eth-benz
LAB	SITE											
M	CL	< 50	< 100	< 50	< 50	< 500	< 500	230	< 50	440	< 50	150
W	DE	52	< 10	< 5.0	< 5.0	< 50	< 50	84	< 5.0	550	< 5.0	270
W	EL	< 55	< 110	< 55	< 55	< 550	< 550	740	< 55	500	430	1700
M	LE	< 170	< 330	< 170	< 170	< 1700	< 1700	260	< 170	530	< 170	200
C	RE	< 500	< 1000	< 500	< 500	< 5000	< 5000	1000	< 500	4600	< 500	1800

Parameter		styrene	xylenes	1.2-DClB	1.3-DClB	1.4-DClB
LAB	SITE					
M	CL	< 50	1200	< 100	< 100	< 100
W	DE	< 5.0	13000	< 5.0	47	< 5.0
W	EL	< 55	1200	250	< 55	100
M	LE	< 170	1400	<170	<170	<170
C	RE	< 500	8700	< 500	< 500	< 500

Dumpster Mud Wastes

Volatile Organics (EPA 8240) Analysis, ppm

Parameter		CH3Cl	CH3Br	C2H3Cl	C2H5Cl	CH2Cl2	acetone	CS2	1.1-DCE	1.1-DCA	1.2-DCE	CHCl3
LAB	SITE											
M	CL	< 100	< 100	< 100	< 100	< 50	< 1000	< 50	< 50	< 50	< 50	29
W	DE	< 10	< 10	< 10	< 10	< 5.0	< 100	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
W	EL	< 110	< 110	< 110	< 110	< 55	< 1100	< 55	< 55	< 55	< 55	< 55
M	LE	< 330	< 330	< 330	< 330	610	< 3300	< 170	< 170	< 170	< 170	< 170
C	RE	< 1000	< 1000	< 1000	< 1000	< 500	< 10000	< 500	< 500	< 500	< 500	< 500

Parameter		1,2-DCA	MEK	1.1.1-TCA	CCl4	v-acetate	CHBrCl2	1.2-DCPA	1.3-DCPE	TCE	CHBr2Cl	1.1.2-TCA
LAB	SITE											
M	CL	< 50	< 1000	48	< 50	< 500	< 50	< 50	< 50	< 50	< 50	< 50
W	DE	< 5.0	< 100	11	< 5.0	< 50	< 5.0	< 5.0	< 5.0	6.4	< 5.0	< 5.0
W	EL	< 55	< 1100	750	< 55	< 550	< 55	< 55	< 55	< 55	< 55	< 55
M	LE	< 170	< 3300	1500	< 170	< 1700	< 170	< 170	< 170	< 170	< 170	< 170
C	RE	< 500	< 10000	2300	< 500	< 2500	< 500	< 500	< 500	< 500	< 500	< 500

Parameter		benzene	2-CVE	1.3-DCPE	CHBr3	Me-2-pen	2-hex'one	PCE	1.1.2.2PCA	toluene	Cl-benz	eth-benz
LAB	SITE											
M	CL	< 50	< 100	< 50	< 50	< 500	< 500	230	< 50	440	< 50	150
W	DE	52	< 10	< 5.0	< 5.0	< 50	< 50	84	< 5.0	550	< 5.0	270
W	EL	< 55	< 110	< 55	< 55	< 550	< 550	740	< 55	500	430	1700
M	LE	< 170	< 330	< 170	< 170	< 1700	< 1700	260	< 170	530	< 170	200
C	RE	< 500	< 1000	< 500	< 500	< 5000	< 5000	1000	< 500	4600	< 500	1800

Parameter		styrene	xylenes	1.2-DCIB	1.3-DCIB	1.4-DCIB
LAB	SITE					
M	CL	< 50	1200	< 100	< 100	< 100
W	DE	< 5.0	13000	< 5.0	47	< 5.0
W	EL	< 55	1200	250	< 55	100
M	LE	< 170	1400	<170	<170	<170
C	RE	< 500	8700	< 500	< 500	< 500

Dumpster Mud Wastes

Semivolatile Organics (EPA 8270) Analysis, ppm

Parameter		phenol	b-2Cl-ethr	2Cl-phenol	1.3-DClB	1.4-DClB	benzyl 'ol	1.2-DClB	2Me-phenol	b-2Cl-IPE	4Me-phenol	N-nitroso
LAB	SITE											
M	CL	< 2200	< 2200	< 2200	< 2200	< 2200	< 4400	< 2200	< 2200	< 2200	< 2200	< 2200
W	DE	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	25	< 3.0	< 3.0	< 3.0
W	EL	< 1100	< 1100	< 1100	< 1100	< 1100	< 2100	< 1100	< 1100	< 1100	< 1100	< 1100
M	LE	230	< 63	< 63	< 63	200	< 130	450	420	< 63	350	< 63
C	RE	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
M	CL	< 2500	< 2500	< 2500	99000	220000	< 5100	610000	< 2500	< 2500	< 2500	< 2500

Parameter		C2Cl6	nitrobenz	Isophorone	2ntroph'ol	2.4Meph'ol	benz acid	b-2Clethox	2.4-dClph	1.2.4-TClB	Naph'ene	4-Clanilline
LAB	SITE											
M	CL	< 2200	< 2200	< 2200	< 2200	< 2200	< 11000	< 2200	< 2200	< 2200	< 2200	< 4400
W	DE	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 15	< 3.0	< 3.0	< 3.0	180	< 3.0
W	EL	< 1100	< 1100	< 1100	< 1100	< 1100	< 5300	< 1100	< 1100	< 1100	1200	< 2100
M	LE	< 63	< 63	< 63	< 63	< 63	< 310	< 63	< 63	< 63	430	< 130
C	RE	< 100	< 100	< 100	< 100	< 100	< 500	< 100	< 100	< 100	1400	< 100
M	CL	< 2500	< 2500	< 2500	< 2500	6800	< 12000	< 2500	< 2500	< 2500	< 2500	< 5100

Parameter		Cl6buladien	4Cl3Mephnl	2-Menaph	Cl6cycpent	2.4.6tClph	2.4.5tClph	2-Clnaph	2-ntroanil	Me2phthal	acenaphthy	2.6-DNT
LAB	SITE											
M	CL	< 2200	< 4400	< 2200	< 2200	< 2200	< 2200	< 2200	< 11000	< 2200	< 2200	< 2200
W	DE	< 3.0	< 3.0	120	< 3.0	< 3.0	< 15	< 3.0	< 15	< 3.0	< 3.0	< 3.0
W	EL	< 1100	< 2100	< 1100	< 1100	< 1100	< 1100	< 1100	< 5300	< 1100	< 1100	< 1100
M	LE	< 63	< 130	140	< 63	< 63	< 63	< 63	< 310	< 63	< 63	< 63
C	RE	< 100	< 100	1900	< 100	< 100	< 500	< 100	< 500	< 100	< 100	< 100
M	CL	< 2500	< 5100	< 2500	< 2500	< 2500	< 2500	< 2500	< 12000	< 2500	< 2500	< 2500

Dumpster Mud Wastes

Semivolatile Organics (EPA 8270) Analysis, ppm

Parameter		3-ntroanil	acenaphthe	2.4dnitrophe	4nitrophenol	dibenfuran	2.4-DNT	delhphthal	4Clphenphe	fluorene	4-ntroanil	4.6dn2Mep
LAB	SITE											
M	CL	< 11000	< 2200	< 11000	< 11000	< 2200	< 2200	< 2200	< 2200	< 2200	< 11000	< 11000
W	DE	< 15	< 3.0	< 15	< 15	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 15	< 15
W	EL	< 5300	< 1100	< 5300	< 5300	< 1100	< 1100	< 1100	< 1100	< 1100	< 5300	< 5300
M	LE	< 310	< 63	< 310	< 310	< 63	< 63	< 63	< 63	< 63	< 310	< 310
C	RE	< 500	< 100	< 500	< 500	< 100	< 100	< 100	< 100	< 100	< 500	< 500
M	CL	< 12000	< 2500	< 12000	< 12000	< 2500	< 2500	< 2500	< 2500	< 2500	< 12000	< 12000

Parameter		N-nitroso	4Brphenph	Cl6benzene	Cl5phenol	phenanthre	anthracene	d-n-butpht	fluoranthen	pyrene	butbenphth	3.3'Cl2benz
LAB	SITE											
M	CL	< 2200	< 2200	< 2200	< 11000	< 2200	< 2200	< 2200	< 2200	< 2200	< 2200	< 4400
W	DE	< 3.0	< 3.0	< 3.0	< 15	5.2	< 3.0	20	< 3.0	< 3.0	< 3.0	< 6.0
W	EL	< 1100	< 1100	< 1100	< 5300	< 1100	< 1100	< 1100	< 1100	< 1100	< 1100	< 2100
M	LE	< 63	< 63	< 63	< 310	< 63	< 63	< 63	< 63	< 63	< 63	< 130
C	RE	< 100	< 100	< 100	< 500	< 100	< 100	210	< 100	< 100	920	< 200
M	CL	< 2500	< 2500	< 2500	< 12000	< 2500	< 2500	< 2500	< 2500	< 2500	< 2500	< 5100

Parameter		ben[a]anthr	chrysene	b2elhhexph	d-n-oclpht	ben[b]fluor	ben[k]fluor	ben[a]pyren	Ind[123-cd]	dben[a,h]an	ben[ghi]per
LAB	SITE										
M	CL	< 2200	< 2200	< 2200	< 2200	< 2200	< 2200	< 2200	< 2200	< 2200	< 2200
W	DE	< 3.0	< 3.0	50	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
W	EL	< 1100	< 1100	< 1100	< 1100	< 1100	< 1100	< 1100	< 1100	< 1100	< 1100
M	LE	< 63	< 63	110	< 63	< 63	< 63	< 63	< 63	< 63	< 63
C	RE	< 100	< 100	1700	100	< 100	< 100	< 100	< 100	< 100	< 100
M	CL	< 2500	< 2500	< 2500	< 2500	< 2500	< 2500	< 2500	< 2500	< 2500	< 2500

Dumpster Mud Wastes

Physical Properties and TCLP Metals Analysis, ppm

	Parameter	pH	SG	FP	As	Ba	Cd	Cr	Pb	Hg	Se	Ag
	Reg. Limit	<2 or >10	na	< 100	5	100	1	5	5	0.2	1	5
LAB	*SITE*											
M	*CL*	10	na	115	< 0.5	0.85	0.8	0.06	2.2	0.002	< 0.2	< 0.01
W	*DE*	7	na	80	< 0.05	1	0.84	< 0.05	570	< 0.01	< 0.05	< 0.05
W	*EL*	8	na	115	< 0.05	0.9	1	< 0.05	1.3	< 0.01	< 0.05	< 0.05
M	*LE*	6.5	na	85	< 0.5	0.47	2	0.01	1.3	< 0.001	< 0.2	< 0.01
C	*RE*	7.9	1.2	85	< 1	0.41	2.8	0.02	4.6	< 0.002	< 1	< 0.5
M	*CL*	7.5	na	> 160	< 0.5	0.26	1.3	0.16	8.8	< 0.001	< 0.2	< 0.01

TCLP Semi Volatiles Analysis, ppm

	Parameter	cresol	2.4-DNT	Cl6-benz	Cl6-13-but	Cl6-eth	nitrobenz	Cl5-phenol	pyridine	2.4.5-TCP	2.4.6-TCP
	Reg. Limit	200	0.13	0.13	0.5	3	2	100	5	400	2
LAB	*SITE*										
M	*CL*	10	< 0.33	< 0.33	< 0.33	< 0.33	< 0.33	< 1.7	< 1.7	< 0.33	< 0.33
W	*DE*	5	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.17	< 0.17	< 0.033	< 0.033
W	*EL*	96	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.46	< 0.46	< 0.091	< 0.091
M	*LE*	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.17	< 0.17	< 0.033	< 0.033
C	*RE*	0.88	< 0.066	< 0.066	< 0.066	< 0.066	< 0.066	< 0.34	< 0.34	< 0.066	< 0.066
M	*CL*	22	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 3.3	< 3.3	< 0.67	< 0.67

TCLP Volatiles Analysis, ppm

	Parameter	benzene	CCl4	Clbenz	CHCl3	1.4-DClB	1.2-DCA	1.1-DCE	MEK	PCE	TCE	VChloride
	Reg. Limit	0.5	0.5	100	6	7.5	0.5	0.7	200	0.7	0.5	0.2
LAB	*SITE*											
M	*CL*	0.11	< 0.10	< 0.10	< 0.10	< 0.20	< 0.10	< 0.10	< 2.0	0.96	< 0.10	< 0.20
W	*DE*	0.52	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 2.0	< 0.10	< 0.10	< 0.20
W	*EL*	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 2.0	0.16	< 0.10	< 0.20
M	*LE*	< 0.10	< 0.10	< 0.10	< 0.10	0.52	< 0.10	< 0.10	< 2.0	0.64	< 0.10	< 0.20
C	*RE*	0.1	< 0.05	< 0.05	< 0.05	< 0.1	< 0.05	< 0.05	15	0.17	0.14	< 0.1
M	*CL*	< 0.10	0.17	4.3	< 0.10	> 4.4	< 0.10	< 0.10	< 2.0	3.6	0.45	< 0.20

1991 Recharacterization
Spent Mineral Spirits and Dumpster Mud Analyses

Enseco
A Corning Company

TCL Volatile Organics
Method 8240

Parameter	Units	HEDUMPMUD 19 DEC 91 Result	Reporting Limit
Chloromethane	mg/kg	ND	500
Bromomethane	mg/kg	ND	500
Vinyl Chloride	mg/kg	ND	500
Chloroethane	mg/kg	ND	500
Methylene chloride	mg/kg	ND	250
Acetone	mg/kg	ND	500
Carbon disulfide	mg/kg	ND	250
1,1 - Dichloroethene	mg/kg	ND	250
1,1 - Dichloroethane	mg/kg	ND	250
1,2 - Dichloroethene (cis/trans)	mg/kg	ND	250
Chloroform	mg/kg	ND	250
1,2 - Dichloroethane	mg/kg	ND	250
2 - Butanone	mg/kg	ND	500
1,1,1 - Trichloroethane	mg/kg	ND	250
Carbon tetrachloride	mg/kg	ND	250
Vinyl Acetate	mg/kg	ND	500
Bromodichloromethane	mg/kg	ND	250
1,2 - Dichloropropane	mg/kg	ND	250
cis - 1,3 - Dichloropropene	mg/kg	ND	250
Trichloroethene	mg/kg	ND	250
Dibromochloromethane	mg/kg	ND	250
1,1,2 - Trichloroethane	mg/kg	ND	250
Benzene	mg/kg	ND	250
trans - 1,3 - Dichloropropene	mg/kg	ND	250
2 - Chloroethyl vinyl ether	mg/kg	ND	500
Bromoform	mg/kg	ND	250
4 - Methyl - 2 - pentanone	mg/kg	ND	500
2 - Hexanone	mg/kg	ND	500
1,1,2,2 - Tetrachloroethane	mg/kg	ND	250
Tetrachloroethene	mg/kg	310	250
Toluene	mg/kg	610	250
Chlorobenzene	mg/kg	ND	250
Ethylbenzene	mg/kg	ND	250
Styrene	mg/kg	ND	250
Xylenes (total)	mg/kg	910	250

Parameter	Units	CL PWS DUMPMUD 16 OCT 91 Result	Reporting Limit
Chloromethane	mg/kg	ND	2000
Bromomethane	mg/kg	ND	2000
Vinyl Chloride	mg/kg	ND	2000
Chloroethane	mg/kg	ND	2000
Methylene chloride	mg/kg	ND	1000
Acetone	mg/kg	ND	2000
Carbon disulfide	mg/kg	ND	1000
1,1 - Dichloroethene	mg/kg	ND	1000
1,1 - Dichloroethane	mg/kg	ND	1000
1,2 - Dichloroethene (cis/trans)	mg/kg	ND	1000
Chloroform	mg/kg	ND	1000
1,2 - Dichloroethane	mg/kg	ND	1000
2 - Butanone	mg/kg	ND	2000
1,1,1 - Trichloroethane	mg/kg	ND	1000
Carbon tetrachloride	mg/kg	ND	1000
Vinyl Acetate	mg/kg	ND	2000
Bromodichloromethane	mg/kg	ND	1000
1,2 - Dichloropropane	mg/kg	ND	1000
cis - 1,3 - Dichloropropene	mg/kg	ND	1000
Trichloroethene	mg/kg	ND	1000
Dibromochloromethane	mg/kg	ND	1000
1,1,2 - Trichloroethane	mg/kg	ND	1000
Benzene	mg/kg	ND	1000
trans - 1,3 - Dichloropropene	mg/kg	ND	1000
2 - Chloroethyl vinyl ether	mg/kg	ND	2000
Bromoform	mg/kg	ND	1000
4 - Methyl - 2 - pentanone	mg/kg	ND	2000
2 - Hexanone	mg/kg	ND	2000
1,1,2,2 - Tetrachloroethane	mg/kg	ND	1000
Tetrachloroethene	mg/kg	ND	1000
Toluene	mg/kg	ND	1000
Chlorobenzene	mg/kg	ND	1000
Ethylbenzene	mg/kg	ND	1000
Styrene	mg/kg	ND	1000
Xylenes (total)	mg/kg	ND	1000

OTC Volatile Organics
TCLP Leachate
Method 8240

Parameter	Units	GLUSED PWS 16 OCT 91 Result	Reporting Limit	ELUSED PWS 17 DEC 91 Result	Reporting Limit
Vinyl Chloride	mg/L	ND	10000	ND	250
1,1 Dichloroethene	mg/L	ND	5000	ND	120
Chloroform	mg/L	ND	5000	ND	120
1,2 Dichloroethane	mg/L	ND	5000	ND	120
2-Butanone	mg/L	ND	10000	ND	250
Carbon Tetrachloride	mg/L	ND	5000	ND	120
Trichloroethene	mg/L	ND	5000	ND	120
Benzene	mg/L	ND	5000	ND	120
Tetrachloroethene	mg/L	ND	5000	ND	120
Chlorobenzene	mg/L	ND	5000	ND	120

OTC Volatile Organics
TCLP Leachate
Method 8240

Parameter	Units	HEDUMPMUD 24 OCT 91 Result	HEDUMPMUD 24 OCT 91 Reporting Limit	CL PWS DUMP MUD 19 DEC 91 Result	CL PWS DUMP MUD 19 DEC 91 Reporting Limit
Vinyl Chloride	mg/L	ND	0.20	ND	0.2
1,1 Dichloroethene	mg/L	ND	0.10	ND	0.1
Chloroform	mg/L	ND	0.10	ND	0.1
1,2 Dichloroethane	mg/L	ND	0.10	ND	0.1
2-Butanone	mg/L	ND	0.20	ND	0.2
Carbon Tetrachloride	mg/L	ND	0.10	ND	0.1
Trichloroethene	mg/L	ND	0.10	ND	0.1
Benzene	mg/L	ND	0.10	0.17	0.1
Tetrachloroethene	mg/L	0.29	0.10	0.32	0.1
Chlorobenzene	mg/L	ND	0.10	ND	0.1

Parameter	Units
Vinyl Chloride	mg/L
1,1 Dichloroethene	mg/L
Chloroform	mg/L
1,2 Dichloroethane	mg/L
2-Butanone	mg/L
Carbon Tetrachloride	mg/L
Trichloroethene	mg/L
Benzene	mg/L
Tetrachloroethene	mg/L
Chlorobenzene	mg/L

OTC Volatile Organics
TCLP Leachate
Method 8240

Parameter	Units	CL PWSSLUDGE 16 OCT 91 Result	Reporting Limit
Vinyl Chloride	mg/L	ND	10000
1,1 Dichloroethene	mg/L	ND	5000
Chloroform	mg/L	ND	5000
1,2 Dichloroethane	mg/L	ND	5000
2-Butanone	mg/L	ND	10000
Carbon Tetrachloride	mg/L	ND	5000
Trichloroethene	mg/L	ND	5000
Benzene	mg/L	ND	5000
Tetrachloroethene	mg/L	ND	5000
Chlorobenzene	mg/L	ND	5000

OTC Volatile Organics
TCLP Leachate
Method 8240

		LE 140 PWS 26 DEC 91		DENTON V-140 25 OCT 91		EL 140 PWS 17 DEC 91	
Parameter	Units	Result	Reporting Limit	Result	Reporting Limit	Result	Reporting Limit
Vinyl Chloride	mg/L	ND	10000	ND	5000	ND	5
1,1 Dichloroethene	mg/L	ND	5000	ND	2500	ND	2.5
Chloroform	mg/L	ND	5000	ND	2500	ND	2.5
1,2 Dichloroethane	mg/L	ND	5000	ND	2500	ND	2.5
2-Butanone	mg/L	ND	10000	ND	25000	ND	5
Carbon Tetrachloride	mg/L	ND	5000	ND	2500	ND	2.5
Trichloroethene	mg/L	ND	5000	ND	2500	ND	2.5
Benzene	mg/L	ND	5000	ND	2500	ND	2.5
Tetrachloroethene	mg/L	ND	5000	15000	2500	ND	2.5
Chlorobenzene	mg/L	ND	5000	ND	2500	ND	2.5

OTC Semivolatile Organics
TCLP Leachate
Method 8270

		CL USED PWS 16 OCT 91		EL USED PWS 17 OCT 91	
Parameter	**Units**	**Result**	**Reporting Limit**	**Result**	**Reporting Limit**
Pyridine	mg/L	ND	20000	ND	10000
1,4-Dichlorobenzene	mg/L	ND	10000	ND	5000
2-Methylphenol	mg/L	ND	10000	ND	5000
3/4-Methylphenol	mg/L	ND	10000	ND	5000
Hexachloroethane	mg/L	ND	10000	ND	5000
Nitrobenzene	mg/L	ND	10000	ND	5000
Hexachlorobutadiene	mg/L	ND	10000	ND	5000
2,4,6-Trichlorophenol	mg/L	ND	10000	ND	5000
2,4,5-Trichlorophenol	mg/L	ND	50000	ND	25000
2,4-Dinitrotoluene	mg/L	ND	10000	ND	5000
Hexachlorobenzene	mg/L	ND	10000	ND	5000
Pentachlorophenol	mg/L	ND	50000	ND	25000

OTC Semivolatile Organics
TCLP Leachate
Method 8270

Parameter	Units	HEDUMPMUD 24 OCT 91 Result	HEDUMPMUD 24 OCT 91 Reporting Limit	CLPWS DUMP MUD 16 OCT 91 Result	CLPWS DUMP MUD 16 OCT 91 Reporting Limit
Pyridine	mg/L	ND	0.5	ND	20
1,4-Dichlorobenzene	mg/L	ND	0.25	ND	10
2-Methylphenol	mg/L	1.3	0.25	ND	10
3/4-Methylphenol	mg/L	1.2	0.25	ND	10
Hexachloroethane	mg/L	ND	0.25	ND	10
Nitrobenzene	mg/L	ND	0.25	ND	10
Hexachlorobutadiene	mg/L	ND	0.25	ND	10
2,4,6-Trichlorophenol	mg/L	ND	0.25	ND	10
2,4,5-Trichlorophenol	mg/L	ND	1.2	ND	50
2,4-Dinitrotoluene	mg/L	ND	0.25	ND	10
Hexachlorobenzene	mg/L	ND	0.25	ND	10
Pentachlorophenol	mg/L	ND	1.2	ND	50

OTC Semivolatile Organics
TCLP Leachate
Method 8270

Parameter	Units	CL PWS SLUDGE 16 OCT 91 Result	Reporting Limit
Pyridine	mg/L	ND	2000
1,4-Dichlorobenzene	mg/L	ND	1000
2-Methylphenol	mg/L	ND	1000
3/4-Methylphenol	mg/L	ND	1000
Hexachloroethane	mg/L	ND	1000
Nitrobenzene	mg/L	ND	1000
Hexachlorobutadiene	mg/L	ND	1000
2,4,6-Trichlorophenol	mg/L	ND	1000
2,4,5-Trichlorophenol	mg/L	ND	5000
2,4-Dinitrotoluene	mg/L	ND	1000
Hexachlorobenzene	mg/L	ND	1000
Pentachlorophenol	mg/L	ND	5000

OTC Semivolatile Organics
TCLP Leachate
Method 8270

Parameter	Units	LE 140 PWS 09 OCT 91 Result	Reporting Limit	DENTON V-140 25 OCT 91 Result	Reporting Limit	EL 140 PWS 17 OCT 91 Result	Reporting Limit
Pyridine	mg/L	ND	4000	ND	200	ND	10000
1,4-Dichlorobenzene	mg/L	ND	2000	ND	200	ND	5000
2-Methylphenol	mg/L	ND	2000	ND	200	ND	5000
3/4-Methylphenol	mg/L	ND	2000	ND	200	ND	5000
Hexachloroethane	mg/L	ND	2000	ND	200	ND	5000
Nitrobenzene	mg/L	ND	2000	ND	200	ND	5000
Hexachlorobutadiene	mg/L	ND	2000	ND	200	ND	5000
2,4,6-Trichlorophenol	mg/L	ND	2000	ND	200	ND	5000
2,4,5-Trichlorophenol	mg/L	ND	10000	ND	200	ND	25000
2,4-Dinitrotoluene	mg/L	ND	2000	ND	200	ND	5000
Hexachlorobenzene	mg/L	ND	2000	ND	200	ND	5000
Pentachlorophenol	mg/L	ND	10000	ND	1000	ND	25000

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TCL Semivolatile Organics
Method 8270

Parameter	Units	HEDUMPMUD 24 OCT 91 Result	HEDUMPMUD 24 OCT 91 Reporting Limit	CL PWS DUMPMUD 16 OCT 91 Result	CL PWS DUMPMUD 16 OCT 91 Reporting Limit
Phenol	mg/kg	ND	330	ND	3300
bis(2 - Chlorethyl) ether	mg/kg	ND	330	ND	3300
2 - Chlorophenol	mg/kg	ND	330	ND	3300
1,3 - Dichlorobenzene	mg/kg	ND	330	ND	3300
1,4 - Dichlorobenzene	mg/kg	ND	330	ND	3300
Benzyl alcohol	mg/kg	ND	330	ND	3300
1,2 - Dichlorobenzene	mg/kg	ND	330	ND	3300
2 - Methylphenol	mg/kg	ND	330	ND	3300
bis(2 - Chloroisopropyl) - ether	mg/kg	ND	330	ND	3300
4 - Methylphenol	mg/kg	ND	330	ND	3300
N - Nitroso - di - n - propylamine	mg/kg	ND	330	ND	3300
Hexachloroethane	mg/kg	ND	330	ND	3300
Nitrobenzene	mg/kg	ND	330	ND	3300
Isophorone	mg/kg	ND	330	ND	3300
2 - Nitrophenol	mg/kg	ND	330	ND	3300
2,4 - Dimethylphenol	mg/kg	ND	330	ND	3300
Benzoic acid	mg/kg	ND	1600	ND	16000
bis(2 - Chloroethoxy) - methane	mg/kg	ND	330	ND	3300
2,4 - Dichlorophenol	mg/kg	ND	330	ND	3300
1,2,4 - Trichlorobenzene	mg/kg	ND	330	ND	3300
Napthalene	mg/kg	ND	330	ND	3300
4 - Chloroaniline	mg/kg	ND	330	ND	3300
Hexachlorobutadiene	mg/kg	ND	330	ND	3300
4 - Chloro - 3 - methylphenol	mg/kg	ND	330	ND	3300
2 - Methylnaphthalene	mg/kg	ND	330	ND	3300
Hexachlorocyclopentadiene	mg/kg	ND	330	ND	3300
2,4,6 - Trichlorophenol	mg/kg	ND	330	ND	3300
2,4,5 - Trichlorophenol	mg/kg	ND	1600	ND	16000
2 - Chloronapthalene	mg/kg	ND	330	ND	3300
2 - Nitroaniline	mg/kg	ND	1600	ND	16000
Dimethyl phthalate	mg/kg	ND	330	ND	3300
Acenaphthylene	mg/kg	ND	330	ND	3300
3 - Nitroaniline	mg/kg	ND	1600	ND	16000
Acenaphthene	mg/kg	ND	330	ND	3300
2,4-Dintrophenol	mg/kg	ND	1600	ND	16000
4 - Nitrophenol	mg/kg	ND	1600	ND	16000

continued on next page -

Dibenzofuran	mg/kg	ND	330	ND	3300
2,4 - Dinitrotoluene	mg/kg	ND	330	ND	3300
2,6 - Dinitrotoluene	mg/kg	ND	330	ND	3300
Diethyl phthalate	mg/kg	ND	330	ND	3300
4 - Chlorophenyl phenyl ether	mg/kg	ND	330	ND	3300
Flourene	mg/kg	ND	330	ND	3300
4 - Nitroaniline	mg/kg	ND	1600	ND	16000
4,6 - Dinitro-2 - Methylphenol	mg/kg	ND	1600	ND	16000
N - Nitrosodiphenylamine	mg/kg	ND	330	ND	3300
4- Bromophenyl phenyl ether	mg/kg	ND	330	ND	3300
Hexachlorobenzene	mg/kg	ND	330	ND	3300
Pentachlorophenol	mg/kg	ND	1600	ND	16000
Phenanthrene	mg/kg	ND	330	ND	3300
Anthracene	mg/kg	ND	330	ND	3300
Di - n - butyl phthalate	mg/kg	ND	330	ND	3300
Flouranthene	mg/kg	ND	330	ND	3300
Pyrene	mg/kg	ND	330	ND	3300
Butyl benzyl phthalate	mg/kg	ND	330	ND	3300
3,3' - Dichlorobenzidine	mg/kg	ND	660	ND	6600
Benzo (a) anthracene	mg/kg	ND	330	ND	3300
bis(2 - Ethythexyl) phthalate	mg/kg	ND	330	ND	3300
Chrysene	mg/kg	ND	330	ND	3300
Di - n - octyl phthalate	mg/kg	ND	330	ND	3300
Benzo (b) flouranthene	mg/kg	ND	330	ND	3300
Benzo (k) flouranthene	mg/kg	ND	330	ND	3300
Benzo (a) pyrene	mg/kg	ND	330	ND	3300
Indeno (1,2,3 - cd) pyrene	mg/kg	ND	330	ND	3300
Dibenz (a,h) anthracene	mg/kg	ND	330	ND	3300
Benzo (g,h,i) perylene	mg/kg	ND	330	ND	3300

General Inorganics

Parameter	Units	ELUSED PWS 17 OCT 91 Result	Reporting Limit	CL USED PWS 16 OCT 91 Result	Reporting Limit
Specific Gravity at 77 degrees F	g/cc	0.79	-	0.785	-
Ignitability	deg. F	124	-	117	-
pH	units	8.2	-	8	-

General Inorganics

Parameter	Units	HEDUMPMUD 24 OCT 91 Result	HEDUMPMUD 24 OCT 91 Reporting Limit	CLPWS DUMPMUD 18 OCT 91 Result	CLPWS DUMPMUD 18 OCT 91 Reporting Limit
Specific Gravity at 77 degrees F	g/cc	1.503	-	1.422	-
		113			
Ignitability	deg. F	-	-	106	-
pH	units	8	-	8.3	-

General Inorganics

Parameter	Units	CL PWS SLUDGE 16 OCT 91 Result	Reporting Limit
Specific Gravity at 77 degrees F	g/cc	1.019	-
Ignitability	deg. F	115	-
pH	units	9.2	-

General Inorganics

Parameter	Units	DENTON V-140 25 OCT 91 Result	Reporting Limit	LE 140 PWS 10 OCT 91 Result	Reporting Limit	EL 140 PWS 17 OCT 91 Result	Reporting Limit
Specific Gravity at 77 degrees F	g/cc	0.82	-	0.78	-	0.799	-
Ignitability	deg. F	-	-	142	-	151	-
pH	units	7.3	-	7.0	-	7.1	-
Flash point (PMCC)	deg. F	120	-	-	-	-	-

Total Metals
TCLP Leachate

Parameter	Units	EL USED PWS 17 OCT 91 Result	EL USED PWS 17 OCT 91 Reporting Limit	CL USED PWS 16 OCT 91 Result	CL USED PWS 16 OCT 91 Reporting Limit
Arsenic	mg/L	ND	5.0	ND	5.0
Barium	mg/L	3.3	0.5	3.1	0.5
Cadmium	mg/L	0.78	0.25	0.93	0.25
Chromium	mg/L	1.2	0.5	1.8	0.5
Lead	mg/L	7.9	2.5	14.5	2.5
Mercury	mg/L	ND	0.002	ND	0.002
Selenium	mg/L	ND	0.5	ND	0.5
Silver	mg/L	ND	0.5	ND	0.05

Total Metals
TCLP Leachate

Parameter	Units	CL PWS SLUDGE 16 OCT 91 Result	Reporting Limit
Arsenic	mg/L	ND	5.0
Barium	mg/L	4.5	0.5
Cadmium	mg/L	2.1	0.25
Chromium	mg/L	1.6	0.5
Lead	mg/L	25.1	2.5
Mercury	mg/L	0.016	0.002
Selenium	mg/L	ND	0.25
Silver	mg/L	ND	0.5

Total Metals
TCLP Leachate

Parameter	Units	CL PWS DUMP MUD 16 OCT 91 Result	Reporting Limit	HEDUMPMUD 24 OCT 91 Result	Reporting Limit
Arsenic	mg/L	ND	1.0	ND	1.0
Barium	mg/L	0.73	0.1	1.2	0.1
Cadmium	mg/L	1.1	0.05	0.71	0.05
Chromium	mg/L	ND	0.1	ND	0.1
Lead	mg/L	5.4	0.5	2.4	0.5
Mercury	mg/L	ND	0.002	ND	0.002
Selenium	mg/L	ND	0.05	ND	0.1
Silver	mg/L	ND	0.1	ND	0.1

Total Metals
TCLP Leachate

Parameter	Units	LE 140 PWS 09OCT 91 Result	Reporting Limit	DENTON V-140 25 OCT 91 Result	Reporting Limit	EL 140 PWS 17 OCT 91 Result	Reporting Limit
Arsenic	mg/L	ND	1.0	ND	0.1	ND	5.0
Barium	mg/L	ND	0.1	ND	0.1	ND	0.5
Cadmium	mg/L	ND	0.05	ND	0.1	ND	0.25
Chromium	mg/L	ND	0.1	ND	0.1	0.61	0.5
Lead	mg/L	ND	0.5	ND	0.1	ND	2.5
Mercury	mg/L	ND	0.002	ND	0.02	ND	0.002
Selenium	mg/L	ND	0.05	ND	0.3	ND	0.5
Silver	mg/L	ND	0.1	ND	0.1	ND	0.5

1991 Recharacterization
Spent 699 Immersion Cleaner Analyses

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TCL Volatile Organics
Method 8240

Parameter	Units	(NEW FORMULA) CL IC SLUDGE 02 JAN 92 Result	Reporting Limit
Chloromethane	mg/kg	ND	330
Bromomethane	mg/kg	ND	330
Vinyl Chloride	mg/kg	ND	330
Chloroethane	mg/kg	ND	330
Methylene chloride	mg/kg	770	160
Acetone	mg/kg	ND	330
Carbon disulfide	mg/kg	ND	160
1,1 - Dichloroethene	mg/kg	ND	160
1,1 - Dichloroethane	mg/kg	ND	160
1,2 - Dichloroethene (cis/trans)	mg/kg	ND	160
Chloroform	mg/kg	ND	160
1,2 - Dichloroethane	mg/kg	ND	160
2 - Butanone	mg/kg	ND	330
1,1,1 - Trichloroethane	mg/kg	ND	160
Carbon tetrachloride	mg/kg	ND	330
Vinyl Acetate	mg/kg	ND	160
Bromodichloromethane	mg/kg	ND	160
1,2 - Dichloropropane	mg/kg	ND	160
cis - 1,3 - Dichloropropene	mg/kg	ND	160
Trichloroethene	mg/kg	ND	160
Dibromochloromethane	mg/kg	ND	160
1,1,2 - Trichloroethane	mg/kg	ND	160
Benzene	mg/kg	ND	160
trans - 1,3 - Dichloropropene	mg/kg	ND	160
2 - Chloroethyl vinyl ether	mg/kg	ND	330
Bromoform	mg/kg	ND	160
4 - Methyl - 2 - pentanone	mg/kg	ND	330
2 - Hexanone	mg/kg	ND	330
1,1,2,2 - Tetrachloroethane	mg/kg	ND	160
Tetrachloroethene	mg/kg	1400	160
Toluene	mg/kg	ND	160
Chlorobenzene	mg/kg	ND	160
Ethylbenzene	mg/kg	ND	160
Styrene	mg/kg	ND	160
Xylenes (total)	mg/kg	220	16

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NEW FORMULA
CL DUMP MUC
02 JAN 92

Parameter	Units	Result	Reporting Limit
Chloromethane	mg/kg	ND	500
Bromomethane	mg/kg	ND	500
Vinyl Chloride	mg/kg	ND	500
Chloroethane	mg/kg	ND	500
Methylene chloride	mg/kg	570	250
Acetone	mg/kg	ND	500
Carbon disulfide	mg/kg	ND	250
1,1 - Dichloroethene	mg/kg	ND	250
1,1 - Dichloroethane	mg/kg	ND	250
1,2 - Dichloroethene (cis/trans)	mg/kg	ND	250
Chloroform	mg/kg	ND	250
1,2 - Dichloroethane	mg/kg	ND	250
2 - Butanone	mg/kg	ND	500
1,1,1 - Trichloroethane	mg/kg	ND	250
Carbon tetrachloride	mg/kg	ND	250
Vinyl Acetate	mg/kg	ND	500
Bromodichloromethane	mg/kg	ND	250
1,2 - Dichloropropane	mg/kg	ND	250
cis - 1,3 - Dichloropropene	mg/kg	ND	250
Trichloroethene	mg/kg	ND	250
Dibromochloromethane	mg/kg	ND	250
1,1,2 - Trichloroethane	mg/kg	ND	250
Benzene	mg/kg	ND	250
trans - 1,3 - Dichloropropene	mg/kg	ND	250
2 - Chloroethyl vinyl ether	mg/kg	ND	500
Bromoform	mg/kg	ND	250
4 - Methyl - 2 - pentanone	mg/kg	ND	500
2 - Hexanone	mg/kg	ND	500
1,1,2,2 - Tetrachloroethane	mg/kg	ND	250
Tetrachloroethene	mg/kg	ND	250
Toluene	mg/kg	ND	250
Chlorobenzene	mg/kg	ND	250
Ethylbenzene	mg/kg	ND	250
Styrene	mg/kg	ND	250
Xylenes (total)	mg/kg	ND	250

OTC Volatile Organics
TCLP Leachate
Method 8240

		LE USED IC 26 DEC 91		EL USED IC 18 DEC 91		NEW FORMULA CL USED IC 10 DEC 91	
Parameter	Units	Result	Reporting Limit	Result	Reporting Limit	Result	Reporting Limit
Vinyl Chloride	mg/L	ND	6600	ND	5000	ND	5000
1,1 Dichloroethene	mg/L	ND	3300	ND	2500	ND	2500
Chloroform	mg/L	ND	3300	ND	2500	ND	2500
1,2 Dichloroethane	mg/L	ND	3300	ND	2500	ND	2500
2-Butanone	mg/L	ND	6600	ND	5000	ND	5000
Carbon Tetrachloride	mg/L	ND	3300	ND	2500	ND	2500
Trichloroethene	mg/L	ND	3300	ND	2500	ND	2500
Benzene	mg/L	ND	3300	ND	2500	ND	2500
Tetrachloroethene	mg/L	ND	3300	ND	2500	ND	2500
Chlorobenzene	mg/L	ND	3300	ND	2500	ND	2500

OTC Volatile Organics
TCLP Leachate
Method 8240

Parameter	Units	(NEW FORMULA) CLIC SLUDGE 02 JAN 92 Result	Reporting Limit	CLIC SLUDGE 19 DEC 91 Result	Reporting Limit
Vinyl Chloride	mg/L	ND	17	ND	40.0
1,1 Dichloroethene	mg/L	ND	8.4	ND	20.0
Chloroform	mg/L	ND	8.4	ND	20.0
1,2 Dichloroethane	mg/L	ND	8.4	ND	20.0
2-Butanone	mg/L	ND	17	ND	40.0
Carbon Tetrachloride	mg/L	ND	8.4	ND	20.0
Trichloroethene	mg/L	ND	8.4	ND	20.0
Benzene	mg/L	ND	8.4	ND	20.0
Tetrachloroethene	mg/L	ND	8.4	ND	20.0
Chlorobenzene	mg/L	ND	8.4	ND	20.0

OTC Volatile Organics
TCLP Leachate
Method 8240

Parameter	Units	CL IC DUMP MUD 19 DEC 91 Result	Reporting Limit
Vinyl Chloride	mg/L	ND	50
1,1 Dichloroethene	mg/L	ND	25
Chloroform	mg/L	ND	25
1,2 Dichloroethane	mg/L	ND	25
2-Butanone	mg/L	ND	50
Carbon Tetrachloride	mg/L	ND	25
Trichloroethene	mg/L	ND	25
Benzene	mg/L	ND	25
Tetrachloroethene	mg/L	ND	25
Chlorobenzene	mg/L	ND	25

Parameter	Units	CL DUMP MUD NEW FORMULA 02 JAN 92 Result	Reporting Limit
Vinyl Chloride	mg/L	ND	6.20
1,1 Dichloroethene	mg/L	ND	3.10
Chloroform	mg/L	ND	3.10
1,2 Dichloroethane	mg/L	ND	3.10
2-Butanone	mg/L	ND	6.20
Carbon Tetrachloride	mg/L	ND	3.10
Trichloroethene	mg/L	ND	3.10
Benzene	mg/L	ND	3.10
Tetrachloroethene	mg/L	ND	3.10
Chlorobenzene	mg/L	ND	3.10

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OTC Semivolatile Organics
TCLP Leachate
Method 8270

Parameter	Units	LE USED IC 09 OCT 91 Result	Reporting Limit	EL USED IC 17 OCT 91 Result	Reporting Limit
Pyridine	mg/L	ND	10.0	ND	200
1,4-Dichlorobenzene	mg/L	ND	5.0	ND	100
2-Methylphenol	mg/L	ND	5.0	ND	100
3/4-Methylphenol	mg/L	ND	5.0	ND	100
Hexachloroethane	mg/L	ND	5.0	ND	100
Nitrobenzene	mg/L	ND	5.0	ND	100
Hexachlorobutadiene	mg/L	ND	5.0	ND	100
2,4,6-Trichlorophenol	mg/L	ND	5.0	ND	100
2,4,5-Trichlorophenol	mg/L	ND	25.0	ND	500
2,4 - Dinitrotoluene	mg/L	ND	5.0	ND	100
Hexachlorobenzene	mg/L	ND	5.0	ND	100
Pentachlorophenol	mg/L	ND	25.0	ND	500

Parameter	Units	NEW FORMULA CL USED IC 10 DEC 91 Result	Reporting Limit
Pyridine	mg/L	ND	20.0
1,4-Dichlorobenzene	mg/L	ND	10.0
2-Methylphenol	mg/L	ND	10.0
3/4-Methylphenol	mg/L	ND	10.0
Hexachloroethane	mg/L	ND	10.0
Nitrobenzene	mg/L	ND	10.0
Hexachlorobutadiene	mg/L	ND	10.0
2,4,6-Trichlorophenol	mg/L	ND	10.0
2,4,5-Trichlorophenol	mg/L	ND	50.0
2,4 - Dinitrotoluene	mg/L	ND	10.0
Hexachlorobenzene	mg/L	ND	10.0
Pentachlorophenol	mg/L	ND	50.0

OTC Semivolatile Organics
TCLP Leachate
Method 8270

Parameter	Units	NEW FORMULA CL IC SLUDGE 2 JAN 92 Result	Reporting Limit
Pyridine	mg/L	ND	50
1,4-Dichlorobenzene	mg/L	ND	25
2-Methylphenol	mg/L	26	25
3/4-Methylphenol	mg/L	ND	25
Hexachloroethane	mg/L	ND	25
Nitrobenzene	mg/L	ND	25
Hexachlorobutadiene	mg/L	ND	25
2,4,6-Trichlorophenol	mg/L	ND	25
2,4,5-Trichlorophenol	mg/L	ND	120
2,4 - Dinitrotoluene	mg/L	ND	25
Hexachlorobenzene	mg/L	ND	25
Pentachlorophenol	mg/L	ND	120

OTC Semivolatile Organics
TCLP Leachate
Method 8270

Parameter	Units	NEW FORMULA OLDUMPMUD 2 JAN 92 Result	Reporting Limit
Pyridine	mg/L	ND	50
1,4-Dichlorobenzene	mg/L	ND	25
2-Methylphenol	mg/L	37	25
3/4-Methylphenol	mg/L	ND	25
Hexachloroethane	mg/L	ND	25
Nitrobenzene	mg/L	ND	25
Hexachlorobutadiene	mg/L	ND	25
2,4,6-Trichlorophenol	mg/L	ND	25
2,4,5-Trichlorophenol	mg/L	ND	120
2,4 - Dinitrotoluene	mg/L	ND	25
Hexachlorobenzene	mg/L	ND	25
Pentachlorophenol	mg/L	ND	120

TCL Semivolatile Organics
Method 8270

Parameter	Units	New Formula CLIC SLUDGE 19 DEC 91 Result	Reporting Limit
Phenol	mg/kg	5500	2500
bis(2 - Chlorethyl) ether	mg/kg	ND	2500
2 - Chlorophenol	mg/kg	ND	2500
1,3 - Dichlorobenzene	mg/kg	9200	2500
1,4 - Dichlorobenzene	mg/kg	21000	2500
Benzyl alcohol	mg/kg	ND	2500
1,2 - Dichlorobenzene	mg/kg	11000	2500
2 - Methylphenol	mg/kg	10000	2500
bis(2 - Chloroisopropyl) - ether	mg/kg	ND	2500
4 - Methylphenol	mg/kg	10000	2500
N - Nitroso - di - n - propylamine	mg/kg	ND	2500
Hexachloroethane	mg/kg	ND	2500
Nitrobenzene	mg/kg	ND	2500
Isophorone	mg/kg	ND	2500
2 - Nitrophenol	mg/kg	ND	2500
2,4 - Dimethylphenol	mg/kg	4600	2500
Benzoic acid	mg/kg	ND	12000
bis(2 - Chloroethoxy) - methane	mg/kg	ND	2500
2,4 - Dichlorophenol	mg/kg	ND	2500
1,2,4 - Trichlorobenzene	mg/kg	ND	2500
Napthalene	mg/kg	ND	2500
4 - Chloroaniline	mg/kg	ND	2500
Hexachlorobutadiene	mg/kg	ND	2500
4 - Chloro - 3 - methylphenol	mg/kg	ND	2500
2 - Methylnaphthalene	mg/kg	ND	2500
Hexachlorocyclopentadiene	mg/kg	ND	2500
2,4,6 - Trichlorophenol	mg/kg	ND	2500
2,4,5 - Trichlorophenol	mg/kg	ND	12000
2 - Chloronapthalene	mg/kg	ND	2500
2 - Nitroaniline	mg/kg	ND	12000
Dimethyl phthalate	mg/kg	ND	2500
Acenaphthylene	mg/kg	ND	2500
3 - Nitroaniline	mg/kg	ND	12000
Acenaphthene	mg/kg	ND	2500
2,4 - Dinitrophenol	mg/kg	ND	12000
4 - Nitrophenol	mg/kg	ND	12000

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Dibenzofuran	mg/kg	ND	2500
2,4 - Dinitrotoluene	mg/kg	ND	2500
2,6 - Dinitrotoluene	mg/kg	ND	2500
Diethyl phthalate	mg/kg	ND	2500
4 - Chlorophenyl phenyl ether	mg/kg	ND	2500
Flourene	mg/kg	ND	2500
4 - Nitroaniline	mg/kg	ND	12000
4,6 - Dinitro-2 - Methylphenol	mg/kg	ND	12000
N - Nitrosodiphenylamine	mg/kg	ND	2500
4- Bromophenyl phenyl ether	mg/kg	ND	2500
Hexachlorobenzene	mg/kg	ND	2500
Pentachlorophenol	mg/kg	ND	12000
Phenanthrene	mg/kg	ND	2500
Anthracene	mg/kg	ND	2500
Di - n - butyl phthalate	mg/kg	ND	2500
Flouranthene	mg/kg	ND	2500
Pyrene	mg/kg	ND	2500
Butyl benzyl phthalate	mg/kg	ND	2500
3,3' - Dichlorobenzidine	mg/kg	ND	5000
Benzo (a) anthracene	mg/kg	ND	2500
bis(2 - Ethylhexyl) phthalate	mg/kg	ND	2500
Chrysene	mg/kg	ND	2500
Di - n - octyl phthalate	mg/kg	ND	2500
Benzo (b) flouranthene	mg/kg	ND	2500
Benzo (k) flouranthene	mg/kg	ND	2500
Benzo (a) pyrene	mg/kg	ND	2500
Indeno (1,2,3 - cd) pyrene	mg/kg	ND	2500
Dibenz (a,h) anthracene	mg/kg	ND	2500
Benzo (g,h,i) perylene	mg/kg	ND	2500

TCL Semivolatile Organics
Method 8270

Parameter	Units	(NEW FORMULA) CL USED IC 10 DEC 91 Result	Reporting Limit	(NEW FORMULA) CL DUMP MUD 2 Jan 92 Result	Reporting Limit
Phenol	mg/kg	ND	10000	ND	1800
bis(2 - Chlorethyl) ether	mg/kg	ND	10000	ND	1800
2 - Chlorophenol	mg/kg	ND	10000	ND	1800
1,3 - Dichlorobenzene	mg/kg	ND	10000	ND	1800
1,4 - Dichlorobenzene	mg/kg	ND	10000	ND	1800
Benzyl alcohol	mg/kg	ND	10000	ND	1800
1,2 - Dichlorobenzene	mg/kg	ND	10000	ND	1800
2 - Methylphenol	mg/kg	ND	10000	ND	1800
bis(2 - Chloroisopropyl) - ether	mg/kg	ND	10000	ND	1800
4 - Methylphenol	mg/kg	ND	10000	ND	1800
N - Nitroso - di - n - propylamine	mg/kg	ND	10000	ND	1800
Hexachloroethane	mg/kg	ND	10000	ND	1800
Nitrobenzene	mg/kg	ND	10000	ND	1800
Isophorone	mg/kg	ND	10000	ND	1800
2 - Nitrophenol	mg/kg	ND	10000	ND	1800
2,4 - Dimethylphenol	mg/kg	ND	10000	ND	1800
Benzoic acid	mg/kg	ND	50000	ND	9200
bis(2 - Chloroethoxy) - methane	mg/kg	ND	10000	ND	1800
2,4 - Dichlorophenol	mg/kg	ND	10000	ND	1800
1,2,4 - Trichlorobenzene	mg/kg	ND	10000	ND	1800
Napthalene	mg/kg	47000	10000	7000	1800
4 - Chloroaniline	mg/kg	ND	10000	ND	1800
Hexachlorobutadiene	mg/kg	ND	10000	ND	1800
4 - Chloro - 3 - methylphenol	mg/kg	ND	10000	ND	1800
2 - Methylnaphthalene	mg/kg	ND	10000	ND	1800
Hexachlorocyclopentadiene	mg/kg	ND	10000	ND	1800
2,4,6 - Trichlorophenol	mg/kg	ND	10000	ND	1800
2,4,5 - Trichlorophenol	mg/kg	ND	50000	ND	9200
2 - Chloronapthalene	mg/kg	ND	10000	ND	1800
2 - Nitroaniline	mg/kg	ND	50000	ND	9200
Dimethyl phthalate	mg/kg	ND	10000	ND	1800
Acenaphthylene	mg/kg	ND	10000	ND	1800
3 - Nitroaniline	mg/kg	ND	50000	ND	9200
Acenaphthene	mg/kg	ND	10000	ND	1800
2,4 - Dinitrophenol	mg/kg	ND	50000	ND	9200
4 - Nitrophenol	mg/kg	ND	50000	ND	9200

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Dibenzofuran	mg/kg	ND	10000	ND	1800
2,4 - Dinitrotoluene	mg/kg	ND	10000	ND	1800
2,6 - Dinitrotoluene	mg/kg	ND	10000	ND	1800
Diethyl phthalate	mg/kg	ND	10000	ND	1800
4 - Chlorophenyl phenyl ether	mg/kg	ND	10000	ND	1800
Flourene	mg/kg	ND	10000	ND	1800
4 - Nitroaniline	mg/kg	ND	50000	ND	9200
4,6 - Dinitro-2 - Methylphenol	mg/kg	ND	50000	ND	9200
N - Nitrosodiphenylamine	mg/kg	ND	10000	ND	1800
4- Bromophenyl phenyl ether	mg/kg	ND	10000	ND	1800
Hexachlorobenzene	mg/kg	ND	10000	ND	1800
Pentachlorophenol	mg/kg	ND	50000	ND	9200
Phenanthrene	mg/kg	ND	10000	ND	1800
Anthracene	mg/kg	ND	10000	ND	1800
Di - n - butyl phthalate	mg/kg	ND	10000	ND	1800
Flouranthene	mg/kg	ND	10000	ND	1800
Pyrene	mg/kg	ND	10000	ND	1800
Butyl benzyl phthalate	mg/kg	ND	10000	ND	1800
3,3' - Dichlorobenzidine	mg/kg	ND	20000	ND	3700
Benzo (a) anthracene	mg/kg	ND	10000	ND	1800
bis(2 - Ethylhexyl) phthalate	mg/kg	ND	10000	ND	1800
Chrysene	mg/kg	ND	10000	ND	1800
Di - n - octyl phthalate	mg/kg	ND	10000	ND	1800
Benzo (b) flouranthene	mg/kg	ND	10000	ND	1800
Benzo (k) flouranthene	mg/kg	ND	10000	ND	1800
Benzo (a) pyrene	mg/kg	ND	10000	ND	1800
Indeno (1,2,3 - cd) pyrene	mg/kg	ND	10000	ND	1800
Dibenz (a,h) anthracene	mg/kg	ND	10000	ND	1800
Benzo (g,h,i) perylene	mg/kg	ND	10000	ND	1800

TCL Semivolatile Organics
Method 8270

Parameter	Units	(NEW FORMULA) CHC SLUDGE 2 JAN 92 Result	Reporting Limit
Phenol	mg/kg	ND	1900
bis(2 - Chlorethyl) ether	mg/kg	ND	1900
2 - Chlorophenol	mg/kg	ND	1900
1,3 - Dichlorobenzene	mg/kg	ND	1900
1,4 - Dichlorobenzene	mg/kg	ND	1900
Benzyl alcohol	mg/kg	ND	1900
1,2 - Dichlorobenzene	mg/kg	ND	1900
2 - Methylphenol	mg/kg	ND	1900
bis(2 - Chloroisopropyl) - ether	mg/kg	ND	1900
4 - Methylphenol	mg/kg	ND	1900
N - Nitroso - di - n - propylamine	mg/kg	ND	1900
Hexachloroethane	mg/kg	ND	1900
Nitrobenzene	mg/kg	ND	1900
Isophorone	mg/kg	ND	1900
2 - Nitrophenol	mg/kg	ND	1900
2,4 - Dimethylphenol	mg/kg	ND	1900
Benzoic acid	mg/kg	ND	9400
bis(2 - Chloroethoxy) - methane	mg/kg	ND	1900
2,4 - Dichlorophenol	mg/kg	ND	1900
1,2,4 - Trichlorobenzene	mg/kg	ND	1900
Napthalene	mg/kg	11000	1900
4 - Chloroaniline	mg/kg	ND	1900
Hexachlorobutadiene	mg/kg	ND	1900
4 - Chloro - 3 - methylphenol	mg/kg	ND	1900
2 - Methylnaphthalene	mg/kg	ND	1900
Hexachlorocyclopentadiene	mg/kg	ND	1900
2,4,6 - Trichlorophenol	mg/kg	ND	1900
2,4,5 - Trichlorophenol	mg/kg	ND	9400
2 - Chloronapthalene	mg/kg	ND	1900
2 - Nitroaniline	mg/kg	ND	9400
Dimethyl phthalate	mg/kg	ND	1900
Acenaphthylene	mg/kg	ND	1900
3 - Nitroaniline	mg/kg	ND	9400
Acenaphthene	mg/kg	ND	1900
2,4 - Dinitrophenol	mg/kg	ND	9400
4 - Nitrophenol	mg/kg	ND	9400

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Dibenzofuran	mg/kg	ND	1900
2,4 - Dinitrotoluene	mg/kg	ND	1900
2,6 - Dinitrotoluene	mg/kg	ND	1900
Diethyl phthalate	mg/kg	ND	1900
4 - Chlorophenyl phenyl ether	mg/kg	ND	1900
Flourene	mg/kg	ND	1900
4 - Nitroaniline	mg/kg	ND	9400
4,6 - Dinitro-2 - Methylphenol	mg/kg	ND	9400
N - Nitrosodiphenylamine	mg/kg	ND	1900
4- Bromophenyl phenyl ether	mg/kg	ND	1900
Hexachlorobenzene	mg/kg	ND	1900
Pentachlorophenol	mg/kg	ND	9400
Phenanthrene	mg/kg	ND	1900
Anthracene	mg/kg	ND	1900
Di - n - butyl phthalate	mg/kg	ND	1900
Flouranthene	mg/kg	ND	1900
Pyrene	mg/kg	ND	1900
Butyl benzyl phthalate	mg/kg	ND	1900
3,3' - Dichlorobenzidine	mg/kg	ND	3700
Benzo (a) anthracene	mg/kg	ND	1900
bis(2 - Ethylhexyl) phthalate	mg/kg	ND	1900
Chrysene	mg/kg	ND	1900
Di - n - octyl phthalate	mg/kg	ND	1900
Benzo (b) flouranthene	mg/kg	ND	1900
Benzo (k) flouranthene	mg/kg	ND	1900
Benzo (a) pyrene	mg/kg	ND	1900
Indeno (1,2,3 - cd) pyrene	mg/kg	ND	1900
Dibenz (a,h) anthracene	mg/kg	ND	1900
Benzo (g,h,i) perylene	mg/kg	ND	1900

General Inorganics

Parameter	Units	LE USED IC 09 OCT 91 Result	Reporting Limit	EL USED IC 17 OCT 91 Result	Reporting Limit	CLUSEIC(New Formula) 10 DEC 91 Result	Reporting Limit
Specific Gravity at 77 degrees F	g/cc	0.938	-	0.958	-	0.945	-
Ignitability	deg. F	>160	-	>160	-	>160	-
pH	units	9.6	-	9.8	-	9.6	-

General Inorganics

Parameter	Units	CL IC DUMPMUD 18 OCT 91 Result	Reporting Limit
Specific Gravity at 77 degrees F	g/cc	1.313	-
Ignitability	deg. F	77	-
pH	units	8.8	-

Parameter	Units	(NEW FORMULA) CL DUMP MUD 02 JAN 92 Result	Reporting Limit
Specific Gravity at 77 degrees F	g/cc	1.108	-
Ignitability	deg. F	124	-
pH	units	10.1	-

General Inorganics

Parameter	Units	CLIC SLUDGE 02 JAN 92 Result	Reporting Limit
Specific Gravity at 77 degrees F	g/cc	1.06	-
Ignitability	deg. F	115	-
pH	units	10.0	-

Total Metals
TCLP Leachate

Parameter	Units	LE USED IC 09 OCT 91 Result	LE USED IC 09 OCT 91 Reporting Limit	EL USED IC 17 OCT 91 Result	EL USED IC 17 OCT 91 Reporting Limit	CLUSEIC(New Formula) 10 DEC 91 Result	CLUSEIC(New Formula) 10 DEC 91 Reporting Limit
Arsenic	mg/L	ND	5.0	1.8	1.0	2.1	1.0
Barium	mg/L	0.54	0.5	0.56	0.1	1.4	0.1
Cadmium	mg/L	12.9	0.25	9.2	0.05	11.6	0.05
Chromium	mg/L	4.7	0.5	1.5	0.1	50.5	0.1
Lead	mg/L	43.4	2.5	86.8	0.5	55.1	0.5
Mercury	mg/L	ND	0.002	ND	0.002	ND	0.002
Selenium	mg/L	ND	0.5	ND	2.0	ND	0.1
Silver	mg/L	ND	0.5	ND	0.1	0.1	0.1

Total Metals
TCLP Leachate

Parameter	Units	NEW FORMULA CL IC SLUDGE 2 JAN 92 Result	Reporting Limit	NEW FORMULA CL DUMP MUD 2 JAN 92 Result	Reporting Limit
Arsenic	mg/L	ND	1.0	ND	1.0
Barium	mg/L	1.4	0.1	1.5	0.1
Cadmium	mg/L	2.5	0.05	2	0.05
Chromium	mg/L	1.1	0.1	2.2	0.1
Lead	mg/L	21	0.5	14.9	0.5
Mercury	mg/L	ND	0.002	ND	0.002
Selenium	mg/L	ND	0.1	ND	0.1
Silver	mg/L	ND	0.1	ND	0.1

1991 Recharacterization
Paint-Related Waste Analyses
For 1991 Data, Spent Paint
Spray Gun Cleaner is Denoted by 5 Within
the Sample Designation; Paint Waste, by 16

OTC Volatile Organics
TCLP Leachate
Method 8240

Parameter	Units	LE USED GC5 26 DEC 91 Result	Reporting Limit	DOUSEDPC5 07 OCT 91 Result	Reporting Limit
Vinyl Chloride	mg/L	ND	4400	ND	1000
1,1 Dichloroethene	mg/L	ND	2200	ND	500
Chloroform	mg/L	ND	2200	ND	500
1,2 Dichloroethane	mg/L	ND	2200	ND	500
2-Butanone	mg/L	6500	4400	ND	1000
Carbon Tetrachloride	mg/L	ND	2200	ND	500
Trichloroethene	mg/L	ND	2200	ND	500
Benzene	mg/L	ND	2200	ND	500
Tetrachloroethene	mg/L	ND	2200	ND	500
Chlorobenzene	mg/L	ND	2200	ND	500

OTC Volatile Organics
TCLP Leachate
Method 8240

Parameter	Units	LE USED GC16 26 DEC 91 Result	Reporting Limit	DOUSEDPGC16 07 OCT 91 Result	Reporting Limit
Vinyl Chloride	mg/L	ND	20000	ND	250
1,1 Dichloroethene	mg/L	ND	10000	ND	120
Chloroform	mg/L	ND	10000	ND	120
1,2 Dichloroethane	mg/L	ND	10000	ND	120
2-Butanone	mg/L	23000	20000	ND	250
Carbon Tetrachloride	mg/L	ND	10000	ND	120
Trichloroethene	mg/L	ND	10000	ND	120
Benzene	mg/L	ND	10000	ND	120
Tetrachloroethene	mg/L	ND	10000	ND	120
Chlorobenzene	mg/L	ND	10000	ND	120

OTC Semivolatile Organics
TCLP Leachate
Method 8270

Parameter	Units	DOUSEDPGC5 07 OCT 91 Result	Reporting Limit	LE USED GC5 09 OCT 91 Result	Reporting Limit
Pyridine	mg/L	ND	360	ND	10.0
1,4-Dichlorobenzene	mg/L	ND	180	ND	5.0
2-Methylphenol	mg/L	ND	180	ND	5.0
3/4-Methylphenol	mg/L	ND	180	ND	5.0
Hexachloroethane	mg/L	ND	180	ND	5.0
Nitrobenzene	mg/L	ND	180	ND	5.0
Hexachlorobutadiene	mg/L	ND	180	ND	5.0
2,4,6-Trichlorophenol	mg/L	ND	180	ND	5.0
2,4,5-Trichlorophenol	mg/L	ND	900	ND	25.0
2,4-Dinitrotoluene	mg/L	ND	180	ND	5.0
Hexachlorobenzene	mg/L	ND	180	ND	5.0
Pentachlorophenol	mg/L	ND	900	ND	25.0

OTC Semivolatile Organics
TCLP Leachate
Method 8270

Parameter	Units	DOUSEDPGC16 07 OCT 91 Result	Reporting Limit	LE USED GC16 09 OCT 91 Result	Reporting Limit
Pyridine	mg/L	ND	10.0	ND	10.0
1,4-Dichlorobenzene	mg/L	ND	5.0	ND	5.0
2-Methylphenol	mg/L	ND	5.0	ND	5.0
3/4-Methylphenol	mg/L	ND	5.0	ND	5.0
Hexachloroethane	mg/L	ND	5.0	ND	5.0
Nitrobenzene	mg/L	ND	5.0	ND	5.0
Hexachlorobutadiene	mg/L	ND	5.0	ND	5.0
2,4,6-Trichlorophenol	mg/L	ND	5.0	ND	5.0
2,4,5-Trichlorophenol	mg/L	ND	25.0	ND	25.0
2,4-Dinitrotoluene	mg/L	ND	5.0	ND	5.0
Hexachlorobenzene	mg/L	ND	5.0	ND	5.0
Pentachlorophenol	mg/L	ND	25.0	ND	25.0

General Inorganics

Parameter	Units	DOUSEDPGC16 07 OCT 91 Result	Reporting Limit	LE USED GC16 09 OCT 91 Result	Reporting Limit
Specific Gravity at 77 degrees F	g/cc	0.889	-	0.872	-
Ignitability	deg. F	77	-	73	-
pH	units	6.6	-	6.2	-

General Inorganics

Parameter	Units	DOUSED/PGC5 07 OCT 91 Result	Reporting Limit	LE USED GC5 10 OCT 91 Result	Reporting Limit
Specific Gravity at 77 degrees F	g/cc	0.731	-	0.864	-
Ignitability	deg. F	84	-	73	-
pH	units	6.6	-	6.2	-

Total Metals
TCLP Leachate

Parameter	Units	DOUSEDPGC16 07 OCT 91 Result	Reporting Limit	LE USED GC16 09 OCT 91 Result	Reporting Limit
Arsenic	mg/L	ND	1.0	ND	1.0
Barium	mg/L	ND	0.1	1.0	0.1
Cadmium	mg/L	ND	0.05	0.47	0.5
Chromium	mg/L	0.17	0.1	1.1	0.1
Lead	mg/L	ND	0.5	0.71	0.5
Mercury	mg/L	ND	0.002	ND	0.002
Selenium	mg/L	ND	0.05	ND	0.1
Silver	mg/L	ND	0.1	ND	0.1

Total Metals
TCLP Leachate

Parameter	Units	DOUSEDPGC5 07 OCT 91 Result	Reporting Limit	LE USED GC5 09 OCT 91 Result	Reporting Limit
Arsenic	mg/L	ND	1.6	ND	1.0
Barium	mg/L	6.2	0.016	1.4	0.1
Cadmium	mg/L	0.73	0.079	0.41	0.05
Chromium	mg/L	1.8	0.16	0.86	0.1
Lead	mg/L	1.9	0.79	ND	0.5
Mercury	mg/L	ND	0.016	ND	0.002
Selenium	mg/L	ND	0.16	ND	0.1
Silver	mg/L	ND	0.16	ND	0.1

1991 Recharacterization
Spent Antifreeze/Glycol Waste

OTC Volatile Organics
TCLP Leachate
Method 8240

Parameter	Units	ELUSEDAF 17 DEC 91 Result	Reporting Limit	BRESLUBE USED ANITFREEZE COMP. 04 NOV 91 Result	Reporting Limit	HE USED AF 24 OCT 91 Result	Reporting Limit
Vinyl Chloride	mg/L	ND	2.50	ND	0.05	ND	0.2
1,1 Dichloroethene	mg/L	ND	1.20	ND	0.025	ND	0.1
Chloroform	mg/L	ND	1.20	ND	0.025	ND	0.1
1,2 Dichloroethane	mg/L	ND	1.20	ND	0.025	ND	0.1
2-Butanone	mg/L	ND	2.50	ND	0.25	0.7	0.2
Carbon Tetrachloride	mg/L	ND	1.20	ND	0.025	ND	0.1
Trichloroethene	mg/L	ND	1.20	ND	0.025	0.11	0.1
Benzene	mg/L	ND	1.20	0.28	0.025	0.15	0.1
Tetrachloroethene	mg/L	ND	1.20	0.16	0.025	0.94	0.1
Chlorobenzene	mg/L	ND	1.20	ND	0.025	ND	0.1

OTC Semivolatile Organics
TCLP Leachate
Method 8270

Parameter	Units	ELUSEDAF 17 OCT 91 Result	Reporting Limit	BPESLUBE USED ANITFREEZE COMP. 04 NOV 91 Result	Reporting Limit	HE USED AF 24 OCT 91 Result	Reporting Limit
Pyridine	mg/L	ND	4.0	ND	0.04	ND	20
1,4-Dichlorobenzene	mg/L	ND	2.0	ND	0.04	ND	10
2-Methylphenol	mg/L	2.1	2.0	ND	0.04	ND	10
3/4-Methylphenol	mg/L	ND	2.0	ND	0.04	ND	10
Hexachloroethane	mg/L	ND	2.0	ND	0.04	ND	10
Nitrobenzene	mg/L	ND	2.0	ND	0.04	ND	10
Hexachlorobutadiene	mg/L	ND	2.0	ND	0.04	ND	10
2,4,6-Trichlorophenol	mg/L	ND	2.0	ND	0.04	ND	10
2,4,5-Trichlorophenol	mg/L	ND	10.0	ND	0.04	ND	50
2,4-Dinitrotoluene	mg/L	ND	2.0	ND	0.04	ND	10
Hexachlorobenzene	mg/L	ND	2.0	ND	0.04	ND	10
Pentachlorophenol	mg/L	ND	10.0	ND	0.2	ND	50

General Inorganics

Parameter	Units	ELUSEDAF 17 OCT 91 Result	Reporting Limit	BRESLUBE USED ANTIFREEZE 04 NOV 91 Result	Reporting Limit	HE USED AF 24 OCT 91 Result	Reporting Limit
Specific Gravity at 77 degrees F	g/cc	1.073	-	1.01	-	0.957	-
Ignitability	deg. F	>160	-	-	-	>160	-
pH	units	8.3	-	NA	-	8.2	-
Flash point (PMCC)	deg. F	-	-	101	-	-	-

Total Metals
TCLP Leachate

Parameter	Units	ELUSEDAF 17 OCT 91 Result	Reporting Limit	BRESLUBE USED ANTIFREEZE COMP. 04 NOV 91 Result	Reporting Limit	HE USED AF 24 OCT 91 Result	Reporting Limit
Arsenic	mg/L	2.5	1.0	ND	0.5	3.7	1.0
Barium	mg/L	ND	0.1	0.5	0.1	ND	0.1
Cadmium	mg/L	ND	0.05	ND	0.1	0.058	0.05
Chromium	mg/L	ND	0.1	ND	0.1	ND	0.1
Lead	mg/L	2.8	0.5	0.2	0.1	1.1	0.5
Mercury	mg/L	ND	0.002	ND	0.02	ND	0.002
Selenium	mg/L	ND	20	ND	0.3	ND	50
Silver	mg/L	ND	0.1	ND	0.1	ND	0.1

1991 Recharacterization
Dry Cleaner Waste

OTC Volatile Organics
TCLP Leachate
Method 8240

Parameter	Units	HEUSEDDCMUCK 24 OCT 91 Result	Reporting Limit	DENTON PERC MUCK 25 OCT 91 Result	Reporting Limit
Vinyl Chloride	mg/L	ND	170	ND	100
1,1 Dichloroethene	mg/L	ND	84	ND	50
Chloroform	mg/L	ND	84	ND	50
1,2 Dichloroethane	mg/L	ND	84	ND	50
2-Butanone	mg/L	ND	170	ND	500
Carbon Tetrachloride	mg/L	ND	84	ND	50
Trichloroethene	mg/L	ND	84	ND	50
Benzene	mg/L	ND	84	ND	50
Tetrachloroethene	mg/L	490	84	790	50
Chlorobenzene	mg/L	ND	84	ND	50

OTC Volatile Organics
TCLP Leachate
Method 8240

HEUSEDDCBOT
23 OCT 91

Parameter	Units	Result	Reporting Limit
Vinyl Chloride	mg/L	ND	2000
1,1 Dichloroethene	mg/L	ND	1000
Chloroform	mg/L	ND	1000
1,2 Dichloroethane	mg/L	ND	2000
2-Butanone	mg/L	ND	1000
Carbon Tetrachloride	mg/L	ND	1000
Trichloroethene	mg/L	ND	1000
Benzene	mg/L	ND	1000
Tetrachloroethene	mg/L	4800	1000
Chlorobenzene	mg/L	ND	1000

OTC Semivolatile Organics
TCLP Leachate
Method 8270

Parameter	Units	HEUSEDDCBOT 19DEC91 Result	Reporting Limit
Pyridine	mg/L	ND	2.0
1,4-Dichlorobenzene	mg/L	ND	1.0
2-Methylphenol	mg/L	ND	1.0
3/4-Methylphenol	mg/L	ND	1.0
Hexachloroethane	mg/L	ND	1.0
Nitrobenzene	mg/L	ND	1.0
Hexachlorobutadiene	mg/L	ND	1.0
2,4,6-Trichlorophenol	mg/L	ND	1.0
2,4,5-Trichlorophenol	mg/L	ND	5.0
2,4 - Dinitrotoluene	mg/L	ND	1.0
Hexachlorobenzene	mg/L	ND	1.0
Pentachlorophenol	mg/L	ND	5.0

OTC Semivolatile Organics
TCLP Leachate
Method 8270

Parameter	Units	HEUSEDDCMUCK 24 OCT 91 Result	Reporting Limit	DENTON PERC MUCK 25 OCT 91 Result	Reporting Limit
Pyridine	mg/L	ND	4.0	ND	2
1,4-Dichlorobenzene	mg/L	ND	2.0	ND	2
2-Methylphenol	mg/L	ND	2.0	ND	2
3/4-Methylphenol	mg/L	ND	2.0	ND	2
Hexachloroethane	mg/L	ND	2.0	ND	2
Nitrobenzene	mg/L	ND	2.0	ND	2
Hexachlorobutadiene	mg/L	ND	2.0	ND	2
2,4,6-Trichlorophenol	mg/L	ND	2.0	ND	2
2,4,5-Trichlorophenol	mg/L	ND	10.0	ND	2
2,4-Dinitrotoluene	mg/L	ND	2.0	ND	2
Hexachlorobenzene	mg/L	ND	2.0	ND	2
Pentachlorophenol	mg/L	ND	10.0	ND	10

General Inorganics

Parameter	Units	HEUSEDDCBOT 23 OCT 91 Result	Reporting Limit
Specific Gravity at 77 degrees F	g/cc	1.05	-
Ignitability	deg. F	>160	-
pH	units	6.3	-
Flash point (PMCC)	deg. F	-	-

General Inorganics

Parameter	Units	HEUSEDDCMUCK 24 OCT 91 Result	Reporting Limit	DENTON PERC MUCK 25 OCT 91 Result	Reporting Limit
Specific Gravity at 77 degrees F	g/cc	0.976	-	-	-
Ignitability	deg. F	>160	-	-	-
pH	units	5.5	-	5	-
Flash point (PMCC)	deg. F	-	-	>180	-

Total Metals
TCLP Leachate

Parameter	Units	HEUSEDDCBOT 23 OCT 91 Result	Reporting Limit
Arsenic	mg/L	ND	1.4
Barium	mg/L	1.6	0.14
Cadmium	mg/L	0.19	0.069
Chromium	mg/L	17.4	0.14
Lead	mg/L	4.9	0.69
Mercury	mg/L	ND	0.011
Selenium	mg/L	ND	0.28
Silver	mg/L	ND	0.14

Enseco
A Corning Company

Total Metals
TCLP Leachate

Parameter	Units	HEUSEDDOMUCK 24 OCT 91 Result	Reporting Limit	DENTON PEROMUCK 25 OCT 91 Result	Reporting Limit
Arsenic	mg/L	ND	1.0	ND	0.5
Barium	mg/L	0.12	0.1	0.5	0.1
Cadmium	mg/L	0.15	0.05	ND	0.1
Chromium	mg/L	ND	0.1	1	0.1
Lead	mg/L	ND	0.5	0.8	0.1
Mercury	mg/L	ND	0.002	ND	0.02
Selenium	mg/L	ND	0.5	ND	0.3
Silver	mg/L	ND	0.1	ND	0.1

EXHIBIT C-4-b

MINERAL SPIRITS-BASED SPENT PARTS WASHER SOLVENT TIERED SAMPING STUDY

Appendix C-4

Exhibit C-4-b
Safety-Kleen Corporation
Mineral Spirits-Based Spent Parts Washer Solvent
Tiered Sampling Study

The data contained within this exhibit summarizes the results of a tiered sampling study conducted by Safety-Kleen on 800 individual containers of mineral spirits-based spent parts washer solvent. This study was conducted on drums received by four Safety-Kleen Branch Facilities in Wisconsin in 1990 and 1991.

Five times a year, each Branch isolates twenty drums and takes a COLIWASA sample for analysis. Only after successful completion of the testing can the drums be dumped into the recycling system.

The testing is performed in two phases. The initial screening involves the measurement of specific gravity (0.7 to 0.9 acceptable) and flashpoint (102 to 104°F acceptable). In addition, the flash is monitored for a green flame that would imply halogenated solvent contamination. In the 800 samples tested since June 1990 (see attachment), only 36 or (4.5%) failed one or more of these initial criteria.

Those failing the first phase were then analyzed for additional parameters. Seventeen of these samples were analyzed for solvent content (percent distilled to 415°F), water content, halogenated solvents, volatiles (volatiles emerging from the GC prior to C_9) and lead and cadmium. The acceptance criteria are presented in Table 1, along with the results for the

more recent samples. The methodologies are presented in Table 2. Only 17.6% of these (3 of 17) actually ended up outside of our acceptance limits.

In one case the sample was mostly oil. In a second case, there was an unusual amount of gasoline dilution; in the third, the sample was essentially all water. Thus, there was a better than 95% probability that any individual drum would pass the initial screen and a better than 99% probability that any individual drum would pass even the more detailed testing.

SK SAFETY-KLEEN CORP.

MEMORANDUM

SUBJECT: PWS Drums Analysis **DATE:** April 21, 1992

TO: Distribution **FROM:** Dennis W. Brinkman

We are consistently asked for analytical data supporting our contention that spent Parts Washer Solvent is uniform in the types and levels of contamination. The closest we can come at this time is the work we have been doing for the state of Wisconsin over the last two years.

Five times a year, each of the four Branches supplies us with 20 samples taken from individual red drums. Thus, we now have data on 800 individual drums. An initial screen for specific gravity and flash point (including monitoring for green flame indicating halogenated solvents) is followed up with secondary tests, if necessary.

As described, only 36 of the 800 failed the initial screen (4.5%), and only 3 of the most recent 17 failures were actually outside of our acceptance criteria. In one case the sample was water, which is hardly a health and safety hazard. Thus, we have a greater than 95% confidence that any individual red drum will pass the initial screen and a greater than 99% confidence level that any individual red drum would pass the more complete acceptance criteria.

I have attempted to summarize all of this in the attached. Please feel free to distribute the information to all your people, if you believe it would be useful. Let me know if I can make any of the discussion more clear.

Distribution:
J. Bard
J. Breece
D. Chari
B. Constantelos
P. Dittmar
E. Jurczak
C. McCord
R. Peoples
S. Walczynski

SPENT PARTS WASHER SOLVENT DRUMS ANALYSIS

Concern has been expressed that the considerable data base generated by Safety-Kleen Corp. over the past two decades on our mineral spirits-based spent Parts Washer Solvent in not sufficient to justify our claim of compositional consistency. Because samples are taken after the waste drums are combined in a tank truck, individual variations would tend to be averaged out.

Over the past two years, we have undertaken a study within the four SK Branches in the state of Wisconsin to quantify the variability of individual Parts Washer Solvent drums. Five times a year, each Branch isolates twenty drums and takes a coliwasa sample for analysis. Only after successful completion of the testing can the drums be dumped into the recycling system.

The testing is performed in two phases. The initial screening involves the measurement of specific gravity (0.7 - 0.9 acceptable) and flashpoint (102 - 140°F acceptable). In addition, the flash is monitored for a green flame that would imply halogenated solvent contamination. In the 800 samples tested since June 1990 (see Attachment), only 36 or 4.5% failed one or more of these initial criteria.

Those failing the first phase were then analyzed for solvent content (percent distilled to 415°F), water content, halogenated solvents, volatiles (volatiles emerging from the GC prior to C_9) and lead and cadmium. The acceptance criteria are presented along with the results in Table 1 for the more recent samples. The methodologies are presented in Table 2. Only 18% of these (3 of 17) actually ended up outside of our acceptance limits.

In one case the sample was mostly oil, in a second there was an unusual amount of gasoline dilution, and in the third the sample was essentially all water. Thus, there was a better than 95% probability that any individual drum would pass the initial screen and a better than 99% probability that any individual drum would pass even the more detailed testing.

TABLE 1 – SPENT PARTS WASHER SOLVENT TESTING
WISCONSIN DRUM SAMPLES
SECONDARY PHASE

BRANCH NUMBER	DATE	CUSTOMER NAME	SAMPLE NUMBER	FLASH POINT	SOLVENT vol%	WATER wt%	HVOC wt%	VOC wt%	Pb + Cd PPM
		CRITERIA LIMITS ----------		(F)	>80%	<10%	<10%	<10%	<500
5-150-01	10/91	Nelson Filter	256081	98	98	0.1	0.06	1.4	< 1
	10/91	Nelson Filter	256080	98	89	0.1	0.06	8.7	< 1
	7/91	Ang. Field Trng. Site.	211155	82	98	0.03	0.05	3	13
	7/91	Vandermeer Chevrolet	211167	95	96	0.05	1.75	3.4	6
	2/92	R & W Repair	289787	99	96	0.39	1.9	1.7	37
	8/91	Hal Lenard Publishing	211199	90	97	0.0	0.1	8.9	< 1
	6/90	LaCrosse Milling	104665	120;GR					
	6/90	Johnson's Sales	104750	80;GR					
	6/90	NCR Corp.	104749	87;GR					
	6/90	Case Power/Equip.	104703	120;GR					
	10/90	Johnson'Sales/Serv.	126368						
5-176-01	12/91	Merit Gear Corporation	235125	>140	19	0.0	0.02	0	3
	4/91	United Parcel Service	202839	>102;GR	98	0.00	1.62	2.7	4
	6/90	Hillshire Farms	84907	113;GR					
	6/90	Righteous Circle	84906	94;GR					
	6/90	Herlache	95796	73					
	8/90	Johnnies Service	96342	140;GR					
	8/90	Watercraft Sales/Serv.	101010	88					
5-197-01	10/91	Horicon Lawn & Service	233535	60	98	0.0	0.17	2.4	< 1
	10/90	Midas Muffler	121861	104;GR					
	10/90	Bancroft Dairy	121867	95					

TABLE 1 (Continued)

BRANCH NUMBER	DATE	CUSTOMER NAME	SAMPLE NUMBER	FLASH POINT	SOLVENT vol%	WATER wt%	HVOC wt%	VOC wt%	Pb + Cd PPM
		CRITERIA LIMITS ----------		(F)	>80%	<10%	<10%	<10%	<500
5-100-01	7/91	Inde. Elec. Wire & Cable	240302	<40	99	0.28	0.04	2.2	108
	7/91	Butler Lawn & Garden	240310	78	83	0.05	0.12	7.4	49
	7/91	GFG Inc. CBS	240319	60	78	1.32	0.1	22.4	< 1
	7/91	Laus Goodyear Tire	240320	>102;GR	93	0.88	2.06	5.4	16
	12/91	Lakeside Centerless Grinding	257870	>140	0.1	99.9	0.01	0	< 1
	8/91	Signs & Lines	210157	85	97	0.0	0.03	4.8	< 1
	2/92	Baker Racing	288499	88	97	0.01	0.8	2.3	29
	2/92	Fredonia Automotive	288486	74	96	0.04	9.2	3.8	23
	8/90	Southeastern Wisc. Prod.	124067	96					
	8/90	Waterford Hardware	124065	140:GR					
	8/90	83 Service	124061	140:GR					
	10/90	Aladdin Label	125536	>205		85			
	12/90	Laus Tire	125931	<140;GR					
	12/90	Milwaukee City	125933	>205					

GR = Green Flame

TABLE 1 - SPENT PARTS WASHER SOLVENT TESTING
WISCONSIN DRUM SAMPLES
SECONDARY PHASE

BRANCH NUMBER	DATE	CUSTOMER NAME	SAMPLE NUMBER	SOLVENT vol%	WATER wt%	HVOC wt%	VOC wt%	Pb + Cd PPM
		CRITERIA LIMITS ---------		>80%	<10%	<10%	<10%	<500
5-150-01	10/91	Nelson Filter	256081	98	0.1	0.06	1.4	< 1
	10/91	Nelson Filter	256080	89	0.1	0.06	8.7	< 1
	7/91	Ang. Field Trng. Site.	211155	98	0.03	0.05	3	13
	7/91	Vandermeer Chevrolet	211167	96	0.05	1.75	3.4	6
	2/92	R & W Repair	289787	96	0.39	1.9	1.7	37
	8/91	Hal Lenard Publishing	211199	97	0.0	0.1	8.9	< 1
5-176-01	12/91	Merit Gear Corporation	235125	19	0.0	0.02	0	3
	4/91	United Parcel Service	202839	98	0.00	1.62	2.7	4
5-197-01	10/91	Horicon Lawn & Service	233535	98	0.0	0.17	2.4	< 1
5-100-01	7/91	Inde. Elec. Wire & Cable	240302	99	0.28	0.04	2.2	108
	7/91	Butler Lawn & Garden	240310	83	0.05	0.12	7.4	49
	7/91	GFG Inc. CBS	240319	78	1.32	0.1	22.4	< 1
	7/91	Laus Goodyear Tire	240320	93	0.88	2.06	5.4	16
	12/91	Lakeside Centerless Grinding	257870	0.1	99.9	0.01	0	< 1
	8/91	Signs & Lines	210157	97	0.0	0.03	4.8	< 1
	2/92	Baker Racing	288499	97	0.01	0.8	2.3	29
	2/92	Fredonia Automotive	288486	96	0.04	9.2	3.8	23

TABLE 2

PARAMETER	WAP/EPA METHOD	SK METHOD	RECYCLE CENTER ACCEPTANCE RANGE
SOLVENTS, V%	ASTM D86-78	9907	>80
WATER, W%	KARL FISHER	9801	<10
HALOGENATED, W%	8010, 8120	9209	<10
VOC, W%	8015, 8020	9803	<10
Pb & Cd, PPM	7420, 7130	ICAP	<500

EPA SW 846 METHOD 8010: Halogenated Volatile Hydrocarbo
8120: Chlorinated Hydrocarbon
8015: Non-Halogenated Volatile Hydroc
8020: Aromatic Volatile Organics

7420: Lead (AA, Direct Aspiration)
7130: Cadmium (AA, Direct Aspiration)

EXHIBIT C-4-c

MINERAL SPIRITS-BASED PARTS WASHER SOLVENT/ 699 IMMERSION CLEANER BULK LOAD SAMPLING STUDY

Appendix C-4

Exhibit C-4-c
Safety-Kleen Corporation
Mineral Spirits-Based Parts Washer Solvent/
699 Immersion Cleaner
Bulk Load Sampling Study

The data contained within this exhibit presents the results of analyses on bulk loads of mineral spirits-based spent parts washer solvent, recycled mineral spirits-based parts washer solven, 699 immersion cleaner (spent and recycled) from wastes received by Safety-Kleen's Recycle Center in Lexington, South Carolina, from Safety-Kleen Branch Facilities in Alabama. These wastes were received in 1991.

Mineral Spirits-Based Spent Parts Washer Solvent

Analyses of mineral spirits-based spent parts washer solvent revealed the following, as presented by Branch Facility:

	BS&W[1] (Average Percent/ Standard Deviation)	Total Organic Halogens (Average/ Standard Deviation)
Whistler	5.514/4.773	0.251/0.181
Montgomery	5.164/3.414	0.161/0.094
Huntsville	4.497/3.779	0.247/0.123
Dolomite[2]	11.02/19.78	0.199/0.117

[1] BS&W = Basic sediment and water.
[2] The BS&W result for Dolomite is skewed by the shipment of loads of tank bottoms containing very high percentage of water.

Recycled Mineral Spirits (Parts Washer Solvent)

Analyses of recycled mineral spirits revealed the following, as presented by Branch Facility:

	Specific Gravity (Average/ Standard Deviation)	Total Organic Halogens (Average Percentage/ Standard Deviation)
Whistler	0.782/0.007	0.266/0.130
Montgomery	0.780/0.0	0.259/0.111
Huntsville	0.781/0.003	0.302/0.151
Dolomite	0.781/0.004	0.301/0.161

These data indicate that the specific gravity of recycled mineral spirits sent to the Branch Facility is extremely consistent, thus there is minimal variation in the baseline of this parameter from which to compare specific gravity in the mineral spirits-based spent parts washer solvent.

These data also indicate no significant difference in the total organic halogen content between spent and recycled mineral spirits, indicating that introduction of halogenated materials into the mineral spirits-based spent parts washer solvent is negligible.

Spent Immersion Cleaner

Analyses of spent 699 immersion cleaner revealed the following:

- No PCBs were detected in any load.
- Basic sediment and water averaged 10.44 (2.58 standard deviation).
- 39 of 40 loads (97.5%) possessed flash points greater than 142°F.
- Specific gravity averaged 0.96 (0.01 standard deviation).

Recycled Immersion Cleaner

Analyses of recycled 699 immersion cleaner revealed the following:

- Percent water averaged 8.077 (0.749 standard deviation).
- All loads possessed flash points greater that 142°F.
- Specific gravity averaged 0.919.

SK SAFETY-KLEEN CORP.

MEMORANDUM

SUBJECT: Recycled Solvent Data **DATE:** January 15, 1992

TO: Jim Breece
Catherine McCord

FROM: Dennis Brinkman

With considerable assistance from Jerry Williams and Bill Botkins from Lexington and from Craig Rose at the Tech Center, I have been able to assemble detailed information on the Parts Washer Solvent and Immersion Cleaner related to the state of Alabama Branches for the year 1991.

Just as a summary, here are a few selected items:

Spent PWS

	BS&W	Total Org. Halogens	Distill. Yield
Whistler	5.54	0.25	91.4
Montgomery	5.16	0.16	92.7
Huntsville	4.50	0.25	92.0
Dolomite	11.0	0.20	90.6

[Dolomite BS&W scewed by a few loads of tank bottoms from the Branch - e.g., 97% water].

Recycled PWS

	Spec. Grav.	Tot. Org. Halogens
Whistler	0.78	0.27
Montgomery	0.78	0.26
Dolomite	0.78	0.30
Huntsville	0.78	0.30

As expected, the recycled PWS are very close in character, but even the spent PWS has quite similar levels of contamination, as evidenced by the organic halogen content.

The immersion cleaner can not be broken out by branches, so the data covers all loads into and out of Lexington. However, it is obvious that most spent IC falls within a rather narrow range of contamination, while the recycled is very consistent.

If you need anything further, please let me know.

cc: J. Bard, L. Chapman, P. Dittmar, E. Jurczak, F. Luft, R. Peoples, J. Williams

LEXINGTON RECYCLE CENTER (1990-1991)

WHISTLER, AL BRANCH - SPENT PWS

6-133-90 MINERAL SPIRITS

DATE	SAMPLE#	MANIFEST#	TOTAL GALLONS	FLASH POINT	BS&W VOL%	TOTAL ORGANIC HALOGENS	TOTAL PCB'S DETECTED	DISTIL-LATION YIELD
-	-	-	-	-	-	-	-	-
01-07-91	LR-3610D	8206	6114	PASS	5.6	0.21	NONE	92.4
01-14-91	LR-3635D	4582	5789	PASS	2.8	0.16	NONE	91.4
01-25-91	LR-3676D	10257	6056	PASS	3.9	0.13	NONE	92.5
02-06-91	LR-3714D	98696	6003	PASS	9.1	0.2	NONE	91
02-11-91	LR-3733D	3741	5944	PASS	4	0.16	NONE	91.3
02-20-91	LR-3754D	3740	5976	PASS	5.5	0.23	NONE	92
02-28-91	LR-3792D	3742	7026	PASS	5.3	0.16	NONE	93
03-13-91	LR-3832D	3743	6952	PASS	19.3	0.12	NONE	91.7
03-21-91	LR-3860D	3739	5273	PASS	11.6	0.19	NONE	91.5
03-28-91	LR-3891D	8211	6763	PASS	7.4	0.11	NONE	92
04-16-91	LR-3943D	8210	7014	PASS	3.6	0.22	NONE	92
04-23-91	LR-3970D	8209	5438	PASS	4.7	0.39	NONE	91.4
05-01-91	LR-4003D	8216	7084	PASS	6.4	0.38	NONE	91
05-09-91	LR-4028D	8217	5425	PASS	5.9	0.35	NONE	90.7
05-21-91	LR-4062D	8215	6991	PASS	4	0.83	NONE	90.9
06-05-91	LR-4110D	8212	7119	PASS	4	0.44	NONE	94
06-14-91	LR-4146D	8213	6818	PASS	3.5	0.15	NONE	91
06-25-91	LR-4173D	8214	6973	PASS	6.5	0.12	NONE	86.5
07-09-91	LR-4219D	8218	6926	PASS	2	0.15	NONE	88.3
07-15-91	LR-4239D	3744	6817	PASS	5.6	0.09	NONE	93.7
07-30-91	LR-4292D	3746	6805	PASS	3	0.22	NONE	88
08-06-91	LR-4314D	3747	5333	PASS	3	0.19	NONE	91.3
08-14-91	LR-4341D	3745	6575	PASS	6	0.16	NONE	92.1
08-27-91	LR-4381D	3748	5369	PASS	4	0.12	NONE	93
09-05-91	LR-4404D	8204	6936	PASS	4.4	0.1	NONE	89
09-13-91	LR-4432D	3749	6646	PASS	3.6	N/A	PCB,S	92
09-20-91	LR-4455D	8205	5585	PASS	2.2	0.21	NONE	93
10-01-91	LR-4488D	8206	6099	PASS	2.6	0.29	NONE	88.7
10-15-91	LR-4535D	8207	6929	PASS	4	0.45	NONE	94.5
10-22-91	LR-4556D	8208	6314	PASS	0.5	0.69	NONE	93
10-31-91	LR-4589D	8209	6158	PASS	5	0.72	NONE	88
11-11-91	LR-4620D	8204	5330	PASS	1.6	0.2	NONE	92.9
11-20-91	LR-4652D	8212	7000	PASS	2.4	0.19	NONE	93
11-28-91	LR-4677D	8213	7136	PASS	4	0.27	NONE	94
12-11-91	LR-4716D	8214	4973	PASS	26	0.17	NONE	87.3
			AVERAGE		5.514	0.251		91.374
			STANDARD DEV.		4.773	0.181		1.968

DATE SAMPLE# MANIFEST# TOTAL GALLONS FLASH POINT BS&W VOL% TOTAL ORGANIC HALOGENS TOTAL PCB'S DETECTED DISTIL-LATION YIELD

LEXINGTON RECYCLE CENTER (1990–1991)

MONTGOMERY, AL BRANCH – SPENT PWS

3-019-90 MINERAL SPIRITS

DATE	SAMPLE#	MANIF.#	TOTAL GALLONS	FLASH POINT	BS&W VOL%	TOTAL ORGANIC ALOGEN	TOTAL PCB'S DETECTED	DISTIL-LATION YIELD
01-04-91	LR-3603D	3324	6387	PASS	4.3	0.15	NONE	95
01-30-91	LR-3690D	3322	6010	PASS	4.4	0.14	NONE	91.6
02-26-91	LR-3781D	3326	2550	PASS	5	0.13	NONE	91.4
03-19-91	LR-3849D	3330	6742	PASS	5.9	0.14	NONE	92.6
04-25-91	LR-3979D	3327	7032	PASS	14.1	0.18	NONE	92
06-18-91	LR-4154D	3328	6808	PASS	7	0.014	NONE	90
07-18-91	LR-4254D	3329	4466	PASS	6.5	0.27	NONE	92
08-07-91	LR-4317D	3330	6914	PASS	1	0.22	NONE	92
09-12-91	LR-4429D	3331	6033	PASS	2.6	0.06	NONE	95
10-25-91	LR-4571D	24956	7001	PASS	5	0.37	NONE	98
12-04-91	LR-4694D	3332	6910	PASS	1	0.1	NONE	90
			AVERAGE		5.164	0.161		92.691
			STANDARD DEV.		3.414	0.094		2.289

DATE	SAMPLE#	MANIF.#	TOTAL GALLONS	FLASH POINT	BS&W VOL%	TOTAL ORGANIC ALOGEN	TOTAL PCB'S DETECTED	DISTIL-LATION YIELD

LEXINGTON RECYCLE CENTER (1990-1991)

HUNTSVILLE, AL BRANCH - SPENT PWS

3-019-91 MINERAL SPIRITS

DATE	SAMPLE#	MANIF.#	TOTAL GALLONS	FLASH POINT	BS&W VOL%	TOTAL ORGANIC HALOGENS	TOTAL PCB'S DETECTED	DISTIL-LATION YIELD
01-04-91	LR-3604D	3345	7066	PASS	3.8	0.15	NONE	95
01-14-91	LR-3633D	3350	7192	PASS	3.5	0.14	NONE	91
01-18-91	LR-3651D	3351	5561	PASS	2.7	0.37	NONE	95
01-24-91	LR-3669D	3352	7092	PASS	3	0.38	NONE	90.8
01-29-91	LR-3686D	3353	5956	PASS	19.2	0.18	NONE	92.6
02-01-91	LR-3702D	3354	5854	PASS	1.9	0.21	NONE	91
02-05-91	LR-3705D	3355	6478	PASS	4.4	0.31	NONE	92
02-06-91	LR-3713D	3356	7072	PASS	9.1	0.27	NONE	91
02-15-91	LR-3744D	3357	6992	PASS	5.2	0.14	NONE	94.6
02-21-91	LR-3762D	3358	6940	PASS	5.2	0.21	NONE	90.8
02-25-91	LR-3777D	3360	7128	PASS	8.5	0.17	NONE	92.5
02-26-91	LR-3784D	3359	5899	PASS	15.9	0.2	NONE	91.4
03-05-91	LR-3805D	3361	7055	PASS	6	0.2	NONE	90.7
03-07-91	LR-3815D	3362	6941	PASS	3.6	0.19	NONE	93.6
03-11-91	LR-3821D	3363	7054	PASS	8.1	0.13	NONE	93.3
03-14-91	LR-3839D	3364	7189	PASS	6.1	0.14	NONE	92.4
03-18-91	LR-3846D	3365	6696	PASS	3.3	0.2	NONE	92
03-22-91	LR-3868D	3366	7240	PASS	4.4	0.11	NONE	90.8
03-27-91	LR-3884D	3367	7030	PASS	3.3	0.22	NONE	91
04-03-91	LR-3900D	3368	7049	PASS	12.5	0.23	NONE	92
04-09-91	LR-3922D	3369	7244	PASS	8.1	0.63	NONE	95
04-26-91	LR-3944D	3370	5980	PASS	5.8	0.21	NONE	92
04-19-91	LR-3961D	3371	7083	PASS	5.1	0.21	NONE	94
04-25-91	LR-3980D	3372	6934	PASS	8.8	0.21	NONE	92
04-29-91	LR-3989D	3373	6916	PASS	3.5	0.34	NONE	89.3
05-03-91	LR-4008D	3374	7004	PASS	6	0.38	NONE	93
05-08-91	LR-4024D	3375	7042	PASS	4.4	0.26	NONE	94.9
05-13-91	LR-4035D	3376	6908	PASS	2.5	0.33	NONE	91.3
05-21-91	LR-4061D	3377	6831	PASS	3	0.41	NONE	90.9
05-28-91	LR-4079D	3378	6616	PASS	5	0.42	NONE	91.3
05-31-91	LR-4096D	3379	6866	PASS	6	0.42	NONE	92.8
06-04-91	LR-4103D	3380	7016	PASS	3.5	0.27	NONE	96
06-11-91	LR-4130D	3381	6956	PASS	3.5	0.19	NONE	93.3
06-17-91	LR-4150D	3382	6975	PASS	2.5	0.24	NONE	93.3
DATE	SAMPLE#	MANIF.#	TOTAL GALLONS	FLASH POINT	BS&W VOL%	TOTAL ORGANIC HALOGENS	TOTAL PCB'S DETECTED	DISTIL-LATION YIELD

06-20-91	LR-4165D	3383	6984	PASS	2	0.095	NONE	90
06-26-91	LR-4183D	3384	7031	PASS	4.5	0.16	NONE	88.3
07-01-91	LR-4197D	3385	7036	PASS	1	0.2	NONE	92.5
07-08-91	LR-4213D	3386	6898	PASS	1	0.22	NONE	90
07-10-91	LR-4225D	3387	5460	PASS	7	0.54	NONE	90
07-18-91	LR-4252D	3388	7061	PASS	4.5	0.16	NONE	92
07-23-91	LR-4264D	3389	6848	PASS	20	0.1	NONE	93.3
07-26-91	LR-4281D	3390	6847	PASS	3	0.21	NONE	90
07-31-91	LR-4295D	3391	6918	PASS	3	0.33	NONE	88
08-07-91	LR-4316D	3392	6984	PASS	1	0.29	NONE	91.3
08-14-91	LR-4343D	3393	2977	PASS	3.6	0.13	NONE	92.1
08-16-91	LR-4349D	3394	6971	PASS	2	0.11	NONE	96
08-19-91	LR-4359D	3395	7043	PASS	1	0.17	NONE	88
08-29-91	LR-4392D	3396	6781	PASS	2.8	0.13	NONE	92.5
09-05-91	LR-4406	3397	6674	PASS	5	0.12	NONE	89
09-06-91	LR-4413D	3398	7074	PASS	1	0.21	NONE	92
09-10-91	LR-4420D	3399	6982	PASS	1	0.15	NONE	95
09-24-91	LR-4463D	3401	7009	PASS	1.8	0.16	NONE	91
09-26-91	LR-4477D	3402	7039	PASS	1.2	0.35	NONE	93.3
10-04-91	LR-4500D	3403	7023	PASS	2.6	0.29	NONE	87.3
10-08-91	LR-4511D	3404	5786	PASS	3.4	0.34	NONE	88
10-14-91	LR-4527D	3405	4866	PASS	2.6	0.41	NONE	93
10-17-91	LR-4541D	3406	5626	PASS	3	0.56	NONE	96.4
10-22-91	LR-4554D	3407	5696	PASS	2	0.5	NONE	91.3
10-28-91	LR-4575D	3408	6894	PASS	1.5	0.54	NONE	91
11-01-91	LR-4594D	3409	6898	PASS	5	0.21	NONE	95.4
11-07-91	LR-4612D	3410	7056	PASS	2.6	0.15	NONE	96.9
11-14-91	LR-4627D	3411	5704	PASS	3.6	0.12	NONE	93.3
11-19-91	LR-4643D	3412	6994	PASS	1	0.15	NONE	90
11-23-91	LR-4661D	3413	6831	PASS	1	0.27	NONE	91
11-25-91	LR-4666D	3414	3424	PASS	4	0.16	NONE	91.3
12-02-91	LR-4685D	3415	4973	PASS	3	0.17	NONE	90.6
12-05-91	LR-4700D	3416	5046	PASS	2.2	0.17	NONE	90
			AVERAGE		4.497	0.247		91.976
			STANDARD DEV.		3.779	0.123		2.122
DATE	SAMPLE#	MANIF.#	TOTAL GALLONS	FLASH POINT	BS&W VOL%	TOTAL ORGANIC HALOGENS	TOTAL PCB'S DETECTED	DISTIL-LATION YIELD

LEXINGTON RECYCLE CENTER (1990-1991)

DOLOMITE, AL BRANCH - SPENT PWS

3-019-90 MINERAL SPIRITS

DATE	SAMPLE#	MANIF.#	TOTAL GALLONS	FLASH POINT	BS&W VOL%	TOTAL ORGANIC ALOGEN	TOTAL PCB'S DETECTED	DISTIL-LATION YIELD
01-03-91	LR-3598D	3318	6098	PASS	47	0.11	NONE	92.4
01-09-91	LR-3618D	3311	6233	PASS	2.9	0.14	NONE	92
01-14-91	LR-3631D	3319	7058	PASS	3.5	0.17	NONE	91
01-18-91	LR-3652D	3313	1478	PASS	96.8	0.01	NONE	95
01-21-91	LR-3656D	3316	6128	PASS	3.8	0.18	NONE	91.7
01-25-91	LR-3675D	3314	6244	PASS	5.2	0.44	NONE	90.3
01-29-91	LR-3685D	3315	6003	PASS	22.6	0.15	NONE	92.6
02-05-91	LR-3712D	16155	5918	PASS	5.9	0.15	NONE	92
02-11-91	LR-3732D	16463	6474	PASS	3.7	0.15	NONE	91.3
02-18-91	LR-3751D	1	7020	PASS	5.4	0.07	NONE	90.6
02-21-91	LR-3766D	2	7046	PASS	7.5	0.14	NONE	90.8
02-26-91	LR-3782D	91003	3521	PASS	73.6	0.05	NONE	91.4
02-28-91	LR-3794D	91005	6326	PASS	74	0.11	NONE	92.7
03-05-91	LR-3803D	91004	7092	PASS	21.4	0.26	NONE	93.5
03-12-91	LR-3824D	91006	6451	PASS	10.9	0.13	NONE	92.5
03-14-91	LR-3838D	91007	4754	PASS	11	0.08	NONE	92.4
03-19-91	LR-3850D	91008	3609	PASS	13.1	0.22	NONE	92.6
03-26-91	LR-3880D	91011	7250	PASS	4.1	0.11	NONE	90.7
04-01-91	LR-3892D	91012	5738	PASS	7.5	0.14	NONE	90
04-04-91	LR-3911D	91009	4539	PASS	6.9	0.16	NONE	91
04-11-91	LR-3932D	91015	6943	PASS	5.2	0.61	NONE	93.5
04-16-91	LR-3945D	91013	4304	PASS	3.3	0.22	NONE	92
04-22-91	LR-3964D	91014	5730	PASS	4.5	0.21	NONE	91.5
04-26-91	LR-3984D	91016	6377	PASS	4.2	0.17	NONE	92.5
05-01-91	LR-4002D	91017	4908	PASS	5.7	0.2	NONE	93
05-07-91	LR-4019D	91018	5290	PASS	13.1	0.19	NONE	94.9
05-13-91	LR-4034D	91019	6236	PASS	2.5	0.2	NONE	91.3
05-21-91	LR-4057D	91020	6280	PASS	44.5	0.13	NONE	92.5
05-24-91	LR-4074D	91021	6797	PASS	3	0.19	NONE	94.4
05-29-91	LR-4086D	91023	4874	PASS	3.5	0.22	NONE	90
06-04-91	LR-4106D	91022	5294	PASS	2.5	0.22	NONE	92
06-11-91	LR-4127D	91024	5617	PASS	3.5	0.12	NONE	93
06-21-91	LR-4167D	91027	6064	PASS	4	0.27	NONE	87.5
06-27-91	LR-4188D	91027	5756	PASS	2.5	0.232	NONE	94.4
07-02-91	LR-4204D	91026	3999	PASS	4.5	0.182	NONE	90
DATE	SAMPLE#	MANIF.#	TOTAL GALLONS	FLASH POINT	BS&W VOL%	TOTAL ORGANIC ALOGEN	TOTAL PCB'S DETECTED	DISTIL-LATION YIELD

07-10-91	LR-4227D	91029	6295	PASS	5	0.218	NONE	90
07-16-91	LR-4242D	91030	5519	PASS	2.8	0.1	NONE	91
07-18-91	LR-4253D	91031	3369	PASS	5	0.31	NONE	92
07-23-91	LR-4265D	91032	4507	PASS	7.5	0.09	NONE	93.3
07-31-91	LR-4298D	91034	6937	PASS	0.5	0.34	NONE	84.6
08-05-91	LR-4308D	91033	5994	PASS	1	0.43	NONE	91
08-09-91	LR-4327D	91035	6022	PASS	1	0.17	NONE	89
08-15-91	LR-4342D	91036	4112	PASS	2.8	0.14	NONE	92.1
08-20-91	LR-4357D	91038	4658	PASS	5.6	0.13	NONE	98
08-27-91	LR-4380D	91037	5613	PASS	2.4	0.2	NONE	90
09-11-91	LR-4426D	91040	4387	PASS	3.2	0.33	NONE	91
09-13-91	LR-4431D	91041	6562	PASS	1	0.12	NONE	92
09-16-91	LR-4437D	91042	2356	PASS	3.4	0.16	NONE	91.7
09-18-91	LR-4450D	91044	2918	PASS	4.6	0.31	NONE	91
09-23-91	LR-4461D	91043	5300	PASS	4	0.11	NONE	91
09-26-91	LR-4475D	91046	3541	PASS	2.6	0.18	NONE	93.3
10-04-91	LR-4498D	91074	7172	PASS	1	0.27	NONE	87.3
10-09-91	LR-4517D	91048	3859	PASS	4	0.39	NONE	90.7
10-15-91	LR-4530D	91045	6986	PASS	1.2	0.38	NONE	96.7
10-18-91	LR-4547D	91049	6214	PASS	2.6	0.35	NONE	91.4
10-25-91	LR-4570D	91050	7022	PASS	5	0.6	NONE	98
10-31-91	LR-4591D	91052	6369	PASS	6	0.22	NONE	95.4
11-05-91	LR-4602D	91053	5149	PASS	1	0.12	NONE	91
11-11-91	LR-4617D	91054	5846	PASS	2.4	0.12	NONE	92.9
11-15-91	LR-4636D	91071	6456	PASS	3	0.07	NONE	97
11-21-91	LR-4655D	91055	6813	PASS	3.21	0.23	NONE	N/A
11-27-91	LR-4675D	91056	6260	PASS	78	0.003	NONE	94
12-03-91	LR-4689D	91057	4863	PASS	1.6	0.11	NONE	90.6
12-09-91	LR-4707D	91061	6362	PASS	20	0.25	NONE	94
12-12-91	LR-4720D	91058	6938	PASS	2.2	0.14	NONE	92.5
			AVERAGE		11.02	0.199		90.638
			STANDARD DEV.		19.78	0.117		11.551
DATE	SAMPLE#	MANIF.#	TOTAL GALLONS	FLASH POINT	BS&W VOL%	TOTAL ORGANIC ALOGEN	TOTAL PCB'S DETECTED	DISTIL-LATION YIELD

LEXINGTON RECYCLE CENTER (1990–1991)

WHISTLER, AL BRANCH – RECYCLED PWS

6–133–90 MINERAL SPIRITS

PERIOD	DATE	SAMPLE#	INVENT. ONTROL	BILL OF LADING	TOTAL GALLONS	FLASH POINT	SPEC. GRAV.	TOTAL ORGANIC HALOGENS
1	01-06-91	LR-3282C	846535	189632	6000	PASS	0.78	0.2
1	01-13-91	LR-3305C	870832	189656	6000	PASS	0.78	0.17
1	01-24-91	LR-3341C	907691	189688	6000	PASS	0.78	0.36
2	02-05-91	LR-3374C	986968	189813	6000	PASS	0.78	0.31
2	02-10-91	LR-3393C	25015	189779	6000	PASS	0.78	0.13
2	02-18-91	LR-3415C	49320	199149	6000	PASS	0.78	0.21
3	02-27-91	LR-3447C	80143	199160	7200	PASS	0.78	0.2
3	03-12-91	LR-3488C	168278	199250	4000	PASS	0.78	0.14
3	03-19-91	LR-3513C	205237	199297	6000	PASS	0.78	0.3
4	03-26-91	LR-3539C	231548	199340	6000	PASS	0.78	0.32
4	04-15-91	LR-3594C	347351	199385	6000	PASS	0.78	0.28
5	04-22-91	LR-3617C	387969	199410	7000	PASS	0.78	0.4
5	04-30-91	LR-3647C	436980	199527	7200	PASS	0.78	0.37
5	05-08-91	LR-3670C	471599	199568	7200	PASS	0.78	0.43
6	05-20-91	LR-3704C	555029	199598	7200	PASS	0.78	0.42
6	06-04-91	LR-3743C	648949	199937	7000	PASS	0.78	0.33
6	06-13-91	LR-3770C	691048	199965	6500	PASS	0.78	0.17
7	06-24-91	LR-3795C	749200	199757	7200	PASS	0.78	0.19
7	07-08-91	LR-3831C	811653	202779	5000	PASS	0.78	0.18
8	07-12-91	LR-3855C	853283	202789	3500	PASS	0.78	0.25
8	07-29-91	LR-3891C	936351	202043	7000	PASS	0.78	0.52
8	08-05-91	LR-3922C	983437	203061	6500	PASS	0.8	0.67
9	08-14-91	LR-3954C	17707	203074	7200	PASS	0.78	0.12
9	08-26-91	LR-3995C	87098	203247	4600	PASS	0.8	0.23
9	09-04-91	LR-4022C	126649	203271	7200	PASS	0.8	0.17
10	09-12-91	LR-4053C	179895	203312	7200	PASS	0.78	0.21
10	09-19-91	LR-4077C	225920	203345	7000	PASS	0.78	0.27
10	09-30-91	LR-4116C	285148	203385	7200	PASS	0.78	0.31
11	10-14-91	LR-4162C	360149	203516	6000	PASS	0.78	0.17
11	10-30-91	LR-4214C	N/A	211283	7200	PASS	0.78	0.27
12	11-08-91	LR-4248C	515924	211231	4000	PASS	0.78	0.22
12	11-19-91	LR-4289C	565630	211243	7200	PASS	0.78	0.17
12	11-26-91	LR-4316C	608893	211326	7200	PASS	0.78	0.15
13	12-04-91	LR-4340C	673772	211382	5000	PASS	0.78	0.19
					AVERAGE		0.782	0.266
					STANDARD DEV.		0.007	0.130

PERIOD DATE SAMPLE# INVENT. ONTROL BILL OF LADING TOTAL GALLONS FLASH POINT SPEC. GRAV. TOTAL ORGANIC HALOGENS

LEXINGTON RECYCLE CENTER

MONTGOMERY, AL BRANCH - RECYCLED PWS

2-019-90 MINERAL SPIRITS

PERIOD	DATE	SAMPLE#	INVENT. CONTR.#	BILL OF LADING	TOTAL GALLONS	FLASH POINT	SPECIF. GRAV.	TOTAL ORGANIC HALOGENS
1	01-03-91	LR-3276C	823658	189629	6000	PASS	0.78	0.17
2	01-29-91	LR-3355C	938258	189773	6000	PASS	0.78	0.16
3	02-26-91	LR-3441C	80093	199154	3000	PASS	0.78	0.2
3	03-18-91	LR-3506C	205252	199293	7200	PASS	0.78	0.19
5	04-24-91	LR-3626C	391458	199417	7200	PASS	0.78	0.37
7	06-17-91	LR-3777C	707505	202741	6500	PASS	0.78	0.37
8	07-17-91	LR-3865C	880328	202787	4000	PASS	0.78	0.22
8	08-05-91	LR-3920C	986984	203050	7200	PASS	0.78	0.51
10	09-11-91	LR-4050C	170159	203310	7200	PASS	0.78	0.21
13	12-03-91	LR-4333C	627695	211368	6500	PASS	0.78	0.19
					AVERAGE		0.78	0.259
					STANDARD DEVIATI		0	0.111

PERIOD	DATE	SAMPLE#	INVENT. CONTR.#	BILL OF LADING	TOTAL GALLONS	FLASH POINT	SPECIF. GRAV.	TOTAL ORGANIC HALOGENS

LEXINGTON RECYCLE CENTER (1990 - 1991)

DOLOMITE, AL BRANCH - RECYCLED PWS

3-019-90 MINERAL SPIRITS

PERIOD	DATE	SAMPLE#	INVENT. CONTR.#	BILL OF LADING	TOTAL GALLONS	FLASH POINT	SPECIF. GRAV.	TOTAL ORGANIC HALOGENS
1	01-02-91	LR-3270C	818757	189627	6000	PASS	0.78	0.16
1	01-08-91	LR-3289C	846576	189633	6000	PASS	0.78	0.12
1	01-13-91	LR-3304C	869941	189636	7200	PASS	0.78	0.17
1	01-20-91	LR-3324C	907618	189680	3200	PASS	0.78	0.38
1	01-24-91	LR-3342C	933952	189694	4000	PASS	0.78	0.36
2	01-29-91	LR-3352C	937979	189755	7200	PASS	0.78	0.16
2	02-05-91	LR-3375C	986992	189814	6000	PASS	0.78	0.31
2	02-15-91	LR-3411C	49239	199141	3000	PASS	0.78	0.2
2	02-21-91	LR-3425C	49163	199134	4500	PASS	0.78	0.21
3	02-26-91	LR-3441C	79350	199163	4000	PASS	0.78	0.2
3	02-27-91	LR-3451C	125328	199168	3000	PASS	0.78	0.2
3	03-04-91	LR-3460C	133207	199175	5000	PASS	0.78	0.1
3	03-11-91	LR-3482C	168203	199248	7200	PASS	0.78	0.14
3	03-13-91	LR-3494C	167932	199240	4000	PASS	0.78	0.19
3	03-18-91	LR-3508C	205450	199287	4000	PASS	0.78	0.19
4	03-26-91	LR-3536C	231498	199339	7200	PASS	0.78	0.32
4	03-28-91	LR-3549C	271643	199430	5500	PASS	0.78	0.31
4	04-03-91	LR-3563C	271965	199439	6500	PASS	0.78	0.38
4	04-09-91	LR-3578C	315754	199373	6000	PASS	0.78	0.71
4	04-15-91	LR-3593C	350207	199399	7200	PASS	0.78	0.28
5	04-19-91	LR-3611C	388207	199414	7200	PASS	0.78	0.3
5	04-25-91	LR-3631C	388025	199413	6000	PASS	0.78	0.37
5	05-01-91	LR-3648C	436774	199521	6000	PASS	0.78	0.37
5	05-06-91	LR-3665C	471052	199555	7200	PASS	0.78	0.44
5	05-10-91	LR-3677C	505446	199569	7200	PASS	0.78	0.54
6	05-20-91	LR-3701C	554733	199611	6500	PASS	0.78	0.42
6	05-28-91	LR-3719C	603704	199639	7000	PASS	0.78	0.48
6	06-03-91	LR-3738C	643262	199955	7000	PASS	0.78	0.45
6	06-10-91	LR-3757C	670323	199968	6000	PASS	0.78	0.19
7	06-14-91	LR-3774C	707521	202743	7200	PASS	0.78	0.21
7	06-20-91	LR-3790C	740944	202733	7200	PASS	0.78	0.747
7	06-26-91	LR-3805C	749374	199782	7000	PASS	0.78	0.26
7	07-02-91	LR-3821C	803874	2022826	7200	PASS	0.78	0.18
7	07-02-91	LR-3822C	803767	199798	7200	PASS	0.78	0.18
7	07-10-91	LR-3842C	827279	202757	1500	PASS	0.78	0.19
PERIOD	DATE	SAMPLE#	INVENT. CONTR.#	BILL OF LADING	TOTAL GALLONS	FLASH POINT	SPECIF. GRAV.	TOTAL ORGANIC HALOGENS

8	07-15-91	LR-3858C	859199	202794	7000	PASS	0.78	0.25
8	07-17-91	LR-3865C	880310	202786	3000	PASS	0.78	0.22
8	07-22-91	LR-3875C	903674	202815	6900	PASS	0.78	0.34
8	07-30-91	LR-3902C	951178	202044	4000	PASS	0.78	0.62
8	08-01-91	LR-3907C	973115	203048	7200	PASS	0.78	0.66
8	08-07-91	LR-3929C	997338	203052	7200	PASS	0.78	0.39
9	08-14-91	LR-3953C	28233	203085	5500	PASS	0.78	0.12
9	08-19-91	LR-3968C	47738	203225	7200	PASS	0.78	0.18
9	08-26-91	LR-3994C	91587	203254	6000	PASS	0.8	0.23
9	09-03-91	LR-4018C		203268	7200	PASS	0.8	0.17
10	09-11-91	LR-4048C	173617	203311	3500	PASS	0.78	0.12
10	09-13-91	LR-4060C	195966	203333	4000	PASS	0.78	0.195
10	09-18-91	LR-4071C	212423	203342	5500	PASS	0.78	0.23
10	09-23-91	LR-4084C	242107	203348	5000	PASS	0.78	0.59
10	09-25-91	LR-4098C	256545	203367	6000	PASS	0.78	0.64
10	10-02-91	LR-4127C	291328	203386	7000	PASS	0.78	0.46
11	10-07-91	LR-4143C	315085	203407	6500	PASS	0.78	0.52
11	10-14-91	LR-4161C	360115	203521	7200	PASS	0.78	0.17
11	10-17-91	LR-4181C	380147	203529	7200	PASS	0.78	0.49
11	10-24-91	LR-4197C	410811	203547	4000	PASS	0.78	0.43
11	10-30-91	LR-4218C		211272	1500	PASS	0.78	0.27
12	11-04-91	LR-4224C	470955	211305	7200	PASS	0.78	0.27
12	11-11-91	LR-4249C	515841	211214	2500	PASS	0.78	0.22
12	11-14-91	LR-4274C	537928	211234	6000	PASS	0.78	0.13
12	11-20-91	LR-4297C	574236	211244	7200	PASS	0.78	0.32
12	11-26-91	LR-4312C	598557	211337	6500	PASS	0.78	0.13
13	12-02-91	LR-4327C	623298	211367	5000	PASS	0.78	0.19
13	12-05-91	LR-4348C	669390	211375	7200	PASS	0.78	0.17
13	12-11-91	LR-4362C	680686	211388	6200	PASS	0.78	0.15
		AVERAGE					0.781	0.301
		STD DEV					0.003	0.161

PERIOD	DATE	SAMPLE#	INVENT. CONTR.#	BILL OF LADING	TOTAL GALLONS	FLASH POINT	SPECIF. GRAV.	TOTAL ORGANIC HALOGENS

LEXINGTON RECYCLE CENTER (1990 – 1991)

HUNTSVILLE, AL BRANCH – RECYCLED PWS

3-019-91

PERIOD	DATE	SAMPLE#	INVENT. CONTR.#	BILL OF LADING	TOTAL GALLONS	FLASH POINT	SPECIF. GRAV.	TOTAL ORGANIC HALOGENS
1	01-04-91	LR-3278C	818575	189621	4000	PASS	0.78	0.19
1	01-13-91	LR-3303C	870279	189643	7200	PASS	0.78	0.17
1	01-17-91	LR-3320C	870824	189655	6000	PASS	0.78	0.18
2	01-28-91	LR-3350C	938241	189772	6000	PASS	0.78	0.17
2	01-30-91	LR-3360C	872505	189699	6000	PASS	0.78	0.2
2	02-13-91	LR-3403C	24547	189827	4000	PASS	0.78	0.12
2	02-20-91	LR-3423C	49205	199138	4500	PASS	0.78	0.23
3	02-24-91	LR-3434C	104356	199206	6000	PASS	0.78	0.22
3	03-04-91	LR-3462C	132019	199170	7000	PASS	0.78	0.1
3	03-06-91	LR-3471C	165852	199222	2000	PASS	0.78	0.23
3	03-08-91	LR-3480C	167940	199241	5000	PASS	0.78	0.17
3	03-14-91	LR-3498C	200592	199246	2000	PASS	0.78	0.19
3	03-15-91	LR-3504C	205641	199272	7200	PASS	0.78	0.19
3	03-21-91	LR-3523C	205633	199285	4000	PASS	0.78	0.19
4	04-02-91	LR-3558C	271791	199437	7200	PASS	0.78	0.26
4	04-04-91	LR-3569C	315481	199363	7200	PASS	0.78	0.36
4	04-15-91	LR-3591C	350264	199405	6000	PASS	0.78	0.28
4	04-18-91	LR-3609C	350181	199397	5000	PASS	0.78	0.3
5	04-23-91	LR-3622C	388009	199412	7200	PASS	0.78	0.4
5	04-26-91	LR-3637C	437293	199543	7200	PASS	0.78	0.44
5	05-02-91	LR-3654C	436675	199516	7200	PASS	0.78	0.44
5	05-07-91	LR-3667C	470914	199550	7200	PASS	0.78	0.43
5	05-10-91	LR-3678C	505735	199576	7200	PASS	0.78	0.54
6	05-20-91	LR-3706C	554964	199612	7000	PASS	0.78	0.42
6	05-24-91	LR-3715C	600387	199638	7000	PASS	0.78	0.58
6	05-29-91	LR-3725C	621409	199628	7000	PASS	0.78	0.48
6	06-03-91	LR-3735C	638064	199935	7200	PASS	0.78	0.48
6	06-10-91	LR-3758C	674796	199974	7200	PASS	0.78	0.19
7	06-14-91	LR-3775C	707471	202734	7200	PASS	0.78	0.21
7	06-26-91	LR-3802C	766774	199759	7200	PASS	0.78	0.21
7	06-28-91	LR-3811C	790378	199799	7200	PASS	0.78	0.24
7	07-03-91	LR-3828C	811604	202773	7200	PASS	0.78	0.22
7	07-09-91	LR-3840C	827295	202770	7200	PASS	0.78	0.22
8	07-17-91	LR-3866C	880336	202796	4000	PASS	0.78	0.22
8	07-22-91	LR-3874C	903682	202821	7200	PASS	0.78	0.34
8	07-26-91	LR-3888C	920835	203021	7200	PASS	0.78	0.51
PERIOD	DATE	SAMPLE#	INVENT. CONTR.#	BILL OF LADING	TOTAL GALLONS	FLASH POINT	SPECIF. GRAV.	TOTAL ORGANIC HALOGENS

8	07-30-91	LR-3899C	947952	203024	7200	PASS	0.78	0.52
8	08-05-91	LR-3924C	983395	203055	3500	PASS	0.8	0.67
9	08-15-91	LR-3960C	34991	203081	7200	PASS	0.78	0.26
9	08-19-91	LR-3970C	52274	203109	7200	PASS	0.78	0.18
9	08-28-91	LR-4004C	105999	203245	7200	PASS	0.78	0.16
9	09-03-91	LR-4020C	126433	203286	7000	PASS	0.8	0.17
9	09-06-91	LR-4033C	145953	203273	6000	PASS	0.78	0.26
10	09-09-91	LR-4042C	164103	203304	7200	PASS	0.78	0.25
10	09-12-91	LR-4055C	186130	203307	7200	PASS	0.78	0.195
10	09-23-91	LR-4083C	242115	203353	7200	PASS	0.78	0.59
10	09-26-91	LR-4103C	257113	203351	6500	PASS	0.78	0.27
10	10-03-91	LR-4130C	296715	203382	7200	PASS	0.78	0.59
11	10-07-91	LR-4139C	319947	203499	7200	PASS	0.78	0.55
11	10-10-91	LR-4156C	352591	3405	7200	PASS	0.78	0.47
11	10-16-91	LR-4176C	373332	203527	7200	PASS	0.78	0.61
11	10-25-91	LR-4199C	425785	211279	7200	PASS	0.78	0.55
11	10-31-91	LR-4220C	N/A	211292	7200	PASS	0.78	0.27
12	11-06-91	LR-4241C	503672	211298	6500	PASS	0.78	0.19
12	11-12-91	LR-4256C	529628	211232	6500	PASS	0.78	0.23
12	11-18-91	LR-4285C	558528	211237	7200	PASS	0.78	0.15
12	11-20-91	LR-4294C	574160	211259	6500	PASS	0.78	0.17
12	11-23-91	LR-4307C	595785	211336	6500	PASS	0.78	0.13
13	12-01-91	LR-4325C	633207	211364	7000	PASS	0.78	0.2
13	12-04-91	LR-4341C	648964	211365	7200	PASS	0.78	0.19
				AVERAGE			0.781	0.302
				STANDARD DEVIATIO			0.004	0.151

PERIOD	DATE	SAMPLE#	INVENT. CONTR.#	BILL OF LADING	TOTAL GALLONS	FLASH POINT	SPECIF. GRAV.	TOTAL ORGANIC HALOGENS

DIRTY INCOMING IMMERSION CLEANER (699)

LEXINGTON RECYCLE CENTER 1991

DATE	PER.	A150 (%)	DPME (%)	NMP (%)	MEA (%)	PCB	H2O (%)	FLASH POINT	SP. GR.	APPEAR.	RECOV. (%)	HVOC (%)
-	-	-	-	-	-	-	-	-	-	-	-	-
03-04-91	3	47.10	9.30	17.30	4.50	NONE	11.10	<142	0.954	DARK/NO	88.0	
03-14-91	3	43.20	8.90	16.90	4.10	ND	13.30	>142	0.949	DARK/	90.0	
03-22-91	3	47.60	9.70	16.60	4.40	NONE	11.80	<142	0.942	DARK/NO	92.0	
04-15-91	4	48.40	9.70	16.70	4.50	ND	9.10	>142	0.947	DARK/	87.0	
04-17-91	4	47.70	9.70	16.70	4.60	ND	9.10	>142	0.949	DARK/	90.0	
04-19-91	4	40.30	9.40	19.90	5.40	ND	8.90	>142	0.956	DARK	87.0	
04-30-91	5	9.90	2.20	3.40	1.00	NONE	9.10	>142	0.959	DARK/NO	90.0	0.980
05-08-91	5	43.30	9.50	15.90	4.30	NONE	9.60	>142	0.962	DARK/NO	87.0	2.100
05-16-91	5	51.00	10.60	18.30	2.70	NONE	9.30	>142	0.946	DK.BROWN	87.5	0.640
05-17-91	5	48.00	10.30	17.00	2.50	NONE	9.90	>142	0.958	DK.BROWN	90.0	0.940
05-24-91	6	43.70	9.50	16.60	2.20	NONE	12.20	>142	0.955	DK. BROWN	88.0	1.100
05-30-91	6	44.90	9.70	17.30	2.60	NONE	12.60	>142	0.954	DK. BROWN	89.0	0.900
06-06-91	6	46.70	9.70	17.10	4.50	NONE	9.00	>142	0.951	DK. BROWN	87.5	0.770
06-12-91	6	50.70	10.40	18.20	5.00	NONE	8.60	>142	0.950	DK. BROWN	89.0	0.450
06-14-91	6	45.40	9.70	16.90	4.50	NONE	9.30	>142	0.948	DK. BROWN	88.5	0.370
06-18-91	7	53.43	10.67	18.14	6.48	NONE	9.94	>142	0.958	DK. BROWN	90.0	0.230
06-20-91	7	40.63	8.03	14.75	3.97	NONE	9.73	>142	0.956	DK. BROWN	88.0	0.262
06-21-91	7	34.63	7.46	14.22	3.82	NONE	10.35	>142	0.957	DK. BROWN	89.0	0.079
06-25-91	7	41.96	9.26	16.97	4.55	NONE	8.82	>142	0.950	DK. BROWN	88.5	0.387
07-07-91	7	43.68	8.61	14.41	4.39	NONE	11.36	>142	0.957	DK. BROWN	89.0	0.685
07-09-91	7	49.75	9.98	18.47		NONE	11.90	>142	0.958	DK. BROWN	87.0	0.588
07-26-91	8	51.28	9.96	17.68	4.58	NONE	9.10	>142	0.956	DK. BROWN	89.0	1.263
08-02-91	8	43.91	10.04	21.55	5.42	NONE	10.42	>142	0.964	DK. BROWN	88.0	0.573
08-13-91	8	48.66	9.72	17.41	4.41	NONE	11.51	>142	0.957	DK. BROWN	91.0	0.453
08-16-91	9	53.30	10.73	19.57	4.95	NONE	9.14	>142	0.948	DK. BROWN	86.0	3.400
DATE	PER.	A150 (%)	DPME (%)	NMP (%)	MEA (%)	PCB	H2O (%)	FLASH POINT	SP. GR.	APPEAR.	RECOV. (%)	HVOC (%)

08-23-91	9	49.02	9.88	18.44	2.81	NONE	11.44	>142	0.957	DK. BROWN	90.0	0.119
08-29-91	9	37.07	10.15	24.94	5.74	NONE	9.90	>142	0.960	DK. BROWN	88.0	0.378
09-05-91	9	43.59	9.55	20.07	4.95	NONE	9.57	>142	0.958	DK. BROWN	91.0	0.627
09-19-91	10	49.10	9.70	17.87	4.41	NONE	9.87	>142	0.957	DK. BROWN	88.7	1.330
09-23-91	10	48.51	9.77	18.39	4.71	NONE	10.03	>142	0.960	DK. BROWN	88.0	0.965
09-27-91	10	48.54	9.62	17.94	4.56	NONE	9.59	>142	0.958	DK. BROWN	89.0	1.560
10-07-91	10	49.91	9.94	17.88	4.44	NONE	10.02	>142	0.958	DK. BROWN	87.0	0.405
10-18-91	11	44.00	9.96	21.56	5.02	NONE	11.22	>142	0.957	DK. BROWN	90.0	0.807
10-18-91	11	44.00	9.96	21.56	5.02	NONE	11.22	>142	0.957	DK. BROWN	90.0	0.807
10-25-91	11	14.29	10.08	36.37	5.86	NONE	11.08	>142	0.964	DK. BROWN	69.0	1.032
11-01-91	11	9.03	10.66	37.66	8.26	NONE	20.30	>142	0.994	DK. BROWN	93.0	0.472
11-11-91	12	3.52	10.91	45.09	1.76	NONE	7.28	>142	0.996	DK. BROWN	84.0	0.121
11-15-91	12	3.90	10.95	42.34	1.29	NONE	1.91	>142	0.980	DK. BROWN	87.0	0.052
11-22-91	12	51.80	9.93	16.94	4.54	NONE	15.16	>142	0.950	DK. BROWN	95.0	0.427
11-27-91	12	3.56	10.78	44.71	9.42	NONE	13.99	>142	1.020	DK. BROWN	90.0	0.427
AVERAGE		40.47	9.62	20.49	4.30		10.44		0.96		88.39	0.76
STD DEV		14.55	1.38	8.49	1.71		2.58		0.01		3.65	0.64
DATE	PER.	A150 (%)	DPME (%)	NMP (%)	MEA (%)	PCB	H2O (%)	FLASH POINT	SP. GR.	APPEAR.	RECOV. (%)	HVOC (%)

LEXINGTON RECYCLE CENTER (1990–1991)

BATCHED IMMERSION CLEANER (699)

DATE	BATCH#	GALLONS	A150	DPME	NMP	MEA	OLEIC ACID	WATER	BHT	DYE	FL. PT.	SPEC. GRAV.	HVOC	APPEAR.
01-03-91	L-91-101	5000	48.8	9.9	17	5.3	9	8	50 PPM	50 PPM	>142	0.952		OK
01-10-91	L-91-102	4982	50.5	9.6	17.2	5.5	9.8	7.3	50 PPM	50 PPM	>142	0.95		OK
01-17-91	L-91-103	5036	50.9	10.8	17.3	5.4	9	8.2	50 PPM	50 PPM	>142	0.95		OK
01-30-91	L-91-104	5102	49.9	9.2	16.9	5.3	8.6	8.8	50 PPM	50 PPM	>142	0.952		OK
02-07-91	L-91-105	5994	50.3	9.1	17.2	5.7	8.3	9.7	50 PPM	50 PPM	>142	0.955		OK
02-15-91	L-91-106	6128	51.6	9.6	17.2	5.6	10.3	7.5	50 PPM	50 PPM	>142	0.948		OK
02-21-91	L-91-107	8505	48.1	10.2	18.2	5.8	9.8	8.4	50 PPM	50 PPM	>142	0.951		OK
02-27-91	L-91-108	8302	50.9	9.7	17.5	5.1	9	7.3	50 PPM	50 PPM	>142	0.948		OK
03-05-91	L-91-109	7304	49.4	10.1	18.1	5.4	8.3	7.6	50 PPM	50 PPM	>142	0.95		OK
03-12-91	L-91-110	5980	50	11	17.8	5.7	10	7.1	50 PPM	50 PPM	>142	0.953		OK
03-15-91	L-91-111	7264	51.3	10.4	18.1	5.4	10	7.6	50 PPM	50 PPM	>142	0.953		OK
03-21-91	L-91-112	7952	48.6	10.2	18.3	5.3	9.8	7.2	50 PPM	50 PPM	>142	0.952		OK
04-02-91	L-91-113	7844	48.2	10.2	18	5.7	9	7.6	50 PPM	50 PPM	>142	0.951		OK
04-11-91	L-91-114	7236	48.1	9.8	18	5.9	8.3	7.6	50 PPM	50 PPM	>142	0.951		OK
04-19-91	L-91-115	8384	47.4	9.8	17.4	5	9.8	7.6	50 PPM	50 PPM	>142	0.949		OK
04-26-91	L-91-116	8033	49.8	9.4	17.4	6.3	7.8	7.8	50 PPM	50 PPM	>142	0.951		OK
05-10-91	L-91-117	6980	51.3	10.4	18.1	5.4	9.1	7.1	50 PPM	50 PPM	>142	0.951		OK
05-22-91	L-91-118	7992	46.2	10.4	18.2	6.9	8.4	9.6	50 PPM	50 PPM	>142	0.956		OK
06-03-91	L-91-119	7816	49.3	10.2	18	4.9	10	9	50 PPM	50 PPM	>150	0.952		OK
06-06-91	L-91-120	7858	49.4	11.2	19	4.5	8	8.1	50 PPM	50 PPM	>145	0.957		OK
06-13-91	L-91-121	5602	48.4	10	17.3	5.1	9	7.9	50 PPM	50 PPM	>145	0.953		OK
06-17-91	L-91-122	6483	50.9	10.3	17.8	5.3	9	8.9	50 PPM	50 PPM	>142	0.952		OK
06-26-91	L-91-123	8506	51.1	9.8	15.5	5.2	9	7.1	50 PPM	50 PPM	>145	0.947		OK
07-04-91	L-91-124	8640	49.9	9.8	17.1	5.5	7.6	8.7	50 PPM	50 PPM	>143	0.951		OK
DATE	BATCH#	GALLONS	A150	DPME	NMP	MEA	OLEIC ACID	WATER	BHT	DYE	FL. PT.	SPEC. GRAV.	HVOC	APPEAR.

DATE	BATCH#	GALLONS	A150	DPME	NMP	MEA	OLEIC ACID	WATER	BHT	DYE	FL. PT.	SPEC. GRAV.	HVOC	APPEAR.
07-12-91	L-91-125	8344	50.3	9.8	18.6	5.8	9.8	8.4	50 PPM	50 PPM	>142	0.951	-----	OK
07-25-91	L-91-126	7790	48.6	9.8	17.5	5.3	9.1	8.8	50 PPM	50 PPM	>145	0.95	-----	OK
07-25-91	L-91-127	5001	48.9	10	16.2	5.9	8.3	6.4	50 PPM	50 PPM	>140	0.94	-----	OK
07-31-91	L-91-128	8060	49.7	9.9	18	5.4	9	7.4	50 PPM	50 PPM	>142	0.948	-----	OK
08-08-91	L-91-129	7399	48.8	10.3	18.7	5.6	8.3	7.1	50 PPM	50 PPM	>142	0.949	-----	OK
08-28-91	L-91-130	8236	48.6	9.8	19.5	5.6	9	8.3	50 PPM	50 PPM	>143	0.952	-----	OK
09-06-91	L-91-131	6710	49.5	9.7	16.4	5.5	9.2	8.4	50 PPM	50 PPM	>142	0.947	-----	OK
09-19-91	L-91-132	8088	50.2	10.1	16.2	5.1	7.6	8.9	50 PPM	50 PPM	>142	0.949	-----	OK
09-25-91	L-91-133	7147	49.3	10.1	18.3	5.7	8.2	8.3	50 PPM	50 PPM	>146	0.95	-----	OK
10-08-91	L-91-134	8034	50.1	10.1	17.3	6.2	7.6	8.9	50 PPM	50 PPM	>143	0.95	0.48	OK
10-21-91	L-91-135	7858	50.1	10.2	17	5.5	9	9	50 PPM	50 PPM	>143	0.95	-----	OK
10-25-91	L-91-136	8290	50.3	10.1	17.1	5.6	7.9	8.6	50 PPM	50 PPM	>144	0.95	-----	OK
10-30-91	L-91-137	7682	48	9.8	16.1	5.5	9	8.1	50 PPM	50 PPM	>144	0.948	-----	OK
11-08-91	L-91-138	7088	51.1	10.4	16.8	6	10.2	8.7	50 PPM	50 PPM	>140	0.949	0.42	OK
12-06-91	L-91-139	7344	50.4	10.2	15.5	5	9	8	50 PPM	50 PPM	>140	0.951	0.46	OK
	AVERAGE		49.595	10.036	17.482	5.510	8.926	8.077				0.919 ~~5.510~~		
	STANDARD DEV.		1.192	0.417	0.878	0.415	0.756	0.749				0.415		

EXHIBIT C-4-d

INDIVIDUAL WASTE DRUMS SAMPLING
INDIANA STUDY

Appendix C-4

Exhibit C-4-d
Safety-Kleen Corporation
Individual Waste Drums Sampling
Indiana Study

The data presented within this exhibit provides detailed analyses of individual drums of wastes randomly selected at Safety-Kleen Branch Facilities in Indiana in 1992.

Data is presented for the following parameters:

- Semivolatile organics.
- Volatile organics.
- TCLP organics.
- Metals.
- PCB.
- Flashpoint and specific gravity.

In summary, these detailed analyses have not revealed any levels of constituents that would change how the Branch Facilities would handle these wastes.

Semivolatiles were detected in low concentrations (generally less than 0.1%) primarily within mineral spirit and immersion cleaner wastes, which is to be expected due to the petroleum distillate-base of these materials.

Both chlorinated and nonchlorinated volatiles were encountered in mineral spirit and immersion cleaner wastes. Concentrations of chlorinated organics were generally less than 0.1% in all wastes, except in dry cleaner wastes and two samples of mineral spirit dumpster mud, where phase-separated perchloroethylene appears to have settled into the sampled sediments. Paint-related waste streams were void of chlorinated organics, except low concentrations of methylene chloride, which is indicative of the typical lack of chlorinated materials in paint solvents and formulations.

Analyses for PCBs of spent immersion cleaner, mineral spirits-based spent parts washer solvent and mineral spirits-based parts washer solvent dumpster mud revealed no detected isomers. The following table summarizes flash point and specific gravity data for the various waste streams:

	Flash Point (°F)		**Specific Gravity**	
	Range	**Average**	**Range**	**Average**
Mineral Spirits-Based Spent Parts Washer Solvent	120 - 134	126	0.792 - 0.801	0.790
Spent 699 Immersion Cleaner	See footnote	See footnote	0.938 - 0.945	0.943
Spent Paint Spray Gun Cleaner	< 40	< 40	0.792 - 0.849	0.832
Paint Waste	< 40	< 40	0.794 - 0.875	0.843
Spent Antifreeze/Glycol Waste	NA	NA	1.065 - 1.085	1.078
Mineral Spirits-Based Parts Washer Solvent Dumpster Mud	40 - 86	60	0.792 - 0.842	0.804

Samples of spent 699 immersion cleaner were re-analyzed for flash point due to unanticipated low readings. Re-analysis indicated that all samples possessed flash points > 140°F.

SEMIVOLATILES

BRANCH #	DESC	LAB#	Phenol	b2ClIPE	2ClPhen	1,3DCB	1,4DCB	1,2DCB	2MePhen	2,2ClProp
Immersion Cleaner										
PORTAGE	IC	254879	ND	ND	ND	.06%	.17%	.27%	ND	ND
EVANSVILLE	IC	254895	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	IC	271345	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	IC	254867	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	ICD	254895D	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	ICD	271345D	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	ICD	254879D	ND	ND	ND	ND	.14%	.22%	ND	ND
FORT WAYN	ICD	254867D	ND	ND	ND	ND	ND	ND	ND	ND
Mineral Spirits Dumpster Sediment										
EVANSVILLE	MSDS	254896	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	MSDS	271346	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	MSDS	254878	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	MSDS	254866	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	MSDSD	254896D	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	MSDSD	271346D	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	MSDSD	254878D	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	MSDSD	254866D	ND	ND	ND	ND	ND	ND	ND	ND
Mineral Spirits										
EVANSVILLE	SMS	254201	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	SMS	254870	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	SMS	254884	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	SMS	254855	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	SMSD	254201D	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	SMSD	254870D	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	SMSD	254884D	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	SMSD	254855D	ND	ND	ND	ND	ND	ND	ND	ND

SEMIVOLATILES

BRANCH #	DESC	4MePhen	N-nitroso	Cl6Eth	NitroB	Isophor	2NitrPhn	2,4DMP	2CEM	,4DCPhen
Immersion Cleaner										
PORTAGE	IC	.094%	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	IC	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	IC	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	IC	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	ICD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	ICD	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	ICD	.088%	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	ICD	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mineral Spirits Dumpster										
EVANSVILLE	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mineral Spirits										
EVANSVILLE	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND

SEMIVOLATILES

BRANCH #	DESC	1,2,4TCB	Naphth	4ClAnil	Cl6-but	4Cl3MP	2MeNaph	6ClCPD	2,4,6ClPh	2,4,5ClPh
Immersion Cleaner										
PORTAGE	IC	ND	ND	ND	ND	ND	.14%	ND	ND	ND
EVANSVILLE	IC	ND	2.5%	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	IC	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	IC	ND	1.7%	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	ICD	ND	2.7%	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	ICD	ND	2.6%	ND	ND	ND	ND	ND	ND	ND
PORTAGE	ICD	ND	ND	ND	ND	ND	.14%	ND	ND	ND
FORT WAYN	ICD	ND	1.7%	ND	ND	ND	ND	ND	ND	ND
Mineral Spirits Dumpster										
EVANSVILLE	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	MSDS	ND	.11%	ND	ND	ND	.052%	ND	ND	ND
FORT WAYN	MSDS	ND	.45%	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	MSDSD	ND	.07%	ND	ND	ND	.033%	ND	ND	ND
FORT WAYN	MSDSD	ND	.35%	ND	ND	ND	ND	ND	ND	ND
Mineral Spirits										
EVANSVILLE	SMS	ND	.11%	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	SMS	ND	.20%	ND	ND	ND	.056%	ND	ND	ND
SOUTH BEN	SMS	ND	.037%	ND	ND	ND	.014%	ND	ND	ND
EVANSVILLE	SMSD	ND	.11%	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	SMSD	ND	.22%	ND	ND	ND	.063%	ND	ND	ND
SOUTH BEN	SMSD	ND	.053%	ND	ND	ND	.020%	ND	ND	ND

SEMIVOLATILES

BRANCH #	DESC	2ClPhen	2NitrAnil	DMPhth	Acenapthl	2,6DNT	3NitrAnil	Acenapth	2,4DNP	4Nitroph
Immersion Cleaner										
PORTAGE	IC	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	IC	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	IC	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	IC	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	ICD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	ICD	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	ICD	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	ICD	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mineral Spirits Dumpster										
EVANSVILLE	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mineral Spirits										
EVANSVILLE	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND

SEMIVOLATILES

BRANCH #	DESC	DibenFur	2,4DNT	DiethPhth	4Clphen	Fluor	4NitrAnil	6N2MePh	NitDPA	4BrPhEth
Immersion Cleaner										
PORTAGE	IC	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	IC	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	IC	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	IC	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	ICD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	ICD	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	ICD	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	ICD	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mineral Spirits Dumpster										
EVANSVILLE	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mineral Spirits										
EVANSVILLE	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND

SEMIVOLATILES

BRANCH #	DESC	6C|Benz	5C|Phen	Phenan	Anthr	Carbaz	DiBPhth	Floranth	Pyrene	BenzPhth
Immersion Cleaner										
PORTAGE	IC	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	IC	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	IC	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	IC	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	ICD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	ICD	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	ICD	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	ICD	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mineral Spirits Dumpster										
EVANSVILLE	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	.17%
EVANSVILLE	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	.15%
Mineral Spirits										
EVANSVILLE	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	SMS	ND	ND	ND	ND	ND	.059%	ND	ND	.12%
PORTAGE	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	SMSD	ND	ND	ND	ND	ND	.038%	ND	ND	.095%
PORTAGE	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND

SEMIVOLATILES

BRANCH #	DESC	DCBenzi	Benzanth	Chrysene	2EthHexP	DIOctPhth	B(b)fluor	B(k)fluor	B(a)pyr	IndPyr
Immersion Cleaner										
PORTAGE	IC	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	IC	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	IC	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	IC	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	ICD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	ICD	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	ICD	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	ICD	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mineral Spirits Dumpster										
EVANSVILLE	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mineral Spirits										
EVANSVILLE	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	SMS	ND	ND	ND	.14%	ND	ND	ND	ND	ND
PORTAGE	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYN	SMSD	ND	ND	ND	.10%	ND	ND	ND	ND	ND
PORTAGE	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEN	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND

SEMIVOLATILES

BRANCH #	DESC	DiBnzAnth	BenzPeryl
Immersion Cleaner			
PORTAGE	IC	ND	ND
EVANSVILLE	IC	ND	ND
SOUTH BEN	IC	ND	ND
FORT WAYN	IC	ND	ND
EVANSVILLE	ICD	ND	ND
SOUTH BEN	ICD	ND	ND
PORTAGE	ICD	ND	ND
FORT WAYN	ICD	ND	ND
Mineral Spirits Dumpster			
EVANSVILLE	MSDS	ND	ND
SOUTH BEN	MSDS	ND	ND
PORTAGE	MSDS	ND	ND
FORT WAYN	MSDS	ND	ND
EVANSVILLE	MSDSD	ND	ND
SOUTH BEN	MSDSD	ND	ND
PORTAGE	MSDSD	ND	ND
FORT WAYN	MSDSD	ND	ND
Mineral Spirits			
EVANSVILLE	SMS	ND	ND
FORT WAYN	SMS	ND	ND
PORTAGE	SMS	ND	ND
SOUTH BEN	SMS	ND	ND
EVANSVILLE	SMSD	ND	ND
FORT WAYN	SMSD	ND	ND
PORTAGE	SMSD	ND	ND
SOUTH BEN	SMSD	ND	ND

VOLATILES

(PPB, UNLESS OTHERWIS E NOTED)

BRANCH #	DESCRIP	LAB#	ClMeth	BrMeth	VinylCl	ClEth	MeCL	Acet	CS2	1,1DCE
Immersion Cleaner										
EVANSVILLE	IC	254895	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	IC	271345	ND	ND	ND	ND	ND	.020%	ND	ND
FORT WAYNE	IC	254867	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	IC	254879	ND	ND	ND	ND	ND	.031%	ND	ND
SOUTH BEND	ICD	271345D	ND	ND	ND	ND	ND	.020%	ND	ND
FORT WAYNE	ICD	254867D	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	ICD	254879D	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	ICD	254895D	ND	ND	ND	ND	ND	ND	ND	ND
Lacquer Thinner										
EVANSVILLE	LT	254899	ND	ND	ND	ND	ND	7.0%	ND	ND
SOUTH BEND	LT	254853	ND	ND	ND	ND	3%	9.6%	ND	ND
PORTAGE	LT	254882	ND	ND	ND	ND	ND	8.9%	ND	ND
FORT WAYNE	LT	254872	ND	ND	ND	ND	ND	14%	ND	ND
PORTAGE	LTD	254882D	ND	ND	ND	ND	ND	7.6%	ND	ND
EVANSVILLE	LTD	254899D	ND	ND	ND	ND	ND	8.4%	ND	ND
SOUTH BEND	LTD	264853D	ND	ND	ND	ND	ND	15%	ND	ND
FORT WAYNE	LTD	254872D	ND	ND	ND	ND	ND	9.8%	ND	ND
Mineral Spirits Dumpster Se diment										
EVANSVILLE	MSDS	254896	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	MSDS	271346	ND	ND	ND	ND	ND	.082%	ND	ND
PORTAGE	MSDS	254878	ND	ND	ND	ND	ND	2.5%	ND	ND
FORT WAYNE	MSDS	254866	ND	ND	ND	ND	ND	.027%	ND	ND
FORT WAYNE	MSDSD	254866D	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	MSDSD	254896D	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	MSDSD	271346D	ND	ND	ND	ND	ND	.13%	ND	ND
PORTAGE	MSDSD	254878D	ND	ND	ND	ND	ND	ND	ND	ND
BRANCH #	DESCRIP	LAB#	ClMeth	BrMeth	VinylCl	ClEth	MeCL	Acet	CS2	1,1DCE

Naphtha Dry Cleaner Waste s										
SOUTH BEND	NAPHFM	254854	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	NAPHFMD	254854D	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	NAPHSB	254871	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	NAPHSBD	254871D	ND	ND	ND	ND	ND	ND	ND	ND
PERC Filter Material										
FORT WAYNE	PERCFM	254868	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	PERCFM	271343	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	PERCFM	254898	ND	ND	ND	ND	ND	.11%	ND	ND
PORTAGE	PERCFM	254881	ND	ND	ND	ND	.71%	ND	ND	ND
EVANSVILLE	PERCFMD	254898D	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	PERCFMD	261343D	ND	ND	ND	ND	ND	1.3%	ND	ND
FORT WAYNE	PERCFMD	254868D	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	PERCFMD	254881D	ND	ND	ND	ND	1.2%	ND	ND	ND
PERC Dry Cleaner Wastes										
FORT WAYNE	PERCMUC	254865	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	PERCMUC	254865D	ND	ND	ND	ND	ND	.71%	ND	ND
EVANSVILLE	PERCSB	254897	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	PERCSB	271344	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	PERCSB	254869	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	PERCSB	254880	ND	ND	ND	ND	.85%	3.5%	ND	ND
FORT WAYNE	PERCSBD	254869D	ND	ND	ND	ND	ND	2.8%	ND	ND
EVANSVILLE	PERCSBD	254897D	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	PERCSBD	254880D	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	PERCSBD	271344D	ND	ND	ND	ND	ND	ND	ND	ND
BRANCH #	DESCRIP	LAB#	ClMeth	BrMeth	VinylCl	ClEth	MeCL	Acet	CS2	1,1DCE

Mineral Spirits										
PORTAGE	SMS	254884	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	SMS	254870	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	SMS	254201	ND	ND	ND	ND	ND	.14%	ND	ND
SOUTH BEND	SMS	254855	ND	ND	ND	ND	.029%	ND	ND	ND
EVANSVILLE	SMSD	254201D	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	SMSD	254870D	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	SMSD	254855D	ND	ND	ND	ND	.032%	ND	ND	ND
PORTAGE	SMSD	254884D	ND	ND	ND	ND	ND	ND	ND	ND
Waste Paint										
EVANSVILLE	WP	254900	ND	ND	ND	ND	ND	1.6%	ND	ND
SOUTH BEND	WP	254852	ND	ND	ND	ND	ND	11%	ND	ND
FORT WAYNE	WP	254873	ND	ND	ND	ND	ND	6.2%	ND	ND
PORTAGE	WP	254883	ND	ND	ND	ND	ND	6.3%	ND	ND
PORTAGE	WPD	254883D	ND	ND	ND	ND	ND	6.3%	ND	ND
EVANSVILLE	WPD	254900D	ND	ND	ND	ND	ND	1.4%	ND	ND
SOUTH BEND	WPD	254852D	ND	ND	ND	ND	ND	14%	ND	ND
FORT WAYNE	WPD	254873D	ND	ND	ND	ND	ND	10%	ND	ND
BRANCH #	DESCRIP	LAB#	ClMeth	BrMeth	VinylCl	ClEth	MeCL	Acet	CS2	1,1DCE

VOLATILES

(PPB, UNLESS OTHERWIS

BRANCH #	DESCRIP	1,1DCA	1,2DCE	CCl3	1,2DCA	2Butano	111TCA	CCl4	BrCl2Me	1,2DCP
Immersion Cleaner										
EVANSVILLE	IC	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	IC	ND	ND	ND	ND	.053%	ND	ND	ND	ND
FORT WAYNE	IC	ND	ND	ND	ND	.019%	ND	ND	ND	ND
PORTAGE	IC	ND	ND	ND	ND	.028%	ND	ND	ND	ND
SOUTH BEND	ICD	ND	ND	ND	ND	.037%	ND	ND	ND	ND
FORT WAYNE	ICD	ND	ND	ND	ND	.025%	ND	ND	ND	ND
PORTAGE	ICD	ND	ND	ND	ND	.030%	ND	ND	ND	ND
EVANSVILLE	ICD	ND	ND	ND	ND	.029%	ND	ND	ND	ND
Lacquer Thinner										
EVANSVILLE	LT	ND	ND	ND	ND	9.7%	ND	ND	ND	ND
SOUTH BEND	LT	ND	ND	ND	ND	12%	ND	ND	ND	ND
PORTAGE	LT	ND	ND	ND	ND	9.5%	ND	ND	ND	ND
FORT WAYNE	LT	ND	ND	ND	ND	12%	ND	ND	ND	ND
PORTAGE	LTD	ND	ND	ND	ND	8.1%	ND	ND	ND	ND
EVANSVILLE	LTD	ND	ND	ND	ND	11%	ND	ND	ND	ND
SOUTH BEND	LTD	ND	ND	ND	ND	14%	ND	ND	ND	ND
FORT WAYNE	LTD	ND	ND	ND	ND	15%	ND	ND	ND	ND
Mineral Spirits Dumpster Se										
EVANSVILLE	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	MSDS	ND	ND	ND	ND	.034%	ND	ND	ND	ND
PORTAGE	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	MSDS	ND	ND	ND	ND	.022%	.052%	ND	ND	ND
FORT WAYNE	MSDSD	ND	ND	ND	ND	.027%	.056%	ND	ND	ND
EVANSVILLE	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	MSDSD	ND	ND	ND	ND	.039%	ND	ND	ND	ND
PORTAGE	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND

BRANCH # DESCRIP 1,1DCA 1,2DCE CCl3 1,2DCA 2Butano 111TCA CCl4 BrCl2Me 1,2DCP

Naphtha Dry Cleaner Waste										
SOUTH BEND	NAPHFM	ND	ND	ND	ND	.034%	ND	ND	ND	ND
SOUTH BEND	NAPHFMD	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	NAPHSB	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	NAPHSBD	ND	ND	ND	ND	ND	ND	ND	ND	ND
PERC Filter Material										
FORT WAYNE	PERCFM	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	PERCFM	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	PERCFM	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	PERCFM	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	PERCFMD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	PERCFMD	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	PERCFMD	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	PERCFMD	ND	ND	ND	ND	ND	ND	ND	ND	ND
PERC Dry Cleaner Wastes										
FORT WAYNE	PERCMUC	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	PERCMUC	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	PERCSB	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	PERCSB	ND	ND	ND	ND	1.4%	ND	ND	ND	ND
FORT WAYNE	PERCSB	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	PERCSB	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	PERCSBD	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	PERCSBD	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	PERCSBD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	PERCSBD	ND	ND	ND	ND	ND	ND	ND	ND	ND
BRANCH #	DESCRIP	1,1DCA	1,2DCE	CCl3	1,2DCA	2Butano	111TCA	CCl4	BrCl2Me	1,2DCP

Mineral Spirits										
PORTAGE	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	SMS	ND	ND	ND	ND	.040%	.23%	ND	ND	ND
EVANSVILLE	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	SMSD	ND	ND	ND	ND	.024%	.23%	ND	ND	ND
PORTAGE	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
Waste Paint										
EVANSVILLE	WP	ND	ND	ND	ND	12%	ND	ND	ND	ND
SOUTH BEND	WP	ND	ND	ND	ND	5.1%	ND	ND	ND	ND
FORT WAYNE	WP	ND	ND	ND	ND	5%	ND	ND	ND	ND
PORTAGE	WP	ND	ND	ND	ND	7.1%	ND	ND	ND	ND
PORTAGE	WPD	ND	ND	ND	ND	7.4%	ND	ND	ND	ND
EVANSVILLE	WPD	ND	ND	ND	ND	11%	ND	ND	ND	ND
SOUTH BEND	WPD	ND	ND	ND	ND	3.1%	ND	ND	ND	ND
FORT WAYNE	WPD	ND	ND	ND	ND	7.9%	ND	ND	ND	ND
BRANCH #	DESCRIP	1,1DCA	1,2DCE	CCl3	1,2DCA	2Butano	111TCA	CCl4	BrCl2Me	1,2DCP

VOLATILES

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BRANCH #	DESCRIP	C13DCP	TCE	r2ClMeth	112TCA	Benz	T13DCP	Brform	4Me2Pen	2Hexano
Immersion Cleaner										
EVANSVILLE	IC	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	IC	ND	ND	ND	ND	ND	ND	ND	.051%	ND
FORT WAYNE	IC	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	IC	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	ICD	ND	ND	ND	ND	ND	ND	ND	.076%	ND
FORT WAYNE	ICD	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	ICD	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	ICD	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lacquer Thinner										
EVANSVILLE	LT	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	LT	ND	ND	ND	ND	ND	ND	ND	3%	ND
PORTAGE	LT	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	LT	ND	ND	ND	ND	ND	ND	ND	3.3%	ND
PORTAGE	LTD	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	LTD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	LTD	ND	ND	ND	ND	ND	ND	ND	2.8%	ND
FORT WAYNE	LTD	ND	ND	ND	ND	ND	ND	ND	3%	ND
Mineral Spirits Dumpster Se										
EVANSVILLE	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	MSDSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
BRANCH #	DESCRIP	C13DCP	TCE	r2ClMeth	112TCA	Benz	T13DCP	Brform	4Me2Pen	2Hexano

Naphtha Dry Cleaner Waste										
SOUTH BEND	NAPHFM	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	NAPHFMD	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	NAPHSB	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	NAPHSBD	ND	ND	ND	ND	ND	ND	ND	ND	ND
PERC Filter Material										
FORT WAYNE	PERCFM	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	PERCFM	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	PERCFM	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	PERCFM	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	PERCFMD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	PERCFMD	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	PERCFMD	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	PERCFMD	ND	ND	ND	ND	ND	ND	ND	ND	ND
PERC Dry Cleaner Wastes										
FORT WAYNE	PERCMUC	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	PERCMUC	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	PERCSB	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	PERCSB	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	PERCSB	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	PERCSB	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	PERCSBD	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	PERCSBD	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	PERCSBD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	PERCSBD	ND	ND	ND	ND	ND	ND	ND	ND	ND

BRANCH #	DESCRIP	C13DCP	TCE	r2ClMeth	112TCA	Benz	T13DCP	Brform	4Me2Pen	2Hexano

Mineral Spirits										
PORTAGE	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	SMS	ND	ND	ND	ND	ND	ND	ND	.062%	ND
EVANSVILLE	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	SMSD	ND	ND	ND	ND	ND	ND	ND	.067%	ND
PORTAGE	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
Waste Paint										
EVANSVILLE	WP	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	WP	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	WP	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	WP	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	WPD	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	WPD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	WPD	ND	ND	ND	ND	ND	ND	ND	2.5%	ND
FORT WAYNE	WPD	ND	ND	ND	ND	ND	ND	ND	ND	ND
BRANCH #	DESCRIP	C13DCP	TCE	r2ClMeth	112TCA	Benz	T13DCP	Brform	4Me2Pen	2Hexano

VOLATILES

(PPB, UNLESS OTHERWIS

BRANCH #	DESCRIP	PERC	1122TCA	Toluen	ClBenz	EtBenz	STYR	XYLS
Immersion Cleaner								
EVANSVILLE	IC	.02%	ND	ND	ND	ND	ND	ND
SOUTH BEND	IC	ND	ND	.053%	ND	ND	ND	.030%
FORT WAYNE	IC	.020%	ND	.013%	ND	ND	ND	.028%
PORTAGE	IC	.017%	ND	.029%	.013%	ND	ND	.037%
SOUTH BEND	ICD	.014%	ND	.058%	ND	ND	ND	.033%
FORT WAYNE	ICD	ND	ND	.012%	ND	ND	ND	.029%
PORTAGE	ICD	.016%	ND	.032%	.013%	.014%	ND	.038%
EVANSVILLE	ICD	.02%	ND	ND	ND	ND	ND	.031%
Lacquer Thinner								
EVANSVILLE	LT	ND	ND	25%	ND	ND	ND	3.4%
SOUTH BEND	LT	ND	ND	27%	ND	ND	ND	3.2%
PORTAGE	LT	ND	ND	26%	ND	ND	ND	2.4%
FORT WAYNE	LT	ND	ND	50%	ND	ND	ND	6.8%
PORTAGE	LTD	ND	ND	28%	ND	ND	ND	2.5%
EVANSVILLE	LTD	ND	ND	25%	ND	ND	ND	3.4%
SOUTH BEND	LTD	ND	ND	28%	ND	ND	ND	3.4%
FORT WAYNE	LTD	ND	ND	28%	ND	ND	ND	3.9%
Mineral Spirits Dumpster Se								
EVANSVILLE	MSDS	.048%	ND	ND	ND	.043%	ND	.1%
SOUTH BEND	MSDS	.093%	ND	.27%	ND	ND	ND	.10%
PORTAGE	MSDS	29%	ND	ND	ND	ND	ND	ND
FORT WAYNE	MSDS	.035%	ND	ND	ND	ND	ND	.060%
FORT WAYNE	MSDSD	.049%	ND	ND	ND	ND	ND	.086%
EVANSVILLE	MSDSD	.065%	ND	ND	ND	ND	ND	.094%
SOUTH BEND	MSDSD	.068%	ND	.26%	ND	ND	ND	.065%
PORTAGE	MSDSD	40%	ND	ND	ND	ND	ND	ND

BRANCH # DESCRIP PERC 1122TCA Toluen ClBenz EtBenz STYR XYLS

Naphtha Dry Cleaner Waste								
SOUTH BEND	NAPHFM	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	NAPHFMD	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	NAPHSB	.17%	ND	.16%	ND	ND	ND	.32%
FORT WAYNE	NAPHSBD	.16%	ND	.15%	ND	ND	ND	.30%
PERC Filter Material								
FORT WAYNE	PERCFM	15%	ND	ND	ND	ND	ND	ND
SOUTH BEND	PERCFM	14%	ND	ND	ND	ND	ND	ND
EVANSVILLE	PERCFM	1.4%	ND	ND	ND	ND	ND	ND
PORTAGE	PERCFM	24%	ND	ND	ND	ND	ND	ND
EVANSVILLE	PERCFMD	1.5%	ND	ND	ND	ND	ND	ND
SOUTH BEND	PERCFMD	14%	ND	ND	ND	ND	ND	ND
FORT WAYNE	PERCFMD	14%	ND	ND	ND	ND	ND	ND
PORTAGE	PERCFMD	21%	ND	ND	ND	ND	ND	ND
PERC Dry Cleaner Wastes								
FORT WAYNE	PERCMUC	6.9%	ND	ND	ND	ND	ND	ND
FORT WAYNE	PERCMUC	9.6%	ND	ND	ND	ND	ND	ND
EVANSVILLE	PERCSB	35%	ND	ND	ND	ND	ND	ND
SOUTH BEND	PERCSB	19%	ND	ND	ND	ND	ND	ND
FORT WAYNE	PERCSB	46%	ND	ND	ND	ND	ND	ND
PORTAGE	PERCSB	35%	ND	ND	ND	ND	ND	ND
FORT WAYNE	PERCSBD	26%	ND	ND	ND	ND	ND	ND
EVANSVILLE	PERCSBD	37%	ND	ND	ND	ND	ND	ND
PORTAGE	PERCSBD	38%	ND	ND	ND	ND	ND	ND
SOUTH BEND	PERCSBD	19%	ND	ND	ND	ND	ND	ND
BRANCH #	DESCRIP	PERC	1122TCA	Toluen	ClBenz	EtBenz	STYR	XYLS

Mineral Spirits								
PORTAGE	SMS	ND	ND	ND	ND	ND	ND	.13%
FORT WAYNE	SMS	.075%	ND	ND	ND	ND	ND	ND
EVANSVILLE	SMS	ND	ND	ND	ND	ND	ND	.22%
SOUTH BEND	SMS	.052%	ND	.027%	ND	.077%	ND	.28%
EVANSVILLE	SMSD	ND	ND	ND	ND	ND	ND	.24%
FORT WAYNE	SMSD	.095%	ND	ND	ND	ND	ND	ND
SOUTH BEND	SMSD	.053%	ND	.028%	ND	.080%	ND	.29%
PORTAGE	SMSD	ND	ND	ND	ND	ND	ND	.12%
Waste Paint								
EVANSVILLE	WP	ND	ND	8.2%	ND	1.2%	ND	5.3%
SOUTH BEND	WP	ND	ND	26%	ND	ND	ND	2.7%
FORT WAYNE	WP	ND	ND	10%	ND	1%	ND	4.3%
PORTAGE	WP	ND	ND	18%	ND	ND	ND	4.5%
PORTAGE	WPD	ND	ND	18%	ND	ND	ND	4.6%
EVANSVILLE	WPD	ND	ND	6.5%	ND	1%	ND	4.5%
SOUTH BEND	WPD	ND	ND	27%	ND	ND	ND	2.7%
FORT WAYNE	WPD	ND	ND	ND	ND	1.1%	ND	4.4%
BRANCH #	DESCRIP	PERC	1122TCA	Toluen	ClBenz	EtBenz	STYR	XYLS

TCLP ORGANICS

(PPB, Unless Otherwise Note d)

Branch	Descrip.	Lab #	Benz	CCl4	ClBenz	Clform	Cresols	1,4DCB	1,2DCA	1,1DCE
Antifreeze										
EVANSVILLE	AF	254894	163	ND	ND	ND	ND	ND	ND	180
FORT WAYNE	AF	254864	ND	ND	ND	ND	ND	ND	ND	860
SOUTH BEND	AF	254851	748	ND	ND	ND	ND	ND	ND	720
PORTAGE	AF	254877	ND	ND	ND	ND	ND	ND	ND	79
PORTAGE	AFD	254877D	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	AFD	254894D	150	ND	ND	ND	ND	ND	ND	110
FORT WAYNE	AFD	254864D	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	AFD	254851D	598	ND	ND	ND	ND	ND	ND	510
Immersion Cleaner										
EVANSVILLE	IC	254895	ND	ND	ND	ND	350000	1100000	ND	ND
SOUTH BEND	IC	271345	ND	ND	ND	ND	ND	940000	ND	ND
FORT WAYNE	IC	254867	ND	ND	ND	ND	ND	ND	ND	190000
PORTAGE	IC	254879	ND	ND	130000	ND	ND	1200000	ND	ND
FORT WAYNE	ICD	254867D	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	ICD	254895D	ND	ND	ND	ND	ND	1000000	ND	ND
PORTAGE	ICD	254879D	ND	ND	130000	ND	ND	1400000	ND	ND
SOUTH BEND	ICD	271345D	ND	ND	ND	ND	ND	670000	ND	ND
Lacquer Thinner										
PORTAGE	LT	254882	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	LT	254872					ND	ND		
EVANSVILLE	LT	254899	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	LT	254853					ND	ND		
PORTAGE	LTD	254882D	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	LTD	254853D					ND	ND		
FORT WAYNE	LTD	254872D					ND	ND		
EVANSVILLE	LTD	254899D	ND	ND	ND	ND	ND	ND	ND	ND
Branch	Descrip.	Lab #	Benz	CCl4	ClBenz	Clform	Cresols	1,4DCB	1,2DCA	1,1DCE

Branch	Descrip.	Lab #	Benz	CCl4	ClBenz	Clform	Cresols	1,4DCB	1,2DCA	1,1DCE
PERC Dry Cleaner Waste										
SOUTH BEND	PERCFM	271343	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	PERCFM	254881	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	PERCFM	254868	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	PERCFM	254898	ND	ND	ND	ND	1200	ND	ND	ND
FORT WAYNE	PERCFMD	254868D	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	PERCFMD	254881D	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	PERCFMD	254898D	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	PERCFMD	271343D	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	PERCMUCK	254865	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	PERCMUCK	254865D	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	PERCSB	271344	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	PERCSB	254869	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	PERCSB	254880	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	PERCSB	254897	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	PERCSBD	271344D	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	PERCSBD	254869D	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	PERCSBD	254880D	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	PERCSBD	254897D	ND	ND	ND	ND	ND	ND	ND	ND
Mineral Spirits										
FORT WAYNE	SMS	254870					ND	ND		
SOUTH BEND	SMS	254855					ND	ND		
EVANSVILLE	SMS	254201	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	SMS	254884	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	SMSD	254870D					ND	ND		
PORTAGE	SMSD	254884D	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	SMSD	254201D	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	SMSD	254855D					ND	ND		

Branch	Descrip.	Lab #	Benz	CCl4	ClBenz	Clform	Cresols	1,4DCB	1,2DCA	1,1DCE
Mineral Spirits Dumpster Slud ge										
SOUTH BEND	MSDS	271346	ND	ND	ND	ND	1800	ND	ND	ND
FORT WAYNE	MSDS	254866	ND	ND	ND	ND	3500	ND	ND	ND
PORTAGE	MSDS	254878	ND	ND	ND	ND	1800	ND	ND	ND
EVANSVILLE	MSDS	254896	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	MSDSD	254866D	ND	ND	ND	ND	1300	ND	ND	370
PORTAGE	MSDSD	254878D	ND	ND	ND	ND	3500	ND	ND	ND
EVANSVILLE	MSDSD	254896D	ND	ND	ND	ND	1200	ND	ND	52
SOUTH BEND	MSDSD	271346D	ND	ND	ND	ND	1800	ND	ND	ND
Naptha Dry Cleaner Waste										
SOUTH BEND	NAPHFM	254854	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	NAPHFMD	254854D	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	NAPHSB	254871	ND	ND	ND	4600			ND	ND
FORT WAYNE	NAPHSBA	254871					ND	ND		
FORT WAYNE	NAPHSBAD	254871D					ND	ND		
FORT WAYNE	NAPHSBD	254871D	ND	ND	ND	ND			ND	ND
FORT WAYNE	NAPHSBL	254871	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	NAPHSBLD	254871D	ND	ND	ND	ND	ND	ND	ND	ND

Paint Waste

PORTAGE	WP	254883	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	WP	254900	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	WP	254852	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	WP	254873	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	WPD	254900D	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	WPD	254852D	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	WPD	254873D	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	WPD	254883D	ND	ND	ND	ND	ND	ND	ND	ND
Branch	Descrip.	Lab #	Benz	CCl4	ClBenz	Clform	Cresols	1,4DCB	1,2DCA	1,1DCE

TCLP ORGANICS

(PPB, Unless Otherwise Noted)

Branch	Descrip.	2,4DNT	HCB	HCBD	HCA	MEK	NitroB	PCP	Pyrid	PERC
Antifreeze										
EVANSVILLE	AF	ND	ND	ND	ND	390	ND	ND	ND	66
FORT WAYNE	AF	ND	ND	ND	ND	3042	ND	ND	ND	ND
SOUTH BEND	AF	ND	ND	ND	ND	ND	ND	ND	ND	2100
PORTAGE	AF	ND	ND	ND	ND	296	ND	ND	ND	540
PORTAGE	AFD	ND	ND	ND	ND	468	ND	ND	ND	2800
EVANSVILLE	AFD	ND	ND	ND	ND	445	ND	ND	ND	60
FORT WAYNE	AFD	ND	ND	ND	ND	6552	ND	ND	ND	ND
SOUTH BEND	AFD	ND	ND	ND	ND	242	ND	ND	ND	660
Immersion Cleaner										
EVANSVILLE	IC	ND	ND	ND	ND	ND	ND	ND	ND	200000
SOUTH BEND	IC	ND	ND	ND	ND	530000	ND	ND	ND	ND
FORT WAYNE	IC	ND	ND	ND	ND	ND	ND	ND	ND	200000
PORTAGE	IC	ND	ND	ND	ND	280000	ND	ND	ND	170000
FORT WAYNE	ICD	ND	ND	ND	ND	250000	ND	ND	ND	ND
EVANSVILLE	ICD	ND	ND	ND	ND	290000	ND	ND	ND	200000
PORTAGE	ICD	ND	ND	ND	ND	300000	ND	ND	ND	160000
SOUTH BEND	ICD	ND	ND	ND	ND	370000	ND	ND	ND	140000
Lacquer Thinner										
PORTAGE	LT	ND	ND	ND	ND	95000000	ND	ND	ND	ND
FORT WAYNE	LT	ND	ND	ND	ND		ND	ND	ND	
EVANSVILLE	LT	ND	ND	ND	ND	5.290%	ND	ND	ND	ND
SOUTH BEND	LT	ND	ND	ND	ND		ND	ND	ND	
PORTAGE	LTD	ND	ND	ND	ND	81000000	ND	ND	ND	ND
SOUTH BEND	LTD	ND	ND	ND	ND		ND	ND	ND	
FORT WAYNE	LTD	ND	ND	ND	ND		ND	ND	ND	
EVANSVILLE	LTD	ND	ND	ND	ND	6.270%	ND	ND	ND	ND

Branch Descrip. 2,4DNT HCB HCBD HCA MEK NitroB PCP Pyrid PERC

Branch	Descrip.	2,4DNT	HCB	HCBD	HCA	MEK	NitroB	PCP	Pyrid	PERC
PERC Dry Cleaner Waste										
SOUTH BEND	PERCFM	ND	ND	ND	ND	ND	ND	ND	ND	1200000
PORTAGE	PERCFM	ND	ND	ND	ND	ND	ND	ND	ND	.017%
FORT WAYNE	PERCFM	ND	ND	ND	ND	ND	ND	ND	ND	640000
EVANSVILLE	PERCFM	ND	ND	ND	ND	ND	ND	ND	ND	11000
FORT WAYNE	PERCFMD	ND	ND	ND	ND	ND	ND	ND	ND	720000
PORTAGE	PERCFMD	ND	ND	ND	ND	ND	ND	ND	ND	.019%
EVANSVILLE	PERCFMD	ND	ND	ND	ND	ND	ND	ND	ND	11000
SOUTH BEND	PERCFMD	ND	ND	ND	ND	ND	ND	ND	ND	940000
FORT WAYNE	PERCMUCK	ND	ND	ND	ND	ND	ND	ND	ND	2108000
FORT WAYNE	PERCMUCK	ND	ND	ND	ND	ND	ND	ND	ND	2108000
SOUTH BEND	PERCSB	ND	ND	ND	ND	ND	ND	ND	ND	110000
FORT WAYNE	PERCSB	ND	ND	ND	ND	ND	ND	ND	ND	190000
PORTAGE	PERCSB	ND	ND	ND	ND	ND	ND	ND	ND	35%
EVANSVILLE	PERCSB	ND	ND	ND	ND	ND	ND	ND	ND	35%
SOUTH BEND	PERCSBD	ND	ND	ND	ND	ND	ND	ND	ND	82000
FORT WAYNE	PERCSBD	ND	ND	ND	ND	ND	ND	ND	ND	160000
PORTAGE	PERCSBD	ND	ND	ND	ND	ND	ND	ND	ND	38%
EVANSVILLE	PERCSBD	ND	ND	ND	ND	ND	ND	ND	ND	37%
Mineral Spirits										
FORT WAYNE	SMS	ND	ND	ND	ND		ND	ND	ND	
SOUTH BEND	SMS	ND	ND	ND	ND		ND	ND	ND	
EVANSVILLE	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
PORTAGE	SMS	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	SMSD	ND	ND	ND	ND		ND	ND	ND	
PORTAGE	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	SMSD	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	SMSD	ND	ND	ND	ND		ND	ND	ND	

Branch	Descrip.	2,4DNT	HCB	HCBD	HCA	MEK	NitroB	PCP	Pyrid	PERC
Mineral Spirits Dumpster Slud										
SOUTH BEND	MSDS	ND	ND	ND	ND	1625	ND	ND	ND	1736
FORT WAYNE	MSDS	ND	ND	ND	ND	425	ND	ND	ND	693
PORTAGE	MSDS	ND	ND	ND	ND	ND	ND	ND	ND	322
EVANSVILLE	MSDS	ND	ND	ND	ND	262	ND	ND	ND	335
FORT WAYNE	MSDSD	ND	ND	ND	ND	275	ND	ND	ND	592
PORTAGE	MSDSD	ND	ND	ND	ND	375	ND	ND	ND	360
EVANSVILLE	MSDSD	ND	ND	ND	ND	450	ND	ND	ND	409
SOUTH BEND	MSDSD	ND	ND	ND	ND	2125	ND	ND	ND	1860
Naptha Dry Cleaner Waste										
SOUTH BEND	NAPHFM	ND	ND	ND	ND	360	ND	ND	ND	ND
SOUTH BEND	NAPHFMD	ND	ND	ND	ND	270	ND	ND	ND	ND
FORT WAYNE	NAPHSB					ND				220000
FORT WAYNE	NAPHSBA	ND	ND	ND	ND		ND	ND	ND	
FORT WAYNE	NAPHSBAD	ND	ND	ND	ND		ND	ND	ND	
FORT WAYNE	NAPHSBD					ND				44000
FORT WAYNE	NAPHSBL	ND	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	NAPHSBLD	ND	ND	ND	ND	ND	ND	ND	ND	ND

Paint Waste

PORTAGE	WP	ND	ND	ND	ND	3000000	ND	ND	ND	ND
EVANSVILLE	WP	ND	ND	ND	ND	.2052%	ND	ND	ND	ND
SOUTH BEND	WP	ND	ND	ND	ND	741000	ND	ND	ND	ND
FORT WAYNE	WP	ND	ND	ND	ND	1140000	ND	ND	ND	ND
EVANSVILLE	WPD	ND	ND	ND	ND	.2679%	ND	ND	ND	ND
SOUTH BEND	WPD	ND	ND	ND	ND	444600	ND	ND	ND	ND
FORT WAYNE	WPD	ND	ND	ND	ND	1026000	ND	ND	ND	ND
PORTAGE	WPD	ND	ND	ND	ND	4000000	ND	ND	ND	ND
Branch	Descrip.	2,4DNT	HCB	HCBD	HCA	MEK	NitroB	PCP	Pyrid	PERC

TCLP ORGANICS

(PPB, Unless Otherwise Noted)

Branch	Descrip.	TCE	2,4,5TCP	2,4,6TCP	VinylCl
Antifreeze					
EVANSVILLE	AF	ND	ND	ND	ND
FORT WAYNE	AF	ND	ND	ND	ND
SOUTH BEND	AF	ND	ND	ND	ND
PORTAGE	AF	ND	ND	ND	ND
PORTAGE	AFD	ND	ND	ND	ND
EVANSVILLE	AFD	ND	ND	ND	ND
FORT WAYNE	AFD	ND	ND	ND	ND
SOUTH BEND	AFD	ND	ND	ND	ND
Immersion Cleaner					
EVANSVILLE	IC	ND	ND	ND	ND
SOUTH BEND	IC	ND	ND	ND	ND
FORT WAYNE	IC	ND	ND	ND	ND
PORTAGE	IC	76000	ND	ND	ND
FORT WAYNE	ICD	ND	ND	ND	ND
EVANSVILLE	ICD	ND	ND	ND	ND
PORTAGE	ICD	ND	ND	ND	ND
SOUTH BEND	ICD	ND	ND	ND	ND
Lacquer Thinner					
PORTAGE	LT	ND	ND	ND	ND
FORT WAYNE	LT		ND	ND	
EVANSVILLE	LT	ND	ND	ND	ND
SOUTH BEND	LT		ND	ND	
PORTAGE	LTD	ND	ND	ND	ND
SOUTH BEND	LTD		ND	ND	
FORT WAYNE	LTD		ND	ND	
EVANSVILLE	LTD	ND	ND	ND	ND

Branch Descrip. TCE 2,4,5TCP 2,4,6TCP VinylCl

PERC Dry Cleaner Waste

SOUTH BEND	PERCFM	ND	ND	ND	ND
PORTAGE	PERCFM	ND	ND	ND	ND
FORT WAYNE	PERCFM	ND	ND	ND	ND
EVANSVILLE	PERCFM	ND	ND	ND	ND
FORT WAYNE	PERCFMD	ND	ND	ND	ND
PORTAGE	PERCFMD	ND	ND	ND	ND
EVANSVILLE	PERCFMD	ND	ND	ND	ND
SOUTH BEND	PERCFMD	ND	ND	ND	ND
FORT WAYNE	PERCMUCK	ND	ND	ND	ND
FORT WAYNE	PERCMUCK	ND	ND	ND	ND
SOUTH BEND	PERCSB	ND	ND	ND	ND
FORT WAYNE	PERCSB	ND	ND	ND	ND
PORTAGE	PERCSB	ND	ND	ND	ND
EVANSVILLE	PERCSB	ND	ND	ND	ND
SOUTH BEND	PERCSBD	ND	ND	ND	ND
FORT WAYNE	PERCSBD	ND	ND	ND	ND
PORTAGE	PERCSBD	ND	ND	ND	ND
EVANSVILLE	PERCSBD	ND	ND	ND	ND

Mineral Spirits

FORT WAYNE	SMS		ND	ND	
SOUTH BEND	SMS		ND	ND	
EVANSVILLE	SMS	ND	ND	ND	ND
PORTAGE	SMS	ND	ND	ND	ND
FORT WAYNE	SMSD		ND	ND	
PORTAGE	SMSD	ND	ND	ND	ND
EVANSVILLE	SMSD	ND	ND	ND	ND
SOUTH BEND	SMSD		ND	ND	

Branch	Descrip.	TCE	2,4,5TCP	2,4,6TCP	VinylCl

Mineral Spirits Dumpster Slud

SOUTH BEND	MSDS	ND	ND	ND	ND
FORT WAYNE	MSDS	ND	ND	ND	ND
PORTAGE	MSDS	ND	ND	ND	ND
EVANSVILLE	MSDS	ND	ND	ND	ND
FORT WAYNE	MSDSD	ND	ND	ND	ND
PORTAGE	MSDSD	ND	ND	ND	ND
EVANSVILLE	MSDSD	ND	ND	ND	ND
SOUTH BEND	MSDSD	ND	ND	ND	ND

Naptha Dry Cleaner Waste

SOUTH BEND	NAPHFM	ND	ND	ND	ND
SOUTH BEND	NAPHFMD	ND	ND	ND	ND
FORT WAYNE	NAPHSB	ND			ND
FORT WAYNE	NAPHSBA		ND	ND	
FORT WAYNE	NAPHSBAD		ND	ND	
FORT WAYNE	NAPHSBD	ND			ND
FORT WAYNE	NAPHSBL	ND	ND	ND	ND
FORT WAYNE	NAPHSBLD	ND	ND	ND	ND

Branch	Descrip.	TCE	2,4,5TCP	2,4,6TCP	VinylCl

Paint Waste

PORTAGE	WP	ND	ND	ND	ND
EVANSVILLE	WP	ND	ND	ND	ND
SOUTH BEND	WP	ND	ND	ND	ND
FORT WAYNE	WP	ND	ND	ND	ND
EVANSVILLE	WPD	ND	ND	ND	ND
SOUTH BEND	WPD	ND	ND	ND	ND
FORT WAYNE	WPD	ND	ND	ND	ND
PORTAGE	WPD	ND	ND	ND	ND
Branch	Descrip.	TCE	2,4,5TCP	2,4,6TCP	VinylCl

METALS ANALYSES

BRANCH	Descrip	Sample #	As	Ba	Cd	Cr	Pb	Hg	Se	Ag
Antifreeze										
EVANSVILLE	AF	254894	ND	ND	ND	ND	65	ND	ND	ND
PORTAGE	AF	254877	696	272	50	16	9535	ND	ND	ND
SOUTH BEND	AF	254851	1102	75	20	24	10568	ND	ND	ND
FORT WAYNE	AF	254864	640	ND	24	ND	499	ND	ND	ND
PORTAGE	AFD	254877D	835	201	34	15	2939	ND	ND	ND
SOUTH BEND	AFD	254851D	1132	70	19	31	10952	ND	ND	ND
FORT WAYNE	AFD	254864D	680	ND	14	ND	404	ND	ND	ND
EVANSVILLE	AFD	254894D	ND	ND	ND	ND	1039	ND	ND	ND
Immersion Cleaner										
SOUTH BEND	IC	271345	874	3446	1575	10100	49172	18	ND	98
PORTAGE	IC	254879	1008	ND	11653	454	22670	5	ND	74
FORT WAYNE	IC	265867	ND	206	319	30	3447	13	ND	31
EVANSVILLE	IC	254895	972	220	845	219	6062	10	ND	95
FORT WAYNE	ICD	264867D	ND	153	2115	296	25224	3	ND	86
PORTAGE	ICD	254879D	973	ND	13073	401	24428	ND	ND	48
EVANSVILLE	ICD	254895D	1018	859	6663	709	43542	6	ND	111
SOUTH BEND	ICD	271345D	1009	2342	1463	15103	45560	14	ND	79
Lacquer Thinner										
EVANSVILLE	LT	254899	2185	ND	ND	1300	2620	81	ND	ND
SOUTH BEND	LT	254853	1818	ND	111	2787	5802	87	ND	ND
FORT WAYNE	LT	254872	2149	ND	172	3456	5830	49	ND	ND
PORTAGE	LT	254882	1420	4555	247	905	1888	85	ND	ND
PORTAGE	LTD	254882D	1013	21289	655	2306	4207	119	ND	ND
FORT WAYNE	LTD	254872D	1225	ND	220	3296	6418	55	ND	ND
SOUTH BEND	LTD	254853D	410	ND	223	3700	7673	110	ND	ND
EVANSVILLE	LTD	254899D	911	ND	ND	1736	3178	88	ND	ND
BRANCH	Descrip	Sample #	As	Ba	Cd	Cr	Pb	Hg	Se	Ag

Mineral Spirits Dumpster Sediment										
EVANSVILLE	MSDS	254896	ND	574	204	123	ND	ND	ND	ND
SOUTH BEND	MSDS	271346	ND	589	523	ND	482	ND	ND	ND
PORTAGE	MSDS	254878	109	526	181	553	264	ND	ND	24
FORT WAYNE	MSDS	254866	ND	1346	2412	52	1974780	ND	ND	ND
PORTAGE	MSDSD	254878D	80	674	435	494	1290	ND	ND	38
FORT WAYNE	MSDSD	254866D	ND	1665	2656	99	1678880	ND	ND	ND
SOUTH BEND	MSDSD	271346D	ND	529	443	ND	346	ND	ND	ND
EVANSVILLE	MSDSD	254896D	ND	343	241	153	ND	ND	ND	ND
Naphtha Dry Cleaner Wastes										
SOUTH BEND	NAPHFM	254854	ND	658	ND	128	ND	ND	ND	ND
SOUTH BEND	NAPHFMD	264854D	ND	421	ND	69	ND	ND	ND	ND
FORT WAYNE	NAPHSB	254871	ND	1543	147	5285	3407	12	ND	ND
FORT WAYNE	NAPHSBD	254871D	ND	1747	153	3448	3942	11	ND	ND
PERC Filter Media										
EVANSVILLE	PERCFM	254898	ND	464	671	27	33818	ND	ND	ND
SOUTH BEND	PERCFM	271343	ND	232	42	87	81	ND	ND	ND
PORTAGE	PERCFM	254881	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	PERCFM	254868	ND	378	65	121	467	ND	ND	ND
PORTAGE	PERCFMD	254881D	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	PERCFMD	254868D	ND	353	65	103	357	ND	ND	ND
SOUTH BEND	PERCFMD	271343D	ND	355	65	105	149	ND	ND	ND
EVANSVILLE	PERCFMD	254895D	ND	506	734	30	31803	ND	ND	ND
BRANCH	Descrip	Sample #	As	Ba	Cd	Cr	Pb	Hg	Se	Ag

PERC Wastes										
FORT WAYNE	PERCMUC	254865	ND	319	21	39	262	ND	ND	ND
FORT WAYNE	PERCMUC	254865D	ND	374	26	84	381	ND	ND	ND
SOUTH BEND	PERCSB	271344	ND	220	56	39	95	ND	ND	ND
EVANSVILLE	PERCSB	254897	ND	3548	253	34414	9629	57	4475	334
FORT WAYNE	PERCSB	254869	ND	279	104	57	539	ND	ND	ND
PORTAGE	PERCSB	254880	444	6125	307	25952	6296	43	ND	ND
FORT WAYNE	PERCSBD	254869D	ND	207	55	36	1551	ND	ND	ND
EVANSVILLE	PERCSBD	254897D	ND	4637	285	38990	11453	84	5432	368
SOUTH BEND	PERCSBD	271344D	ND	248	65	35	157	ND	ND	32
PORTAGE	PERCSBD	254880D	521	4312	259	31768	6684	42	ND	ND
Spent Mineral Spirits										
SOUTH BEND	SMS	254855	ND	ND	129	ND	4185	ND	ND	ND
EVANSVILLE	SMS	254201	ND	ND	116	ND	2287	9	ND	ND
FORT WAYNE	SMS	254870	ND	ND	27	ND	853	14	ND	ND
PORTAGE	SMS	254884	ND	ND	118	145	2947	ND	ND	ND
SOUTH BEND	SMSD	254855D	ND	ND	126	ND	3461	ND	ND	ND
PORTAGE	SMSD	254884D	ND	ND	174	179	4059	ND	ND	ND
EVANSVILLE	SMSD	254201D	ND	ND	95	ND	1407	9	ND	ND
FORT WAYNE	SMSD	254870D	ND	ND	40	ND	1294	14	ND	ND
Waste Paint										
EVANSVILLE	WP	254900	ND	ND	ND	810	ND	ND	ND	ND
SOUTH BEND	WP	254852	ND	2050	ND	ND	ND	ND	ND	ND
PORTAGE	WP	254883	ND	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	WP	254873	ND	ND	ND	1081	ND	ND	ND	ND
PORTAGE	WPD	254883D	ND	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	WPD	254852D	ND	2125	ND	ND	ND	ND	ND	ND
EVANSVILLE	WPD	254900D	ND	ND	ND	482	ND	ND	ND	ND
FORT WAYNE	WPD	254873D	ND	ND	ND	801	ND	ND	ND	ND
BRANCH	Descrip	Sample #	As	Ba	Cd	Cr	Pb	Hg	Se	Ag

PCBs, FLASH, AND SPECIFIC GRAVITY

Branch	Descrip	Lab #	Sp. Gr.	Flash (F)	1016	1221	1232	1242	1248	1254	1260
Antifreeze											
FORT WAYNE	AF	254864	1.08								
PORTAGE	AF	254877	1.065								
SOUTH BEND	AF	254851	1.075								
EVANSVILLE	AF	254894	1.085								
FORT WAYNE	AFD	254864D	1.08								
SOUTH BEND	AFD	254851D	1.08								
PORTAGE	AFD	254877D	1.075								
EVANSVILLE	AFD	254894D	1.085								
Immersion Cleaner											
PORTAGE	IC	254879	0.938	94	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	IC	271345	0.943	128	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	IC	254895	0.945	89	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	IC	254867	0.944	133	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	ICD	254867D	0.943	135	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	ICD	254895D	0.943	82	ND	ND	ND	ND	ND	ND	ND
PORTAGE	ICD	254879D	0.942	90	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	ICD	271345D	0.945	136	ND	ND	ND	ND	ND	ND	ND
					reanalyzed per Dennis Brinkman						
Lacquer Thinner											
FORT WAYNE	LT	254872	0.849	<40							
PORTAGE	LT	254882	0.839	<40							
SOUTH BEND	LT	254853	0.792	<40							
EVANSVILLE	LT	254899	0.844	<40							
FORT WAYNE	LTD	254872D	0.848	<40							
EVANSVILLE	LTD	254899D	0.846	<40							
PORTAGE	LTD	254882D	0.841	<40							
SOUTH BEND	LTD	254853D	0.794	<40							
Branch	Descrip	Lab #	Sp. Gr.	Flash (F)	1016	1221	1232	1242	1248	1254	1260

Branch	Descrip	Lab #	Sp. Gr.	Flash (F)	1016	1221	1232	1242	1248	1254	1260
Mineral Spirits Dumpster Mud											
EVANSVILLE	MSDS	254896	0.792	62	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	MSDS	271346	0.808	54	ND	ND	ND	ND	ND	ND	ND
PORTAGE	MSDS	254878	0.797	86	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	MSDS	254866	0.795	48	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	MSDSD	254866D	0.795	50	ND	ND	ND	ND	ND	ND	ND
PORTAGE	MSDSD	254878D	0.797	84	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	MSDSD	254896D	0.842	40	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	MSDSD	271346D	0.806	58	ND	ND	ND	ND	ND	ND	ND
Mineral Spirits											
PORTAGE	SMS	254884	0.796	121	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	SMS	254855	0.801	127							
FORT WAYNE	SMS	254870	0.794	121	ND	ND	ND	ND	ND	ND	ND
EVANSVILLE	SMS	254201	0.792	132	ND	ND	ND	ND	ND	ND	ND
PORTAGE	SMSD	254884D	0.798	123	ND	ND	ND	ND	ND	ND	ND
SOUTH BEND	SMSD	254855D	0.799	130							
EVANSVILLE	SMSD	254201D	0.794	134	ND	ND	ND	ND	ND	ND	ND
FORT WAYNE	SMSD	254870D	0.794	120	ND	ND	ND	ND	ND	ND	ND
Waste Paint											
EVANSVILLE	WP	254900	0.851	<40							
SOUTH BEND	WP	254852	0.794	<40							
FORT WAYNE	WP	254873	0.849	<40							
PORTAGE	WP	254883	0.874	<40							
PORTAGE	WPD	254883D	0.875	<40							
SOUTH BEND	WPD	254852D	0.796	<40							
EVANSVILLE	WPD	254900D	0.849	<40							
FORT WAYNE	WPD	254873D	0.856	<40							

APPENDIX C-5

ANALYTICAL PROCEDURES

The analytical procedures described herein are routinely updated by Safety-Kleen. The Waste Analysis Plan incorporates these procedures only by reference to the indicated number, not the specific protocol/equipment described herein.

EXHIBIT C-5-a

CROSS-REFERENCE FOR ANALYTICAL METHODS

APPENDIX C-5

EXHIBIT C-5-a

CROSS-REFERENCE OF SAFETY-KLEEN AND
U.S. EPA/ASTM ANALYTICAL METHODS

Analyses	Safety-Kleen Test Method[1]	U.S. EPA/ASTM Method
Flash Point	S-K Method 9401	U.S. EPA Method 1020, ASTM D3828
Specific Gravity	S-K Method 9903/9934	ASTM D1298
Volatile Organic Compound	S-K Method 9203	U.S. EPA Method 3820
Halogenated Organic Volatiles	S-K Method 9209	U.S. EPA Method 8120

[1]The indicated Safety-Kleen method was derived from the corresponding U.S. EPA (SW846) and/or ASTM methods. The Safety-Kleen methods are subject to revision when applicable improvements in proven analytical technologies become available.

EXHIBIT C-5-b

FLASH POINT

METHOD: SK9401

PARAMETER: IGNITABILITY
MATRIX: ALL

TITLE: **STANDARD OPERATING PROCEDURE FOR SCREENING WASTE MATERIALS FOR IGNITABILITY USING A SETAFLASH CLOSED TESTER**

AUTHORITATIVE REFERENCES: EPA 1020 and ASTM D3828

SIGNIFICANT DEVIATIONS: None

SUMMARY OF METHOD: FLASH/NO FLASH SCREENING TEST at 90 F using a SETAFLASH closed cup tester.

ACCEPTANCE RATIONALE: Primary acceptance test to assure that the waste material is not excessively sensitive to ignition during handling. **LIMIT - 90 F MINIMUM, PROVIDING THAT THE MATERIAL, AFTER PROCESSING, CAN BE BLENDED TO REACH A PRODUCT SPECIFICATION OF 105 F.**

SAMPLE HANDLING AND PRESERVATION: Samples must be stored at a temperature between 55 F and 90 F. Short term elevated/reduced temperatures will not significantly affect sample integrity.

For routine samples, use a one (1) quart, wide mouth glass bottle with an outer plastic coating and a Teflon lined cap. The bottle should be filled at least 75% full but not more than 90% full. Plastic containers may be used for process samples that will be analyzed within 24 hours.

A 2 mL specimen is required for each analysis.

QUALITY CONTROL:
Daily: One duplicate per shift or every 20 samples, which ever is more frequent. The duplicate results for the sample must be consistent.

Daily: 1-Butanol and 2-Propanol must be run once per shift to assure that the system is operating acceptably. The 2-Propanol must flash and the 1-Butanol must not flash at 90 F.

Weekly: An example of an ambiguous flash must be run for familiarity.

METHOD #: 9401
REV: 5/91
SUPERSEDES: 8/89

SAFETY-KLEEN CORP.
TECHNICAL CENTER

ATTACHED IS A DOCUMENT FOR: REVISION DATE: 4-29-91

TITLE: STANDARD OPERATING PROCEDURE FOR SCREENING WASTE MATERIALS FOR IGNITABILITY USING A SETAFLASH CLOSED CUP TESTER

(BASED ON ASTM D 3828 AND USEPA 1020)
(KEY WORDS: IGNITABILITY, D001, SETAFLASH)

SERIES/SUBJECT

9000 Analytical Methods
9400 General Methods - Organic

APPROVALS/CONCURRENCES:

DEPARTMENT MANAGER(S)

- 4/30/91
- [illegible]
- 5/20/91

VICE PRESIDENT - TECHNICAL-

5/21/91

DISTRIBUTION

ARCHIVES _____
LIBRARY _____

VICE PRESIDENT - TECHNICAL-

DEPARTMENT MANAGER(S)

TITLE: **STANDARD OPERATING PROCEDURE FOR SCREENING WASTE MATERIALS FOR IGNITABILITY USING A SETAFLASH CLOSED CUP TESTER (BASED ON ASTM D 3828 AND USEPA 1020) (KEY WORDS: IGNITABILITY, D001, SETAFLASH)**

1. SCOPE AND APPLICATION

1.1 The SETAFLASH CLOSED CUP TESTER is used to screen waste materials for the hazardous waste characteristic of ignitability. This method describes the determination of the flash point of a material using a SETAFLASH closed cup tester. This is primarily a screening procedure used to determine whether a sample will or will not flash at a specified temperature under ambient atmospheric pressure conditions.

1.2 Due to the long temperature equilibration times needed with the SETAFLASH, specific flash points should be determined using the TAG CLOSED CUP tester if possible. The SETAFLASH tester may be used to determine the flash point of a sample if a TAG CLOSED CUP tester is not available.

1.3 The SETAFLASH test may be performed on all samples including solids, semi-solids and highly viscous samples; however, it should not be used on recoverable samples with a specific gravity of 1.2 or over because such samples are likely to have a high concentration of halogenated solvents which will cause ambiguous results due to the rapid evolution of non-ignitable vapors.

2. SAFETY AND WASTE HANDLING

2.1 **FIRE - CAUTION - BEFORE CLEANING MAKE SURE THERE ARE NO OPEN FLAMES IN THE AREA.**

FIRE - DO NOT OPEN OR STORE SAMPLE CONTAINERS IN THE VICINITY OF AN OPEN FLAME.

FIRE - When the test flame is not lit be certain the gas is off and that the flame has not simply gone out.

FIRE - If any spill occurs, wipe up with an absorbent wipe. Used wipes and plastic pipettes must be placed in

a metal container lined with a plastic trash bag. The metal top must be kept on the container at all times except to add or to remove the contents. In the event of a fire, the top should quickly smother it. Any fires involving these materials must be treated as Class A fires. The contents must be removed daily and may be disposed of in the regular trash.

BURNS - At high temperature, care must be taken to keep the hands away from the cup area, except for the operating handle of the tester.

2.2 **EYE CONTACT** - Regular safety glasses with side shields are to be worn to provide protection from accidental sample spillage, sample splash, and sample splatter during flashing. Any eye contact must be removed by thorough washing and follow-up action.

2.3 **HAND CONTACT** - The use of disposable vinyl or latex gloves provides adequate protection from contact with the samples and liquids used for cleaning. All skin contact must be washed off immediately.

2.4 **RESPIRATORY** - Exposure to the vapors from the sample and liquids used for cleaning should be kept to a minimum by working in a well-ventilated area. The sample container must be opened in a hood and only long enough to obtain a sample. A fitted respirator must be available for use in case of sample spills.

2.5 **WASTE DISPOSAL** - After each run, transfer the spent sample to a waste solvent container for disposal or recycling.

WASTE DISPOSAL - The remainder of the sample in the original jar must be returned to sample storage for future testing or later disposal.

3. SUMMARY OF METHOD

3.1 This is a flash/no flash screening test suitable for liquids, solids, highly viscous liquids, and semi-solids. The sample is introduced into the cup of the apparatus by opening the cover and adding the sample. The tester is set and maintained at fixed threshold temperatures. After one (1) minute, a test flame of a

definite size is applied and an observation made as to whether or not an unambiguous flash occurs.

3.2 The instrument is to be **set 2 F** above the target temperature to bias the results in a conservative direction and to assure that any effect from pressure differences is accounted for without having to determine the pressure correction. The reported results **are not** to include the 2 F temperature adjustment.

4. SAMPLE HANDLING AND PRESERVATION

4.1 The samples are considered to be concentrated wastes.

The sample container may be a wide mouth glass bottle with a TEFLON lined cap.

No sample preservation is required, however, samples should be stored at a temperature between 40 F and 90 F to prevent physical damage to the container due to freezing or pressure build up. Short term elevated/reduced temperatures experienced during sample shipment will not significantly affect sample integrity.

4.2 Erroneous results may be obtained if precautions are not taken to avoid the loss of volatile material. Do not open containers unnecessarily. Results for samples from leaky containers must be marked to indicate that the sample integrity was not maintained during shipping/storage.

4.3 For shipment of samples, use a wide mouth glass bottle (preferably plastic-coated) with a TEFLON lined cap. For samples to be used on location, any clean glass bottle is satisfactory, but some secondary containment must be provided when transporting the sample. The bottle should be filled at least 75% full but not more than 90% full.

4.4 A 2 mL (or 2 g) specimen is required for each screening analysis. An actual flash point determination by Setaflash may require as many as 10 analyses. Do not repeat the test on the same sample. If a replicate is needed, use a new specimen.

5. INTERFERENCES

5.1 Occasionally, at a temperature near the flash point, the application of the test flame will cause a halo or an enlarged flame. This is not a flash and should be ignored.

5.2 Abnormally low or high ambient pressures may cause an error by as much as 3 F. When carrying out equipment qualifications and when establishing the flash point for a sample that is very close to a regulatory limit, correct the result for barometric pressure and report the resulted as "corrected".

5.3 The combustion of halogenated solvents in the flame may cause the flame to change shape, color, or to be extinguished.

6. APPARATUS

6.1 **SETAFLASH TESTER** - ERDCO Engineering Corporation
Evanston, IL. 60204
Model 01SF, s/n 1995

6.2 **DISPOSABLE PIPETTES** - Falcon plastic transfer pipets. One piece polyethylene, 3 mL capacity with a reference line at 2 mL. (VWR Cat.No. 52947-948)

6.3 **TUBING** -

Silicone Rubber 1/16" I.D., 1/8" O.D., 1/32" Wall. 12" needed for each changeover. Soft flexible tubing is needed to assure that the flame is easily controlled by the pinch clamp. (VWR Cat.No. 62998-173)

and

Amber Latex 3/16" I.D., 3/8" O.D., 3/32" Wall. 36-48" needed for each changeover. Flexible tubing is needed so that the SETAFLASH can be easily placed on the work area. (VWR Cat No. 62996-440)

6.4 **IGNITER** - Statolite Lighter, Manostat, refillable butane, (VWR Cat.No. 18386-531)

6.5 **FACE SHIELD** - (VWR Cat.No. 33007-060) (optional)

6.6 **DISPOSABLE PAPER WIPES** - Kimwipes 4.5"x8.5" (VWR Cat.No. 21905-025)

6.7 **DISPOSABLE GLOVES** -
VINYL - Prepowdered
(VWR Cat.Nos. 32915-461,32915-483, 32915-508) or
LATEX
(VWR Cat.Nos. 32917-875, 32917-897, 32915-508)

6.8 **BAROMETER** - OPTIONAL - Aneroid, Hanging Type, (VWR Cat. No. 13117-000)

6.9 **PASTEUR DISPOSABLE PIPETTES**, 2 mL (Baxter Cat. No. P5214-10)

7. REAGENTS

7.1 **Natural Gas** for flame (Methane CAS No.74-82-8)

7.2 **Butane** refills for igniter (CAS No. 106-97-8)

7.3 **Calibration Check Standard (CCS)** - Calibration Check Standards are typically technical or reagent grade materials, with flashpoints close to the target flashpoint, that have been spiked to bring the experimentally determined flash point to the target flash point. The tolerance for the flash points is established for each temperature range separately.

8. PREVENTIVE MAINTENANCE

8.1 **DAILY:** Clean spillage and routine handling contamination from the surfaces of the instrument and work areas. methanol or acetone are usually adequate solvents.

BE SURE THERE ARE NO OPEN FLAMES IN THE AREA WHILE CLEANING. BOTH METHANOL AND ACETONE ARE HIGHLY FLAMMABLE.

8.2 **PERIOD:** Nothing anticipated.

8.3 **QUARTERLY:** Complete the system cleaning and decontamination. This is largely to remove carbon residues and contamination in areas that are not effectively cleaned during the daily cleaning. Record this information on the equipment log indicating who did the cleaning and the date it was performed.

8.4 **ANNUALLY:** Replace all tubing. Verify the accuracy of the thermometer and the timer. Record this information on the equipment log indicating who did the verification and the date it was performed.

8.5 All maintenance must be recorded in the maintenance logbook.

9. TROUBLE SHOOTING AND CORRECTIVE ACTION

9.1 If a flash point obtained on a control sample or if the average or range of two control sample determinations does not fall within acceptable control limits, be sure the cup lid assembly makes a vapor-tight seal with the cup, the shutter provides a light-tight seal, and that adequate heat transfer paste surrounds the thermometer bulb and the immersed portion of the barrel.

9.2 When in doubt about a response, get a second opinion.

10. QUALITY CONTROL

10.1 **CALIBRATION** - Initially and annually, verify the accuracy of the thermometer and the timer. Record this information on the equipment log indicating who did the verification and the date it was performed.

10.2 **CALIBRATION CHECK STANDARD (CCS)** - DAILY - Each analytical system used will be checked with a standard at the threshold level for the sample being evaluated. A sample that is representative of the waste stream or product line being evaluated, will be analyzed. The sample may be a formulated sample or a composite of representative samples. If the sample is a composite, the analyte levels may be adjusted to give a flash at the target temperature. The expected result will be known to the labs. The data will be used for

information purposes to evaluated ongoing laboratory performance and for interlaboratory comparisons.

10.3 **ROUND ROBIN SAMPLES - UNANNOUNCED** - A blind sample will be submitted for analysis from an outside source. The sample may be a formulated sample or a composite of representative samples. If the sample is a composite, the analyte levels may be adjusted to give a flash at the target temperature. The expected result will not be known to the labs. The data will be used for information purposes to evaluated on-going laboratory performance and for interlaboratory comparisons.

10.4 **DUPLICATE SAMPLES** - Every 20 samples - Duplicate samples will be selected in an unbiased manner or if appropriate, in a manner that targets the more difficult samples.

11. PROCEDURE

11.1 PREPARATION OF APPARATUS

The tester is easily moved and can be stored when not in use. Place the tester on a level, stable surface. Tests are to be made in a draft-free area so that the minimum temperature at which a sample will flash is detected.

11.2 INITIAL CALIBRATION AND STANDARDIZATION

Before initial use, determine and plot the relationship between the temperature control dial and the thermometer readings. At each major (numbered) dial division proceed as follows:

Turn the temperature control knob (see Note 1) fully counterclockwise ("0" reading). Advance the temperature control knob clockwise until the indicator light is illuminated. Advance the knob clockwise to the next numbered line. After the thermometer's mercury column ceases to advance, record the dial reading and the temperature. Advance the knob clockwise to the next numbered line. After the thermometer's mercury column ceases to advance, record the dial reading and the temperature. Repeat this procedure through the full range of the instrument. Plot the dial readings versus

the respective temperatures. Record the results in the equipment log along with the date and analyst's name.

NOTE 1: Set the fine control (center, small knob) at its mid-position and allow it to remain there throughout the calibration. The calibration is determined by adjusting the coarse control (large, outer knob) only.

11.3 START-UP FOR EACH SHIFT

For the first sample at each temperature, record temperatures and any distinctive flame characteristics as described later in this section.

11.4 FLASH/NO FLASH SCREENING TEST

Inspect the inside of the sample cup, lid, and shutter mechanism for cleanliness. If necessary, use an absorbent paper tissue to wipe clean.

Switch the instrument on and turn the coarse temperature control knob fully clockwise (on full) causing the indicator light to illuminate (see Note 2). When the thermometer indicates a temperature about 5 F below the target (or specification) temperature, reduce the heat input to the sample cup by turning the coarse temperature control knob counterclockwise to the desired control point. When the indicator light slowly cycles on and off read the temperature on the thermometer. If necessary, adjust the fine (center) temperature control knob to obtain the desired test (target) temperature. When the test temperature is reached and the indicator lamp occasionally cycles on and off, prepare to introduce the sample.

NOTE 2: The target temperature may be attained by originally turning the coarse temperature control knob to the proper setting for the temperature desired rather than to the maximum setting (on full). The elapsed time to reach the temperature will be greater, except for maximum temperature; however, less attention will be required during the intervening period.

WARNING: Be sure that there are no open flames when opening the sample bottle.

Open the cover and, using a disposable plastic pipette, transfer approximately 2 mL of sample to the cup of the tester. If the sample is highly viscous, solid or semi-solid transfer approximately 2 g of sample with the spatula to the cup and quickly spread it evenly over the surface of the cup.

Set the timer by rotating its knob clockwise to its stop position. Open the gas control valve and light the flame. Adjust the test flame with the pinch valve to conform to the size of the 4mm (5/32 in.) gauge marked on the top of the cup.

After the time signal goes off, apply the test flame by slowly and uniformly opening the shutter and closing it completely over a period of approximately 2-1/2 seconds. Watch carefully for a flash at the cup opening.

The sample is deemed to have flashed when a flame appears and spreads over the surface of the sample. Record the test result as "FLASH" or "NO FLASH".

Occasionally, particularly near the actual flash point, the application of the test flame will cause a "halo" or enlarged flame. In order to verify that the sample has flashed; while directing the flame into the cup, immediately turn off the gas to the test flame. If the flame remains, then the sample has FLASHED. If the flame is extinguished, the sample had NO FLASH.

Record the test result as "FLASH" or "NO FLASH" along with the temperature reading.

Never apply the test flame to the sample in the cup more than once. Fresh portions of the sample must be used for each test.

Turn off the pilot and test flames using the gas control valve. Remove the sample with a pipette and empty the spent sample into a one pint glass jar. Wipe the inside of the cup to remove any remaining sample. If necessary, use a small amount of acetone to clean the cup and then wipe the inside of the cup with absorbent paper tissues. The wipes will emit a large amount of vapor and must be disposed of in a closed waste container for fire control.

12. CALCULATIONS

12.1 If a corrected flash point is needed, determine the barometric pressure and calculate the corrected flash point as follows:

Corrected flash point = F + 0.06 (760 - B)
where:
F = observed flash point (F)
B = ambient barometric pressure (torr)

All flash points reported by Safety-Kleen are uncorrected and do not include the 2 F offset used, unless noted as corrected on the report.

12.2 The following are approximate errors if the flash points are not corrected.:

Inches Hg	torr Hg	Error
32	813	-3 F
31	787	-1.5 F
30	762	0 F
29	737	+1.5 F
28	711	+3 F

13. REFERENCES

13.1 ASTM DESIGNATION: D 3828, "STANDARD TEST METHODS FOR FLASH POINT BY SETAFLASH CLOSED TESTER".

13.2 USEPA METHOD 1020, "SETAFLASH CLOSED-CUP METHOD FOR DETERMINING IGNITABILITY", STANDARD METHODS FOR EVALUATING SOLID WASTE, PHYSICAL/CHEMICAL METHODS (SW846)

ANALYST TRAINING FORM

Trainee_____ Trainer_____

Date:_____

Analysis:_____ Method:_____

1. The following sections of the method were explained by the trainer and understood by the trainee:

	Trainer	Trainee
Scope & Application	_____	_____
Safety & Waste Handling	_____	_____
Summary of Method	_____	_____
Sample Handling & Pres.	_____	_____
Interferences	_____	_____
Apparatus	_____	_____
Reagents	_____	_____
Preventive Maint.	_____	_____
Trouble Shooting / Corrective Action	_____	_____
Quality Control	_____	_____
Procedure	_____	_____
Calculations	_____	_____
References	_____	_____
Attachments	_____	_____

2. Trainee observed analysis performed by Trainer:

_____ _____

3. Trainee repeats analysis. Comparative results:

Sample ID	Trainer Results	Trainee Results
	_____	_____
	_____	_____
	_____	_____
OTHER	_____	_____

Analyst certified to perform method: (by/on)_____

Additional training recommended: (by/on)_____

(Attach additional comparative results)

EXHIBIT C-5-c

SPECIFIC GRAVITY - LABORATORY

METHOD: SK9903

PARAMETER: SPECIFIC GRAVITY
MATRIX: LOW VISCOSITY LIQUID WASTE MATERIALS

TITLE: **STANDARD OPERATING PROCEDURE FOR THE DETERMINATION OF SPECIFIC GRAVITY OF WASTE MATERIALS USING HYDROMETERS**

AUTHORITATIVE REFERENCE: ASTM D1298

SIGNIFICANT DEVIATIONS: The temperature of the sample is controlled to the extent necessary to determine the specific gravity to two decimal places. No significant information is obtained beyond two decimal places.

SUMMARY OF METHOD: The amount of buoyancy provided to a hydrometer by a sample, is directly related to its specific gravity/density.

ACCEPTANCE RATIONALE: This is a secondary, operational, test used for billing purposes to convert the shipment weights into volumes. **LIMIT - NONE.**

SAMPLE HANDLING AND PRESERVATION: Samples must be stored at a temperature between 55 F and 90 F and conditioned to **60 to 80 F** prior to testing. Short term elevated/reduced temperatures will not significantly affect sample integrity.

For routine samples, use a one (1) quart, wide mouth glass bottle with an outer plastic coating and a Teflon-lined cap. The bottle should be filled at least 75% full but not more than 90% full. Plastic containers may be used for process samples that will be analyzed within 24 hours.

A 100 mL specimen is required for each analysis.

QUALITY CONTROL:
Each shift: One duplicate per shift or every 20 samples, which ever is more frequent. The duplicate results must be consistent to within 0.03.

TITLE: STANDARD OPERATING PROCEDURE FOR THE DETERMINATION OF SPECIFIC GRAVITY OF WASTE MATERIALS USING HYDROMETERS
(BASED ON ASTM D 1298)
(KEY WORDS: SPECIFIC GRAVITY, HYDROMETER)

1. SCOPE AND APPLICATION

1.1 The hydrometer is used to screen waste material for the specific gravity at a temperature range of 60 to 80 F and the types of compounds that can possibly be expected to be found in the waste material.

1.2 Specific gravity results are used for billing purposes to convert the receipts from weight to volume.

1.3 Specific gravity results are used to help establish that the physical and chemical characteristics of the shipments are consistent with what was expected.

1.4 Generally, a specific gravity of greater than 1.00 is an indication of the presence of halogenated solvents in the sample, inorganics in solution, or very uncommon organic liquids.

1.5 A specific gravity of approximately 1.00 is an indication of mostly water is present in the sample.

1.6 A specific gravity of less than 1.00 is an indication of oils and /or flammable solvents in the sample.

2. SAFETY AND WASTE HANDLING

2.1 FIRE - CAUTION: Some of the materials are highly flammable. Be sure that there are no open flames nearby while testing or cleaning is going on. The fumes released may be flammable and migrate to open flames.

FIRE - If any spill occurs, wipe up with an absorbent wipe. Used wipes and plastic pipettes must be placed in a metal container lined with a plastic trash bag. The metal top must be kept on the container at all times except to add or to remove the contents. In the event of a fire, the top should quickly smother it. Any fires involving these materials must be treated as Class A fires. The contents must be removed daily and may be disposed of in the regular trash.

2.2 EYE CONTACT - Regular safety glasses with side shields provide adequate protection from an accidental sample

splash. Any eye contact must be removed by thorough washing and follow-up action, as detailed in the Safety Plan.

2.3 **HAND CONTACT** - Use of disposable vinyl or latex gloves provide adequate protection from contact with the samples. All skin contact must be washed off immediately.

2.4 **RESPIRATORY** - Exposure to the vapors from the sample should be kept to a minimum by working in a well-ventilated area. The sample container must be opened and tested in a hood, however the flow in the hood must be such that air currents do not affect the motion of the hydrometer. The sample must be removed from the original container only long enough to obtain an analysis.

RESPIRATORY - A fitted respirator must be available for use in case of sample spills.

2.5 **WASTE DISPOSAL** - Samples taken to fill a test cylinder may be returned to the original container and returned to sample storage for future testing or later disposal.

3. SUMMARY OF METHOD

3.1 The amount of buoyancy provided by a sample is directly related to its specific gravity. The hydrometers used are carefully selected to float at a depth corresponding to the specific gravity of the sample being tested.

4. SAMPLE HANDLING AND PRESERVATION

4.1 Samples must be stored at a temperature between 55 F and 90 F and conditioned to **60 to 80 F** prior to testing. Short term elevated/reduced temperatures experienced during sample shipment will not significantly affect sample integrity.

4.2 Erroneous results may be obtained if precautions are not taken to avoid the loss of volatile material. Do not open containers unnecessarily. Results for samples from leaky containers must be marked to indicate that the sample integrity was not maintained during shipping/storage.

significant and the sample may be returned to the original container for further testing.

Make sure the cylinder is clean and dry to avoid any contamination. Be certain that the sample is poured back into the same original sample jar.

4.4 For routine samples, use a one (1) quart, wide mouth glass bottle with an outer plastic coating and a Teflon-lined cap. The bottle should be filled at least 75% full but not more than 90% full. This is adequate for all routine operational or preshipment qualification testing, including laboratory quality control.

4.5 For shipping or long-term storage, do not use plastic (polyethylene, polypropylene, etc.) containers; volatile material may diffuse through the walls of the bottle. Plastic containers may be used for process samples that will be analyzed within 24 hours.

4.6 A 100 mL specimen is required for each analysis.

5. INTERFERENCES

5.1 The limits of precision and accuracy for determining specific gravity depend upon the care given to the technique involved. Consideration must be given to the problems of keeping a consistent temperature. This can be minimized by storing the sample at room temperature for at least 1 hour for every 10 F in temperature difference or by warming the sample. Adequate accuracy can be achieved (to two decimal places) if the samples are between **60 and 80 F**.

5.2 Erroneous results may be obtained if precautions are not taken to avoid the loss of volatile material. Minor losses of volatile material may occur during testing, however, returning the sample to the original container will not significantly affect other test results.

5.3 Erroneous results may be obtained if precautions are not taken to detect physical damage to the hydrometer tip or shifting of the scale.

5.4 Samples containing floating solids, a foam layer or multi-phase liquids will give inaccurate results and must be separated.

5.4 Samples containing floating solids, a foam layer or multi-phase liquids will give inaccurate results and must be separated.

5.5 Samples with high viscosities may not give accurate or reproducible results, because the hydrometer may never reach its equilibrium depth.

5.6 For opaque samples do not allow the hydrometer scale to become obscured.

6. APPARATUS

6.1 **HYDROMETERS -**

0.650 - 1.000, 170 mm x 12 mm, 0.010 Inc.
(Fisher Cat. No. 11-512D)

1.000 - 2.000, 170 mm x 12 mm, 0.020 Inc.
(Fisher Cat. No. 11-522D)

6.2 **NARROW RANGE HYDROMETERS** - Set of eight covering the range of 0.700 to 2.000. The hydrometers are 150 mm long and 12 mm in diameter. (OPTIONAL)

The set includes the following:

	Baxter Cat. No.
0.700 to 0.800 in 0.002	H8700-2
0.800 to 0.900 in 0.002	H8700-3
0.900 to 1.000 in 0.002	H8700-4
1.000 to 1.225 in 0.005	H8710-1
1.200 to 1.425 in 0.005	H8710-2
1.400 to 1.620 in 0.005	H8710-3
1.600 to 1.825 in 0.005	H8710-4
1.800 to 2.000 in 0.005	H8710-5

6.3 **HYDROMETER CYLINDER** - 38 mm diameter, 200 mm height (VWR Cat. No.24629-092)

or

GRADUATED CYLINDER - 29 mm diameter, 255 mm height (VWR Cat. No. 24710-124)

6.4 **DISPOSABLE PAPER WIPES** - Kimwipes 4.5"x8.5" (VWR Cat.No. 21905-025)

6.5 **DISPOSABLE GLOVES -**

VINYL -
Prepowdered (VWR Cat.Nos. 32915-461, 32915-483, 32915-508)

LATEX -
(VWR Cat.Nos. 32917-875, 32917-897, 32915-508)

7. REAGENTS

7.1 **Methyl Alcohol (Methanol)** (CAS No. 67-56-1) for cleaning. d 0.791
(VWR Cat.No. VW4300 or JT9076)

7.2 **Acetone** (CAS No. 67-64-1) for cleaning. d 0.791
(VWR Cat.No. VW0330 or JT9006)

7.3 **p-Xylene**, 98%, (CAS No. 106-42-3), d 0.866
(VWR Cat.No. EMXX0045 or JTX528)

7.4 **Tetrachloroethylene** (CAS No. 127-18-4), Reagent, d 1.623,
(VWR Cat.No.JT9465 or EM-TX0175)

7.5 **Water** (CAS No. 7732-18-5), Milli-Q, d 1.000

7.6 **Dichloromethane (Methylene Chloride)**, Reagent, (CAS No.75-09-2) d 1.325.
(VWR Cat.No. VW4525 or JT9264 or JT9315)

7.7 **2-Butoxyethanol**, Practical, (CAS No. 111-76-2), d 0.903
(VWR Cat.No. JTD648) "BUTYL CELLOSOLVE"

7.8 **1-Butanol**, A.C.S (CAS No. 71-36-3), d 0.810
(VWR Cat.No. EM-BX1780)

7.9 **Ethylene Glycol**, 99.8% (CAS No. 107-21-1), d 1.113,
(Baxter Cat.No. 5001-500NY)

8. PREVENTIVE MAINTENANCE

8.1 The hydrometers are not subject to significant wear or aging. The periodic checks are simply to confirm the reliability and accuracy of the hydrometers. If a hydrometer is damaged, it must be replaced.

8.2 Rinse the hydrometers with methanol and/or acetone after each sample to assure that residue does not build up on the contact surface. Wipe dry with a Kimwipe.

9. TROUBLE SHOOTING AND CORRECTIVE ACTION

9.1 The hydrometer will not read accurately if there is any change to its density. The two most common ways in which the density of the hydrometer will be changed is through the build up of residue on the hydrometer or a missing chip off the tip.

9.2 The hydrometer will not read accurately if the scale has moved inside the stem.

9.3 The hydrometer will not read accurately if the temperature of the sample is not within the 60 to 80 F temperature range.

9.4 The hydrometer will not read accurately if the container used to measure the specific gravity in is too narrow or too shallow. The container must be at least 0.5 inch greater in diameter than the hydrometer; 1 inch is preferable, however, with care to assure that the hydrometer does not hang up on the wall, the narrower 100 ml graduated cylinder will give comparable results to those obtained from the wider hydrometer cylinder. The container must be at least 1 inch deeper than the depth to which the hydrometer sinks. In all cases, if the amount of sample in the sample container is adequate, measure the specific gravity in the sample container, instead of transferring to a graduated cylinder or a hydrometer cylinder.

9.5 For samples containing multiple phases, a foam layer, or floating solids, the liquid phases must be separated and analyzed individually.

10. QUALITY CONTROL

10.1 **EACH SHIFT/EACH USE:** Visual and tactile inspection of the hydrometers. Run at least one duplicate for every twenty samples.

10.2 **PERIOD:** Each analyst who performs specific gravity testing must perform an evaluation of analytical technique using p-Xylene and Tetrachloroethylene. Record the results on the corresponding control chart for each analyst.

10.3 **QUARTERLY:** Nothing scheduled.

10.4 **ANNUALLY:** Evaluate the performance of the hydrometers using the indicated reference material. Record the result on the record for the hydrometer.

NOMINAL RANGE		
0.800-0.850	1-Butanol	0.810
0.850-0.900	p-Xylene	0.866
0.900-0.950	2-Butoxyethanol	0.903
0.950-1.000	Water	1.000
1.000-1.050	Water	1.000
1.050-1.100		
1.100-1.150	Ethylene Glycol	1.113
1.150-1.200		
1.200-1.250		
1.250-1.300		
1.300-1.350		
1.350-1.400		
1.400-1.450	Dichloromethane	1.325
1.450-1.500		
1.500-1.550		
1.550-1.600		
1.600-1.650	Tetrachloroethylene	1.623

10.5 **NEW HYDROMETERS** - must be verified prior to use. A record must be established and maintained for each hydrometer.

PRECISION - Different laboratories using different instruments should be able to obtain results that differ from the means by not more than 0.02. Adequate performance for the testing is within 0.02 of the expected value.

11. PROCEDURE

11.1 Cool/warm the sample in the original container to room temperature. Pour the sample into the clean and dry cylinder without splashing, so as to avoid formation of air bubbles. Remove any air bubbles adhering to the liquid for bubbles on the side walls surface by touching them with a piece of clean paper. Remove any bubbles adhering to the side wall by gently tapping the cylinder on a padded surface.

11.2 Select a location in a hood that is free of air currents that affect the hydrometer. Slowly and carefully lower the hydrometer into the sample to a level within approximately two smallest scale divisions of that at which it will float and then release the hydrometer.

11.3 If hydrometer sticks to wall of cylinder, it may be helpful to spin the hydrometer slightly to bring it to the center of the cylinder. After it has come to rest and floats freely away from the walls of the cylinder, read the specific gravity as the point at which the surface of the sample apparently cuts the hydrometer scale. Make this observation by placing the eye slightly below the level of the liquid and slowly raise the eye until the surface of the sample first seen as a distorted ellipse seems to become a straight line cutting the hydrometer scale.

11.4 If the sample is too viscous for a specific gravity, then report "NA" (not applicable).

12. CALCULATION

12.1 NONE

13. REFERENCES

13.1 Method: ASTM 1298 "Standard Test Methods for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method".

ANALYST TRAINING FORM

Trainee _____

Analysis _____

Trainer _____

Date _____

Analysis: SPECIFIC GRAVITY

Method: HYDROMETER

1. The following sections of the method were explained by the trainer and understood by the trainee:

	Trainer	Trainee
Scope & Application	_____	_____
Safety & Waste Handling	_____	_____
Summary of Method	_____	_____
Sample Handling & Preservation	_____	_____
Interferences	_____	_____
Apparatus	_____	_____
Reagents	_____	_____
Preventive Maintenance	_____	_____
Trouble Shooting/ Corrective Action	_____	_____
Quality Control	_____	_____
Procedure	_____	_____
Calculations	_____	_____
References	_____	_____
Attachments	_____	_____

2. Trainee observed analysis performed by trainer:

_____ _____

3. Trainee repeats analysis. Comparative results:

SAMPLE ID	TRAINER RESULTS	TRAINEE RESULTS
1-Butanol 0.810	_____	_____
p-Xylene 0.866	_____	_____
2-Butoxyethanol 0.903	_____	_____
Water 1.000	_____	_____
Ethylene Glycol 1.113	_____	_____
Dichloromethane 1.325	_____	_____
Tetrachloroethylene 1.623	_____	_____

Analyst certified to perform method: (by/on) _____

Additional training recommended: (by/on) _____

(Attach additional comparative results)

Analyses: SPECIFIC GRAVITY ANALYST _____
Method: HYDROMETER DATES _____

DATES AND RESULTS FOR TETRACHLOROETHYLENE

1.72																		
1.71																		
1.70																		
1.69																		
1.68																		
1.67																		
1.66																		
1.65																		
1.64																		
1.63																		
1.62																		
1.61																		
1.60																		
1.59																		
1.58																		
1.57																		
1.56																		
1.55																		
1.54																		
1.53																		
1.52																		
1.51																		
1.50																		
1.49																		

COMMENTS

_____
_____
_____
_____
_____
_____
_____

EQUIPMENT USAGE LOG AND CALIBRATION VERIFICATION HISTORY
IDENTIFY THE SOURCE AND LOT NUMBER OF THE REFERENCE MATERIALS USED

DATE OBSERVATIONS

COMMENTS

Analyses: SPECIFIC GRAVITY ANALYST _____
Method: HYDROMETER DATES _____

DATES AND RESULTS FOR 2-BUTOXYETHANOL

0.98																		
0.97																		
0.96																		
0.95																		
0.94																		
0.93																		
0.92																		
0.91																		
0.90																		
0.89																		
0.88																		
0.87																		
0.86																		
0.85																		
0.84																		
0.83																		
0.82																		
0.81																		
0.80																		
0.79																		
0.78																		
0.77																		
0.76																		
0.75																		

COMMENTS

_____
_____
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_____
_____
_____
_____
_____

Analyses: SPECIFIC GRAVITY ANALYST _____
Method: HYDROMETER DATES _____

DATES AND RESULTS FOR P-XYLENE

0.98																		
0.97																		
0.96																		
0.95																		
0.94																		
0.93																		
0.92																		
0.91																		
0.90																		
0.89																		
0.88																		
0.87																		
0.86																		
0.85																		
0.84																		
0.83																		
0.82																		
0.81																		
0.80																		
0.79																		
0.78																		
0.77																		
0.76																		
0.75																		

COMMENTS

Analyses: SPECIFIC GRAVITY ANALYST _____
Method: HYDROMETER DATES _____

DATES AND RESULTS FOR 1-BUTANOL

0.98																		
0.97																		
0.96																		
0.95																		
0.94																		
0.93																		
0.92																		
0.91																		
0.90																		
0.89																		
0.88																		
0.87																		
0.86																		
0.85																		
0.84																		
0.83																		
0.82																		
0.81																		
0.80																		
0.79																		
0.78																		
0.77																		
0.76																		
0.75																		

COMMENTS

Analyses: SPECIFIC GRAVITY ANALYST _____
Method: HYDROMETER DATES _____

DATES AND RESULTS FOR 1,2 DICHLOROBENZENE

1.43																		
1.42																		
1.41																		
1.40																		
1.39																		
1.38																		
1.37																		
1.36																		
1.35																		
1.34																		
1.33																		
1.32																		
1.31																		
1.30																		
1.29																		
1.28																		
1.27																		
1.26																		
1.25																		
1.24																		
1.23																		
1.22																		
1.21																		
1.20																		
1.19																		

COMMENTS

_____
_____
_____
_____
_____
_____
_____
_____
_____

Analyses: SPECIFIC GRAVITY ANALYST _____
Method: HYDROMETER DATES _____

DATES AND RESULTS FOR DICHLOROMETHANE

1.43																		
1.42																		
1.41																		
1.40																		
1.39																		
1.38																		
1.37																		
1.36																		
1.35																		
1.34																		
1.33																		
1.32																		
1.31																		
1.30																		
1.29																		
1.28																		
1.27																		
1.26																		
1.25																		
1.24																		
1.23																		
1.22																		
1.21																		
1.20																		
1.19																		

COMMENTS

_____
_____
_____
_____
_____
_____
_____
_____
_____

Analyses: SPECIFIC GRAVITY ANALYST _____
Method: HYDROMETER DATES _____

DATES AND RESULTS FOR ETHYLENE GLYCOL

1.24																		
1.23																		
1.22																		
1.21																		
1.20																		
1.19																		
1.18																		
1.17																		
1.16																		
1.15																		
1.14																		
1.13																		
1.12																		
1.11																		
1.10																		
1.09																		
1.08																		
1.07																		
1.06																		
1.05																		
1.04																		
1.03																		
1.02																		
1.01																		
1.00																		
0.99																		
0.98																		

COMMENTS

Analyses: SPECIFIC GRAVITY
Method: HYDROMETER

ANALYST _____
DATES _____

DATES AND RESULTS FOR: WATER

1.07																		
1.06																		
1.05																		
1.04																		
1.03																		
1.02																		
1.01																		
1.00																		
0.99																		
0.98																		
0.97																		
0.96																		
0.95																		
0.94																		
0.93																		
0.92																		
0.91																		
0.90																		
0.89																		
0.88																		
0.87																		
0.86																		
0.85																		

COMMENTS

METHOD #: 9903
REV: 08/89
SUPERSEDES: NEW

SAFETY-KLEEN CORPORATION
TECHNICAL CENTER

ATTACHED IS A DOCUMENT FOR: CREATION DATE: 8-12-89

TITLE: STANDARD OPERATING PROCEDURE FOR THE DETERMINATION OF SPECIFIC GRAVITY OF WASTE MATERIALS USING HYDROMETERS
(BASED ON ASTM D 1298)
(KEY WORDS: SPECIFIC GRAVITY, HYDROMETER)

SERIES/SUBJECT

9000 ANALYTICAL METHODS
9903 GENERAL METHODS

COMMENTS:

INITIATOR -

DEPARTMENT MANAGER(S) -

TECHNICAL INFORMATION
SPECIALIST

MANAGER OF TECHNICAL
SERVICES-

Safety-Kleen Corporation
Technical Center

Method #: 9903
Rev: 08/89
SUPERSEDES: New

ATTACHED IS A DOCUMENT FOR: CREATION

Date: 8-12-89

TITLE: STANDARD OPERATING PROCEDURE FOR THE DETERMINATION OF SPECIFIC GRAVITY OF WASTE MATERIALS USING HYDROMETERS
(BASED ON ASTM D 1298)
(KEY WORDS: SPECIFIC GRAVITY, HYDROMETER)

SERIES/SUBJECT

9000 Analytical Methods
9903 General Methods

APPROVALS/CONCURRENCES:

DEPARTMENT MANAGER (S)

8/11/89

8/11/89

MANAGER OF TECHNICAL SERVICES 8/15/89

DISTRIBUTION

ARCHIVES
LIBRARY

MANAGER OF TECHNICAL SERVICES

DEPARTMENT MANAGER (S)

EXHIBIT C-5-d

SPECIFIC GRAVITY - FIELD

METHOD #: 9934
REV: 08/92
SUPERSEDES: NEW

SAFETY-KLEEN CORPORATION
TECHNICAL CENTER

ATTACHED IS A DOCUMENT FOR: CREATION DATE: 8-17-92

TITLE: STANDARD OPERATING PROCEDURE FOR THE DETERMINATION OF SPECIFIC GRAVITY OF WASTE MATERIALS USING HYDROMETERS IN FIELD APPLICATIONS (BASED ON ASTM D891, D1298, AND D2111) (KEY WORDS: SPECIFIC GRAVITY, HYDROMETER)

SERIES/SUBJECT

9000 ANALYTICAL METHODS
9903 GENERAL METHODS

APPROVALS/CONCURRENCES:

DEPARTMENT MANAGER (S)

8/17/92

9/24/92

9-1-92

MANAGER OF TECHNICAL SERVICES 9/2/92

DISTRIBUTION

ARCHIVES
LIBRARY

MANAGER OF TECHNICAL SERVICES

DEPARTMENT MANAGER (S)

TITLE: **STANDARD OPERATING PROCEDURE FOR THE DETERMINATION OF SPECIFIC GRAVITY OF WASTE MATERIALS USING HYDROMETERS IN FIELD APPLICATIONS (BASED ON ASTM D891, D1298, & D2111) (KEY WORDS: SPECIFIC GRAVITY, HYDROMETER)**

1. SCOPE AND APPLICATION

1.1 A hydrometer is used to screen waste material for the specific gravity at a temperature range of **50 to 90 F**, which is used as an indication of the types of compounds that can be found in the waste material.

1.2 Specific gravity results are used in field locations (e.g., at customer sites or at SK Branches) for screening purposes to assist in the determination of whether a waste stream has unexpected levels of contamination.

1.3 Specific gravity results are used to help establish that the physical and chemical characteristics of the shipments are consistent with what was expected.

1.4 Acceptable specific gravity ranges are established within the waste analysis plans for each location. These ranges are sufficiently broad that no temperature correction is required within the temperature range given above.

1.5 This method provides a specific gravity accuracy of two decimal places.

2. SAFETY AND WASTE HANDLING

2.1 **FIRE - CAUTION:** Some of the materials tested are highly flammable. Be sure that there are no open flames nearby while testing or cleaning is going on. The fumes released may be flammable and migrate to open flames.

FIRE - If any spill occurs, wipe up with an absorbent wipe and dispose of properly, preferably in a metal container with a lid. Any fires involving these materials must be treated as Class A fires.

2.2 **EYE CONTACT** - Regular safety glasses with side shields or goggles provide adequate protection from an accidental sample splash. Any eye contact must be removed by thorough washing and follow-up action.

2.3 **HAND CONTACT** - Use of disposable vinyl or latex gloves provide adequate protection from contact with the samples. All skin contact must be washed off immediately.

2.4 **RESPIRATORY** - Exposure to the vapors from the sample should be kept to a minimum by working in a well-ventilated area.
RESPIRATORY - A fitted respirator must be available for use in case of sample spills.

2.5 **WASTE DISPOSAL** - Samples taken to fill a test cylinder may be returned to the original container.

3. SUMMARY OF METHOD

3.1 The amount of buoyancy provided by a sample is directly related to its specific gravity. The hydrometers used are carefully calibrated to float at a depth corresponding to the specific gravity of the sample being tested.

4. SAMPLE HANDLING AND PRESERVATION

4.1 Samples must be at a temperature between 50 to 90 F prior to testing. Temperature corrections may be required outside of this range.

4.2 Erroneous results may be obtained if precautions are not taken to avoid the significant loss of volatile material.

4.3 For shipping or long-term storage of samples, do not use plastic (polyethylene, polypropylene, etc.) containers; volatile material may diffuse through the walls of the bottle. Plastic containers may be used for process samples that will be analyzed within 24 hours.

4.4 Approximately 100 mL of specimen is required for each analysis.

5. INTERFERENCES

5.1 The limits of precision and accuracy for determining specific gravity depend upon the care given to the technique involved. Adequate accuracy can be achieved without temperature correction (to two decimal places) if the samples are between **50 and 90 F**.

5.2 Erroneous results may be obtained if precautions are not taken to avoid the excessive loss of volatile material.

5.3 Erroneous results may be obtained if precautions are not taken to detect physical damage to the hydrometer tip or shifting of the scale.

5.4 Samples containing floating solids, a foam layer, or liquids with significant second or third phases may give inaccurate results.

5.5 Samples with high viscosities may not give accurate or reproducible results, because the hydrometer may never reach its equilibrium depth.

5.6 For opaque samples, do not allow the hydrometer scale to become obscured.

6. EQUIPMENT

NOTE: Unless indicated as mandatory, all references to manufacturer and catalog number are provided as examples.

6.1 HYDROMETERS -

There are several possible hydrometers that may be used:

0.650 - 1.000, 170 mm x 12 mm, 0.010 Inc.
(Fisher Cat. No. 11-512D)

1.000 - 2.000, 170 mm x 12 mm, 0.020 Inc.
(Fisher Cat. No. 11-522D)

0.75 - 1.20 and other custom ranges
(Francis L. Freas Glass Works, Inc., P.O. Box 26, Conshohocken, PA 19428; (215)828-0430).

6.2 SAMPLING DEVICES -
There are several possible sampling devices available, some of which have a hydrometer resident inside for a quick determination. These include:

Coliwasa (without hydrometer) - 38-inch long, 1.0625-inch o.d. polyethylene tube fitted with metal rod, cam, and o-ring seal. Available as SK Part No. 8850.

Coliwasa with hydrometer -
44-inch tube with 1.5-inch o.d. Glass tube is graduated to provide volume measurement.

Syringe with hydrometer - SK Part No. 8740
Hydrometer range = 0.70 to 1.00

Syringe sampler/hydrometer combination - 12-inch straight barrel glass fitted with 2 oz. rubber bulb and wide-range hydrometer (0.750 - 1.200; 0.010 subdivisions). Comes as a set in a box. Francis L. Freas Glass Works Inc., P.O. Box 26, Conshohocken, PA 19428; (215)828-0430.

Truck sampler - 76-inch long, 1-inch diameter PVC pipe with cam and o-ring seal (Ramco Tool & Mfg, 65 Franklin St., Elgin, IL 60120).

6.3 MEASUREMENT CYLINDERS - If the sampling device does not have an internal hydrometer, the actual measurement can be taken by placing the sample into a container such as the following:

HYDROMETER CYLINDER - 38 mm diameter, 200 mm height (VWR Cat. No.24629-092)

GRADUATED CYLINDER - 29 mm diameter, 255 mm height (VWR Cat. No. 24710-124)

6.4 DISPOSABLE GLOVES -

VINYL -
Prepowdered (VWR Cat.Nos. 32915-461, 32915-483, 32915-508)

LATEX -
(VWR Cat.Nos. 32917-875, 32917-897, 32915-508)

7. REAGENTS

7.1 **p-Xylene**, 98%, (CAS No. 106-42-3), d 0.866 (VWR Cat.No. EMXX0045 or JTX528)

7.2 **Water** (CAS No. 7732-18-5), d 1.000 (use commercial distilled or de-ionized)

7.3 **Ethylene Glycol**, 99.8% (CAS No. 107-21-1), d 1.113, (Baxter Cat.No. 5001-500NY)

7.4 **Tetrachloroethylene** (CAS No. 127-18-4), Reagent, d 1.623, OPTIONAL - If high specific gravity standard required.(VWR Cat.No.JT9465 or EM-TX0175)

8. PREVENTIVE MAINTENANCE

8.1 The hydrometers are not subject to significant wear or aging. The periodic checks are simply to confirm the reliability and accuracy of the hydrometers. If a hydrometer is damaged, it must be replaced.

8.2 Rinse the hydrometers after each sample to assure that residue does not build up on the contact surface. Wipe dry.

8.3 Cylinders and sampling devices should be rinsed and kept clean.

8.4 Glass syringe/hydrometer set (PN 8740) are fragile and the hydrometer should be removed from the barrel and stored in a separate small box between uses.

8.5 Document all maintenance.

9. TROUBLE SHOOTING AND CORRECTIVE ACTION

9.1 The hydrometer will not read accurately if there is any change to its density. The two most common ways in which the density of the hydrometer will be changed is through the build up of residue on the hydrometer or a missing chip off the tip. If hydrometer has spacing nubs near the bottom, check to make sure all are still present.

9.2 The hydrometer will not read accurately if the scale has moved inside the stem.

9.3 The hydrometer reading may need adjustment if the temperature of the sample is not within the 50 to 90 F temperature range. Temperature correction factors are available in ASTM D1250.

9.4 The hydrometer will not read accurately if the container used to measure the specific gravity in is too narrow or too shallow. The container must be approximately 0.5 inch greater in diameter than the hydrometer. Take care to assure that the hydrometer does not hang up on the wall. The sample within the sampler or container must be at least 1 inch deeper than the depth to which the hydrometer sinks.

9.5 For samples containing significant multiple phases, a foam layer, or floating solids, the liquid phases must be separated and analyzed individually.

10. QUALITY CONTROL

10.1 EACH DAY: Visual and tactile inspection of the hydrometers.

10.2 ANNUAL: Each person who performs specific gravity testing must perform an evaluation of analytical technique using at least two of the materials listed in section seven. Record the results on the corresponding control chart (see attached examples) for that individual.

10.3 QUARTERLY: Nothing scheduled.

10.5 NEW HYDROMETERS - must be verified prior to use. A record must be established and maintained for each hydrometer.

PRECISION - Different operators using different instruments should be able to obtain results that differ from the means by not more than 0.02. Adequate performance for the testing is within 0.02 of the expected value.

11. PROCEDURE

11.1 There are a number of different scenarios, depending on the location, type of material being sampled, and equipment availability. The following are general procedures, which will need to be adapted to the specific situation:

11.2 Sampling

11.2.1 - Coliwasa - A representative sample is taken using a clean coliwasa that is able to extend to the entire depth of the liquid being sampled. Depending on the volume required, multiple coliwasa samples may need to be obtained. [See SK Environmental, Health & Safety Procedure #89-1, "Drum Sampling Procedures"]

11.2.2 - Syringe - If possible, mix the sample by rotating the drum or stirring the contents with a metal (preferably brass, to avoid sparks) rod. Draw up and release sample three times.

11.3 External Hydrometer -

11.3.1 - If the container holding the sample does not provide for sufficient depth of liquid, pour the sample into a clean and dry cylinder without splashing, so as to avoid formation of air bubbles. Examine the sample for unusual appearance (excessive solids, foam, or significant second layer). If unusual, sample can be sent to Recycle Center for analysis.

Remove any bubbles adhering to the side wall by gently tapping the cylinder on a padded surface or using a finger.

11.3.2 -Slowly and carefully lower the hydrometer into the sample to a level approximately at which it will float and then release the hydrometer.

11.3.3 -If the hydrometer sticks to the wall of the cylinder, it may be helpful to spin the hydrometer slightly to bring it to the center of the cylinder. After it has come to rest and floats freely away from the walls of the cylinder, read the specific gravity as the point at which the surface of the sample apparently cuts the hydrometer scale. Make this observation by placing the eye slightly below the level of the liquid and slowly raise the eye until the surface of the sample first seen as a distorted ellipse seems to become a straight line cutting the hydrometer scale. See Figures 1 & 2 for an illustration of this procedure.

11.4 Internal Hydrometer -

If there is a hydrometer within the coliwasa or syringe, raise the sampler such that the upper liquid surface is at eye level. Read the specific gravity as described above and as shown in Figures 1 and 2.

11.5 If the sample is too viscous for a specific gravity, then report "NA" (not applicable).

12. CALCULATION

12.1 NONE

13. REFERENCES

13.1 ASTM D891, "Standard Test Methods for Specific Gravity, Apparent, of Liquid Industrial Chemicals."

13.2 ASTM D1298, "Standard Test Methods for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method".

13.3 ASTM D2111, "Standard Test Methods for Specific Gravity of Halogenated Organic Solvents and Their Admixtures."

13.4 ASTM D1250 Guide for Petroleum Measurement Tables (see Tables 23A and 23B).

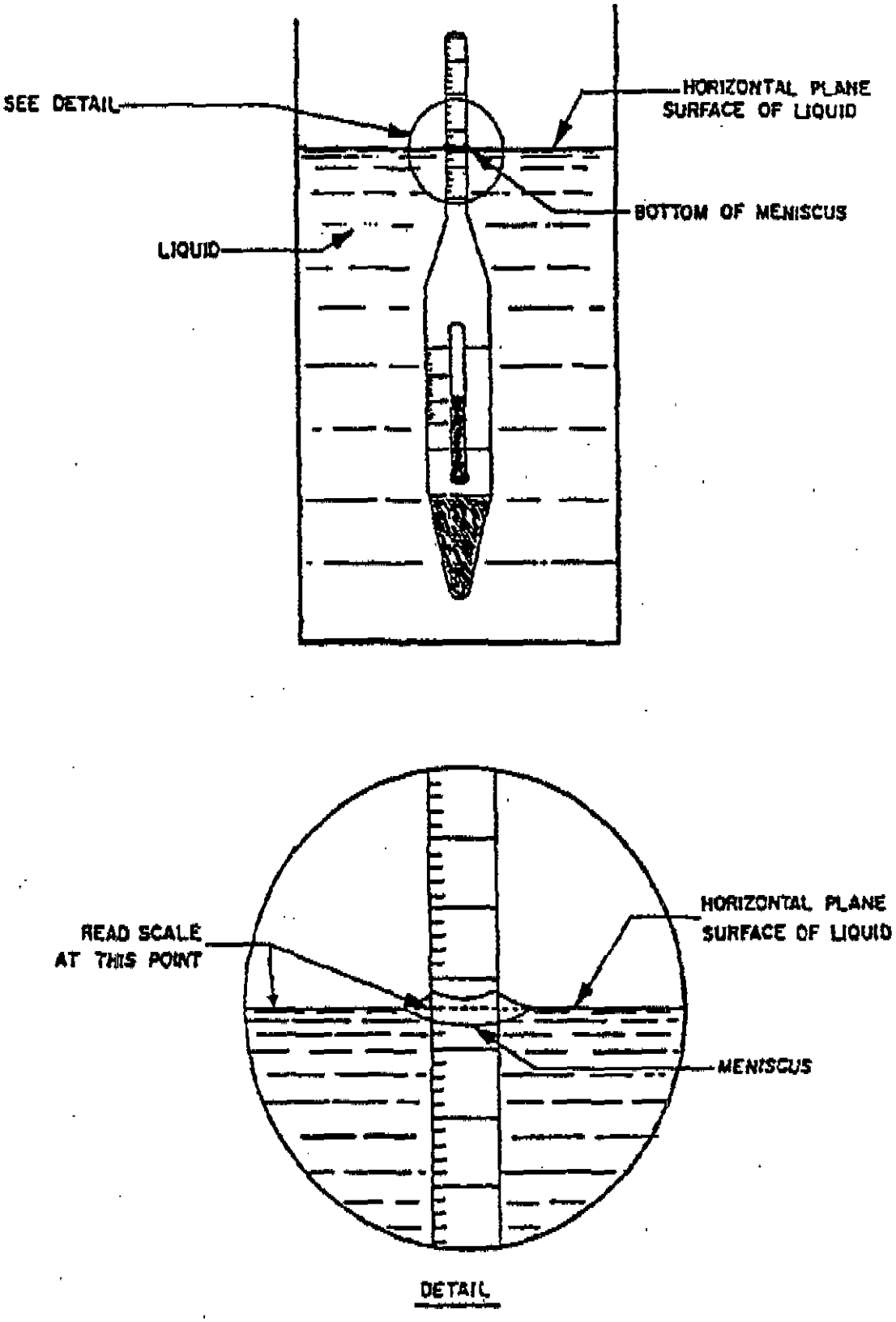


FIG. 1 Hydrometer Scale Reading for Transparent Liquids

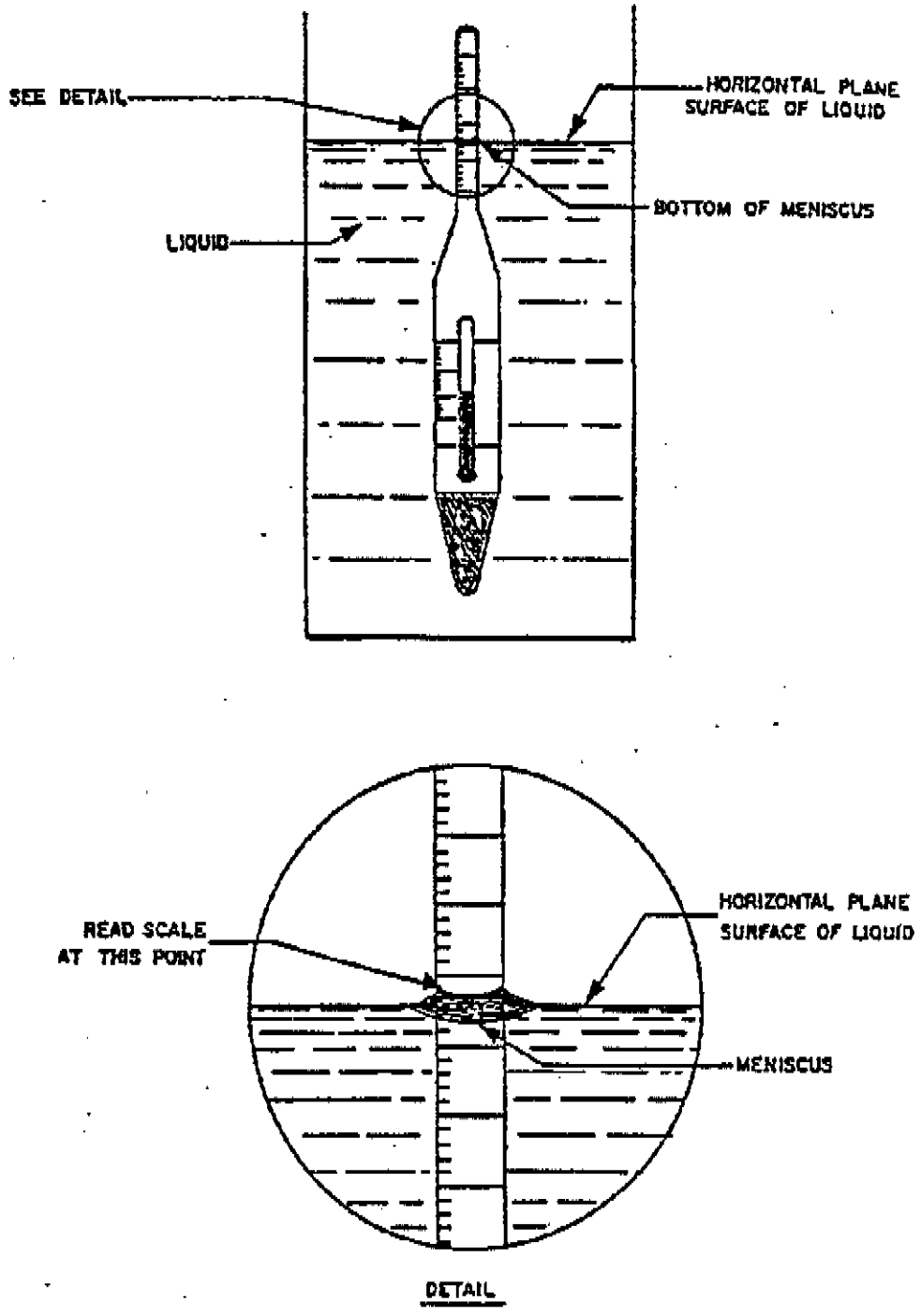


FIG. 2 Hydrometer Scale Reading for Opaque Fluids

ANALYST TRAINING FORM Trainee _____

Trainer _____ Date_____

Analysis: SPECIFIC GRAVITY Method: SK9934

1. The following sections of the method were explained by the trainer and understood by the trainee (enter initials):

	Trainer	Trainee
Scope & Application	_____	_____
Safety & Waste Handling	_____	_____
Summary of Method	_____	_____
Sample Handling & Preservation	_____	_____
Interferences	_____	_____
Apparatus	_____	_____
Reagents	_____	_____
Preventive Maintenance	_____	_____
Trouble Shooting/ Corrective Action	_____	_____
Quality Control	_____	_____
Procedure	_____	_____
Calculations	_____	_____
References	_____	_____
Attachments	_____	_____

2. Trainee observed analysis performed by trainer:

_____ _____

3. Trainee repeats analysis. Comparative results:

SAMPLE ID	TRAINER RESULTS	TRAINEE RESULTS
Water 1.000	_____	_____
Ethylene Glycol 1.113	_____	_____
Tetrachloroethylene 1.623	_____	_____

_____

_____

_____

Analyst certified to perform method: (by/on) _____

Additional training recommended: (by/on)_____

(Attach any additional comparative results)

Analyses: SPECIFIC GRAVITY ANALYST _____
Method: HYDROMETER, SK9934

DATES AND RESULTS FOR TETRACHLOROETHYLENE

1.72																		
1.71																		
1.70																		
1.69																		
1.68																		
1.67																		
1.66																		
1.65																		
1.64																		
1.63																		
1.62																		
1.61																		
1.60																		
1.59																		
1.58																		
1.57																		
1.56																		
1.55																		
1.54																		
1.53																		
1.52																		
1.51																		
1.50																		
1.49																		

COMMENTS

EQUIPMENT USAGE LOG AND CALIBRATION VERIFICATION HISTORY

[IDENTIFY THE SOURCE OF THE REFERENCE MATERIALS USED]

DATE OBSERVATIONS

COMMENTS

Analyses: SPECIFIC GRAVITY ANALYST _____
Method: HYDROMETER, SK9934

DATES AND RESULTS FOR ETHYLENE GLYCOL

1.24																		
1.23																		
1.22																		
1.21																		
1.20																		
1.19																		
1.18																		
1.17																		
1.16																		
1.15																		
1.14																		
1.13																		
1.12																		
1.11																		
1.10																		
1.09																		
1.08																		
1.07																		
1.06																		
1.05																		
1.04																		
1.03																		
1.02																		
1.01																		
1.00																		
0.99																		
0.98																		

COMMENTS

Analyses: SPECIFIC GRAVITY ANALYST _____
Method: HYDROMETER, SK9934

DATES AND RESULTS FOR: WATER

1.07																		
1.06																		
1.05																		
1.04																		
1.03																		
1.02																		
1.01																		
1.00																		
0.99																		
0.98																		
0.97																		
0.96																		
0.95																		
0.94																		
0.93																		
0.92																		
0.91																		
0.90																		
0.89																		
0.88																		
0.87																		
0.86																		
0.85																		

COMMENTS

EXHIBIT C-5-e

VOLATILE ORGANIC COMPOUNDS

TITLE: STANDARD OPERATING PROCEDURE FOR ANALYSIS OF VOLATILE ORGANIC COMPOUNDS IN WASTE MATERIALS

(BASED ON: EPA 8000/3820 - NIOSH P&CAM 127)
(KEY WORDS: VOC, CAPILLARY, FID)

1. SCOPE AND APPLICATION

1.1 The volatile organic analysis is used to identify and quantify organic compounds found in waste material. This method may not be applicable to single component streams. A list of common organic compounds is statistically derived on a routine basis from a frequency distribution of at least one year's compiled results of volatile organic analyses. The types of compounds found are included in, but not limited to, the following compound categories:

1) Alcohols
2) Aliphatic Hydrocarbons
3) Aromatic Hydrocarbons
4) Chlorinated Solvents
5) Esters
6) Glycol Ethers
7) Inhibitors/Additives
8) Ketones

1.2 This procedure has a typical detection limit of about 0.1% by weight. However, the data quality objectives for this procedure currently are to identify and quantitate volatile organic compounds down to 1% by weight in the total sample as received.

1.3 The organic compounds which elute of the primary column described in Section 6.5 and the parameters tabulated in Section 11.2 from the gas chromatographic system, specified in this procedure, before the retention time of **Hexadecane** will be labeled as **VOLATILE ORGANIC COMPOUNDS.**

1.4 Attachment A contains definitions and acronyms.

2. SAFETY AND WASTE HANDLING

2.1 **FIRE - CAUTION:** Some of the materials are highly flammable. Be sure that there are no open flames nearby while testing or cleaning is going on. The fumes released may be flammable and migrate to open flames.

FIRE - If any spill occurs, wipe up with an absorbent wipe. Used wipes and plastic pipettes must be placed in a metal container lined with a plastic trash bag. The metal top must be kept on the container at all times except to add or to remove the contents. In the event of a fire, the top should quickly smother it. Any fires involving these materials must be treated as Class A fires. The contents must be removed daily and may be disposed of in the regular trash.

FIRE - Since a gas chromatographic instrument is an electrical device, no open containers of liquid are to be placed on top of or near the instrument.

BURNS - Injectors and detectors are extremely hot. Extreme care should be exercised when replacing septa. The injectors and detectors should be cooled down before any injector or detector repair or maintenance is attempted.

BURNS - The chromatographic oven can be a source of very hot air. Do not attempt to open the oven compartment until the oven temperature is below 50°C.

2.2 **EYE CONTACT** - Regular safety glasses with side shields provide adequate protection from an accidental sample splash. Any eye contact must be removed by thorough washing and follow-up action, as detailed in the Safety Plan.

2.3 **HAND CONTACT** - Use of disposable vinyl or latex gloves provide adequate protection from contact with the samples. All skin contact must be washed off immediately.

2.4 **RESPIRATORY** - Exposure to the vapors from the sample should be kept to a minimum by working in a well-ventilated area. The sample container must be opened in a hood and only long enough to obtain a

sample. A fitted respirator must be available for use in case of sample spills.

RESPIRATORY - Appropriate precautions, such as installing a canopy hood, for venting the hot exhaust oven air and the effluent from capillary vents must be in place before operating the gas chromatographic instrument.

RESPIRATORY - The used gas chromatographic sample vials are to be removed from the sample tray and placed into a well constructed container that is resistant to solvents. The container must be kept in a hood or other well ventilated area.

2.5 **WASTE DISPOSAL** - The remainder of the sample in the original container must be returned to sample storage for future testing or later disposal.

2.6 **TOXICS** - The material safety data sheets for each chemical reagent and compounds in each sample submitted should be read to ensure proper handling and storage.

3. SUMMARY OF METHOD

Waste materials are analyzed by direct neat injection, or by carbon disulfide, methanol, or hexane extraction and injection of the extract into a gas chromatograph. Detection is achieved by a Flame Ionization Detector (FID). Initial identification of individual components is accomplished by multiplying the specific components' calibration retention time by +/- 2.3 percent and then searching the resulting retention time window for a chromatographic peak. Confirmation of identification may be achieved by using a second type of GC column, or by GC/MS, or by other methods.

4. SAMPLE HANDLING AND PRESERVATION

4.1 The samples are considered to be concentrated wastes.

The sample container may be a wide mouth glass bottle with a TEFLON lined cap.

No sample preservation is required, however, samples should be stored at a temperature between 40 °F and 90 °F to prevent physical damage to the container due to freezing or pressure build up. Short term elevated/reduced temperatures experienced during sample shipment will not significantly affect sample integrity.

4.2 Erroneous results may be obtained if precautions are not taken to avoid the loss of volatile material. Do not open containers unnecessarily. Results for samples from leaky containers must be marked to indicate that the sample integrity was not maintained during shipping/storage.

4.3 Plastic containers or lids may NOT be used for the storage of samples due to the possibility of contamination from the phthalate esters and other hydrocarbons within the plastic. For shipment of samples, use a wide mouth glass bottle (preferably plastic-coated) with a TEFLON lined cap. For samples to be used on location, any clean glass bottle is satisfactory, but some secondary containment must be provided when transporting the sample. The bottle should be filled at least 75% full but not more than 90% full.

4.4 A 10 mL specimen is required for each analysis.

5. INTERFERENCES

5.1 Interferences may be encountered from volatile organic compounds that respond similarly to the FID due to co-elution, peak deformation, and compound degradation. Also, closely eluting components may complicate identification based solely on retention time. When these types of interferences are encountered, the analyst must rely on other sources of information for positive identification. These include:

Sample history, e.g., any information available from the waste generator's material survey and Material Safety Data Sheet (MSDS).

Physical characteristics; e.g., flammability or miscibility with water, BTU data, etc.

Use of a confirmation column, such as a capillary column of different polarity or GC/ECD for halogenated organics. (See SOP 9209).

If available, GC/MS analysis will attempt to identify all unconfirmed volatile organics that appear to be greater than 1% on the Safety-Kleen common compounds list. Peaks still unidentified and/or unconfirmed after GC/MS analysis will be so designated and the data package will be forwarded to a data reviewer for disposition.

5.2 Some examples of compound pairs which may be misidentified are as follows:

methylene chloride/freon-113,
butylene oxide/methyl ethyl ketone,
perchloroethylene/normal butyl acetate,
acetone/isopropyl alcohol/propylene oxide,
benzene/n-butanol.

The analyst should be aware of the possibility of other co-eluting compounds not specifically mentioned.

5.3 Interferences may also be encountered from syringe carryover. Immediately following each injection, the syringe should be thoroughly rinsed first with a low-boiling organic solvent, such as methanol, acetone, hexane and then with carbon disulfide.

5.4 Solvents, reagents, glassware, and other sample processing hardware may yield interferences to standard analysis. All these materials must be demonstrated to be free from interferences, under the condition of analysis, by analyzing method blanks.

5.5 Interferences caused by carryover from previous sample runs are usually indicated by characteristic large bulbous peaks. A repeat of that run is required.

6. APPARATUS

6.1 GAS CHROMATOGRAPH - HP5880 or HP5890

6.2 Detector: Flame Ionization Detector (FID) (MANDATORY).

6.3 Data System: A data system capable of measuring peak areas.

6.4 Autosampler: Hewlett Packard Model 7673A or 7673B with dual injector modules.

6.5 PRIMARY COLUMN - Crosslinked 5% phenyl methyl silicone, 50 m x 0.32 mm x 1 um film (Mandatory). (Rt_X-5, Restek Cat. No. 10257-105)

6.6 CONFIRMATORY COLUMN - Crossbonded 14% Cyanopropylphenyl, 80% Methylpolysiloxane, 50 meter x 0.32 mm x 1 um Film (Rt_X-1701, Restek Cat. No. 12057-105) or equivalent.

The Crossbonded Carbowax PEG-20M, Stabilwax, 50 m x 0.32 mm x 1 um film or equivalent may be used as an option (Restek Cat. No. 10657-105).

6.7 Analytical balance, minimum 200 gm capacity capable of weighing to 0.001 gm.

6.8 Reference Masses - 5 g, and 500 milligrams
NBS Class S or ASTM Class 1
(VWR Cat. No. 12626-155)

6.9 Vials, glass, screw-cap - To store standards, and long term storage of samples, Teflon should be used for the cap liner. For short term storage, other inert materials maybe used.
(40 mL vials, National Scientific No. B7800-6)
(22 mL vials, National Scientific No. B7800-5)

6.10 GC vials for autosampler.
(National Scientific No. 4011-1; Caps - 4011-1A)

6.11 Microsyringes: 1.0, 10 uL

1 uL - Supelco No. 2-0731
10 uL - National Scientific 1010HP.

6.12 Pasteur disposable pipets to transfer samples. (Baxter No. P5214-10)

6.13 Disposable Gloves:

Vinyl: Prepowdered (VWR Cat. #32915-461, 32915-483, 32915-508).

Latex: (VWR Cat. #32917-875, 32917-897, 32917-911).

6.14 Gas Purifier - 1/4 inch fittings (Supelco No. 2-3802)

7. REAGENTS AND STANDARDS

7.1 Methanol - Reagent grade (Baxter No. 3041-1NY)

7.2 Acetone - Reagent grade (Baxter No. 2435-1NY)

7.3 Carbon Disulfide - with ≤50ppm benzene (VWR No. EMCX0396-3)

7.4 **REAGENTS** for each component of interest as supplied to Safety-Kleen Technical Services. (99% purity available from Supelco, Aldrich, or J.T. Baker.)

Each reagent's information should include the following:

REAGENT Name, Source and Catalog Number,
Lot Number and Purity,
Date Received and Date Opened and by Whom.

7.5 All prepared standard solutions must be refrigerated at about 4°C and stored with minimal headspace.

All refrigerated reagents, samples, or standards must be allowed to equilibrate to room temperature after transferal to GC vials and before injection into a GC.

All standards must be properly labeled so that it can easily be traced back to the original source.

7.6 **WORKING STANDARD SOLUTIONS** are prepared from **REAGENTS** at concentrations of 10% nominal (wt/vol). Tables of retention times for the volatile organic compounds that Safety-Kleen Corp. encounters most often in all lines of business are published in a confidential technical report available from Technical Services and is updated on a regular basis. (See Attachment C3).

The **WORKING STANDARDS** can be prepared by directly weighing each component or by volume (e.g., 1 mL each component), and then calculated to (w/v).

7.7 **INSTRUMENT SET-UP STANDARDS**

INSTRUMENT SET-UP STANDARD A - A solution of **1% 1,1,1-TRICHLOROETHANE** is prepared by weighing 0.1 gm of 1,1,1-Trichloroethane into a tared 10 mL volumetric flask, containing about 5 mL of CS_2. Fill to the mark with CS_2, cap the flask and shake well. This solution is used to set the column head pressure for a consistent retention time (8.6 $\pm$ 0.2 minutes on the crosslinked 5% phenyl Methyl Silicone, 50 m (RTx-5); 10.0 $\pm$ 0.2 minutes on RTx-1701, 50 m; and 9.0 $\pm$ 0.2 minutes on Stabilwax, 50 m).

INSTRUMENT SET-UP STANDARD B - A solution of **1% TOLUENE AND 1% CARBON TETRACHLORIDE** is prepared by weighing 0.1 gm of each compound into a tared 10 mL volumetric Flask containing about 5 mL of **DECANE**. Fill to the mark with DECANE, cap and shake well. This solution is used to set up the area reject and the uncalibrated peak response factor for neat injections. Area reject for diluted sample should be adjusted according to the dilution factor.

Each set-up standard A or B will be transferred into a 20-mL vial with a Teflon-lined cap, and refrigerated at about 4°C.

7.8 **CALIBRATION CHECK STANDARD (CCS).** A CCS standard is prepared as follows:

Into a 1000 mL volumetric flask accurately weigh the following amount in the order listed:

1. Ortho-Dichloro Benzene	(ODCB)	90.0	gm
2. Ethylene Glycol Butyl Ether	(EGBE)	90.0	
3. n-Octane	(OCT)	90.0	
4. Toluene	(TOL)	100.0	
5. n-Butyl Alcohol	(NBA)	90.0	
6. 1,1,1-Trichloroethane	(111)	90.0	
7. Ethyl Acetate	(ETAC)	90.0	
8. Methylene Chloride	(MECL)	90.0	
9. Acetone	(ACE)	90.0	

Cap and mix well. Add methanol to bring to volume, and mix well again. Enter weights and other information into log book as per section 7.4. Pre-chill a liter of CCS and then transfer this solution into pre-chilled 40 mL vials. Cap (use Teflon-lined caps) tightly, seal with proper tape or cellulose bands, label the name and expiration date, (i.e., "CCS, expires xx/xx/xx") where the date listed is six months from the date of preparation. Once the tape (or cellulose band) is removed from a vial, it is to be used or discarded within 72 hours.

The CCS solution must be kept refrigerated at all times except when being used. Individual GC vials may be made up and stored in the GC lab for up to 72 hours prior to running them. Each CCS vial must not be used 24 hours past the first injection.

It will not be necessary to change the theoretical amounts or limits at the top of the CCS record sheets (Attachment D.1) for all GCs unless the amounts weighed vary by more than 1% (0.9 gm) from the target amount.

This mixture contains the most frequently occurring classes of compounds. It provides a good overall performance check of the GC/FID system.

7.9 **PREPARATION OF MATRIX SPIKE STANDARD (33.3% WT/VOL)**
Into a 100 mL volumetric flask, weigh 33.3 gm each of:

1. 2-Methyl-1-Propanol (IBA)
2. Trichloroethylene (TCE)
3. 1-Methyl Naphthalene (MN1)

Fill to the mark with methanol and mix well. Place into 40 ml vials that are labeled with the name and expiration date, where the expiration is one month from the date of preparation (e.g. "spiking standard, expires xx/xx/xx"). Record the weights, compounds, sources, and your initials into the standards notebook as per Section 7.4. Fill out a Matrix spike prep and calculation worksheet (Attachment D.4) with the appropriate standards log reference. Make copies of this filled out form, and discard any copies from the previous batch of spiking standard.

(Amount of Standard made can be adjusted proportionally to accommodate each lab for the required period.)

7.10 METHOD DETECTION LIMIT STANDARD
MDL Standard is prepared identical to CCS solution except substituting CCL4 for NBA. A 1% (w/v) standard is prepared by diluting 1 gm of this solution to 10 mL with CS_2.

7.11 Nitrogen, Carrier Gas, Zero Grade.

7.12 Compressed Air, Zero Grade.

7.13 Hydrogen, Zero Grade.

8. PREVENTIVE MAINTENANCE

8.1 DAILY: Clean all contamination, both spillage and routine handling from the hood and instrument surfaces. Check for proper auto-sampler syringe operation (plunger is not sticky and syringe is correctly aligned with injection port). Change syringe wash solvents and make sure that waste vials are empty.

8.2 GUIDELINES:

EVERY 50 INJECTIONS: Replace the septa.
Replace or service the injector-insert as needed.

8.3 For further information on system maintenance such as cleaning FID jet, etc., see the "Operation and Maintenance Manual" for the instrument. All instrument maintenance must be recorded in the instrument maintenance log book.

9. TROUBLESHOOTING AND CORRECTIVE ACTION

9.1 If the quantitation obtained on the control samples are not within the control limits, check for septum leakage, syringe operations, gas pressure, column integrity, detector jet blockage.

9.2 Consult troubleshooting manual associated with the type of gas chromatographic instrument if unusual problems are encountered.

9.3 For further information, see the "Operation and Maintenance Manual" for the instrument.

10. QUALITY CONTROL

10.1 **BALANCE CHECK:** Prior to weighing any standards or samples, check the operation of the balance by zeroing the balance, adding a 5 gm reference mass, re-zeroing, and then adding a 500 milligram reference mass. The balance must be within ± 1% of the expected mass for each of the two weights to be acceptable for use for this method. The acceptable ranges are 4.95-5.05 gm and 0.495-0.505 gm. If the masses are out of bounds, a service call is to be made to correct the problem.

10.2 **DAILY - CALIBRATION CHECK STANDARD (CCS)**

The CCS is injected daily to verify the performance of each quantifying channel in use.

10.2.1 The Retention Time (RT) and Area count (A) of 1,1,1-Trichloroethane is tabulated (See Attachment D.1). The acceptance criteria are:

± 0.2 min for the retention time of 1,1,1-Trichloroethane (111),
± 20% from the mean area.

using means established as described below.

A Control chart on the area of 111 is plotted daily on all quantifying channels (charts not required for confirmation channels). The RT and area of 1,1,1-Trichloroethane will also be tabulated for confirming channels. Retention time limit is ±0.2 min. as on the quantifying channel, but due to variations observed on Stabilwax column, an area range of ±50% of the initial setting is allowed on confirmation channels.

If the performance criteria are not met, troubleshooting must be performed to locate the problem.

If major changes are performed on a GC (e.g. changing columns, split flows, etc.), after instrument is adjusted using set up Standard A, run a CCS sample to see if the CCS is in Control. If not in control, then the GC will be recalibrated and control limits will be established based on a series of 5 consecutive injections of CCS (only one injection per vial). The control limits established by the first five consecutive injections are termed the "Temporary Limits." Twenty additional points, which fall within the temporary limits will be used to produce final control limits. These limits are to remain in effect until such time as recalibration is again required.

10.2.2 DAILY - CALIBRATION CHECKS

Daily, the concentration of each of the ten compounds in the CCS is used to check the validity of the current calibration (see Attachment D-2). Percent difference (PD) may be obtained by comparing the calculated amount against the known amount, or if it is desired, the area of each compound may be used in the calculation (recognizing that this means of calculation is channel specific) of percent difference. Reporting of PDs may include a minus sign to indicate direction of deviation if desired.

Calculation of PD based on concentration:

$$PD = \frac{C - C_{CCS}}{C_{CCS}} \times 100$$

where C = concentration calculated from current calibration

C_{CCS} = known concentration in CCS solution.

Calculation of PD based on area count.

$$PD = \frac{A - A_{CCS}}{A_{CCS}} \times 100$$

Where A = Raw area count of the compound on this channel.
A_{CCS} = Area count on this channel obtained at time of setting final limits (must have produced acceptable quantitation of the peak).

If the Percent Difference (PD) for any compound is greater than 20%, the laboratory should consider this as a warning limit. If the percent difference for each CCS is less than 25%, the initial calibration is assumed to be valid. If criterion is not met (>25% difference) for any one CCS, corrective action must be taken. (See Ref. 13.3).

10.3 DUPLICATE AND MATRIX SPIKED SAMPLES:

10.3.1 Every 20th sample must be prepared and analyzed in duplicate. These results must be documented in a log book.

Acceptance criteria for average percent difference (APD) are equal to or less than 20% deviation on duplicates (as shown below). (See Attachment D.3 and D.5)

$$RPD = \frac{|\text{Result 1} - \text{Result 2}|}{\text{Average of Result 1 and Result 2}} \times 100\%$$

This formula is not applicable to results of less than or equal to 1 percent.

10.3.2 PREPARATION OF MATRIX SPIKED SAMPLES

Every 20th sample must also be prepared and analyzed as a matrix spike. The recovery result must be documented in a log book. (See Attachment D.3 and D.5). Acceptance criteria are 80 to 120% recovery on the matrix spiked samples. (See Attachment D-4).

$$\% \text{ Recovery} = \frac{\text{Recovered Amount}}{\text{Spiked Amount}} \times 100\%$$

If acceptance criteria are not met, re-prepare the spiked blank and re-analyze. Fresh spiking solution may be required. These results must be documented in a log book.

SOLID SAMPLES:

A 3.0 gm test portion of the sample is spiked with 1.0 gm or 1.0 mL of the **MATRIX SPIKE** (sp. gr. = 1), then enough carbon disulfide (~11 mL) is added to obtain a final organic solution of 12 mL. The organic extract is injected into a GC, and the concentration of each of the three standards is then calculated. (See Attachment D.4).

LIQUID SAMPLES:

SAMPLES SUITABLE FOR NEAT INJECTIONS

A 11.0 mL test portion of the sample is spiked with 1.0 gm or 1.0 mL **MATRIX SPIKE** (sp. gr. = 1). The solution is mixed well.

If the mixture is **HOMOGENEOUS**, inject the mixture into a GC. Calculate the concentration of each spike compound, and then its recovery.

If the spiking solution is **NOT MISCIBLE** with the sample (e.g. water matrix), follow procedure described below for immiscible liquid with carbon disulfide extraction.

SAMPLES REQUIRING CARBON DISULFIDE EXTRACTION

If the liquid is **MISCIBLE** with Carbon Disulfide, a 3.0 gm sample is spiked with 1.0 gm (or 1.0 mL) of the **MATRIX SPIKE** and then diluted with about 8.0 mL Carbon Disulfide (total volume of solution is 12 mL). If the liquid is **NOT MISCIBLE** with carbon disulfide, a 3.0 gm sample is spiked with 1.0 gm (or 1.0 mL) of the **MATRIX SPIKE** and then extracted with 11.0 mL carbon disulfide.

If the liquid is **PARTIALLY MISCIBLE** with Carbon Disulfide, a 3.0 gm sample is spiked with 1.0 gm or 1.0 mL of **MATRIX SPIKE** and then extracted with carbon disulfide (between 8 and 11 mL) to obtain a total volume of 12 mL organic phase. A measuring ruler marked 0 to 12 mL in length corresponding to the same diameter of the vial will be helpful to get the 12 mL total volume.

In either case, the carbon disulfide extract is injected into a GC and the concentration of each of the three standards is calculated.

Due to the moderate solubility of iso-butanol in water, good recovery may not be possible. If a water phase develops upon extraction with CS_2 during spiking, it should be noted so that any discrepancies in the recovery can be explained. If necessary a methanol extraction may also be done.

For MULTI-PHASE samples, only the organic phase will be spiked, and the spiked phase only will be specified in documentation.

If the spiked compounds are also found in the sample, a correction is needed before % recovery calculation. If the native material exceeds 5 times the spike value, the results are to be marked as invalid and not used in any performance tracking systems.

10.5 **BLANKS AND SPIKED BLANKS** A blank or spiked blank must be prepared and run every 20th sample. The spiked blank is prepared in the same manner as a sample, except substituting 1 gm of spiking standard for the sample weight.

The spiked blank serves as a method blank and a reagent blank to check against the reagent (CS_2) purity in the run sequence set-up for 20 samples.

A blank must be run for each batch of CS_2 and for any suspected contaminated CS_2 before any sample preparation can be done. A blank can be run as frequently as required. Only one check is sufficient to ensure the purity of the CS_2 reagent in the batch. Contaminated CS_2 must not be used and should be discarded.

10.6 **ANNUALLY - FRESH WORKING STANDARDS** will be run, to validate the existing calibration, every twelve months unless major changes are done on the GC or the Quality Control (QC) criteria are not met. (See Attachment C.3)

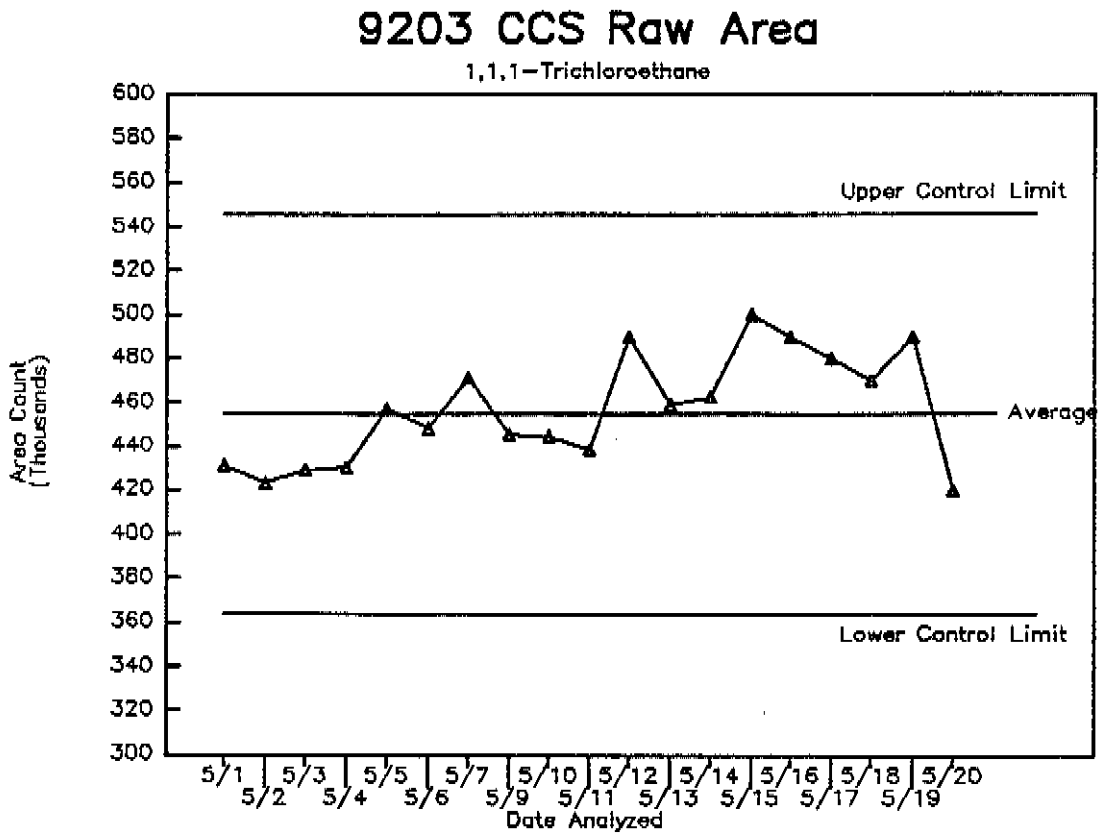
10.7 **NEW COLUMNS - NEW COLUMNS** must be conditioned at 250 ^{o}C overnight or for at least 4 hours, with carrier gas flowing. New sets of limits and response factors must be checked. (See 10.2, 10.3)

10.8 **METHOD DETECTION LIMIT (MDL)** - It has been demonstrated, from Calibration Tables, that Carbon tetra Chloride (CCL_4) has the lowest FID response of materials on the SK Common Compound List. Using MDL standard, METHOD DETECTION LIMIT for CCL_4 will be established according to the procedure found in Section 2.5.3 of QC Manual. This will be done on a one time basis by the Corporate Lab and documented. Results will be available to all SK labs using SOP 9203.

10.9 **INITIAL** - Each instrument must demonstrate the ability to achieve a detection of 1% (w/v) of compounds of interests. This is done by injecting SETUP STANDARD B. [Where required by contract, additional standards of SK regulated compounds at lower levels must be run and detection demonstrated. (See Attachment B.1)] Documentation of results is required. Failure to demonstrate these detection limits requires removal of the instrument from service until necessary repairs are made.

10.10 **AS NEEDED** - As new compounds are added to the SK Technical Services list additional REAGENTS must be prepared for these compounds. For the determination of retention time and response factor.

10.11 QUALITY CONTROL CHARTS: A QC control chart is prepared and plotted for the area of 1,1,1 from CCS. An example QC chart follows.



10.12 SUMMARY - See Flow Chart in Attachment E.

11. PROCEDURE

11.1 Sample Preparation

SAMPLES WHICH ARE SUITABLE FOR DIRECT INJECTION

Transfer an aliquot of the sample into a GC vial filling to at least 1/2 full, but not more than 3/4 full. Label and record properly. (See Attachment D.6 and D.7 for example log sheet).

NOTE: Samples received as freons should be prepped by CS_2 rather than neat due to their extreme volatility.

VOLUMETRIC SAMPLE PREPARATION OF CS2 DILUTED SAMPLES

Weigh 3.0 gm sample into a tared 22 mL. glass vial (National Scientific Co. #B7800-5). Using a volume gauging device fill to a total volume of 12 mL. with CS_2 (approx. 9 ml.) and vortex for 30 seconds at maximum speed. If the sample is not a single phase, centrifuge for 2 minutes at 50% setting to separate the phases. Remove any extraneous top phase with a disposable pipet and adjust the CS_2 phase to 12 mL using the volume gauge. If a layer of solids is present, estimate its true volume (this layer will usually be slanted due to the geometry of the centrifugation) and exclude this volume from the 12 mL measurement. Vortex and centrifuge the sample again to obtain a well mixed injectable sample. Transfer an aliquot of the sample into a GC vial filling to at least 1/2 full, but not more than 3/4 full. Label and record properly.

If the sample displayed a reaction with CS_2 or formed a top aqueous layer upon addition of the CS_2, it may be necessary to perform an additional methanol prep of the sample.

CAUTION: SAMPLES CONTAINING MORPHOLINE MUST NOT COME IN CONTACT WITH CS_2, BECAUSE OF VIOLENT REACTION. USE METHANOL IN PLACE OF CS_2 IN THE EXTRACTION PROCEDURE.

If desired, sample prep may be performed on a weight per weight basis and converted to wt/vol. This will require that the type of vial used be accurately calibrated to determine the volume per unit height. (If type or supplier of vials is changed this conversion must be reestablished.) In this case, weigh 3 gm sample and dilute to 15 gm with CS_2, allow to settle or centrifuge sample to separate any solids or water phase present. Accurately measure the height of each phase in the vial and determine the volume of the clean CS_2 layer. Transfer an aliquot of the sample into a GC vial filling to at least 1/2 full, but not more than 3/4 full. Label and record properly. This

dilution may also be performed using uniform vials that have been premarked at a height corresponding to a volume of 12 ml.

The dilution factor will be determined by dividing the sample weight by the volume of the CS_2 layer. In the case of spiked samples, the 1 gm of spiking standard will be substituted for 1 gm of CS_2, and the amount spiked into sample will have to be calculated based on the volume of the CS_2 layer. (e.g. 1 gm x 33% = 0.33 gm each component. 0.33 gms/11 ml CS_2 = 3.6 expected in sample) see example prep worksheet D.7.

OTHER LIQUID, SEMI-LIQUID, OR SOLID SAMPLES

For liquid samples which are miscible with carbon disulfide, weigh accurately, 3.0 gm of the sample into a 20 mL vial. Add carbon disulfide (CS_2) to make a solution of 12 mL total. For samples which are not miscible with carbon disulfide or are solid, add 12 mL carbon disulfide to a 3.0±0.1 gm sample. For partially miscible liquids samples, add CS_2 to a 3.0 ± 0.1 gm sample to obtain a CS_2 phase of 12 mL. Cap the vial. Vortex well. Let it settle or centrifuge for phase separation. Transfer an aliquot of the CS_2 extract into a GC vial, filling to 1/2 to 3/4 full. Label and record properly.

SPECIAL SAMPLES

Some samples that contain **AMINES, GLYCOLS**, and some **ALCOHOLS** may also require **METHANOL** extraction. These could include hydraulic fluid/hydraulic oil, coolants, brake/transmission fluids, or any suspect glycols as stated in the survey. Transfer an aliquot of the methanol extract into a GC vial, filling to 1/2 to 3/4 full. Label properly.

11.2 GC ANALYSIS

INSTRUMENT SET UP-Consult the operator's manual for your specific gas chromatographic instrument for specific instructions for connecting gas lines, adjusting gas pressures and flow rates, installing capillary columns, and igniting the Flame Ionization Detector.

Install and condition column. Follow manufacturer's recommendations.

Program oven temperature profile.

A. The set-up conditions for specific systems are provided in the Attachment B.

B. Typical Oven Temperature Profile:

6 minutes at 40°C
10°C per minute ramp to 100°C
20°C per minute ramp to 250°C
Final Time 13.5 (HP-5890)
For HP-5880
Final Time 8.5 minutes
Post Value 250°C
Post Time 5.0 minutes

C. Typical Flow Parameters Profile:

Carrier gas: Nitrogen
Head pressure: Variable (approx 18 psi)
Column flow: Adjust to 111 RT (-2.5)mL/min

Split vent (FID) 125 mL/min
Split ratio: (FID) 50 to 1
Septum purge: 1.4 - 1.8 mL/min

Make-up gas: Nitrogen
Make-up gas (FID) 30-35 mL/min

Sample injection 1.0 uL

Inject the **INSTRUMENT SET-UP STANDARD A** into the GC. Adjust carrier gas head pressure, so that retention time of 1,1,1-Trichloroethane is 8.6±0.2 minutes on the crosslinked 5% phenyl methyl silicone column, and 9.0+0.2 minutes on the Stabilwax, and 10.0 ± 0.2 for Rt_x 1701.

Inject the **INSTRUMENT SET-UP STANDARD B** into the GC. Record the peak areas of Toluene (TOL) and Carbon Tetrachloride (CCL_4). The area counts for CCL_4 will be the Area Reject setting. The average of the response

factors (RF) for TOL and CCl_4 will be the RF for uncalibrated peaks (See Attachment C for Confirmation column setup).

11.2.1 RUN SEQUENCE

NOTE: A CCS sample must be run daily and after every 20th sample on each instrument. A blank must also be run every 20th sample. However, for special samples (such as hot rush, re-runs, receipts, etc.), a run sequence may be extended to 25 samples. These special samples are still subject to QC sample prep procedure.

NOTE: Prepared samples in GC vials must be refrigerated if not analyzed within 72 hours.

TYPICAL PREQUAL RUN SEQUENCE

Inject the samples and controls as listed in the following run profile:

Calibration Check Standard (CCS)

Samples 1 to 20

Duplicate Prep. of Sample (20th)

Spiked Sample (20th)

Spiked Blank or Method Blank. (In this method, Reagent Blank is equivalent to Method Blank.)

CCS (Injection 1 of next sequence)

Use this sequence as long as the instrument is in control as defined in Sec. 10. If any CCS components are not in control, take appropriate corrective action before proceeding.

Print out the chromatograms and initial reports.

11.3 PEAK IDENTIFICATION AND CONFIRMATION

Check sample survey information to see if peaks identified are consistent with survey.

If there is any doubt about chlorinated compound peaks, prepare the samples in hexane and inject samples in GC/ECD. (See SOP 9209).

If there are any peak identification or co-elution problems, rerun samples in GC equipped with FID, using a confirmation column. (See Attachment C).

If there is still uncertainty in the compound identifications, send samples for GC/MS analysis. (See Attachment F)

Identification of Complex Mixtures (such as mineral spirits, gasoline, etc.) commonly known by a commercial or trade name using pattern recognition is permitted once chromatograms for these products have been generated by each lab. (See Attachment C).

Report the concentrations as **NORMALIZED %**. ESTD report may also be generated as needed.

For those samples receiving GC/MS analysis, peaks greater than 0.1% of the total sample (ESTD) are evaluated to determine whether or not they are Safety-Kleen Regulated Volatile Organic compounds (See Attachment G).

11.4 CALIBRATION

WORKING STANDARD of a set of Safety-Kleen common compounds are prepared at concentrations 10% (nominal)(wt/vol) of each component from reagent.

Because of the closeness of retention times, solubility difficulties, compatibility problems, and the large number of standards involved, several working standards are used to generate single point calibrations. They then are merged into a single calibration table.

SINGLE LEVEL CALIBRATION STANDARDS will be run every twelve months or as required if major changes are done on the GC, or if the Quality Control (QC) criteria are not met.

Inject the **WORKING STANDARD** into the GC. Tabulate the peak area against concentration and express the response factor for each component in terms of area counts per 1% by weight/volume in sample.

The response factors must be verified by injecting the CCS every day. If the absolute responses vary from the predicted responses by more than ± 25%, the affected class of compounds must be recalibrated.

11.5 For confirmation procedures, refer to Attachment C.

12. CALCULATIONS

12.1 External Standard Method (ESTD)

Compound concentration is determined by the following calculation:

$$C\ samp\ wt/wt = \frac{A\ samp}{A\ std.} \times C\ Std.\ g/mL \times F\ \frac{mL}{g}$$

Where:

C samp = Concentration of compound in sample (wt/wt)%
C Std. = concentration of compound in standard (wt/vol)%

A samp = Peak area of compound in sample
A Std. = Peak area of compound in standard
F = Correction Factor

$$F = \frac{\text{Total Volume of Sample (mL) + Solvent (mL)}}{\text{Sample Weight (g)}}$$

= Approximately 4 for CS_2 dilutions.

F = 1/sp. gr. for neat liquid samples

This calculation assumes the <u>same</u> injection volume is used for the standard and sample.

If response factor (R.F.) is used, the calculation is:

$$C\ samp = \frac{A\ samp}{R.F.} \times F \text{ in the Multichrom set-up}$$

where R.F. = $\frac{\text{A Std.}}{\text{C Std.}}$

or

C samp = A samp x R.F. x W in the HP integrator set-up

where R.F. = $\frac{\text{C Std.}}{\text{A Std.}}$

12.2 Normalized Percent Method (Norm %)

The weight % of each of the components in the standard mixture is calculated as follows:

$$X\%A = \frac{Acomp}{Acomp + Bcomp + Ccomp} \times 100 \quad (1)$$

Where:

Acomp is the weight % of component A, Bcomp is the weight % of component B, etc. (from ESTD)

X%A = the norm wt% of component A in the mixture.

(1) Each component's norm wt% is calculated by substituting the ESTD weight % for each component into the equation.

13. REFERENCES

13.1 Method 8000, Gas Chromatography, USEPA "Test Methods for Evaluating Solid Waste".

13.2 Method 3820, Hexadecane Extraction and Screening of Purgeable Organics, USEPA "Test Methods for Evaluating Solid Waste".

13.3 Method 8240, Gas Chromatography/Mass Spectrometry. Volatile Organics, USEPA "Test Method for evaluating solid wastes."

13.4 NIOSH P & CAM 127, "Organic Solvents in Air".

13.5 ASTM E-260, "General Gas Chromatography Procedure".

13.6 ASTM E-355, "Gas Chromatography Terms and Relationships".

13.7 ASTM E-594, "Testing Flame Ionization Detectors Used in Gas Chromatography".

ATTACHMENT A

DEFINITIONS

Carryover - In chromatography, the material remaining within the system after an analysis is over which then emerges during a subsequent analysis. The shape of this peak is usually sufficiently abnormal (broad/rounded) to call it into question.

Co-elution - The phenomenon of having more than one component eluting through a chromatography column at retention times too close to distinguish them.

Confirmatory Column - The gas chromatography column to be used to substantiate and/or resolve compound identifications made by the primary column.

ECD - Electron Capture Detector - The ECD uses a low-power radioactive Ni-63 source to force electrons free from easily ionizable species, especially halogenated compounds. Typically used for halogenated compounds.

ESTD - External Standard Method - An approach to quantitating chromatography results through the use of separate analyses of an unknown sample and a known mixture of the same or similar components.

FID - Flame Ionization Detector - Gas chromatography detector that burns the GC effluent and monitors positive ions in the flame. This detector responds only to organic and organometallic molecules that are combustible.

GC/MS - An analytical instrument interfacing a gas chromatograph with a mass spectrometer. The GC provides the initial separation of compounds, while the MS serves as the detector of the eluents as they emerge from the GC column.

Interference - in chromatography, the masking of a peak on a chromatogram due to co-elution, column bleed, or other simultaneous phenomena that cause difficulty in qualitative and quantitative interpretation of the results.

Material Survey - An official Safety-Kleen Corp. document filled out cooperatively by a potential customer and a Safety-Kleen representative. The survey describes in as much detail as possible the nature of the waste stream.

Method Blank - A sample which is carried through the entire analytical procedure of interest. The purpose is to demonstrate that the system is clean and not generating spurious results due to carryover or electronic noise and that there is no contamination during the process of preparing samples using the analytical procedure (See also Reagent Blank).

MSDS - Material Safety Data Sheet - An official document filed with OSHA to document compositional, health, and safety issues related to any chemical or mixture of chemicals that is to be transported and/or marketed.

Peak deformation - In chromatography, the skewing of a peak as shown on a print-out of the detector response versus time (chromatogram). Instead of a very sharp Gaussian curve, the peak may be very rounded or one side might be much steeper than the other. This can be caused by chemical reactions occurring on the column, degradation of the column coating, or carryover of components of previous samples (see Carryover).

Primary Column - The gas chromatography column used in the quantitative analysis of samples.

Reject Setting - A gas chromatograph signal level (normally in terms of area counts) below which we want the instrument to assume the result to be insignificant.

RF - Response Factor, instrumental response for unit mass of an individual chemical analyte.

Safety-Kleen Common Compound List - A formal set of chemical compounds identified by Safety-Kleen Corp. Technical Services as having been identified in at least one pre-qualification sample per period (4 weeks) over the last twelve months. These compounds are normally specifically identified in a sample if at a concentration of 1% or greater.

Safety-Kleen Regulated Material - A formal set of chemical compounds identified by Safety-Kleen Corp. Waste Review Panel and Technical Services as requiring special attention due to health and safety concerns. These compounds will be searched for at lower levels (0.1 % wt) than those on the Common Compound List. The acceptability of their presence at the determined concentration will be reviewed before the receipt is accepted.

Reagent Blank - A solvent used in diluting or extracting compounds from the sample using the analytical procedure. This is to demonstrate that there is no contaminants in the solvent (reagent). (See also Method Blank)

Spiked Blank - (see Method Blank) - A variation of the Method Blank in which known compounds have been added as an extra check of proper system operations.

VOA - Volatile Organics Analysis - any analytical method whose purpose is to characterize in detail the composition of those compounds within a sample that have sufficient vapor pressure to evaporate at ambient conditions.

WAP - Waste Analysis Plan - An official document generated by a company or facility to describe what waste streams are generated and how each of them is to be characterized to demonstrate that the proposed disposition is appropriate.

ATTACHMENT B

B.1 - MULTICHROME SET-UP PARAMETERS

B.2 - ANALYSIS "MULTICHROME" FOR COLLECTION OF 5880 ANALOG-SIGNAL ONTO MULTICHROME

B.3 - 5880 SET-UP PARAMETERS

B.4 - CHEM STATION SET-UP PARAMETERS

B.5 - LAB DATA 200 SET-UP PARAMETERS

MULTICHROM METHOD FILE FOR ANALYSIS OF VOLATILE ORGANIC COMPOUNDS IN WASTE MATERIALS

Some processing and report parameters may differ according to software revision or enhancements. Area reject may be lowered if lower level detection is desired.

ACQUISITION PARAMETERS

SAFETY-KLEEN FUEL ANALYSIS

Data Collection:
- Length of run..... 25.00 mins for HP-5
  28.00 min. for Rt_x-1701
  28.00 min. for Stabilwax
- Post injection delay..... 0.00 mins
- Time to next run..... Length of run plus 0.01 min
- Width at half height..... 2.00 secs (for neat)

Baseline Offset: 0.80 (for extracts)
- Adjust baseline..... Yes
- Baseline offset..... 1.00%

POST PROCESSING PARAMETERS

Post Injection Actions:
- Subtract blank (AB)..... No
- Peak process (AP)..... Yes
- Calibrate (AC)..... No
- Quantity (AQ)..... Yes
- Analysis report (AR)..... Yes
- Combined report (AX)..... No
- Plot data (PL)..... Yes
- Template plot (PT)..... No
- Dual plot (RPD)..... No
- Post inj. user program (UA)..... No

Post Sample Actions:
- Averaged report (AT)..... No
- Post samp. user program (UA)..... No

Post Analysis Actions:
- Analysis list (AL)..... No
- Analysis summary (AY)..... Yes
- Isometric plot (PI)..... No
- Post anal. user program (UA)..... No

MULTICHROM METHOD FILE
(continued)

PEAK PROCESSING PARAMETERS

Auto Process Parameters:
- Peak threshold..... 4.00
- Baseline test..... 11
- Peak trend..... 2

Separation Parameters:
- Shoulder sensitivity..... 0.10
- Rider sensitivity..... 0.05

Rejection Parameters:
- Minimum peak width..... 0.1 secs
- Minimum peak height..... 0.0 uV
- Minimum peak area..... Channel Specific)

- Ignore flattop peak..... No

User Imposed Action Control:
- Force baseline..... Yes
- Suppress integration..... Yes
- Tangent skimming..... Yes
- Shoulder detection..... No
- Data bunching..... Yes
- Negative detection..... No

Integration Modes:
- Retention time integration..... No
- Square root area and height..... No

PROCESSING ACTIONS

No processing actions specified.

REPORT PARAMETERS

Report Table Format Control:
- Peak number..... Yes
- Calibration flags..... No
- Retention time..... Yes
- Corrected time..... No
- Retention time..... No
- Area..... Yes
- Area %..... No
- Height..... No
- Amount..... Yes

MULTICHROM METHOD FILE
(continued)

Peak name..... Yes
Response factor..... No
Width at half height..... No

Peak type flags..... No
Restrictions:
Report threshold..... 0.00 mV
Number of decimal places..... 2

Additional Information:
Unknowns..... Yes
Missing peaks..... No
Extended report..... No
Report groups..... Yes

Header Information:
System title..... All injections
Run information..... All injections
Analysis information..... All injections
Sample information..... All injections

PRINTER PLOT PARAMETERS

Plot Style:
Style of plot..... Normal
Y Scaling:
Scaling mode..... User scale
Maximum height..... 100.000 mV (For Extracts)
(500.000 For Neat)
Minimum height..... 0.000 mV
Plot Time Window:
User defined time range..... No

MULTICHROM METHOD FILE
(continued)

Plot Features:
- Data Plot mode..... Raw
- Baselines..... Base
- Peak annotation..... All
- Annotation threshold..... 1.00 mV
- Shaded..... No
- Grid..... No

Isometric offset:
- Offset angle..... 90 degrees
- X offset..... 0.00 min
- Hidden lines..... Yes

MULTICHROM CONTROL FILE

1st Ramp

Temperature..... 40 °C
Minutes..... 6.00 mins
Rate..... 10.0 °C/min

2nd Ramp

Temperature..... 100 °C
Minutes..... 0.00 mins
Rate..... 20.0 °C/min

3rd Ramp

Temperature..... 250 °C
Minutes..... 13.5 mins
Rate..... 0.0 °C/min

Final Conditions

Temperature..... 250 °C
Minutes..... 0.00 mins

General

Oven Control..... Yes
Oven Maximum..... 300 °C
Cryogenic..... No
Equilibrium Time..... 0.00 mins

Detector A

State..... On
Polarity..... Off
Time..... 0.00 mins
Temperature Control..... On
Temperature..... 250 °C

MULTICHROM CONTROL FILE
(continued)

Injector A

State..... On
Temperature Control..... On
Temperature..... 225 °C

Purge A

Purge Control..... On
Purge On Time..... 0.00 mins
Purge Off Time..... 40.00 mins

Signal A

Select..... 1
Range..... 5
Attenuation..... 0

Detector B

State..... On
Polarity..... Off
Time..... 0.00 mins
Temperature Control..... On
Temperature..... 250 °C

Injector B

State..... On
Temperature Control..... On
Temperature..... 225 °C

Purge B

Purge Control..... On
Purge On Time..... 0.00 mins
Purge Off Time..... 40.00 mins

Signal B

Select..... 2
Range..... 5
Attenuation..... 0

ANALYSIS "MULTICHROME" FOR COLLECTION
OF 5880 ANALOG-SIGNAL ONTO MULTICHROME

```
OVEN TEMP LIMIT 300
OVEN TEMP 40
OVEN TEMP ON
DET 1 TEMP LIMIT 405
DET 1 TEMP 250
DET 1 TEMP OFF
DET 2 TEMP LIMIT 405
DET 2 TEMP 250
DET 2 TEMP ON
INJ 1 TEMP LIMIT 405
INJ 1 TEMP 225
INJ 1 TEMP ON
INJ 2 TEMP LIMIT 405
INJ 2 TEMP 225
INJ 2 TEMP ON
AUX 2 TEMP LIMIT 405
AUX 2 TEMP 50
AUX 2 TEMP OFF
DETECTOR D ON
DETECTOR C ON
DELETE RUN TBL
RUN TBL ON
RUN TBL ANNOTATION OFF
RUN TIME  0.00 EXTEND RT ON
RUN TIME  0.00 VALVE 9 ON (TO START MULTICHROME)
RUN TIME  1.00 VALVE 9 OFF (TURN OFF START SIGNAL)
RUN TIME 28.10 STOP
SIGNAL C DEVICE# 12
SIGNAL ON DEVICE# 12
STOP PLOT DEVICE# 12
CHART SPEED 0.10 0.10 DEVICE# 12
ATTN 2↑6 DEVICE# 12
%OFFSET 10 DEVICE# 12
ZERO ON DEVICE# 12
SIGNAL C DEVICE# 18
SIGNAL ON DEVICE# 18
STOP PLOT DEVICE# 18
ATTN 2↑2 DEVICE# 18 (D/A BOARD ATTN FOR MC OUTPUT)
%OFFSET 0 DEVICE# 18
ZERO ON DEVICE# 18
SIGNAL D DEVICE# 28
SIGNAL ON DEVICE# 28
STOP PLOT DEVICE# 28
ATTN 2↑2 DEVICE# 28 (D/A BOARD ATTN FOR MC OUTPUT)
```

ANALYSIS "MULTICHROME" CONT.

```
%OFFSET 0 DEVICE #28
ZERO ON DEVICE #28
INTG SIGNAL C
SYNC ON
RUN TIME ANNOTATION ON
OVEN TEMP EQUIB TIME 0.00
DELETE OVEN TEMP
OVEN TEMP INITIAL TIME 6.00
OVEN TEMP 1 PRGM RATE 10.00
OVEN TEMP 1 FINAL VALUE 100
OVEN TEMP 1 FINAL TIME 0.00
OVEN TEMP 2 PRGM RATE 20.00
OVEN TEMP 2 FINAL VALUE 250
OVEN TEMP 2 FINAL TIME 8.50
OVEN TEMP POST VALUE 250
OVEN TEMP POST TIME 5.00
OVEN TEMP ANNOTATION OFF
VALVE 5 OFF
VALVE 6 OFF
VALVE 9 OFF
PEAK WIDTH 0.02
THRESHOLD 2
REPORT ON DEVICE #0
REPORT OFF
REPORT ANNOTATION ON
DELETE REPORT TBL
REPORT TIME  0.00 REJECT 5000
NORM%
DELETE CALIB
EDIT CALIB 0,1
EDIT CALIB -1,1
EDIT CALIB -2,1
EDIT CALIB-3,0.000282
EDIT CALIB -4,""
EDIT CALIB -5,0
***
DETECTOR D ON
DELETE RUN TBL
RUN TBL ON
RUN TBL ANNOTATION ON
RUN TIME  0.00 EXTEND RT ON
RUN TIME 28.10 STOP
SIGNAL D DEVICE #22
SIGNAL ON DEVICE #22
STOP PLOT DEVICE #22
```

ANALYSIS "MULTICHROM CONT.

```
CHART SPEED 0.10 DEVICE #22
ATTN 2↑6 DEVICE #22
%OFFSET 10 DEVICE #22
ZERO ON DEVICE #22
INTG SINGAL D
SYNC OFF
RUN TIME ANNOTATION ON
OVEN TEMP EQUIB TIME 0.00
DELETE OVEN TEMP
OVEN TEMP INITIAL TIME 6.00
OVEN TEMP 1 PRGM RATE 10.00
OVEN TEMP 1 FINAL VALUE 100
OVEN TEMP 1 FINAL TIME 0.00
OVEN TEMP 2 PRGM RATE 20.00
OVEN TEMP 2 FINAL VALUE 250
OVEN TEMP 2 FINAL TIME 10.50
OVEN TEMP POST VALUE 250
OVEN TEMP POST TIME 5.00
OVEN TEMP ANNOTATION OFF
PEAK WIDTH 0.02
THRESHOLD 2
REPORT ON DEVICE #0
REPORT OFF
REPORT ANNOTATION ON
DELETE REPORT TBL
REPORT TIME 0.00 REJECT 5000
NORM%
```

PROGRAM "MASTER" FOR TERMINAL 1

```
PROGRAM:    (ANNOTATION OFF)
10    REM THIS PROGRAM CAN BE MADE TO SAVE REPORTS BY DELETING THE
15    REM GOTO STATEMENT IN LINES 25, 85,125,165,AND 255
17    REM ALSO CHANGE LINE 250 FROM .5 TO 7.0 WAIT TIME, SET
      REJECT 100
20    REPORT OFF
22    PRINT "THIS PROGRAM DOES NOT SAVE DATA FILES!"  -
25    GOTO 40
30    PRINT "THIS PRGM SAVES ON DEVICE# 16"
40    PRINT "PROGRAM FOR TERMINAL 1"
50    PRINT "REMEMBER TO START PRGM ON DEVICE# 26 FIRST"
60    SYNC ON
70    INPUT "FIRST SAMPLE # ",A
80    INPUT "LAST SAMPLE# ",B
```

PROGRAM "MASTER" FOR TERMINAL 1 CONT.

```
85    GOTO 100
90    INPUT "TAPE #? ",C
100   INPUT "PRESS EXIT WHEN READY ",D
110   FOR X=A TO B
120   PRINT "########## GC# (XX) TERM 1 ##########"
125   GOTO 140
130   PRINT "TAPE # ";C
140   EDIT AUTO SEQ 8,X
150   EDIT AUTO SEQ 9,X
160   START 3 AUTO SEQ
165   GOTO 180
170   PRINT "TAPE # ";C;
180   PRINT TAB (15);"GC# (XX) FRONT CHANNEL"
190   LIST REPORT
200   LET S=0
205   IF #PEAKS=0 THEN 240
210   FOR I=1 TO #PEAKS
220   LET S=S+AREA(I)
230   NEXT I
240   PRINT "TOTAL AREA = ";S
250   WAIT 0.5
255   GOTO 270
260   EXECUTE E," SAVE REPORT """&ID$&""" DEVICE# 16"
270   NEXT X
280   REPORT ON
290   END
```

PROGRAM "SLAVE" FOR TERMINAL 2

```
PROGRAM:  (ANNOTATION OFF)
5     REM TO MODIFY PROGRAM TO SAVE DATA FILES, DELETE LINES
      45,85,135,205
10    REPORT OFF
20    PRINT "PROGRAM FOR TERMINAL 2"
30    INPUT "FIRST SAMPLE# ",A
40    INPUT "LAST SAMPLE# ",B
45    GOTO 60
50    INPUT "TAPE #? ",C
60    INPUT "PRESS EXIT WHEN READY ",D
70    FOR X=A TO B
80    PRINT "########## GC # (XX) TERM 2 ##########"
85    GOTO 100
90    PRINT "TAPE # ";C
```

TABLE 7

THE BEDIT SAMPLE FORM

```
Sequence: NOV09S::SC .Sample#1.                    BEDIT Rev. (860930.1701)

 Data File Name: >S5991   SAMPLE INFORMATION

      Name: SK# 48541
 Misc Data: 11/09/89
    Method: STD30                  Bottle Number: 34     Sample Size: 2

 Quant(Y or N): Y     Report Format (N,S,M,F,E,P): M  Aux Reprt:
 Quant ID File: ID_SK9::SC      Output File: ~S5991::QO
                                Dilution Factor:  1.00000 (-n means 1/n)
 REPRT Options:
 Label Meth (1-5): 1 Back Sub (Y or N) N Scale from 0.000 min.   3 page TIC
 Qion replaces Rt or Scan# (R or S):    Omit/Only (-/+) Types:
 ARCHIVE:  Data File: N   Quant ID File: N   Quant Output File: N

 U |                    After Quant ? ---- Additional Program Data
 S |  User Prog 1:                    N
 E |  User Prog 2:                    N
 R | FMGR TR File: TOXIC              Y 3G:       4G:       Aux:

 Header   Insert  Previous  Next              FMGR   Screen  Create/  Exit/
  Form    Sample  Sample    Sample            Copy   Refresh Replace  Restart
Make changes to existing sample and hit ENTER.
```

TABLE 8

REPORT AFTER DATA REQUISITION

QUANT REPORT

Operator ID: CARO
Output File: ^PF002::QO
Data File: >PF002::A3
Name: PERF STD
Misc: 12/7/89 MSD#1

Quant Rev: 6
Quant Time: 891207 18:30
Injected at: 891207 16:39
Dilution Factor: 1.00000

BTL#25

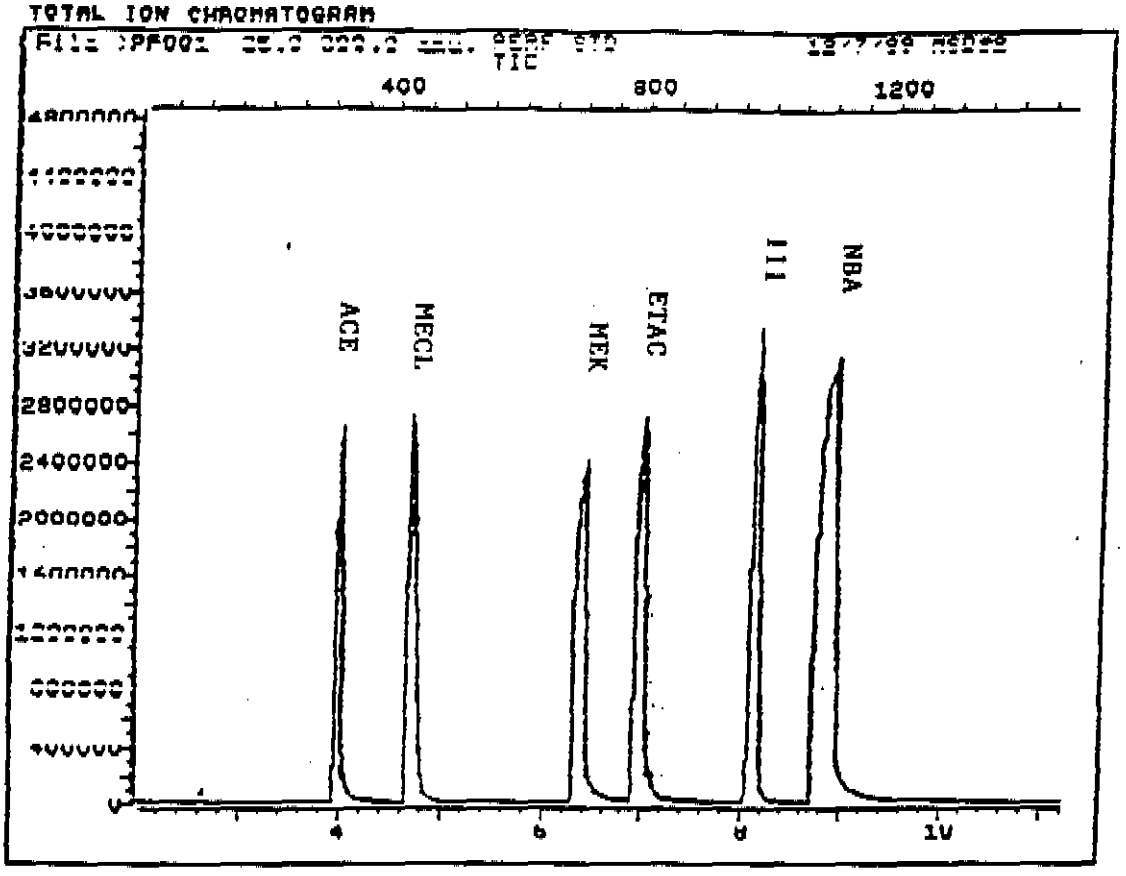
ID File: IDPERF::D1
Title: SAFETY KLEEN TARGET COMPOUNDS - PCS
Last Calibration: 891207 18:16

		Compound	R.T.	Scan#	Area	Conc	Units	q
1)	#ACE	Acetone	4.01	315	882174^	7.37	WT %	83
2)	#MECL	Methylene Chloride	4.70	425	234394^	16.52	WT %	97
3)	#MEK	Methyl Ethyl Ketone	6.53	720	839759^	7.55	WT %	98
4)	#ETAC	Ethyl Acetate	7.13	816	735519^	8.37	WT %	95
[illegible])	#111	1,1,1-Trichloroethane	8.25	995	1694293	12.44	WT %	96
[illegible])	#NBA	N-Butanol	9.06	1126	1524349	7.41	WT %	96
7)	#TOL	Toluene	12.36	1657	516586^	8.16	WT %	83
8)	#PERC	Tetrachloroethylene	13.57	1851	424697	15.20	WT %	95
9)	#XYL	Xylene	15.46	2154	558947^	8.22	WT %	99
10)	#EGBA	EG Butyl Acetate	18.16	2588	545285^	8.78	WT %	99

Compound uses ESTD

FIGURE 1

TOTAL ION CHROMATOGRAM PAGE 1



Data File: >PF001::A3 Quant Output File: ^PF001::QO
Name: PERF STD
Misc: 12/7/89 MSD#2 BTL#70

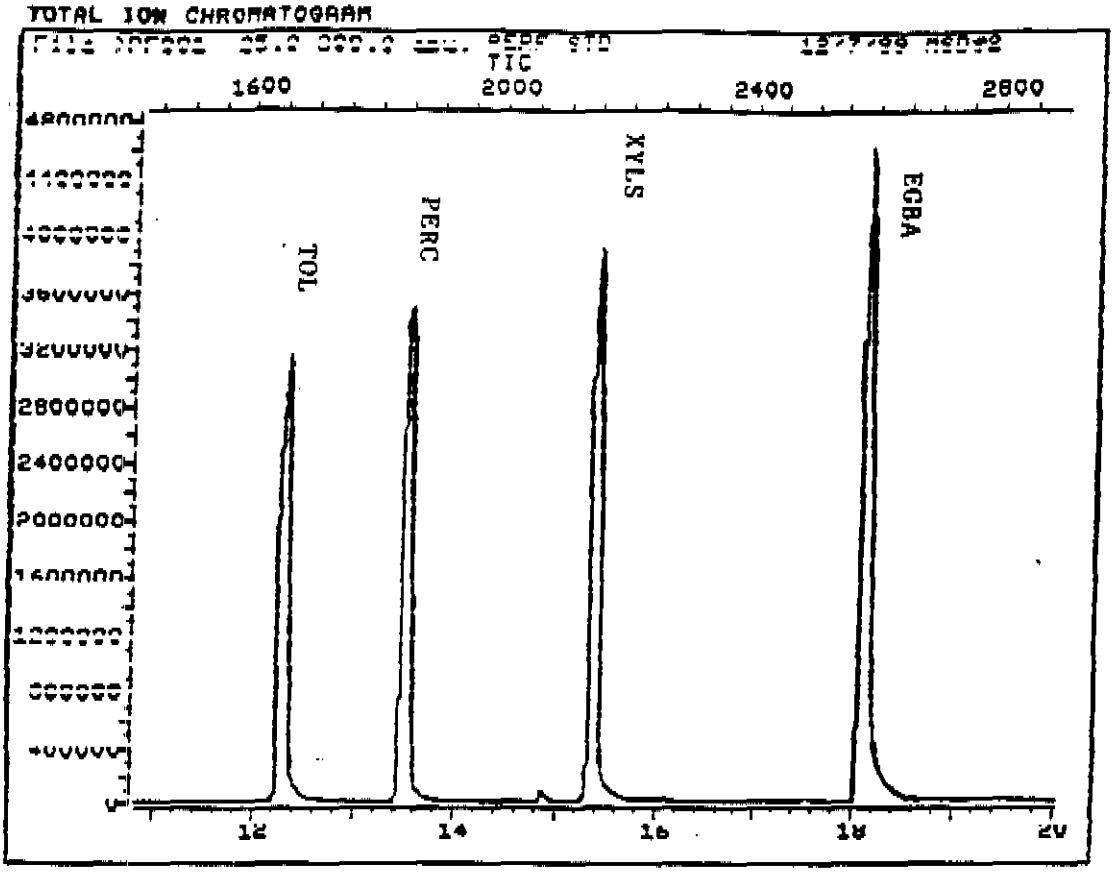
Id File: IDPERF::01
Title: SAFETY KLEEN TARGET COMPOUNDS - PCS
Last Calibration: :

Operator ID: HENDREN
Quant Time: 891207 12:59
Injected at: 891207 12:38

TIC page 1 of 2

FIGURE 2

TOTAL ION CHROMATOGRAM PAGE 2



Data File: >PF001::A3 Quant Output File: ^PF001::QO
Name: PERF STD
Misc: 12/7/89 MSD#2 BTL#

Id File: IDPERF::01
Title: SAFETY KLEEN TARGET COMPOUNDS - PCS
Last Calibration: :

Operator ID: HE'CREN
Quant Time: 891207 12:59
Injected at: 891207 12:38

TIC page 2 of 2

PROGRAM "SLAVE" FOR TERMINAL 2

```
100  EDIT AUTO SEQ 8,X
110  EDIT AUTO SEQ 9,X
120  START
130  PRINT TAB(15);"GC # (XX) REAR CHANNEL"
135  GOTO 150
140  PRINT "TAPE # ";C;
150  LIST REPORT
160  LET S=0
165  IF #PEAKS=0 THEN 200
170  FOR I=1 TO #PEAKS
180  LET S=S+AREA(I)
190  NEXT I
200  PRINT "TOTAL AREA = ";S
205  GOTO 220
210  EXECUTE E," SAVE REPORT """&ID$&""" DEVICE# 16"
220  NEXT X
230  REPORT ON
240  END
```

CHROMATOGRAPHIC SET-UP PARAMETERS (5880)
FOR HP-5880 WITH LEVEL 4 TERMINALS

Injector inlet system 225 °C
Detector 250 °C

OVEN TEMPERATURE PROFILE:

Initial value 40 °C
Initial time 6.0 minutes
Level 1
Program rate 10 °C/minute
Final value 100 °C
Final time 0.0 minutes
Level 2
Program rate 20 °C/minute
Final value 250 °C
Final time 10.5 minutes
Post Value 250 °C
Post Time 5.0 minutes

Carrier gas: Nitrogen
Head pressure: Variable (approx 18 psi)
Column flow: Adjust to 1,1,1 RT (~2.5)mL/min

Split vent (FID) 125 mL/min
Split ratio: (FID) 50 to 1
Septum purge: 1.4 - 1.8 mL/min

Make-up gas: Nitrogen
Make-up gas (FID) 30-35 mL/min

Sample injection 1.0 uL

Threshold: 2
Peak width: 0.02

METHOD FILE FOR GC/FID SET UP IN CHEMSTATION

_____DATA:FID/FID.M_____

[METHOD]

DATA:FID/FID.M

[APPLICATIONS]
GCACQ DATA:FID/FID.A YES
DATAED DATA:FID/FID.E NO
REPORT DATA:FID/FID.R NO

[DATA FILES]
RAWDATA DATA:TESTA01A.D
REPORT DATA:TESTA01A.ASO
INTEGRATION DATA:TESTA01A.I
CALIBRATION DATA:FUELS.Q

_____DATA:EC/FID.A_____

Description:

Last Changed By:

Date Last Changed:

* HP 5890A Injection Port Setpoints Dual auto injectors

Injection Port A: Split/Splitless
Injection mode: Split mode

Injector A Temp: 225 Zone is: On

Injection Port B: Split/Splitless
Injection mode: Split mode

Injector B Temp: 225 Zone is: On

* HP 7673A Controller Setpoints

Injector A:	Installed	Injector B:	Installed
Sampler Tray:	Installed		
Sample Washes:	5	Viscosity:	0
Sample Pumps:	5	Sample Volume:	1
Solvent A Washes:	5	Solvent B Washes:	5

(continued)

* Oven Temperature Program:

Oven Temp:	40	Cryo: Off	
Initial Temp:	40	Initial Time:	6.00
Rate:	10		
Final Temp:	100	Final Time:	0.00
Rate A:	20		
Final Temp A:	250	Final Time A:	13.5

Equilibrium Time: 0.0

* HP 5890A Detector Setpoints

Detector A: FID		R.I. Column A:	Not Present
Detector A Temp:	250	Zone is:	On
Detector B: FID		R.I. Column B:	Not Present
Detector B Temp:	250	Zone is:	On

* HP 5890A Signal Setpoints

Signal 1: Detector A Signal is: On
Signal 2: Detector B Signal is: On

* Crt Plot Setpoints

Signal: 1

Crt Time Window: 20.00
Crt Attn: 2^5
Crt Offset: 5%
Minimum Peak Width: 0.020 min

Signal: 2

Crt Time Window: 20.00
Crt Attn: 2^5
Crt Offset: 5%
Minimum Peak Width: 0.020 min

OVEN	Oven ON	Cryo OFF	Oven max 300	Equil time 0.00		
	Rate 10.00	Init temp 40	Init time 6.00	Final temp 100	Final time 0.00	
	Rate A 20.00	Finl temp A 250	Finl time A 13.50	Rate B 0.00	Finl temp B 0	Finl time B 0.00
INJ	Injector A ON	Inj A temp 225	Injector B ON	Inj B temp 225		
SIGNAL	Address 1 A	Sig 1 range 5	Sig 1 zero OFF	Sig 1 zero 0.0	Sig 1 atten ON	Sig 1 atten 0
	Address 2 B	Sig 2 range 5	Sig 2 zero OFF	Sig 2 zero 0.0	Sig 2 atten ON	Sig 2 atten 0
DETECTOR	Detector A ON	Det A time 0.00	Det A polar NONE	Det A temp ON	Det A temp 250	
	Detector B ON	Det B time 0.00	Det B polar NONE	Det B temp ON	Det B temp 250	
PRG	Purge A ON	A ON time 0.00	A OFF time 0.00	Purge B ON	B ON time 0.00	B OFF time 0.00

Workfile: sop9203 Date: 19-Mar-91 10:50 Operator: _____

FRONT INJECTOR	Inj/Bottle 1	Init Bottle 1	Last Bottle 1	# Washes 5	# Pumps 5	Viscosity 0
	Inj Volume 1	Solv A Wash 5	Solv B Wash 5	Priorty Smp DISABLE	On-Col Mode DISABLE	
REAR INJECTOR	Inj/Bottle 1	Init Bottle 1	Last Bottle 1	# Washes 5	# Pumps 5	Viscosity 0
	Inj Volume 1	Solv A Wash 5	Solv B Wash 5	Priorty Smp DISABLE	On-Col Mode DISABLE	
XTRA	Aux Cn Botl REAR					

Workfile: sop9203 Date: 19-Mar-91 10:51 Operator: _____

```
Report Type a
 Component File
 Integration Start Time  0.000 min.
 Peak Rejection Area     50
 Slope Sens.   50 until 999.9 min     0 until  -1.0 min     0 until  -1.0 min
 rt for Time Reference Peak 1  -1.000 min. +,- 10 sec.
 rt for Time Reference Peak 2  -1.000 min. +,- 10 sec.
 rt for Time Reference Peak 3  -1.000 min. +,- 10 sec.
 rt for Time Reference Peak 4  -1.000 min. +,- 10 sec.
 rt for Time Reference Peak 5  -1.000 min. +,- 10 sec.
 User-Selected Baseline Points no
 Valley to Valley Baseline Interval 1  -1.000 min. to  -1.000 min.
 Valley to Valley Baseline Interval 2  -1.000 min. to  -1.000 min.
 Valley to Valley Baseline Interval 3  -1.000 min. to  -1.000 min.
 Valley to Valley Baseline Interval 4  -1.000 min. to  -1.000 min.
 Valley to Valley Baseline Interval 5  -1.000 min. to  -1.000 min.
 Fixed Tolerance  0 sec.
 Variable Tolerance 0.023
 Multiplet Peak Assignment File



 Forced Integration Between  -1.000 min. to  -1.000 min.
 Forced Integration Between  -1.000 min. to  -1.000 min.
 Forced Integration Between  -1.000 min. to  -1.000 min.



 sys:gcn/sop9203  Report Format 1
```

ATTACHMENT D

SK - 9203 FORMS

D.1	INSTRUMENT CALIBRATION CHECK STANDARD (CCS)	
D.2.A	CALIBRATION CHECK STANDARDS (CCS)	(USING CONCENTRATION FOR CALCULATIONS, DB-5)
D.2.B	CALIBRATION CHECK STANDARDS (CCS)	(USING AREA COUNTS FOR CALCULATIONS, DB-5)
D.2.C	CALIBRATION CHECK STANDARDS (CCS)	(USING CONCENTRATION FOR CALCULATIONS, DB-1701)
D.2.D	CALIBRATION CHECK STANDARDS (CCS)	(USING AREA COUNTS OR CALCULATIONS, DB-1701)
D.3	SUMMARY OF DUPLICATE AND SPIKE RECOVERY RESULTS	
D.4	SPIKE PREP AND CALCULATION WORKSHEET	
D.5	DUPLICATE ANALYSIS WORKSHEET	
D.6	PREPARATION OF SAMPLES FOR VOLATILE ANALYSIS IN WASTE MATERIALS (wt/vol).	
D.7	PREPARATION OF SAMPLES FOR VOLATILE ANALYSIS IN WASTE MATERIAL (wt./vol.), ALTERNATIVE PROCEDURE.	

INSTRUMENT CALIBRATION CHECK STANDARD (CCS)
METHOD #9203

CC#_____ CHANNEL#_____ SIGNAL:_____ CALIB.:_____

DATE	ANALYST	SEQUENCE	111 RT MIN	111 AREA	COMMENTS
					MEAN
					LOWER LIMIT
					UPPER LIMIT
					1
					2
					3
					4
					5
					6
					7
					8
					9
					10
					11
					12
					13
					14
					15
					16
					17
					18
					19
					20

1,1,1-TRICHLOROETHANE (_____%) RECORD: LOG BOOK/PAGE/DATE_____

*PLOT THE 111 AREA EVERYDAY TO SEE ANY TREND *COMMENT ON RESULTS OUTSIDE LIMITS

*RETENTION TIME WINDOW +/- 0.2 MIN.

*AREA LIMITS: +/-20% OF MEAN REVIEWED BY/DATE: _____

CALIBRATION CHECK STANDARD (CCS)
METHOD #9203

1991 GC#_____ DB-5 CHANNEL#_____

SEQ-UENCE	CONC. W/V % /RT (MIN)	ACE 4.3	MECL 5.0	ETAC 7.4	111 8.6	NBA 9.3	HEP 10.4	TOL 12.8	DMF 13.3	EGBE 16.1	ODCB 18.4
**	C2										
LOWER	LIMIT										
UPPER	LIMIT										
	C1'										
	C1"										
	PD										
	C1'										
	C1"										
	PD										
	C1'										
	C1"										
	PD										
	C1'										
	C1"										
	PD										
	C1'										
	C1"										
	PD										
	C1'										
	C1"										
	PD										
	C1'										
	C1"										
	PD										
	C1'										
	C1"										
	PD										
	C1'										
	C1"										
	PD										

C1',C1" = CONCS. CALCULATED FROM CURRENT CALIBRATION TABLE, AT THE START AND END OF SEQUENCE (FILE NAME:_____)
C2 = CONCS. FROM CCS
PD = PERCENT DIFFERENCE
= 100 X (DIFFERENCE OF C1" and C2)/C2
** ACCEPTANCE CRITERIA: PD < OR = 20%.
CCS PREPARATION RECORD: LOG BOOK NO. _____ PAGE_____

REVIEWED BY/DATE:_____

CALIBRATION CHECK STANDARD (CCS)
METHOD #9203

1991 GC#_____ DB-5 CHANNEL#_____

SEQ-UENCE	AREA COUNT /RT (MIN)	ACE 4.3	MECL 5.0	ETAC 7.4	111 8.6	NBA 9.3	HEP 10.4	TOL 12.8	DMF 13.3	EGBE 16.1	ODCB 18.4
**	A2										
LOWER	LIMIT										
UPPER	LIMIT										
	A1'										
	A1"										
	PD										
	A1'										
	A1"										
	PD										
	A1'										
	A1"										
	PD										
	A1'										
	A1"										
	PD										
	A1'										
	A1"										
	PD										
	A1'										
	A1"										
	PD										
	A1'										
	A1"										
	PD										
	A1'										
	A1"										
	PD										
	A1'										
	A1"										
	PD										
	A1'										
	A1"										
	PD										

A1',A1" = AREA COUNTS FROM CURRENT CALIBRATION TABLE, AT THE START AND END OF SEQUENCE (FILE NAME:_____)
A2 = AREA COUNTS FROM CCS
PD = PERCENT DIFFERENCE
= 100 X (DIFFERENCE OF A1" and A2)/A2
** ACCEPTANCE CRITERIA: PD < OR = 20%.
CCS PREPARATION RECORD: LOG BOOK NO. _____ PAGE_____

REVIEWED BY/DATE:_____

CALIBRATION CHECK STANDARD (CCS)
METHOD #9203

1991 GC#_____ DB-1701 CHANNEL#_____

SEQ-UENCE	CONC. W/V % /RT (MIN)	ACE 6.5	MECL 7.2	ETAC 9.7	111 10.0	HEP 10.3	NBA 12.8	TOL 14.2	DMF 16.9	EGBE 17.9	ODCB 19.7
**	C2										
LOWER	LIMIT										
UPPER	LIMIT										
	C1'										
	C1"										
	PD										
	C1'										
	C1"										
	PD										
	C1'										
	C1"										
	PD										
	C1'										
	C1"										
	PD										
	C1'										
	C1"										
	PD										
	C1'										
	C1"										
	PD										
	C1'										
	C1"										
	PD										
	C1'										
	C1"										
	PD										
	C1'										
	C1"										
	PD										
	C1'										
	C1"										
	PD										

C1',C1" = CONCS. CALCULATED FROM CURRENT CALIBRATION TABLE, AT THE START AND END OF SEQUENCE (FILE NAME:_____)
C2 = CONCS. FROM CCS
PD = PERCENT DIFFERENCE
= 100 X (DIFFERENCE OF C1" and C2)/C2
** ACCEPTANCE CRITERIA: PD < OR = 20%.
CCS PREPARATION RECORD: LOG BOOK NO. _____ PAGE_____

REVIEWED BY/DATE:_____

CALIBRATION CHECK STANDARD (CCS)
METHOD #9203

1991 GC#_____ DB-1701 CHANNEL#_____

SEQ-UENCE	AREA COUNT /RT (MIN)	ACE 6.5	MECL 7.2	ETAC 9.7	111 10.0	HEP 10.3	NBA 12.8	TOL 14.2	DMF 16.9	EGBE 17.9	ODCB 19.7
**	A2										
LOWER	LIMIT										
UPPER	LIMIT										
	A1'										
	A1"										
	PD										
	A1'										
	A1"										
	PD										
	A1'										
	A1"										
	PD										
	A1'										
	A1"										
	PD										
	A1'										
	A1"										
	PD										
	A1'										
	A1"										
	PD										
	A1'										
	A1"										
	PD										
	A1'										
	A1"										
	PD										
	A1'										
	A1"										
	PD										

A1',A1" = AREA COUNTS FROM CURRENT CALIBRATION TABLE, AT THE START AND END OF SEQUENCE (FILE NAME:_____)
A2 = AREA COUNTS FROM CCS
PD = PERCENT DIFFERENCE
= 100 X (DIFFERENCE OF A1" and A2)/A2
** ACCEPTANCE CRITERIA: PD < OR = 20%.
CCS PREPARATION RECORD: LOG BOOK NO. _____ PAGE_____

REVIEWED BY/DATE:_____

PAGE_____

SUMMARY OF DUPLICATE AND SPIKE RECOVERY RESULTS

DUPLICATE			SPIKE RECOVERY % **						
DATE 1991	LAB #	AVG % RPD *	DATE 1991	IBA	TCE	MN1	GC CHAN #	PREP ANYT/ DATE	COMMENTS

* ACCEPTANCE CRITERIA FOR DUPLICATE: AVERAGE % RPD > OR = 20%
** ACCEPTANCE CRITERIA FOR SPIKE RECOVERY: 80 TO 120%

REVIEWED BY/DATE:_____

SPIKE PREP AND CALCULATION WORKSHEET (METHOD #9203)

LAB. #: _____
SPIKED BLANK? YES _____ NO _____
(IF YES, CIRCLE SPIKED BLANK BELOW)

I) PREPARATION

i) CS2 EXTRACTION? YES___ NO___

		SPIKED BLANK
WT. OF SAMPLE	= _____g	; = 0
VOL OF SPIKING STANDARD(sp.gr.=1)	= 1.0 mL(1g)	; = 1.0 mL(1g)
VOLUME OF CS2 ADDED	= 8.0 mL (approx.)	; = 11.0 mL (approx.)
TOTAL VOLUME (CS2 LAYER)	= 12.0 mL	; = 12.0 mL
DILUTION FACTOR (OF SPIKING STD)	= 12	; = 12

ii) NEAT SAMPLE? YES___ NO___

		SPIKED BLANK
VOL OF SAMPLE (Sp. Gr. = _____)	= 11.0 mL	; = 0
VOL OF SPIKING STANDARD(sp.gr.=1)	= 1.0 mL(1g)	; = 1.0 mL(1g)
VOLUME OF CS2 ADDED	= 0 mL	; = 11.0 mL
TOTAL VOLUME	= 12.0 mL	; = 12.0 mL
DILUTION FACTOR (OF SPIKING STD)	= 12	; = 12

SPIKE SOLUTION:
IN BOOK #_____ PG:_____ CONC. OF: IBA 33.3 %(Y1) MN1 33.3 %(Y3)
(W/V) TCE 33.3 %(Y2)

AMOUNT SPIKED (A) (IBA) = Y1 / DILUTION FACTOR = 2.775 %
(TCE) = Y2 / DILUTION FACTOR = 2.775 %
(MN1) = Y3 / DILUTION FACTOR = 2.775 %

COMMENTS: _____

_____

ANALYST/DATE: _____

II) CALCULATION (GC #_____Channel #_____)

unit = wt/wt %	IBA	TCE	MN1
TOTAL AMT FOUND IN SPIKED SAMPLE (BY ESTD) (T)			
AMT IN NON-SPIKED SAMPLE (BY ESTD) (S)*			
AMT RECOVERED (T-S)			
AMT SPIKED INTO SAMPLE (A)			
% RECOVERY = (T-S)/A X 100			

* Multiplication factor for equivalent amount in non-spiked neat sample = 12/(11 x sp. gr. of neat sample).
CRITERIA FOR RECOVERY RANGE = 80 to 120%

COMMENTS: _____

_____

ANALYST/DATE: _____ REVIEWED BY/DATE: _____

CALCULATION WORKSHEET (METHOD #9203)

LAB#_____

DUPLICATE ANALYSIS

SAMPLE TYPE	UNITS	QUANTITATION METHOD	PREP
T=TOTAL B=BOTTOMS O=ORGANIC A=AQUEOUS S=SLUDGE/SOLID D=DISTILLATE	W=WT% V=VOL% M=WT/VOL P=PPM	N=NORMALIZATION E=EXTERNAL STD. A=AREA	N=NEAT C=CS2 M=MEOH H=HEXANE O=OTHER

CODE	ORIGINAL AMT	DUPLICATE AMT	% DIFFERENCE
	.	.	.
	.	.	.
	.	.	.
	.	.	.
	.	.	.
	.	.	.
	.	.	.
	.	.	.
	.	.	.
	.	.	.
	.	.	.
	.	.	.

AVG. % RPD

.

COMMENTS: _____

ANALYST/DATE _____ REVIEWED BY/DATE _____

PAGE_____

PREPARATION OF SAMPLES FOR VOLATILE ANALYSIS IN WASTE MATERIALS (METHOD #9203) 1991

	LAB NO.	SAMPLE TYPE	PREP TYPE	SAMPLE WT (g)	PREP BY	DATE	COMMENTS
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							
11.							
12.							
13.							
14.							
15.							
16.							
17.							
18.							
19.							
20.							
Dupl.							
Spike							

Wt. of Spiking Standard: _____

SPIKING STANDARDS:
- IBA (33.3 %)
- TCE (33.3 %)
- MN1 (33.3 %)

RECORD:
Log Book/Page _____

SAMPLE TYPE:
- T - TOTAL
- O - ORGANIC
- A - AQUEOUS
- S - SLUDGE/SOLID
- B - BOTTOM
- D - DISTILLATE

PREP TYPE:
- N - NEAT
- C - CS2
- M - METHANOL
- H - HEXANE
- D - DISTILLATE
- O - OTHER

REVIEWED BY/DATE: _____

PREPARATION OF SAMPLES FOR VOLATILE ANALYSIS IN WASTE MATERIALS

(ALTERNATIVE PROCEDURE) 1991

LAB #	SAMPLE TYPE	PREP TYPE	SAMPLE WT.(g) (sp.gr. -neat)	TOTAL WT.(g)	HT. CS2 cm./in. (MC)	HT. AQ. cm./in. (MA)	HT.SOLID/ SLUDGE cm/in(MS)	VOL.CS2 LAYER mL.	VOL.AQ. mL.	VOL.SOLID/ SLUDGE mL.	DIL. FACTOR	ANALYST/ DATE	COMMENTS
1.													
2.													
3.													
4.													
5.													
6.													
7.													
8.													
9.													
10.													
11.													
12.													
13.													
14.													
15.													
16.													
17.													
18.													
19.													
20.													
Dupl.													
Spike													

Wt. of Spiking Standard (g): _____

SPIKING STANDARDS: IBA (33.3%)
TCE (33.3%)
MN1 (33.3%)

RECORD: Log Book#_____
Page_____

SAMPLE TYPE:
T = TOTAL
O = ORGANIC
A = AQUEOUS
S = SOLID/SLUDGE
B = BOTTOM
D = DISTILLATE

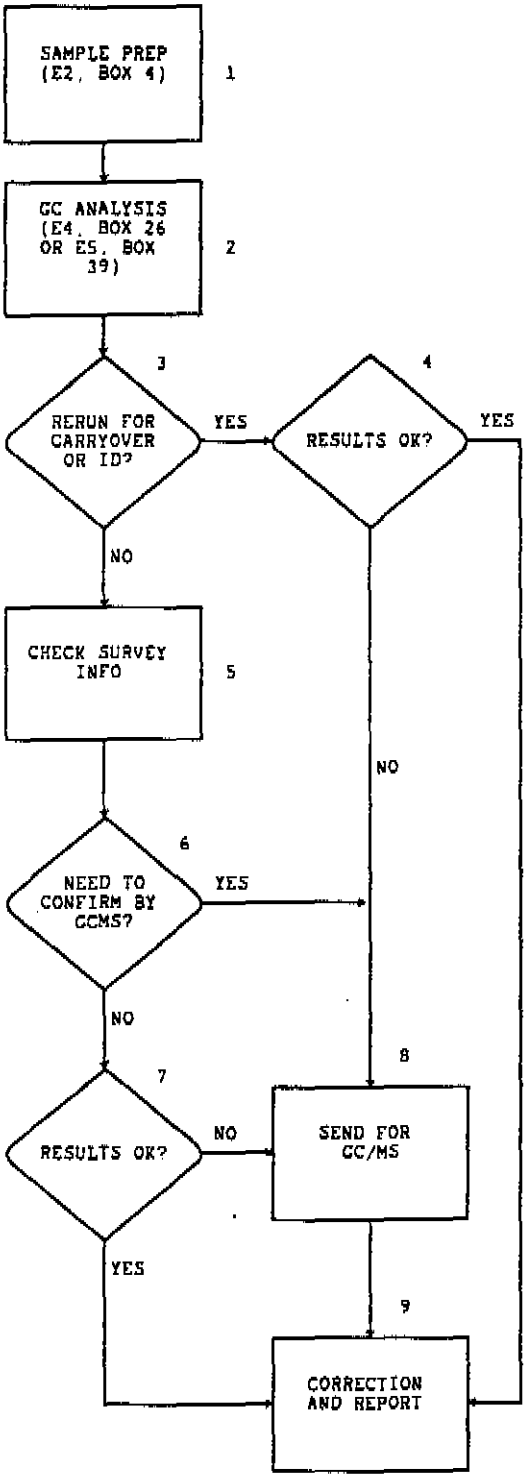
PREP TYPE:
N = NEAT
C = CS2
M = METHANOL
H = HEXANE
D = DISTILLATE
O = OTHER

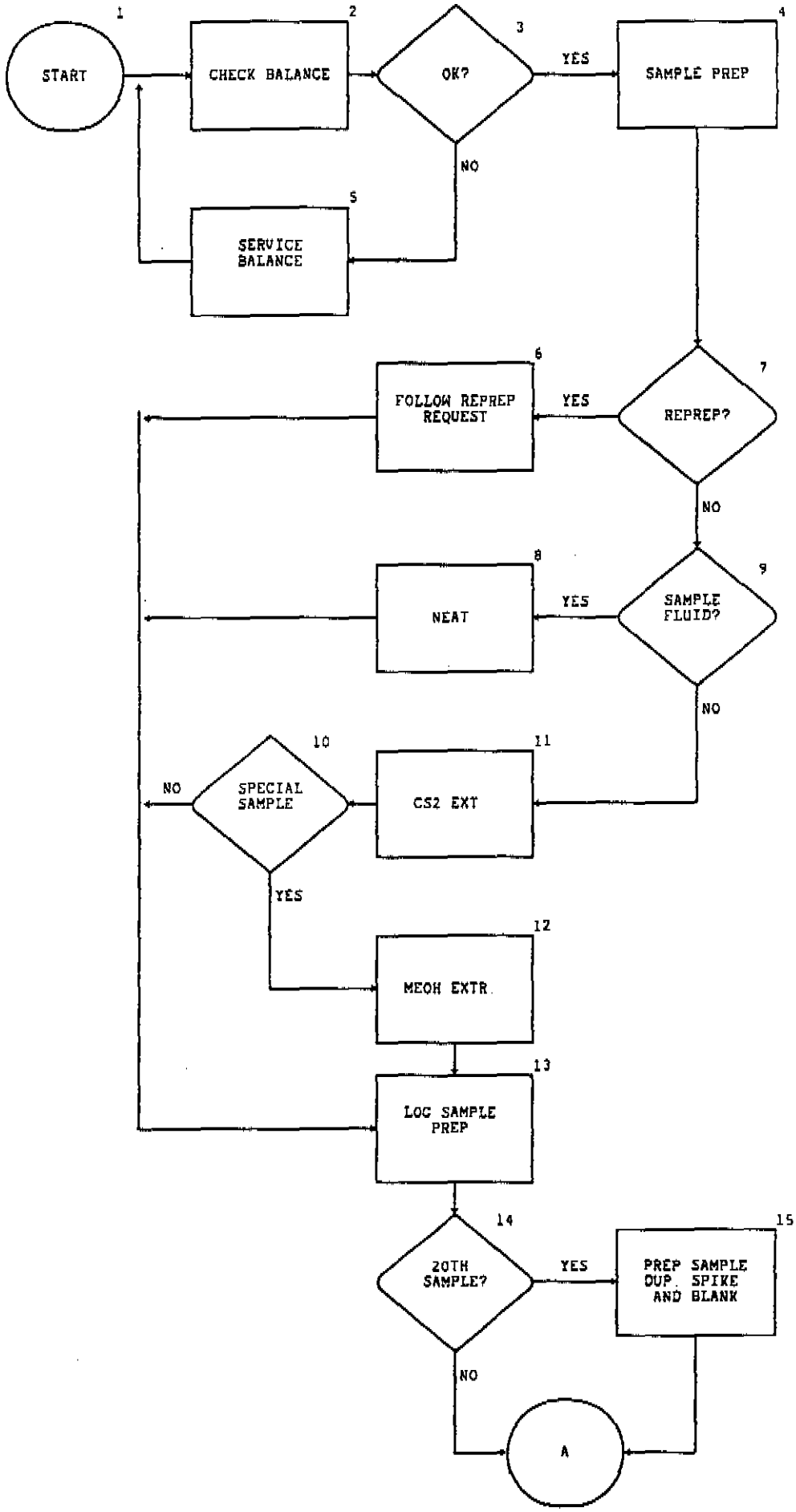
VOL. CS2 LAYER = 12(MC/MT) mL
VOL. AQUEOUS LAYER = 12(MA/MT) mL
VOL. SOLID LAYER = 12(MS/MT) mL.
DIL. FACTOR = VOL. CS2 LAYER/SAMPLE WT.
(= 1/sp. gr. for neat samples)
HT. OF 12 mL LIQUID (MT) = _____cm./in.

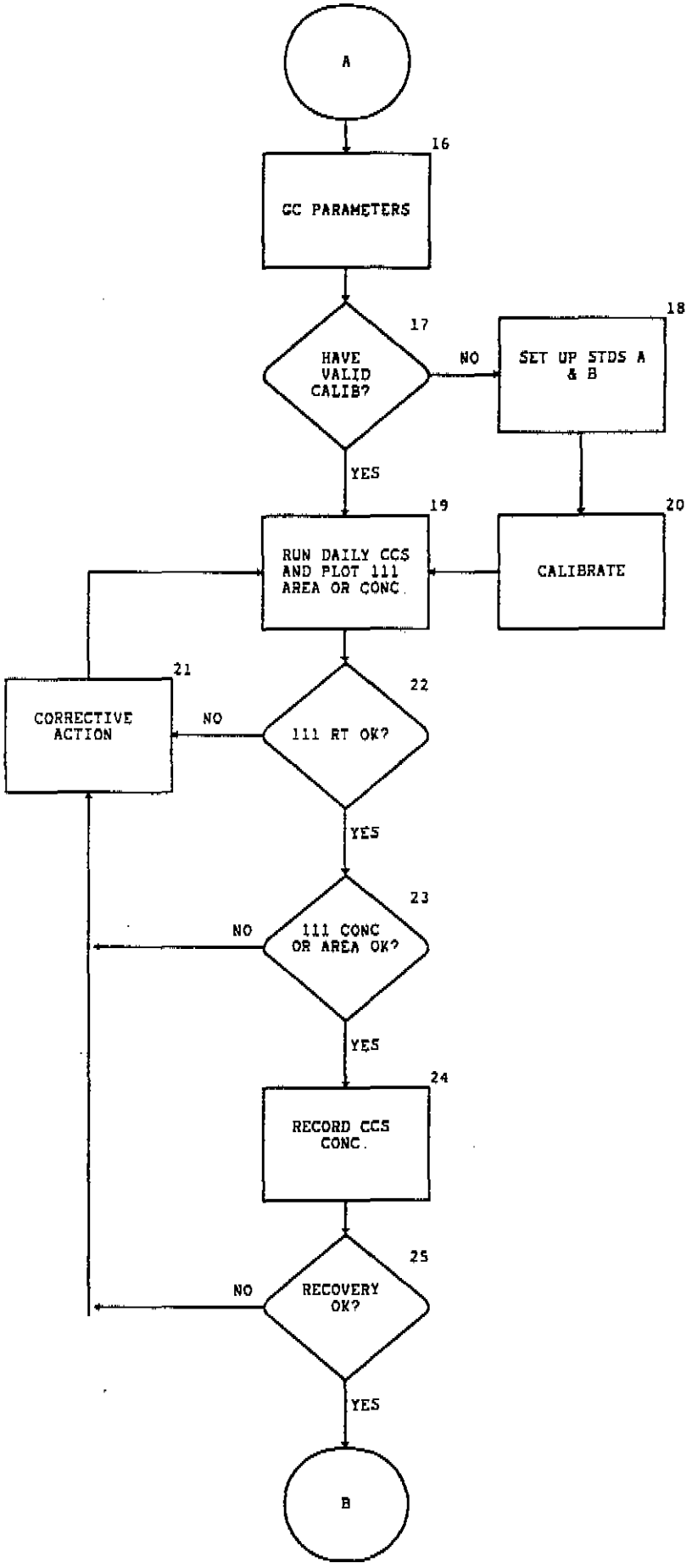
REVIEWED BY/DATE:_____

ATTACHMENT E

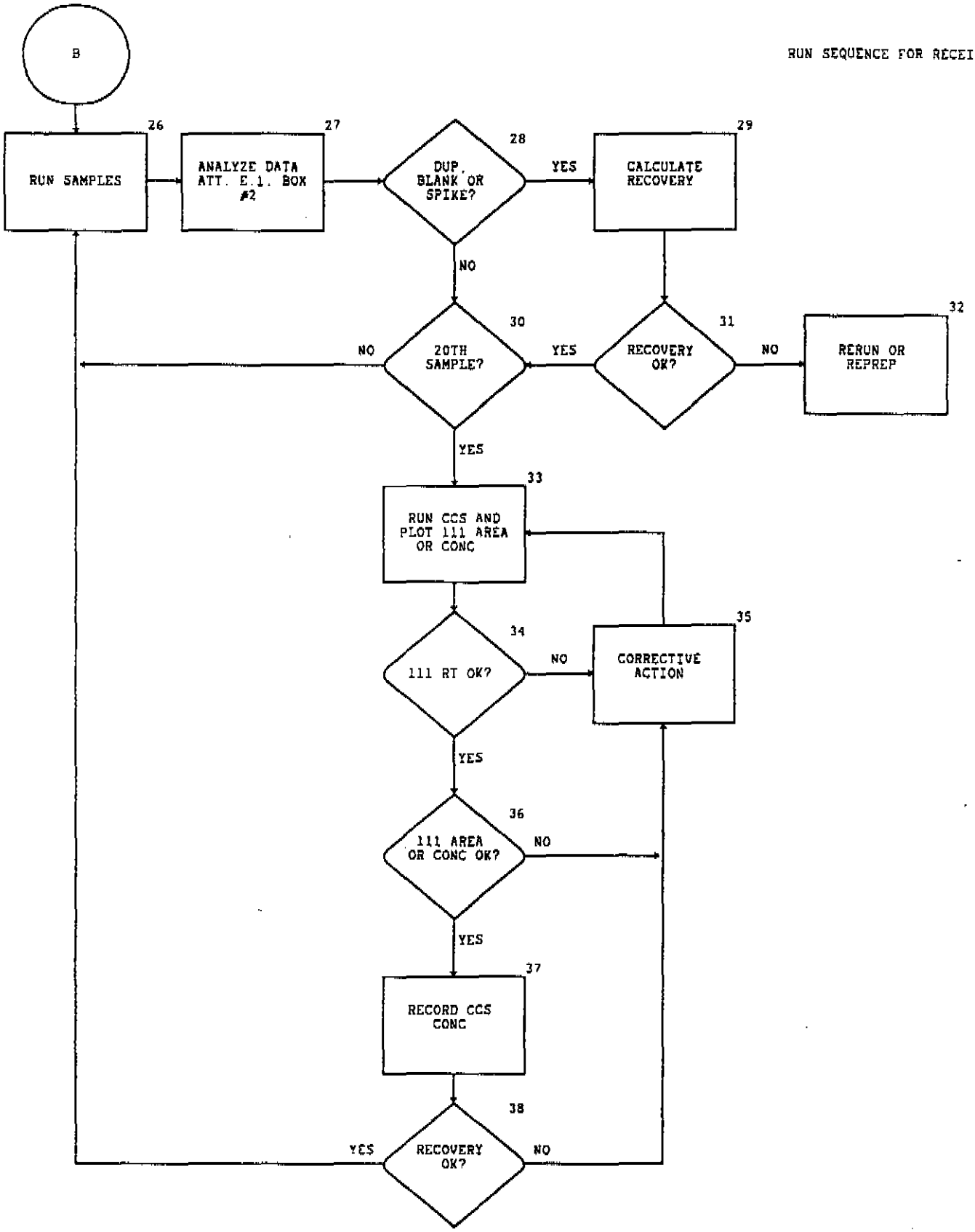
E.1	FLOW CHART FOR SCREENING WASTE MATERIALS FOR VOLATILE ORGANICS
E.2-E.4	PROCEDURE AND QUALITY CONTROL FLOW CHARTS
E.5	PRE-QUAL RUN SEQUENCE


SAMPLE PREP (E2, BOX 4)
1
GC ANALYSIS (E4, BOX 26 OR E5, BOX 39)
2
3
RERUN FOR CARRYOVER OR ID?
YES
4
RESULTS OK?
YES
NO
CHECK SURVEY INFO
5
NO
6
NEED TO CONFIRM BY GCMS?
YES
NO
7
RESULTS OK?
NO
8
SEND FOR GC/MS
YES
9
CORRECTION AND REPORT

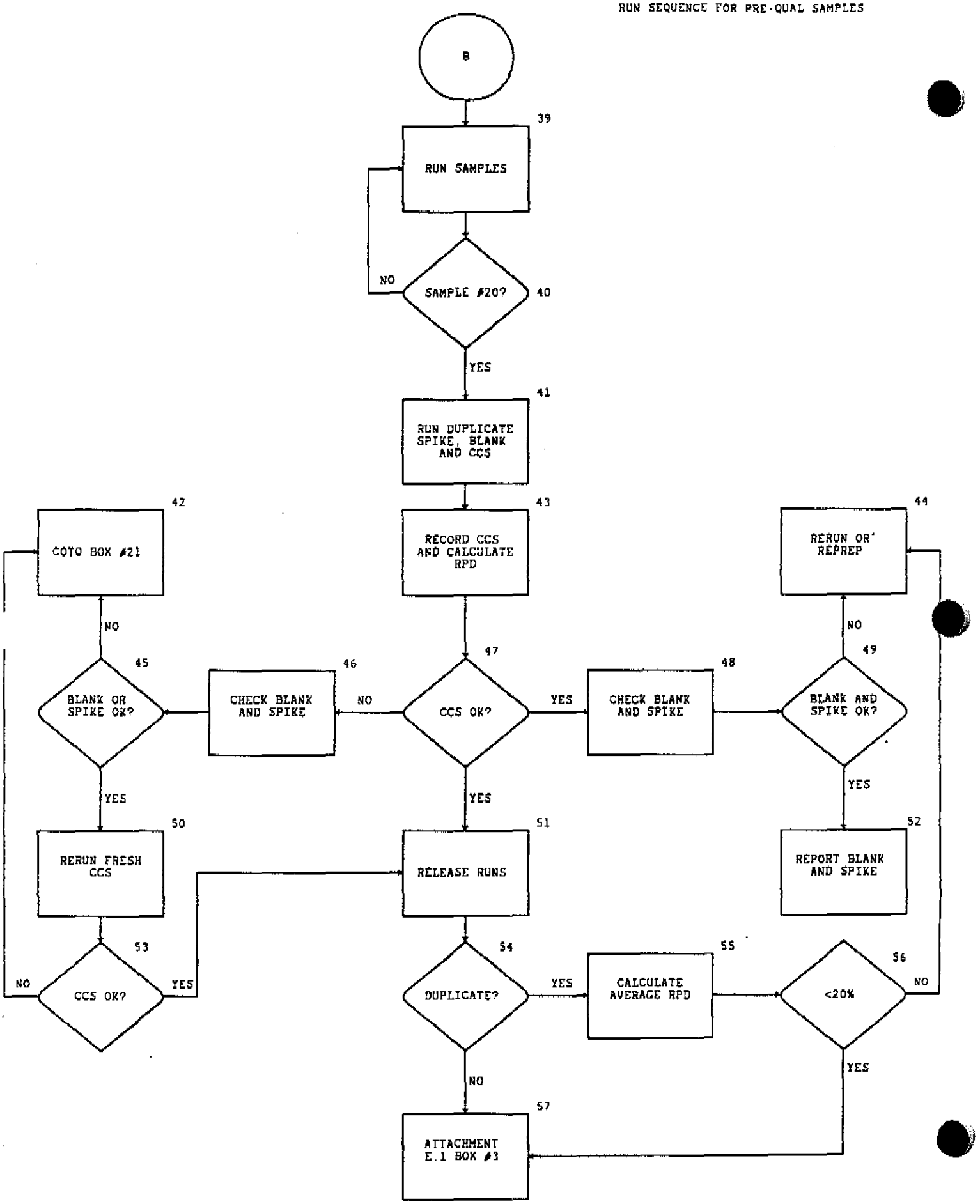

1
START
2
CHECK BALANCE
3
OK?
YES
NO
4
SAMPLE PREP
5
SERVICE BALANCE
6
FOLLOW REPREP REQUEST
YES
7
REPREP?
NO
8
NEAT
YES
9
SAMPLE FLUID?
NO
10
SPECIAL SAMPLE
NO
YES
11
CS2 EXT
12
MEOH EXTR.
13
LOG SAMPLE PREP
14
20TH SAMPLE?
YES
NO
15
PREP SAMPLE DUP. SPIKE AND BLANK
A


A
16
GC PARAMETERS
17
HAVE VALID CALIB?
NO
18
SET UP STDS A & B
YES
19
RUN DAILY CCS AND PLOT 111 AREA OR CONC.
20
CALIBRATE
21
CORRECTIVE ACTION
NO
22
111 RT OK?
YES
23
111 CONC OR AREA OK?
NO
YES
24
RECORD CCS CONC.
25
RECOVERY OK?
NO
YES
B

RUN SEQUENCE FOR RECEIPTS



RUN SEQUENCE FOR PRE-QUAL SAMPLES



ATTACHMENT F

CONFIRMATION PROCEDURE BY GC/MS

TITLE: QUALITATIVE IDENTIFICATION AND CONFIRMATION OF VOLATILE ORGANIC COMPOUNDS BY GAS CHROMATOGRAPHY/MASS SPECTROMETRY

1. SCOPE AND APPLICATION

1.1 This procedure is used to positively identify organic compounds in the gas chromatography (GC) analysis using mass spectral data of the organic compounds, by means of a mass spectrometer coupled with a gas chromatograph (GC/MS), equipped with a dedicated on-line computer data system.

1.2 The volatile organic compounds to be analyzed include the list mentioned in Section 1.1 of the SOP #9203. All other organic compounds which elute from the GC system before the retention time of hexadecane, will be identified through their unique mass spectra.

1.3 The detection quality objectives are to identify organic compounds down to 1% by weight in the total sample as received, and Safety-Kleen Regulated Compounds down to 0.1% by weight.

2. LIMITATIONS

2.1 Not all compounds produce easily recognizable mass spectra. Clean mass spectra may not be obtained because of co-elution of several compounds.

2.2 Structurally similar compounds (isomers) will produce very similar mass spectra, e.g. O-, M-, P- xylenes can be distinguished only with the assistance of their retention time data.

2.3 Lack of molecular ion information in most cases makes the identification of the correct compound difficult. Generally, the type of compounds can be identified easily and retention time data are needed to positively identify the compound, e.g. tridecane ($C_{13}H_{28}$, F.W. 184) and hexadecane ($C_{16}H_{34}$, F.W. 226) have the same aliphatic hydrocarbon fragmentation pattern.

2.4 Some mass spectra are confirmed by running virgin materials from manufacturers. These mass spectra are

not found on the system's NIST Mass Spectral Library, and they are stored a created library for automatic library match.

3. APPARATUS

3.1 Hewlett Packard 5970B GC/MSD with RTE/A data system.

3.2 HP7673 Autosampler

3.3 GC Column: Crosslinked 5% phenyl methyl silicone
50m X 0.32mm i.d. X 1um film

4. PROCEDURE

4.1 SYSTEM TUNING

4.1.1 AUTOTUNE

After the source of the Mass Selective Detector (MSD) is cleaned, the GC/MS system is tuned using the automatic tuning program, "AUTOTUNE", to get diagnostic value and to meet with pre-selected criteria.

The tuning standard is perfluorotributylamine (PFTBA) obtained from Hewlett Packard. This compound is recommended because it is stable and yet volatile enough to be vacuumed to the source, and it fragments over a wide mass range. The molecular formula of PFTBA is $N(C_4F_9)_3$ with molecular weight 671 amu. Isotopes are C-13 and N-15.

The program will scan the PFTBA 10 times to locate ions and isotopes. Then it checks peak widths and peak abundances using a set of tuning parameters: Repeller, Ion Focus, Entrance Lens, X-Ray, Electron Multiplier, AMU Gain, AMU Offset, Mass Axis Gain and Mass Axis Offset (see Hewlett Packard Operation Manual).

After automatic tuning, a report will be generated. The statement "Autotune passed" in Table 1, indicated that the system is in normal operations and is tuned properly.

The tuning is considered passed based on the following criteria (Table 1):

1. Peakwidths of 69, 219, and 502 must be FWHM of 0.5 ± 0.1 amu. (FWHM = Full Width at Half Maximum).

2. The relative peakwidths of 69 and 502 must be such that FWHM of 502 = FWHM of 69 ± 0.1 amu.

3. The mass assignments of 69, 219, and 502 must not deviate by more than 0.4 amu.

4. The mass assignments of 70, 220, and 503 must not deviate by more than 0.4 amu.

5. The relative abundance must be such that m/z 219 > 35% of the 69 abundance and 502 > = 2% of the 69 abundance, which is 100%.

6. The isotope abundances must be within these limits:

   70 abundance = 0.54 to 1.62% of 69 abundance
   220 abundance = 2.16 to 5.48% of 219 abundance
   503 abundance = 5.0 to 15.02% of 502 abundance

4.1.2 MANUAL TUNE

After autotune passed, the peak "Profile Scan" is called in the Manual Tune Program, to check peak widths of masses 69, 219, and 502; deviation of mass assignments for 69, 219, and 502; and deviation of mass assignments for isotopes (70, 220, 503). (See Table 2).

Daily, do "Profile Scan". Do final mass axis calibration by calling programs: "Width Calib" and "Axis Calib". Review and record data as in Table 2. Check criteria in Section 4.1.1, peakwidths, mass assignment deviations, relative abundance of m/z = 69 and 502, and isotope abundances. Also, make sure that the Absolute Abundance of mass 69 be > 100,000. Then store all data into a tuning file, e.g. APEI01 (Autotune, Positive ion, Electron Impact Ionization, 1st instrument).

In daily "Manual Tune" fails, do autotune. If autotune fails, most probably, the source will need cleaning. If cleaning the source will not help the running, service call will be placed for repair.

The mass spectrum plotted will also help to locate the problem. If there is a leak in the system, air peak m/z = 28, and 32 will show. The tolerance for m/a = 28 will be < 20%. An air leak in the system may cause the tuning to fail and the source to become dirty.

4.2 METHOD FILE (Table 3)

A method file is set up containing information for data acquisition:

1.	Tuning File Used:	APEI01
2.	Scanning Method:	Linear scan
	Column:	Capillary
	Injection Mode:	Split
	Ionization Technique:	EI (Electron Impact)
3.	Temperature Zone:	Injection Port = 250
		Transfer Line = 250
		Ion Source = 200*
		Analyzer = 200*
4.	GC Temperature Profile:	Initial Temp: 40°C for 6 min.
		Rate: 10°/min
		Temp 1: 100°C for 0 min.
		Rate: 20°/min.
		Temp 2: 250°C for 10 min.
		Rate: 20°/min.
		Temp 3: 280°C for 5 min.
5.	Run time: 30.0 min.	
6.	Scan Start Time: 2.0 min.	
7.	Scan Range: 20 to 400 amu	

* Uncontrollable temperature zones in the MSD.

4.3 QUANTITATION AND IDENTIFICATION (ID) FILE (Table 4)

A quantitation and ID file is set up to direct identification and quantitation of the specified target compounds. It is created by the program IEDIT by typing.

:IEDIT

Enter this information:

ID File Name: ID __ SK9

Hit ENTER key two times to generate Header Information.

A. Header Information

Title: SAFETY-KLEEN VOLATILE ORGANIC COMPOUNDS
RT Window : ± 0.5 min.
Maximum Hits/compound to report : 1
Minimum Area (Area Reject) : 500
Peak/Base Peak Ratio : 20%
Slope Sensitivity : 0.2
Subtraction Method : 2 (Smaller of first or last scan)
Ignore Max Check : Yes (to ignore the maximization check that is performed as part of the qualitative identification, but peaks that fail will not be rejected)
Auto Qdel Method : 1 (report all hits)
Units of Conc. : wt. %

B. Target Compound Information: (Table 5)

Compound Name: Vinyl Chloride (VC)

Qualitative Ions	Mass	Relative Abundance %
1	62.0	100.00
2	64.0	34.00

Ion for quantitation : 62.0

Expected RT : 0.168 (Relative Retention Time)
Peak Label Methods : 1:N = Name of compound

C. Calibration Information

Compound Name : Vinyl Chloride (SK Regulated Compound)
Calib Method : 0 (for single or average response factor)
RF : 1.10681440

D. To List Quant ID File

The program IDLST will list the quant ID file created by IEDIT program in S, Summary, or M, Medium, or F, full format listing. M listing will include the mass/abundance information for each compound. F listing will show ALL information in the ID file.

: IDLST, ID _ SK9, 1, S (or M, or F), compound range

ID _ SK9 is the ID file which will be listed in device unit 1 in S or M, or F form, from compound #x to compound #y (default is the entire list).

4.4 DATA ACQUISITION

4.4.1 Run Sequence File (Table 6)

A Run Sequence File is set up to direct the acquisition of a set of samples. It is created by the program BEDIT by typing:

: BEDIT

Enter these informations:

Sequence File Name : NOV 095

Hit ENTER key twice to generate Header Information.

A. Header Information

Tune File Name : APEI01
Data File Cartridge (to store data files) : A7

B. Sample Information (Table 7)

Data File Name : > S5991
Method : STD30 (Set up in Section 4.2)
Quant ID File : ID _ SK9 (Set up in Section 4.3)

C. To List Run Sequence File

The program BLIST will produce listings of sequence files created by BEDIT program, in S, short, or F, full listing format. The full listing will show user programs and/or procedure files used after data file is generated.

: BLIST, sequence file name or system #, list device lu # (=1), S or F, sample range (default is the entire list).

If a sequence file name is entered, e.g. NOV09S, that file will be listed. If a GC/MS system number is entered, then the single sample parameters for that system will be used.

4.4.2 BAMON Commands For Batch Data Acquisition

The BAMON program allows monitoring and control of the Batch Data Acquisition System, accepting commands to start, stop, pause and monitor the status of batch runs.

: BAMON

The use of BAMON:

(1) Use the BA command to set up a sequence file (or a single injection) for Batch Acquisition.

BA, system # - to set up single sample run

BA, system #, name of sequence file - to set up a sequence of samples for batch run.

(2) Use the GO command to start the run.

GO, system # - to start a run after BA command or resume paused run.

(3) The ST command may be used to monitor the status of the run.

ST, system # - to display complete status of an active system.

(4) The PA command may be used to pause a run after the sequence has already started.

PA, system #, sample # - to set run to pause after a given sample number in the sequence. The default is to pause the next run after the current run.

(5) : ?? - will list a summary of BAMON commands.
: ?, command -will give detailed description of an individual command.

(6) To continue after a pause, use the SA command to call up the next sample and then the GO command to restart the run.

e.g. : PA, 1, 5 -to set run to pause after the 5th sample in the sequence.

: SA, 1, 6 - to set a paused run to the 6th sample in the sequence.

: GO, 1 - to start the run.

5. REPORT (TABLE 8)

Results will be processed automatically and report will be generated as in Table 8, followed by a plot of Total Ion Chromatograms (Figure 1 and 2) with peaks identified and annotated as specified in the ID file.

6. REVIEW

The GC/MS report will be compared with the chromatogram generated by the GC. Peaks > 1% of total samples will be identified and marked on the GC chromatograms. (See Figure 3).

Peaks which are identified by the automatic data processing program, QUANT (ID_SK9), will be checked for accuracy and peaks not identified will be reviewed and analyzed to get identifications. In both cases, it will be done by calling PBM to search for match with the NBS Library and also the created Safety-Kleen Level I Target Compounds Library, which is the library storing all the common standards and also part of the master list of organic compounds that have been found in the Safety-Kleen sample analyses. When all information about the compounds in the master list have been obtained, a Safety-Kleen Level II Library will be created for library match.

An example of library match result is shown in Figure 4. The top mass spectrum of a peak in the analysis was matched with 3 mass spectra from the library. A match probability of > 50 will indicate a good match. This will be further confirmed by peak to peak comparison regarding m/z and abundances.

7. SAFETY-KLEEN REGULATED COMPOUNDS

A procedure file TOXIC will generate a report of the scan for Target Safety-Kleen Regulated Compounds. Any regulated compound > 0.1% will be identified (see procedure for screening Regulated Compounds).

8. FINAL REPORT

A final report for the sample analysis will be generated by recorrection of the GC chromatogram based on the confirmed identification of peaks by GC/MS.

Any regulated compounds of concentrations > 1% will be recorded in the final GC report. Those of concentrations less than 1% will be recorded in the Regulated Compounds Report generated by GC/MS, and entered in the comment section of the final report.

9. USAGE OF CODES IN THE FINAL REPORT

A master list of organic compounds that Safety-Kleen Corp. has encountered in all lines of business are published in a confidential technical report available from Technical Services, and is updated on a regular basis. These compounds are all coded with up to 4 characters for computer processing.

A subset of this master list is a target list of organic compounds that are found to be the most frequently encountered in the Corporation's business by statistical evaluations. This list will also be updated on a regular basis.

The identification of organic compounds will include all the compounds in the target list, the master list, and any compound that can be identified through library match and manual interpretation.

There are 3 codes used for compounds which are not found in the target list of compounds in reports: OTH1 ..., TIC, and UNKS.

OTH1 -- OTHERS, also OTH2, OTH3, etc.
They mean other compounds than those calibrated standards in the target list.

It is the code used when a compound is identified positively by high probability library mass spectral data match, and also supported by the retention time data from previous runs.

If the compound is in the master list, report the code already assigned to the compound, otherwise, report the name and the CAS number of the compound found. These compounds will be coded and added to the master list.

TIC -- TENTATIVELY IDENTIFIED COMPOUND
the code used when a compound is identified positively by high probability library mass spectral data match, but, there is no supporting data, such as retention time to confirm this identification.

These TIC compounds can be confirmed later when a standard is run and upgraded as a OTH1.

TIC can also be downgraded as a UNKS, if it is proved after the standard is run that the compound was identified incorrectly.

UNKS -- UNKNOWN
the code used when a compound cannot be positively identified by library search. It may be possible to get some clues from the mass spectral data to derive the class of the compound, or by manual interpretation from fragmentation to derive a possible answer. If this answer can be supported by a library mass spectrum, TIC will be called, otherwise, it will be a UNKS.

10. REFERENCE

(1) Hewlett Packard 59872C GC/MS RTE-A Data System Manual, Vol. 1 and 2.

(2) Hewlett Packard AQUARIUS (Acquisition, Quantitation and Archive Independent of User Sessions) User's Reference Manual.

(3) Hewlett Packard RPN Data Processing Manual.

TABLE 1

AUTOTUNE REPORT

>>>>AUTOTUNE REPORT<<<<

DATE: 10/02/89 8:49 Tuned from Std default values
SYSTEM#1: 5970(5970) SERIAL NO.:
TUNE TYPE: EI MODE: POSITIVE

	Repller Volts	IonFcs Volts	EMvlts Volts	Gain DACs	Offset DACs	EntLens mV/AMU	X-ray Volts	Mass Gain	Mass Offse
Initial:	10.2	0	1654	100	100	48	44	0	0
Final:	10.2	24	2031	153	57	50	54	42	15

Mass	Abs.Abund	Rel.Abund	Trgt.Abund	Iso.Mass	Iso.Abund.	Iso.Ratio	Trgt.Rat
68.95	123742	100.00%	100.00%	69.95	1408	1.14%	1.08%
218.95	62683	50.66%	35.00%	219.95	2635	4.20%	4.32%
501.91	7037	5.69%	2.00%	502.96	716	10.19%	10.11%

Autotune passed

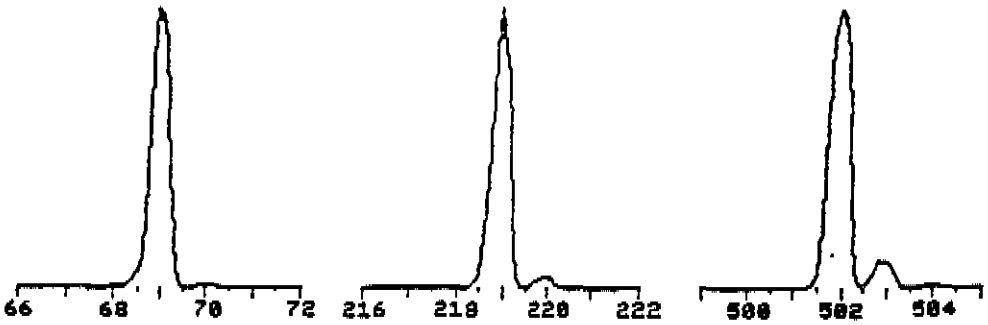
Mass	Abs. Abund	Rel. Ratio	Trgt. Ratio	Iso. Mass	Iso. Abund	Iso. Ratio	Trgt. Ratio
69.00	129692	100.00%	100.00%	70.00	1506	1.16%	1.08%
218.90	57184	44.06%	35.00%	220.00	2311	4.05%	4.32%
501.95	7895	6.09%	2.00%	502.95	723	9.16%	10.11%

TABLE 2

PROFILE SCAN

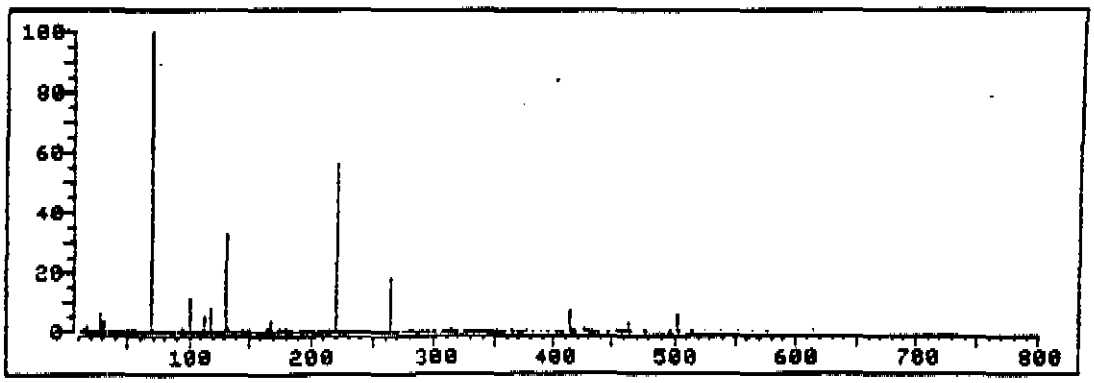
PROFILE SCAN ver 870605

INST # 1:	59700	TYPE:	5970	DATE: 10/02/89	8:56
Repeller (V)	10.2	X - Ray (V)	64.0	AMU Offset	57
Ion Focus (V)	24.0	EM Volts (V)	2031	Mass Gain	42
nt Lens (mV)	50	AMU Gain	153	Mass Offset	15



MASS	ABUND	REL. ABUND	FWHM	ISO FWHM
68.90	135998.	100.00	.460	.430
218.90	80616.	59.28	.450	.490
501.90	7911.	5.82	.490	.500

INST # 1:	59700	TYPE:	5970	DATE: 10/02/89	8:57
Mass Range	10- 800			Peaks detected	359
Base Peak	68.95	Abundance	119280	Total Ab.	393600
Samples / A.D.	16	Integration	50	Threshold	10



Mass	Abund	Rel. Abund	Iso Mass	Iso Abund	Iso Ratio
68.95	119280	100.00	69.95	1324	1.11
218.95	67384	56.43	219.95	2948	4.38
501.90	7251	6.08	502.90	718	9.90

TABLE 3

METHOD FILE

M E T H O D F I L E L I S T

Method file: STD30 GC type: 5890 Run Type: SCAN, GC, EI
Column: Cap Splitless: No

Temperature:	Inj.P	Intfc	Source
	250.0	250.0	0.0

GC/DIP		LEVEL A	LEVEL B	POST RUN
Temp 1	40.0	100.0	250.0	280.0
Time 1	6.0	0.0	5.0	5.0
Rate	10.0	20.0	20.0	
Temp 2	100.0	250.0	280.0	
Time 2	0.0	5.0	5.0	

Oven equilibration Time 0.00 min

Run time: 30.00
Scan Start time: 2.00
Splitless valve time: 0.00

	ON	OFF	ON	OFF
Relay #1:	327.0	327.0	327.0	327.0
Relay #2:	327.0	327.0	327.0	327.0
Triac #0:	327.0	327.0	327.0	327.0
Triac #1:	327.0	327.0	327.0	327.0

ALS operating conditions

Number of sample washes	5	Number of sample Pumps	5
Solvent A washes	5	Solvent B washes	5
Sample viscosity wait	0	Injection mode is FAST	

Scan Parameters: Mass Range 20 to 400
Multiplier voltage: 1800 Number of A/D samples: 2
GC Peak threshold: 20000 counts
Threshold: 500 counts

TABLE 4

QUANT ID FILE

Quant ID File: IDPERF::D1

Title: SAFETY KLEEN TARGET COMPOUNDS - PCS

Last EDIT Date: 891207 18:29 Last Calib Date: 891207 18:16

RT Window (+/- min):	.50
Max Hits/Compound:	1
Minimum Area:	500
Peak/Base Peak Ratio:	20.00 %
Slope Sensitivity:	.200
Subtraction Method:	2
Ignore max check:	YES
Auto Qdel Method:	1
Units of Conc:	WT %

Number of Compounds: 10

Comp No.		Compound Name	(Type)	Retention Time Min. (Rel)	R.F.	Conc.
1)	#ACE	Acetone	(T)	4.02(4.015)	119697.970	7.37
2)	#MECL	Methylene Chloride	(T)	4.70(4.699)	14188.4980	16.52
3)	#MEK	Methyl Ethyl Ketone	(T)	6.53(6.534)	111226.360	7.55
4)	#ETAC	Ethyl Acetate	(T)	7.13(7.131)	87875.6250	8.37
5)	#111	1,1,1-Trichloroethane	(T)	8.25(8.245)	136197.190	12.44
6)	#NBA	N-Butanol	(T)	9.06(9.061)	205715.120	7.41
7)	#TOL	Toluene	(T)	12.36(12.363)	63307.1090	8.16
8)	#PERC	Tetrachloroethylene	(T)	13.57(13.570)	27940.5900	15.20
9)	#XYL	Xylene	(T)	15.46(15.456)	67998.4220	8.22
10)	#EGBA	EG Butyl Acetate	(T)	18.16(18.157)	62105.3520	8.78

Compound uses ESTD

TABLE 5

THE IEDIT COMPOUND FORM

```
ID File: ID_SK9::SC .Compound#33.                    IEDIT Rev. <861002.1519>

                        TARGET COMPOUND INFORMATION
 Compound Name: Vinyl chloride                          Expected RT:      .168
                                                       Positive for Relative RT
                                                       Negative for Absolute RT
            Mass  Rel Ab  Sum?
      1:    62.0 100.00 %    Area Sum
 Qual 2:    64.0  34.00 %    is used by                 PEAK LABEL METHODS:  R=RT
 Ions 3:                 %   subtract                   S=Scan A=Area C=Conc N=Name
      4:                 %   method 4     Compound      T=Type #=Comp# U=User(below)
      5:                 %     only       Type: T       Methods 1:N 2:R 3:S 4:# 5:T
                                                        User:
 Ion for Quantitation (INT):    62.0
  Concentration of compound:    180.00 Area Correction:        * Area@
  Ref Spec Namr: *V0033::VL                Internal Standard (Y or N)? N

   Quant Parameters        RT Window:            Maximum Hits:          Ignore
   If blank, global     Minimum Area:         Peak/Base Error:          Max?
  values will be used     Slope Sens:          Subtract Method:    Auto Odel:

         Last Edit Date: 860226 17:13        Last Calib Date: 861006 13:41
 Header   Insert  Previous   Next              Calib    Screen  Create/   Exit/
  Form   Compound Compound Compound             Form   Refresh  Replace  Restart
Please enter/edit compound information.
```

TABLE 6

SEQUENCE FILE

Sequence File: NOV09S::SC

Tune File: APEI01

CR List: A7
CR Cut-off: 500 blocks.

Number of samples: 15

Samp No.	Data File / Method File	Sample Name / Misc Data	Sample Size / Bottle	Quant	Report	Data Archive	ID Archive	Output Archive	Quant ID / Quant Output
001)	>S5991	SK# 48541	34	2	Y	M	N	N	N	ID_SK9::SC
	STD30	11/09/89		Dil=1.00000					^S5991::QO
	REPRT OPTIONS: Label Meth:1, 3 page TIC								
002)	>S5992	SK# 48041	35	2	Y	M	N	N	N	ID_SK9::SC
	STD30	11/09/89		Dil=1.00000					^S5992::QO
	REPRT OPTIONS: Label Meth:1, 3 page TIC								
003)	>S5993	SK# 48446N	36	2	Y	M	N	N	N	ID_SK9::SC
	STD30	11/09/89		Dil=1.00000					^S5993::QO
	REPRT OPTIONS: Label Meth:1, 3 page TIC								
004)	>S5994	SK# 48526N	37	2	Y	M	N	N	N	ID_SK9::SC
	STD30	11/09/89		Dil=1.00000					^S5994::QO
	REPRT OPTIONS: Label Meth:1, 3 page TIC								
005)	>S5995	SK# 47017	38	2	Y	M	N	N	N	ID_SK9::SC
	STD30	11/09/89		Dil=1.00000					^S5995::QO
	REPRT OPTIONS: Label Meth:1, 3 page TIC								
006)	>S5996	SK# 48671NOR	39	2	Y	M	N	N	N	ID_SK9::SC
	STD30	11/09/89		Dil=1.00000					^S5996::QO
	REPRT OPTIONS: Label Meth:1, 3 page TIC								
007)	>S5997	SK# 48671NAQ	40	2	Y	M	N	N	N	ID_SK9::SC
	STD30	11/09/89		Dil=1.00000					^S5997::QO
	REPRT OPTIONS: Label Meth:1, 3 page TIC								
008)	>S5998	SK# 48057	41	2	Y	M	N	N	N	ID_SK9::SC
	STD30	11/09/89		Dil=1.00000					^S5998::QO
	REPRT OPTIONS: Label Meth:1, 3 page TIC								
009)	>S5999	SK# 48594	42	2	Y	M	N	N	N	ID_SK9::SC
	STD30	11/09/89		Dil=1.00000					^S5999::QO
	REPRT OPTIONS: Label Meth:1, 3 page TIC								
010)	>S6000	SK# 48518	43	2	Y	M	N	N	N	ID_SK9::SC
	STD30	11/09/89		Dil=1.00000					^S6000::QO
	REPRT OPTIONS: Label Meth:1, 3 page TIC								
011)	>S6001	SK# 47562	44	2	Y	M	N	N	N	ID_SK9::SC
	STD30	11/09/89		Dil=1.00000					^S6001::QO
	REPRT OPTIONS: Label Meth:1, 3 page TIC								
012)	>S6002	SK# 48980N	45	2	Y	M	N	N	N	ID_SK9::SC
	STD30	11/09/89		Dil=1.00000					^S6002::QO
	REPRT OPTIONS: Label Meth:1, 3 page TIC								

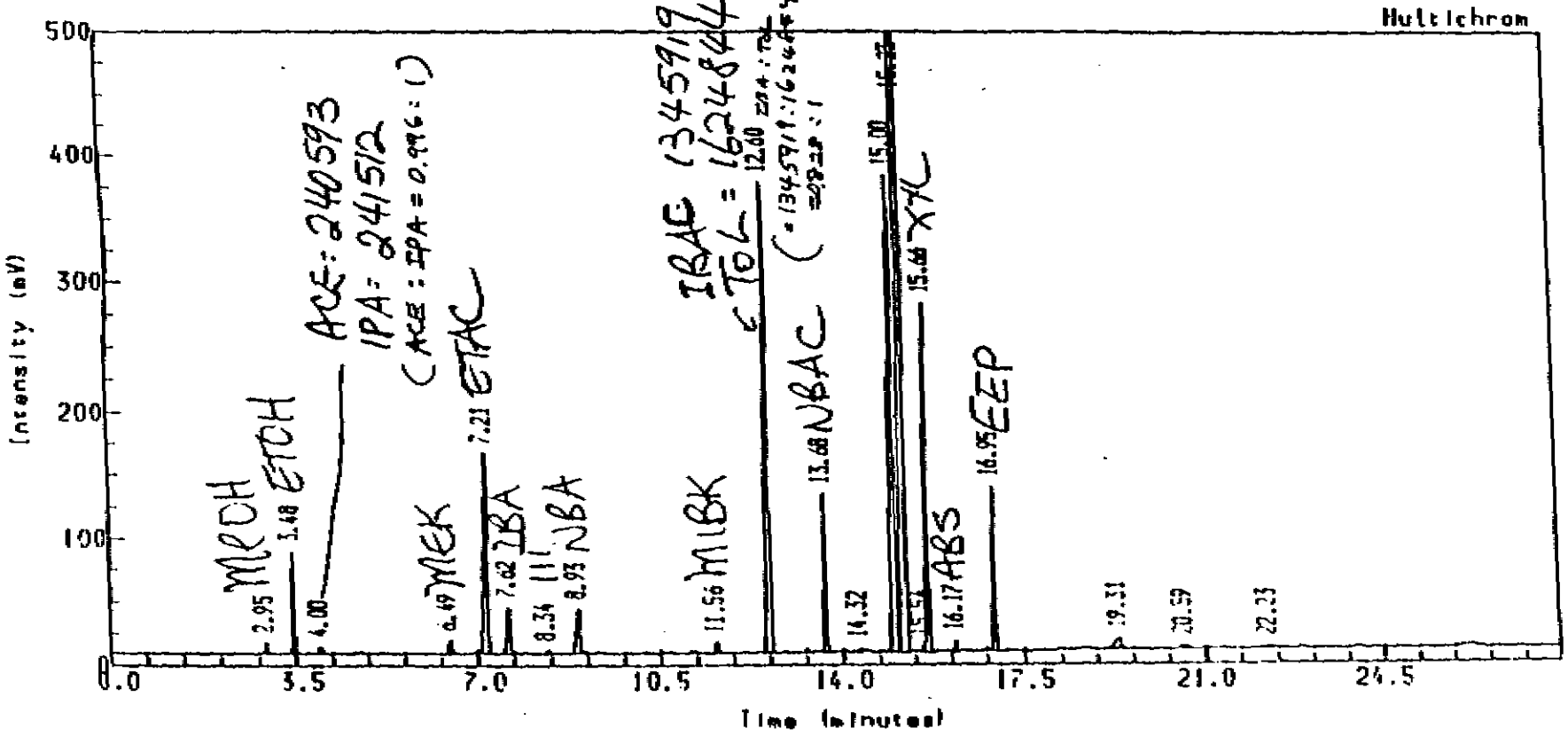
End of sequence file.

FIGURE 3

GC WITH GC/MS IDENTIFICATION

SAFETY-KLEEN CORP., VAX MULTICHROM

Analysts Name : [REVIEW1] 49 GC1113089C.4.1.
50772 N Amount : 1.000



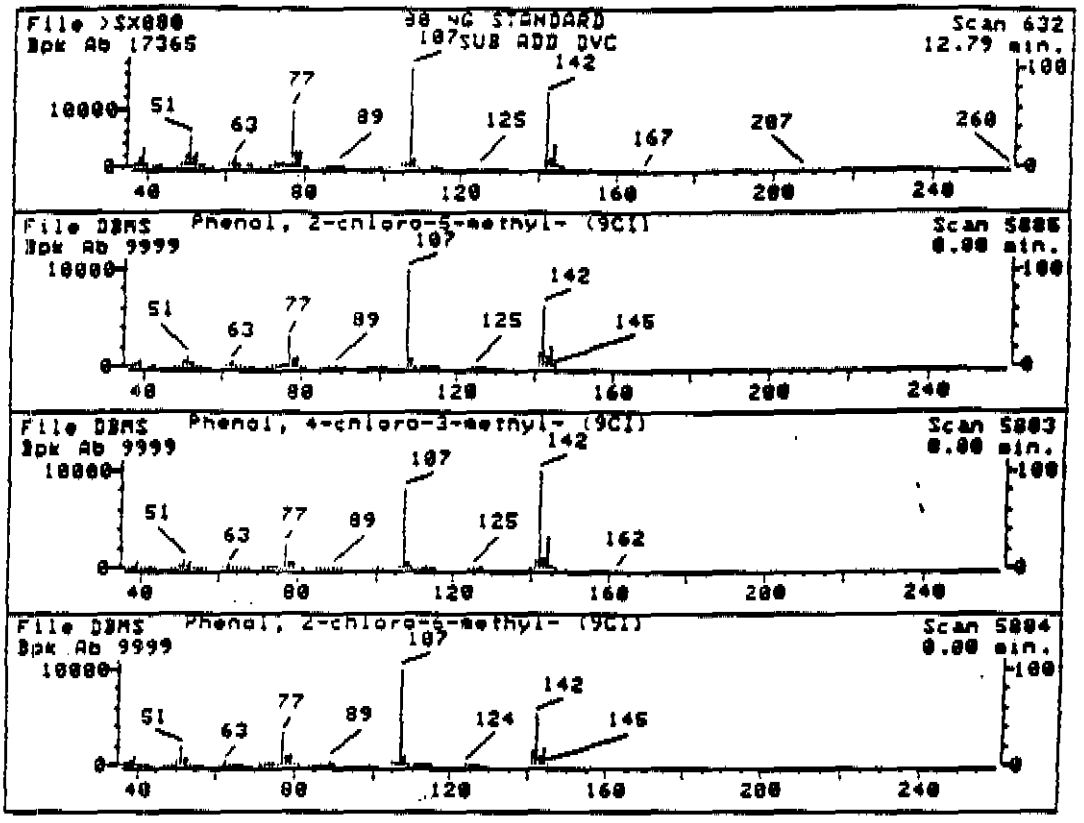
Instrument : HP5 NP
Channel Title : Channel #49
Lims ID :
Acquired on 30-NOV-1989 at 21:36
Reported on 4-DEC-1989 at 10:49

Method : FUELNEAT
Calibration : FUEL10S
Run Sequence : GC111300

30 H 12

FIGURE 4

QUALITATIVE LIBRARY MATCH



1. Phenol, 2-chloro-5-methyl- (9CI) 142 C7H7ClO
2. Phenol, 4-chloro-3-methyl- (9CI) 142 C7H7ClO
3. Phenol, 2-chloro-6-methyl- (9CI) 142 C7H7ClO
4. Phenol, 4-chloro-2-methyl- (9CI) 142 C7H7ClO
5. 1,2-Benzenediamine, 4-chloro- (9CI) 142 C6H7ClN2

Sample file: >SX080 Spectrum #: 632
Search speed: 1 Tilting option: N No. of ion ranges searched: 40

	Prob.	CAS #	CON #	ROOT	K	DK	#FLG	TILT	%	CON	C_I	R_IV
1.	74*	615747	10840	DBMS	57	47	1	0	84	15	39	46
2.	69*	59507	17467	DBMS	52	48	0	0	70	33	26	63
3.	60*	87649	10839	DBMS	44	59	2	0	100	12	30	15
4.	37*	1570645	17470	DBMS	40	69	2	0	70	30	14	14
5.	20*	95830	17461	DBMS	31	79	3	0	75	54	5	13

ATTACHMENT G

SCREENING FOR SK REGULATED COMPOUNDS

TITLE: SCREENING FOR THE PRESENCE OF SK REGULATED COMPOUNDS BY GAS CHROMATOGRAPHY/MASS SPECTROMETRY

1.0 SCOPE

1.1 The Gas Chromatograph/Mass Spectrometer (GC/MS) is used to screen for highly toxic organic compounds (SK Regulated Compounds). The compounds to be determined must be sufficiently thermally stable to be run on a gas chromatograph and must elute from a capillary column system within the retention time window described in the main method to which this is attached. Typically, parameters are set for a 0.1% wt. detection limit.

1.2 The Safety-Kleen Regulated Compound List:

A literature search for regulated compounds, including carcinogens and suspected carcinogens, was made from OSHA 29 CFR 1910 and RCRA 40 CFR 268.

Based upon the results of the literature search, those regulated compounds that were selected by a panel Safety-Kleen senior staff members and scientists, were evaluated to determine whether or not they are likely to be detected by the standard analytical techniques. The list of materials were divided into 3 categories:

1. Those that would reasonably be expected to be found in Safety-Kleen's typical waste streams and that <u>are likely</u> to be detected by normal analytical techniques.

2. Those that would reasonably be expected to be found in Safety-Kleen's typical waste streams and that <u>are not likely</u> to be detected by normal analytical techniques.

3. Those that are not reasonably expected to be found in Safety-Kleen's typical waste streams; whether or not they are likely to be detected by normal analytical techniques.

An interim list of materials including the "Safety-Kleen Corporation Operating Group Banned Compounds for Routine Handling", was established mainly based on Category 1 compounds and evaluated, both technically and analytically. The available reference materials were scanned by GC/MS analysis to get estimates of whether the GC/MS system is or is not capable of detecting materials at a level between 0.1% and 1.0%.

After the initial analysis of the interim list of materials, the Safety-Kleen Regulated Compound List was obtained (See

Table 1). This initial study has ruled out compounds which are not available as reference material, compounds eluted after the routine run-time, and compounds in gaseous state at ambient temperature.

1.3 Documentation of the list of SK Regulated Volatile Organic Compounds.

The documentation of the list of SK Regulated Volatile Organic Compounds consists of 2 parts. The first part is the analysis information for the compound and the second part is the Material Safety Data Sheet (MSDS) of the compound. (See Table 5).

(1) COMPOUND NAME: Name of compound.
Code used by Safety-Kleen Corp.

(2) CAS NUMBER: Unique CAS number.

(3) RETENTION TIME: The retention time of the compound in the GC/MS Analysis.

(4) IONS USED IN IDENTIFICATION:
Compounds are identified from their characteristic ions and abundances as shown in the parentheses. These informations are included in the GC/MS Target Compounds ID File which is used in the analysis.

(5) LIBRARY AND RUN RECORDS:
Library record of each compound from the GC/MS data system's NBS library (BIGDB) is shown. The first figure shows the peak in the GC/MS run, with information of the analysis file and run date. The second figure shows the mass spectrum of the compound from the analysis with its retention time. The third figure shows the mass spectrum of the compound from the library BIGDB for comparison and positive identification.

2.0 PROCEDURE

2.1 The GC/MS procedure for the detection of SK Regulated Compounds will be performed through a screening/verification process using Aquarius software designed for Target Compound Analysis (TCA) included on the HP RTE-A Data System. Compounds designated as "SK Regulated Compounds" are listed in Table 1. This current list includes 45 compounds.

2.2 The initial step of the screening/verification process consists of TCA of reference samples for 45 target compounds and employs criteria to ensure detection of all possible target compounds present. Standards containing 0.1% of the SK Regulated Compounds will be prepared and analyzed to ensure adequate detection. The criteria used for the initial TCA are shown in Table 2. They include the retention time (± 0.5 min), the base ion produced in the mass spectrum, and 2 or 3 secondary ions.

2.3 This TCA will be performed on routine waste stream samples automatically after GC/MS Analysis by using a procedure file named TOXIC (Table 3) in the FMGR TR file option of the run sequence file.

2.4 For each sample run by GC/MS, a form designated "GC/MS Analysis for Volatile SK Regulated Compounds" will be produced (Table 4). All suspect SK Regulated Compounds found in a sample will be listed on this form. In addition, the expected and found retention time and the concentration related to the target compound will be noted.

2.5 To eliminate the possibility of false positives, a GC/MS chemist will examine all target compound spectra listed and compare those to the reference spectra. False positives will be crossed out and labeled as "false positive" in ink by the GC/MS reviewer. The positives will be confirmed by checking as "present". The false negatives will be checked and added to the SK Reg Report form (Table 4). The GC/MS reviewer will initial and date this form.

TABLE 1

CURRENT SK REGULATED COMPOUNDS LIST FOR GC/MS

	Code Name	Compound Name	CAS #
1)	ACH	Acetadehyde	75070
2)	AANH	Acetic Anhydride	108247
3)	ACRL	Acrolein	107028
4)	ACRN	Acrylonitrile	107131
5)	AAC	Allyl Acetate	591877
6)	ALA	Allyl Alcohol	107186
7)	BENZ	Benzene	71432
8)	CMPR	Camphor	76222
9)	CS2	Carbon Disulfide	75150
10)	CCL4	Carbon Tetrachloride	56235
11)	CETN	Chloroethanol, 2-	107073
12)	CHCL	Chloroform	67663
13)	EDB	Dibromoethane, 1,2-	106934
14)	F12	Dichlorodiflurorometh ane	75718
15)	DMS	Dimethyl Sulfate	77781
16)	DMAM	Dimethylamine	124403
17)	DNT	Dinitrotoluene, 2,3-	602017
18)	DNT	Dinitrotoluene, 2,4-	121142
19)	DNT	Dinitrotoluene, 3,4-	610399
20)	DTBP	Ditertbutylphenol, 2,4-	96764
21)	DTBP	Ditertbutylphenol, 2,6-	128392
22)	EPI	Epichlorohydrin	106898
23)	EACR	Ethylacrolein, 2-	922634
24)	EDC	Ethylene Dichloride	107062
25)	FMF	Fluorotrichloromethane	75694
26)	FORM	Formaldehyde	50000
27)	GLUT	Glutaric Dialdehyde	111308
28)	HCB	Hexachlorobenzene	118741
29)	HCBD	Hexachloro-1,3-Butadiene	87683
30)	HQ	Hydroquinone	123319
31)	MDA	Methylene Dianiline, 4,4-	101779
32)	MF	Methylfuran, 2-	534225
33)	PNA	Nitroaniline, p-	100016
34)	NB	Nitrobenzene	98953
35)	PNCB	Nitrobenzene, 1-Chloro-4-	100005
36)	PLAN	Phthalic Anhydride	85449
37)	PPN	Propionitrile	107120
38)	PTAH	Tolualdehyde, p-	104870
39)	TDI	Toluene Diisocyanate	584849
40)	TSA	Toluene Sulfonamide, p-	70553
41)	TAIC	Triallylisocyanurate	1025156
42)	TBPP	Tributyl Phosphate	126738
43)	TCEP	Trichloro Ethyl Phosphate	115968
44)	TEPP	Triethylphosphate	78400
45)	VDC	Vinylidene Chloride	75354

Created 8/22/89 DH

TABLE 2

CRITERIA FOR TARGET COMPOUND ANALYSIS

Quant ID File: ID_SP::SC

Title: CLASS 1 TOXICS MARCH 1989

Last EDIT Date: 890815 18:35 Last Calib Date: <None>

RT Window (+/- min):	.50
Max Hits/Compound:	1
Minimum Area:	100
Peak/Base Peak Ratio:	40.00 %
Slope Sensitivity:	.200
Subtraction Method:	3
Ignore max check:	YES
Auto Qdel Method:	1
Units of Conc:	WT %

Number of Compounds: 28

Comp No.	Compound Name	(Type)	Retention Time Min. (Rel)	R.F.	Conc.
1)	#Formaldehyde	50000(T)	2.86(2.860)	0.00000	1.00

Quant Ion: 29.0 Ref Namr: IDSP01::QT

Mass	Abun
29.0	100.00
30.0	74.00

Comp No.	Compound Name	(Type)	Retention Time Min. (Rel)	R.F.	Conc.
2)	#Dichlorodifluoromethane	75718(T)	2.87(2.870)	0.00000	1.00

Quant Ion: 85.0 Ref Namr: IDSP02::QT

Mass	Abun
85.0	100.00
87.0	38.00
50.0	25.00
101.0	10.00

Comp No.	Compound Name	(Type)	Retention Time Min. (Rel)	R.F.	Conc.
3)	#Acetadehyde	75070(T)	3.14(3.140)	0.00000	1.00

Quant Ion: 29.0 Ref Namr: IDSP03::QT

Mass	Abun
29.0	100.00
44.0	37.00
43.0	23.00

, Compound uses ESTD

TABLE 3

PROCEDURE FILES:

TOXIC
SKTOX

```
FMGR : LI,TOXIC::SC
TOXIC  T=00004 IS ON CR SC USING 00001 BLKS R=0000
                                        4:54 PM  TUE., 15  AUG., 1989

0001  :CA,8,1G,-,6656
0002  :RU,FI,1G
0003  :RU,QT,10G,ID_SP,8G,!!
0004  :TR,SKTOX
0005  :TR

FMGR : LI,SKTOX::SC
SKTOX  T=00004 IS ON CR SC USING 00001 BLKS R=0000
                                        4:55 PM  TUE., 15  AUG., 1989

0001  :RU,NEW
0002  :RU,FI,1G,8G
0003  :RU,CRT,CA,BN
0004  :RU,RPT,SKREG
0005  :RU,CRT,BF,FF
0006  :TR
```

TABLE 4

SKREG REPORT

SAFETY KLEEN TECHNICAL CENTER
12555 W. Old Higgins Road
Elk Grove Village, IL
(312)694-2700

****
GC/MS ANALYSIS
FOR
VOLATILE S.K. REGULATED COMPOUNDS
****

Safety Kleen Sample #: TOXIC MIX, 1%
GC/MS Data File >84428::D2
Date of Analysis 7/10/89 12:00

SK REGULATED COMPOUNDS: FOUND _____
NOT FOUND _____

ID #	TARGET COMPOUNDS DETECTED	CAS#	R(t)min	R(t)min expected	CONC(%)	CHECKED PRESENT
11	Allyl Alochol	107186	5.277	2.860	1.01	x
13	Benzene	71432	9.043	9.140	0.96	✓
19	Nitrobenzene	98953	18.783	18.800	0.95	x
22	Phthalic Anhydride	85449	21.321	21.280	1.05	✓
26	Hexachlorobenzene	118741	26.202	26.010	0.87	x

✓ YES
X NO
false pos

REVIEWED BY: Sc DATE: 7/10/89

TABLE 5

COMPOUND NAME: 1,2,-DIBROMOETHANE

CAS NUMBER : 106934
RETENTION TIME: 13.57 MIN

IONS USED IN IDENTIFICATION: 27(100), 107(66), 109(63)

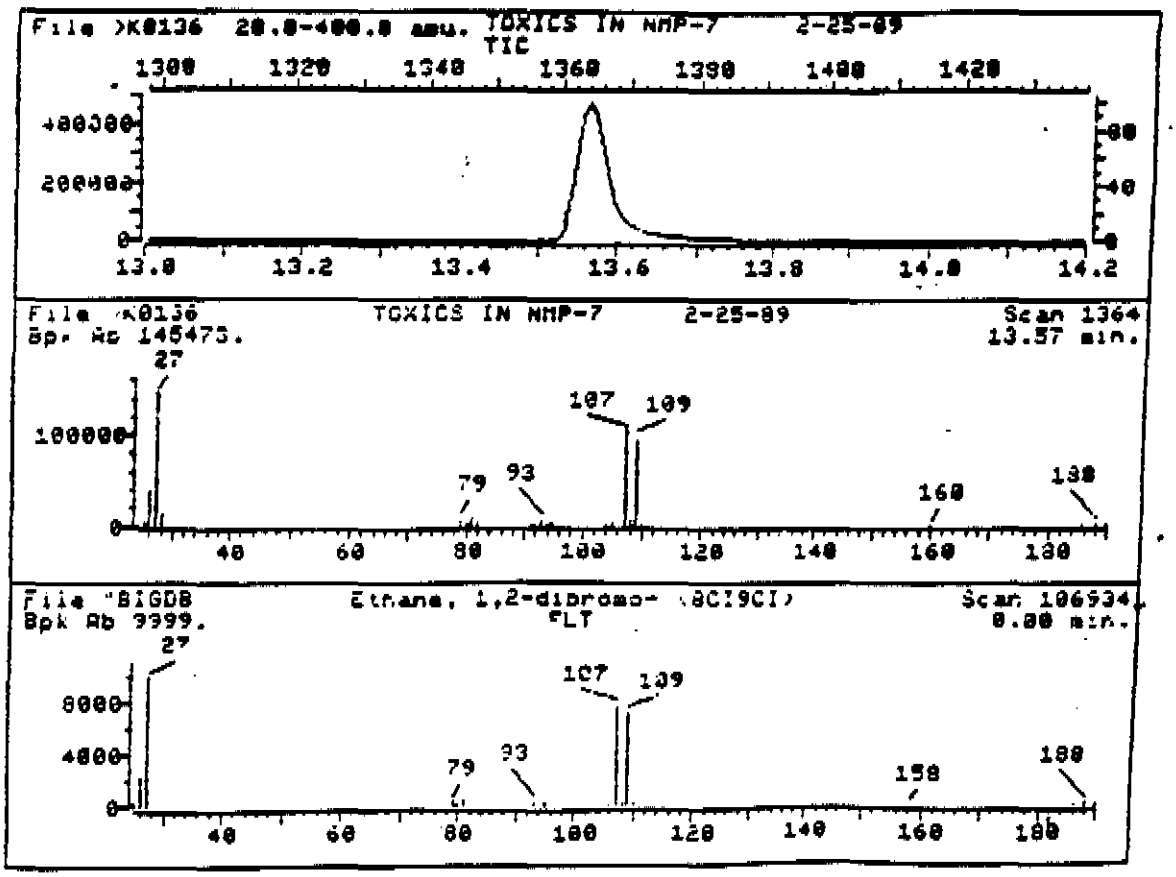
LIBRARY AND RUN RECORDS:

CAS #: 106934 found at record #: 10058

Rec.#: 106934 Reg.#: 106934 Xref.#: 0 Base : "BIGDB
Name: Ethane, 1,2-dibromo- (8CI9CI)
MW : 185.868 QI: 0 MF: C2H4Br2

Rec.#: 106934 Lomass: 1 max K-value:102 No. ions:17 IX: 109 16

m/z	Int.	m/z	Int.	m/z	Int.	m/z	Int.	m/z	Int.	m/z	Int.	m/z	Int.
25:	450	79:	470	93:	440	107:	7708	110:	150	188:	320	0:	0
26:	2431	80:	130	95:	350	108:	250	158:	20	190:	150	0:	0
27:	9999	81:	470	106:	190	109:	7237	186:	170	0:	0	0:	0

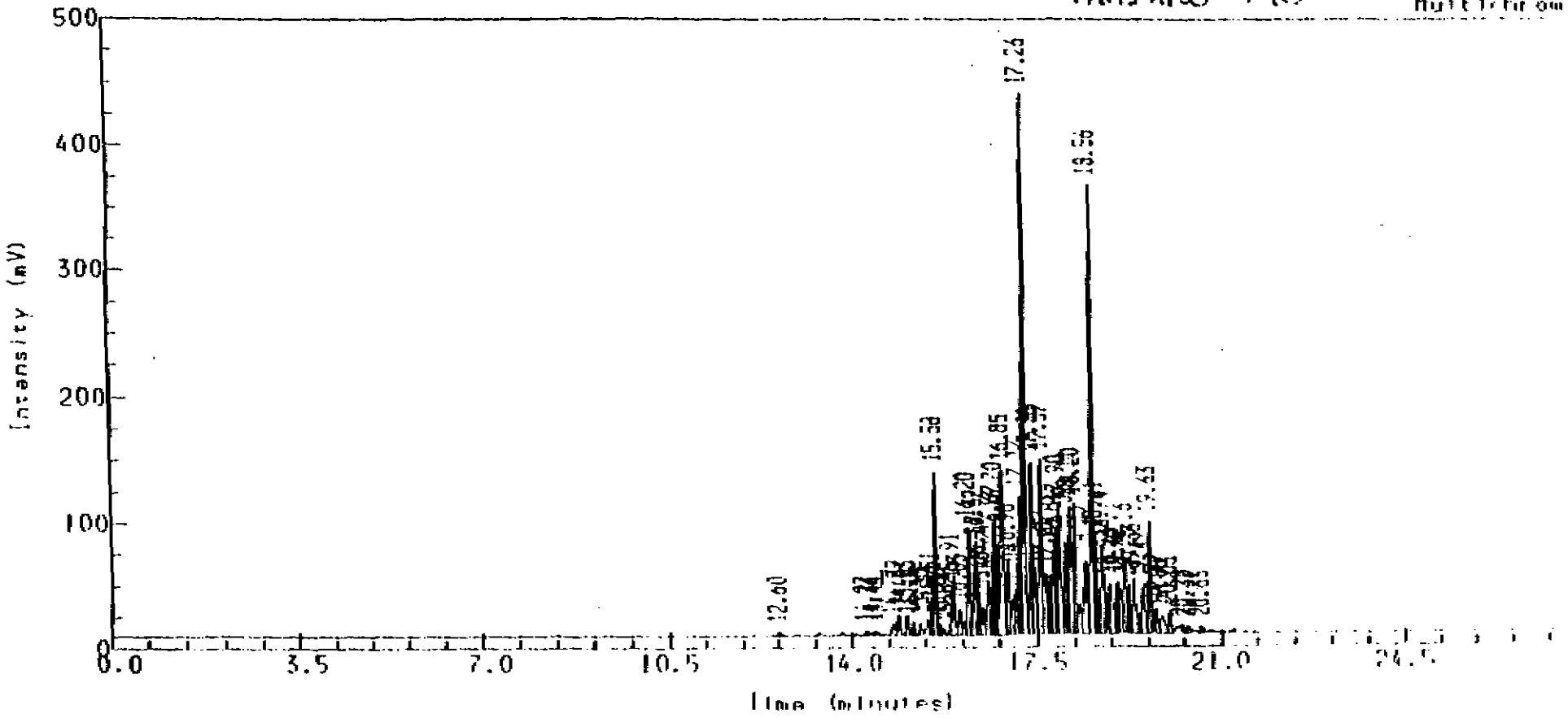


C.5.3

SAFETY-KLEEN CORP.. VAX MULTICHROM

Analysis Name : [ACQUISITION] 52 GC2PATTERNS.7.1.
RECYCLED MS Amount : 1.000

"STANDARD" MS



Instrument : HP5 NP
Channel Title : Channel #52
Lims ID :
Acquired on 28-FEB-1990 at 00:16
Reported on 28-FEB-1990 at 00:45

Method : FUELNEAT
Calibration : FUEL8895
Run Sequence : GC2XNPLS

ATTACHMENT G

SCREENING FOR SK REGULATED COMPOUNDS

Safety-Kleen Corp.
Technical Center

Method #: 9203
Draft: 3/91
SUPERSEDES: NEW

ATTACHED IS A DOCUMENT FOR: CREATION DATE: 3-20-91

TITLE: STANDARD OPERATING PROCEDURE FOR ANALYSIS OF VOLATILE ORGANIC COMPOUNDS IN WASTE MATERIALS

(BASED ON: EPA 8000/3820 - NIOSH P&CAM 127)
(KEY WORDS: VOC, CAPILLARY, FID)

SERIES/SUBJECT

9000 Analytical Methods
9200 Chromatography - Organic

COMMENTS:

INITIATOR -

DEPARTMENT MANAGER(S) -

TECHNICAL INFORMATION SPECIALIST -

GENERAL MANAGER OF TECHNICAL SERVICES -

N O T I C E

PROPRIETARY INFORMATION

NOT FOR EXTERNAL DISTRIBUTION

The following data have been generated by Safety-Kleen Corp. and are for the exclusive use of Safety-Kleen personnel. Publication, submission, or reproduction of any of the attached information for any outside party must be approved in advance by the General Manager of Technical Services.

These tables of data are to be used in conjunction with the various gas chromatography-related volatile organics analysis methods. These include, but are not limited to:

SK SOP #	Title
9203	Standard Operating Procedure for the Analysis of Waste Streams for Volatile Organic Compounds
9204	Standard Operating Procedure for the Analysis of Safety-Kleen Parts Washing Solvent for Volatile Organic Compounds
9205	Standard Operating Procedure for the Analysis of Safety-Kleen Immersion Cleaner/Carburator and Cold Parts Cleaner 609 for Volatile Organic Compounds

TYPICAL RETENTION TIME DATA FOR HP-5 AND STABILWAX

	CODE	COMPOUND NAME	HP5 RT	SBWAX RT
1.	MEOH	METHANOL	3.21	9.51
2.	ETOH	ETHANOL	3.76	10.60
3.	FMF	FREON-MF	4.14	3.51
4.	ACE	ACETONE	4.25	7.08
5.	ACN	ACETONITRILE	4.26	12.81
6.	IPA	ISOPROPANOL	4.32	10.36
7.	PENS	PENTANE	4.33	2.96
8.	TBA	TERT BUTANOL	4.82	9.51
9.	FTF	FREON-TF	4.90	3.53
10.	MEAC	METHYL ACETATE	4.93	7.47
11.	MECL	METHYLENE CHLORIDE	5.04	10.59
12.	NPA	N-PROPANOL	5.67	13.29
13.	NM	NITROMETHANE	5.97	15.81
14.	BO	BUTYLENE OXIDE	6.83	7.73
15.	MEK	METHYL ETHYL KETONE	6.83	9.67
16.	HEXS	HEXANE	6.84	3.35
17.	SBA	SEC BUTYL ALCOHOL	6.99	12.94
18.	DIOL	DIOXOLANE, 1,3-	7.38	11.63
19.	ETAC	ETHYL ACETATE	7.43	9.22
20.	CHCL	CHLOROFORM	7.56	13.04
21.	IBA	ISOBUTANOL	7.92	14.36
22.	THF	TETRAHYDROFURAN	7.94	8.43
23.	EGME	ETH GLY METHYL ETHER	8.19	16.12
24.	111	TRICHLOROETHANE	8.59	9.06
25.	EDC	ETHYLENE DICHLORIDE	8.71	14.15
26.	IPAC	ISOPROPYL ACETATE	9.10	9.51
27.	CHEX	CYCLOHEXANE	9.17	4.73
28.	BENZ	BENZENE	9.18	10.99
29.	NBA	N-BUTANOL	9.20	15.33
30.	CCL4	CARBON TETRACHLORIDE	9.23	9.00
31.	PGME	PRO GLY METHYL ETHER	9.60	15.20
32.	IOCT	ISOOCTANE	9.94	3.85
33.	HEPS	HEPTANE	10.35	4.22
34.	EG	ETHYLENE GLYCOL	10.43	21.02
35.	TCE	TRICHOROETHYLENE	10.45	12.38
36.	DIOX	DIOXANE, 1,4-	10.72	14.13
37.	MEMA	METHYL METHACRYLATE	10.82	12.64
38.	NPAC	N-PROPYL ACETATE	10.86	11.80
39.	EGEE	ETH GLY ETHYL ETHER	10.92	16.74
40.	IAA	ISOAMYL ALCOHOL	11.60	16.34
41.	MIBK	METH-ISOBUT KETONE	11.77	12.72
42.	PG	PROPYLENE GLYCOL	12.04	20.65
43.	SBAC	SEC BUTYL ACETATE	12.29	12.10
44.	TOL	TOLUENE	12.68	13.63
45.	IBAC	ISOBUTYL ACETATE	12.72	12.78
46.	DMF	DIMETHYL FORMAMIDE	13.06	18.43
47.	MBK	METHYL BUTYL KETONE	13.18	14.39
48.	MORP	MORPHOLINE	13.36	17.11
49.	EGDE	ETH GLY DIETHYL ETHER	13.38	12.90

(continued)

	CODE	COMPOUND NAME	HP5 RT	SBWAX RT
50.	OCTS	OCTANE	13.40	6.13
51.	MO	MESITYL OXIDE	13.44	15.48
52.	EGPE	ETH GLY PROPYL ETHER	13.66	17.79
53.	NBAC	N-BUTYL ACETATE	13.74	14.15
54.	PERC	PERCHLOROETHYLENE	13.84	13.17
55.	DAA	DIACETONE ALCOHOL	14.61	18.72
56.	MCB	CHLOROBENZENE	14.74	16.92
57.	MIAK	METHYL ISOAMYL KETONE	14.79	15.52
58.	PGMA	PRO GLY METH ACETATE	14.94	16.65
59.	ETB	ETHYL BENZENE	15.01	15.40
60.	IAAC	ISOAMYL ACETATE	15.12	15.09
61.	XYLS-P	XYLENE, p-,m-	15.19	15.67
62.	MNAK	METHYL N-AMYL KETONE	15.44	16.20
63.	CHA	CYCLOHEXANOL	15.49	19.01
64.	NONS	NONANE	15.59	9.08
65.	STY	STYRENE	15.63	17.47
66.	EGEA	ETH GLY ETHYL ACETATE	15.67	17.59
67.	XYLS-O	XYLENE, o-	15.68	16.45
68.	CHK	CYCLOHEXANONE	15.75	18.18
69.	EGBE	ETH GLY BUTYL ETHER	15.81	18.94
70.	NAAC	N-AMYL ACETATE	15.82	15.95
71.	IBIB	ISOBUTYL ISOBUTYRATE	15.84	14.45
72.	BULT	BUTYROLACTONE, GAMMA	16.15	21.87
73.	HG	HEXYLENE GLYCOL	16.18	20.93
74.	CUM	CUMENE	16.24	16.19
75.	DGME	DIETH GLY METH ETHER	16.36	20.81
76.	DGDM	DIETH GLY DIMET ETHER	16.43	18.01
77.	CTS-O	CHLOROTOLUENE, o-	16.79	18.18
78.	CTS-M	CHLOROTOLUENE, m-	16.82	18.32
79.	DIBK	DIISOBUTYL KETONE	16.85	15.99
80.	CTS-P	CHLOROTOLUENE, p-	16.88	18.35
81.	PHL	PHENOL	16.98	25.12
82.	EEP	ETHYL ETHOXY PROPIONATE	17.00	18.11
83.	DECS	DECANE	17.24	12.05
84.	DEG	DIETHYLENE GLYCOL	17.25	24.70
85.	DPME1	DIPROPYLENE GLYCOL METHYL ETHER	17.31	20.47
86.	PC	PROPYLENE CARBONATE	17.31	24.09
87.	DPME2	DIPROPYLENE GLYCOL METHYL ETHER	17.37	
88.	TMBS124	TRIMETHYLBENZENES	17.40	17.83
89.	DGEE	DIETHYLENE GLYCOL ETHYL ETHER	17.50	21.07
90.	DPME3	DIPROPYLENE GLYCOL METHYL ETHER	17.50	21.07
91.	DCBS-M	DICHLOROBENZENE, m-	17.67	19.47
92.	DBE-SUC	DIBASIC ESTER, SUC	17.70	20.80
93.	EHA	ETHYL HEXYL ALCOHOL	17.75	19.59
94.	DCBS-P	DICHLOROBENZENE, p-	17.76	19.76

(continued)

	CODE	COMPOUND NAME	HP5 RT	SBWAX RT
95.	DPG-1	DIPROPYLENE GLYCOL-1	17.84	23.96
96.	LIM	LIMONENE	17.88	16.56
97.	BZA	BENZYL ALCOHOL	18.02	23.81
98.	NMP	N-METHYLPYRROLIDONE	18.09	22.25
99.	CSLS-O	CRESOL, o-	18.11	24.99
100.	ODCB	DICHLOROBENZENE, o-	18.13	20.31
101.	DPG-2	DIPROPYLENE GLYCOL-2	18.16	22.93
102.	GLY	GLYCERINE	18.18	30.72
103.	CSLS-P	CERSOL, p-	18.36	26.16
104.	CSLS-M	CRESOL, m-	18.38	26.30
105.	EGBA	ETH GLY BUTYL ACETATE	18.41	19.40
106.	C11S	UNDECANE	18.57	14.36
107.	NVP	VINYL PYRROLIDONE	19.00	23.11
108.	DBE-GLU	DIBASIC ESTER, GLU	19.02	21.82
109.	IPHR	ISOPHORONE	19.22	21.46
110.	XYNS-24	DIMETHYL PHENOL, 2,4-	19.31	26.04
111.	XYNS-35	DIMETHYL PHENOL, 3,5-	19.52	27.66
112.	C12S	DODECANE	19.70	16.12
113.	DGBE	DEG BUTYL ETHER	19.72	22.72
114.	TERA	TERPINEOL, ALPHA-	19.96	21.93
115.	NAPH	NAPHTHALENE	20.12	23.14
116.	DBE-AD	DIBASIC ESTER, ADIPAT	20.18	22.94
117.	TEG	TRIETHYLENE GLYCOL	20.34	31.18
118.	C13S	TRIDECANE	20.76	17.48
119.	DGBA	DIETH GLY BUT ACETATE	21.38	23.01
120.	MNS-2	METHYL NAPHTHALENE, 2-	21.39	24.40
121.	PLAN	PHTHALIC ANHYDRIDE	21.52	31.21
122.	MNS-1	METHYL NAPHTHALENE, 1-	21.63	24.92
123.	PHE	PHENYL ETHER	22.44	26.15
124.	DMPL	DIMETHYL PHTHALATE	22.84	31.12
125.	DTBP	DITERT BUTYL PHENOL	22.28	23.55
126.	BHT	BUTYLATED HYDROXY TOL	23.45	23.96
127.	HGDL	HEX GLY DIACRYLATE	23.92	28.40
128.	DEPL	DIETHYL PHTHALATE	24.50	32.60
129.	BZPN	BENZOPHENONE	25.58	21.98
130.	PCP	PENTACHLOROPHENOL	28.23	> 35
131.	FAME-C14	METHYL PALMITATE	29.83	27.86

*ORDER OF OCCURRENCES IN PERIOD 6/1/88 THROUGH 6/23/89:

RANK	COMPOUND	FREQUENCY
1	TOLUENE	4211
113	MORPHOLINE	13 (AVERAGE 1/PERIOD)

TYPICAL RETENTION TIME DATA FOR HP-5 AND STABILWAX (CHLORINATED COMPOUNDS)

COMPOUND CODE\NAME		FREQUENCY RANKING	HP5 RT	SBWAX RT
1.FMF	FREON-MF	46	4.14	3.51
2.FTF	FREON-TF	19	4.90	3.53
3.MECL	METHYLENE CHLORIDE	11	5.04	10.59
4.CHCL	CHLOROFORM	52	7.56	13.04
5.111	TRICHLOROETHANE	3	8.59	9.06
6.EDC	ETHYLENE DICHLORIDE	88	8.71	14.15
7.TCE	TRICHOROETHYLENE	17	10.45	12.38
8.PERC	PERCHLOROETHYLENE	15	13.84	13.17
9.CTS-O	CHLOROTOLUENE, o-	84	16.79	18.18
10.CTS-M	CHLOROTOLUENE, m-	84	16.82	18.32
11.CTS-P	CHLOROTOLUENE, p-	84	16.88	18.35
12.DCBS-M	DICHLOROBENZENE, m-	56	17.67	19.47
13.DCBS-P	DICHLOROBENZENE, p-	56	17.76	19.76
14.ODCB	DICHLOROBENZENE, o-	97	18.13	20.31
15.PCP	PENTACHLOROPHENOL	--	28.23	> 35

TYPICAL RETENTION TIME DATA FOR HP-5
(LINEARITY STANDARD)

	Retention Time (min.)
Acetone	4.25
Methylene Chloride	5.04
Methyl Ethyl Ketone	6.83
Ethyl Acetate	7.43
1,1,1-Trichloroethane	8.59
N-Butyl Alcohol	9.20
Toluene	12.68
Perchloroethylene	13.84
o-Xylene	15.68
Ethylene Glycol Butyl Ether Acetate	18.41

TYPICAL RETENTION TIME DATA FOR HP-5
(CALIBRATION CHECK STANDARD)

	Retention Time (min.)
Acetone	4.25
Methylene Chloride	5.04
Methyl Ethyl Ketone	6.83
Ethyl Acetate	7.43
Isobutyl Alcohol	7.92
1,1,1-Trichloroethane	8.59
N-Butyl Alcohol	9.20
Trichloroethylene	10.45
Methyl Isobutyl Ketone	11.77
Toluene	12.68
Perchloroethylene	13.84
Diacetone Alcohol	14.61
Ethyl Benzene	15.01
o-Xylene	15.68
Ethylene Glycol Butyl Ether Acetate	18.41

SAFETY-KLEEN COMMON COMPOUNDS LIST

COMPOUND NAME	CODE	C.A.S. #	SPEC. GRAV.
ALCOHOLS	**ALCS**	**41**	**0.800**
Amyl Alcohol, Iso-	IAA	123513	0.809
Benzyl Alcohol	BZA	100516	1.042
Butyl Alcohol, Iso-	IBA	78831	0.802
Butyl Alcohol, N-	NBA	71363	0.810
Butyl Alcohol, Sec-	SBA	78922	0.806
Butyl Alcohol, Tert-	TBA	75650	0.798
Cyclohexanol	CHA	108930	0.962
Diacetone Alcohol	DAA	123422	0.939
Ethyl Alcohol	ETOH	64175	0.789
Ethyl Hexyl Alcohol	EHA	104767	0.833
Methyl Alcohol	MEOH	67561	0.792
Propyl Alcohol, Iso-	IPA	67630	0.785
Propyl Alcohol, N-	NPA	71238	0.804
CHLORINATED SOLVENTS	**CS**	**7**	**1.300**
Carbon Tetrachloride	CCL4	56235	1.594
Chlorobenzene	MCB	108907	1.106
Chloroform	CHCL	67663	1.483
Chlorotoluenes	CTS (3)	95498	1.083
Dichlorobenzene, O-	ODCB	95501	1.305
Dichlorobenzenes, P-	DCBS (2)	106467	1.529
Ethylene Dichloride	EDC	107062	1.235
Methylene Chloride	MECL	75092	1.327
Pentachlorophenol	PCP	87865	1.978
Perchloroethylene	PERC	127184	1.623
Trichloroethane, 1,1,1-	111	71556	1.339
Trichloroethylene	TCE	79016	1.464
Trichlorofluoromethane	FMF	75694	1.490
Trichlorotrifluoroethane	FTF	76131	1.575

VOLATILE ORGANIC COMPOUND LIST
(continued)

COMPOUND NAME	CODE	C.A.S. #	SPEC. GRAV.
ESTERS	**ESTS**	**43**	**0.900**
Amyl Acetate, Iso-	IAAC	123922	0.867
Amyl Acetate, N-	NAAC	628637	0.876
Butyl Acetate, Iso-	IBAC	110190	0.871
Butyl Acetate, N-	NBAC	123864	0.883
Butyl Acetate, Sec-	SBAC	105464	0.892
Butyl Isobutyrate, Iso-	IBIB	97858	0.854
Dibasic Ester (DuPont)	DBE (3)	1119400	1.092
Diethyl Phthalate	DEPL	84662	1.110
Diethylene Glycol Butyl Ether Acetate [2-(2-Butoxy Ethoxy), Ethanol Acetate]	DGBA	124174	0.981
Dimethyl Phthalate	DMPL	131113	1.191
Ethyl Acetate	ETAC	141786	0.900
Ethyl 3-Ethoxypropionate	EEP	763699	0.950
Ethylene Glycol Butyl Ether Acetate	EGBA	112072	0.942
Ethylene Glycol Ethyl Ether Acetate	EGEA	111159	0.974
Fatty Acid Methyl Esters (C14-C17 Acids)	FAME (1)	112629	0.874
Methyl Acetate	MEAC	79209	0.933
Methyl Methacrylate	MEMA	80626	0.994
Propyl Acetate, Iso-	IPAC	108214	0.872
Propyl Acetate, N-	NPAC	109604	0.888
Propylene Glycol Methyl Ether Acetate	PGMA	84540578	0.968
INHIBITORS	**INHS**	**40**	**0.900**
Butylated Hydroxy Toluene	BHT	128370	0.894
Butylene Oxide, 1,2-	BO	106887	0.837
Dioxane, 1,4-	DIOX	123911	1.034
Dioxolane, 1,3-	DIOL	646060	1.060
Nitromethane	NM	75525	1.137
Propylene Carbonate	PC	108327	1.207

VOLATILE ORGANIC COMPOUND LIST
(continued)

COMPOUND NAME	CODE	C.A.S. #	SPEC. GRAV.
KETONES	**KETS**	**42**	**0.800**
Acetone	ACE	67641	0.789
Cyclohexanone	CHK	108941	0.947
Diisobutyl Ketone	DIBK	108838	0.805
Isophorone	IPHR	78591	0.923
Mesityl Oxide	MO	141797	0.857
Methyl Butyl Ketone	MBK	591786	0.811
Methyl Ethyl Ketone	MEK	78933	0.805
Methyl Isoamyl Ketone	MIAK	110123	0.813
Methyl Isobutyl Ketone	MIBK	108101	0.798
Methyl N - Amyl Ketone	MNAK	110430	0.817
ALIPHATIC HYDROCARBONS	**ALIP**	**1**	**0.700**
Cyclohexane	CHEX	110827	0.778
Decane	DECS	124185	0.730
Dodecane	C12S	112403	0.750
Heptanes	HEPS	142825	1.000
Hexanes	HEXS	110543	1.000
High-Boiling Aliphatic Hydrocarbons	HHC	34	0.769
Isooctane	IOCT	540841	0.692
Light-Boiling Aliphatic Hydrocarbons	LHC	47	0.770
Mid-Boiling Aliphatic Hydrocarbons	MHC	75	0.770
Mineral Spirits	MS	8030306	0.769
Nonanes	NONS	111842	0.720
Octanes	OCTS	111659	0.702
Pentanes	PENS	109660	0.626
Tridecane	C13S	629505	0.756
Undecane	C11S	1120214	0.740

VOLATILE ORGANIC COMPOUND LIST
(continued)

COMPOUND NAME	CODE	C.A.S. #	SPEC. GRAV.
OTHERS	**OTHS**	**2**	**1.000**
Acetonitrile	ACN	75058	0.786
Benzophenone	BZPN	119619	1.146
Butyrolactone, Gamma-	BULT	96480	1.120
Cresols	CSLS (3)	95487	1.027
Diethylene Glycol	DEG (2)	111466	1.118
Diethylene Glycol Butyl Ether	DGBE	112345	0.955
Diethylene Glycol Dimethyl Ether	DGDM	111966	0.945
Diethylene Glycol Ethyl Ether	DGEE	111900	0.999
Diethylene Glycol Methyl Ether	DGME	111773	1.027
Dimethylformamide	DMF	68122	0.949
Dipropylene Glycol	DPG	110985	1.023
Dipropylene Glycol Methyl Ether	DPME	20324327	0.938
Di-Tert Butyl Phenols, 2.4-	DTBP	128392	0.907
Ethylene Glycol	EG	107211	1.088
Ethylene Glycol Butyl Ether	EGBE	111762	0.903
Ethylene Glycol, Diethyl Ether	EGDE	629141	0.842
Ethylene Glycol Ethyl Ether	EGEE	110805	0.931
Ethylene Glycol Methyl Ether	EGME	109864	0.966
Ethylene Glycol Phenyl Ether	EGPH	122996	1.109

VOLATILE ORGANIC COMPOUND LIST
(continued)

COMPOUND NAME	CODE	C.A.S. #	SPEC. GRAV.
Ethylene Glycol Propyl Ether	EGPE	2807309	0.911
Glycerine	GLY	56815	1.261
Hexylene Glycol Diacrylate, 1,6-	HGDL	13048334	1.000
Hexylene Glycol	HG	107415	0.925
Limonene, D-	LIM	5989275	0.840
Methyl Pyrrolidone, N-	NMP	872504	1.026
Morpholine	MORP	110918	0.999
Phthalic Anhydride	PLAN	85449	1.527
Phenol	PHL	108952	1.058
Phenyl Ether	PHE	101848	1.073
Propylene Glycol	PG	57556	1.036
Propylene Glycol Methyl Ether	PGME	107982	0.962
Terpineol, Alpha-	TERA	98555	0.935
Tetrahydrofuran	THF	109999	0.886
Triethylene Glycol	TEG	112276	1.125
Xylenols	XYNS (2)	68	1.000

COMPOUND NAME	CODE	C.A.S. #	SPEC. GRAV.
Alkyl Benzenes	ABS	4	0.900
Benzene	BENZ	71432	0.876
Cumene	CUM	98828	0.862
Ethylbenzene	ETB	100414	0.867
Methylnaphthalenes	MNS (2)	1321944	1.006
Naphthalene	NAPH	91203	0.962
Styrene	STY	100425	0.906
Toluene	TOL	108883	0.866
Trimethyl Benzene	TMBS	25551137	0.889
Xylenes	XYLS (3)	95476	0.870

STOCK STANDARD 1A (Label as 10 000 mg/Kg)

COMPOUND	CODE	AMOUNT
METHYL ALCOHOL	MEOH	0.5
ETHYL ALCOHOL	ETOH	0.5
PROPYL ALCOHOL, ISO-	IPA	0.5
FREON (TF)	FTF	0.5
METHYLENE CHLORIDE	MECL	20
METHYL ETHYL KETONE	MEK	0.5
ETHYL ACETATE	ETAC	0.5
TRICHLOROETHANE, 1,1,1-	111	0.5
BENZENE	BENZ	0.5
TRICHLOROETHYLENE	TCE	0.5
METHYL ISOBUTYL KETONE	MIBK	0.5
TOLUENE	TOL	0.5
PERCHLOROETHYLENE	PERC	0.5
CHLOROBENZENE	MCB	1
CHLOROTOLUENE, o-	CTS	1
DICHLOROBENZENE, o-	ODCB	20
TRICHLOROBENZENE, 1,2,4-	TCB	2

STOCK STANDARD 2A (Label as 10 000 mg/Kg)

COMPOUND	CODE	AMOUNT
ACETONE	ACE	0.5
TOLUENE	TOL	4.5
MINERAL SPIRITS	MS	45

STOCK STANDARD 3A (Label as 10 000 mg/Kg)

COMPOUND	CODE	AMOUNT
FREON (TF)	FTF	0.5
METHYLENE CHLORIDE	MECL	0.5
TRICHLOROETHANE, 1,1,1-	111	0.5
TRICHLOROETHYLENE	TCE	0.5
PERCHLOROETHYLENE	PERC	0.5
CHLOROBENZENE	MCB	0.5
CHLOROTOLUENE, o-	CTS	0.5
ISO-OCTANE	OCTS	45.5
DICHLOROBENZENE, o-	ODCB	0.5
TRICHLOROBENZENE, 1,2,4-	TCB	0.5

CALIBRATION STANDARD 1B (Label as 1 000 mg/Kg)

COMPOUND	CODE	AMOUNT
STANDARD 1A		1
ISO-OCTANE	OCTS	9

CALIBRATION STANDARD 1C (Label as 500 mg/Kg)

COMPOUND	CODE	AMOUNT
STANDARD 1A		5
ISO-OCTANE	OCTS	5

CALIBRATION STANDARD 1D (Label as 50 mg/Kg)

COMPOUND	CODE	AMOUNT
STANDARD 1C		1
ISO-OCTANE	OCTS	9

CALIBRATION STANDARD 2B (Label as 5 000 mg/Kg)

COMPOUND	CODE	AMOUNT
STANDARD 2A		5
TOLUENE	TOL	5

CALIBRATION STANDARD 2C (Label as 1 000 mg/Kg)

COMPOUND	CODE	AMOUNT
STANDARD 2A		10
TOLUENE	TOL	90

CALIBRATION STANDARD 2D (Label as 500 mg/Kg)

COMPOUND	CODE	AMOUNT
STANDARD 2B		10
TOLUENE	TOL	90

CALIBRATION STANDARD 3B (Label as 1 000 mg/Kg)

COMPOUND	CODE	AMOUNT
STANDARD 3A		1
ISO-OCTANE	OCTS	9

CALIBRATION STANDARD 3C (Label as 100 mg/Kg)

COMPOUND	CODE	AMOUNT
STANDARD 3B		1
ISO-OCTANE	OCTS	9

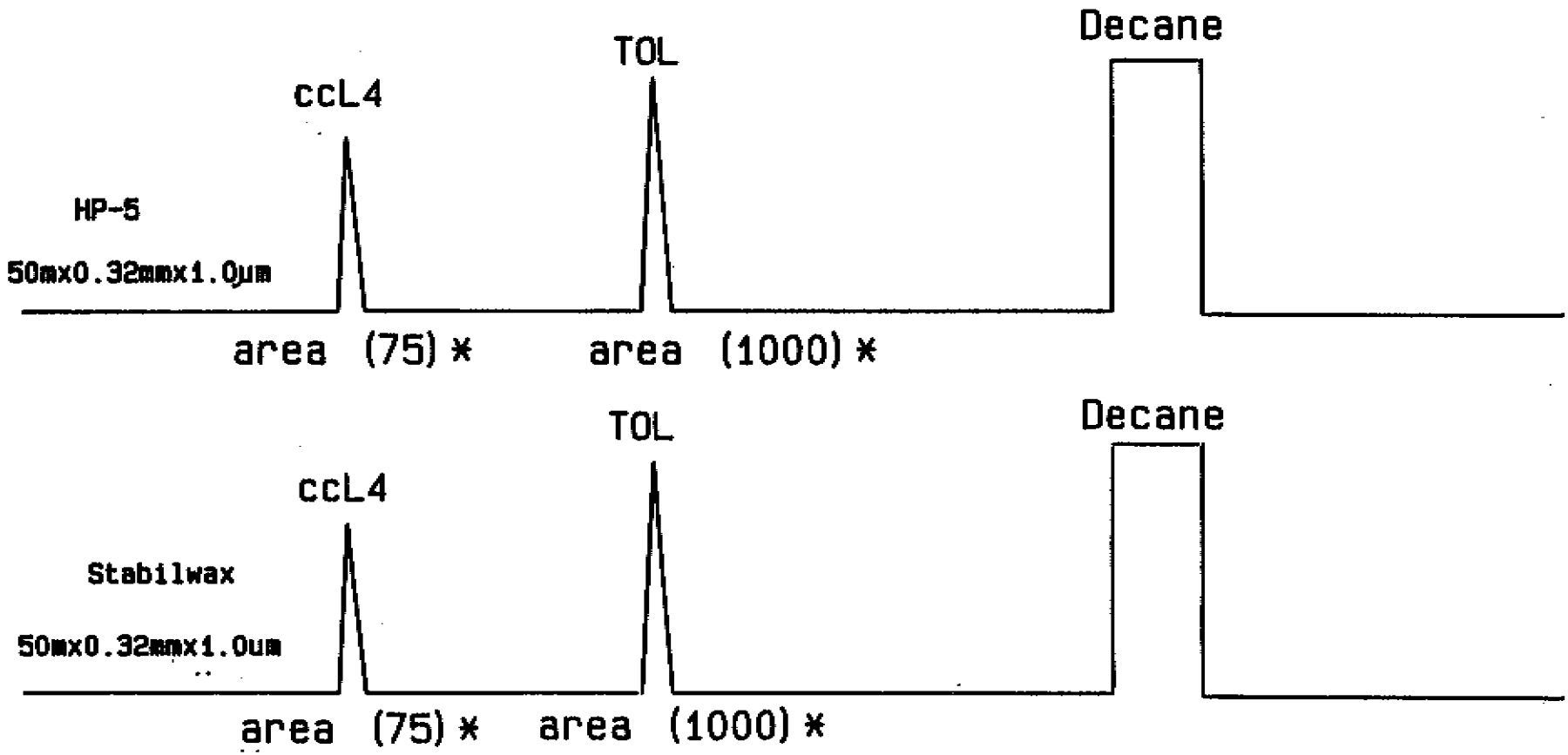
CALIBRATION STANDARD 3D (Label as 50 mg/Kg)

COMPOUND	CODE	AMOUNT
STANDARD 3C		5
ISO-OCTANE	OCTS	5

Instrument Set-up

#9203-7.9

Standard B 1% by Wt. Toluene/Carbon Tetrachloride in Decane



Area Reject = area (ccL4)

Uncalibrated $\frac{RF = RF\ (ccL4) + RF\ (Tol)}{2}$

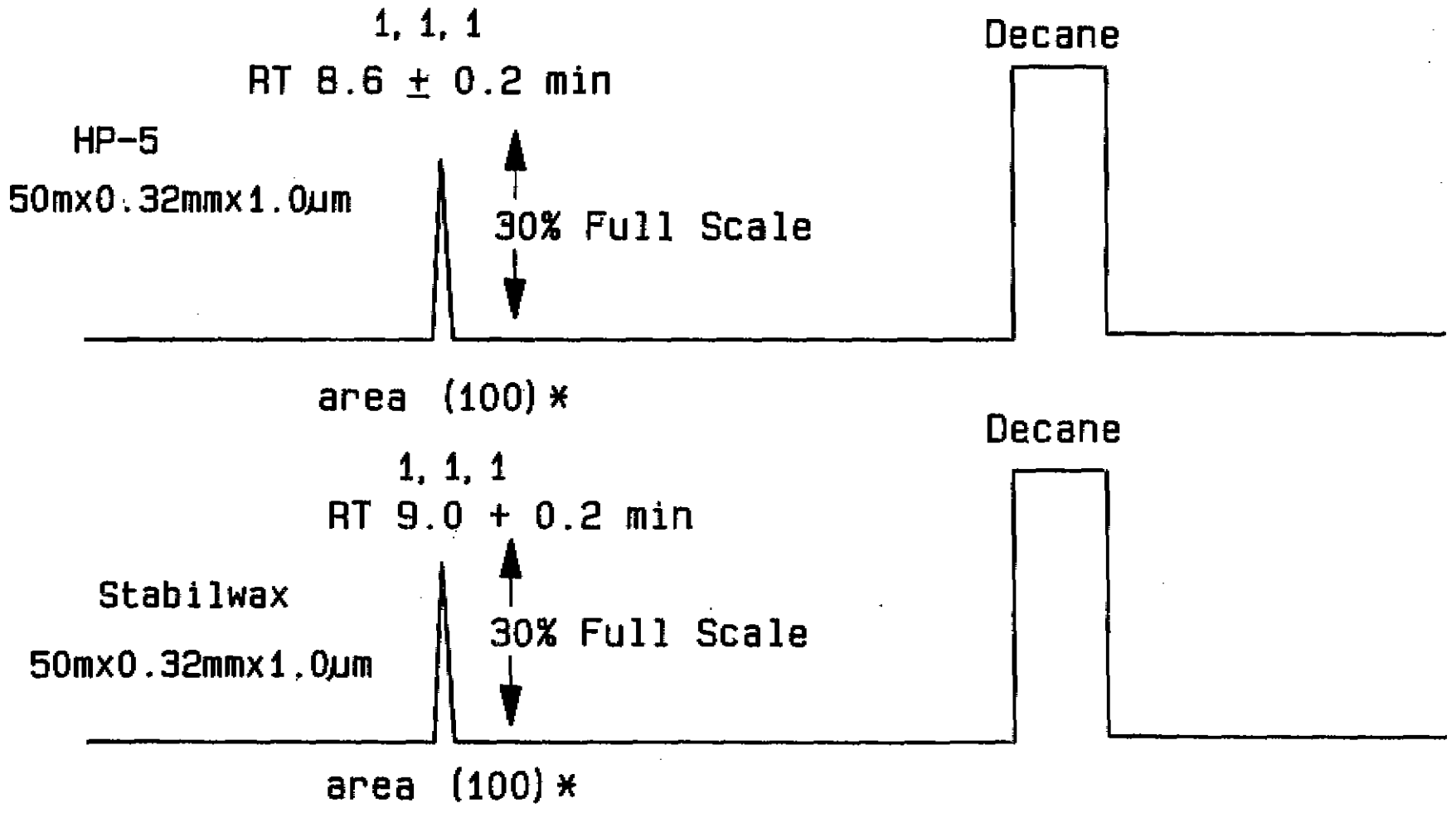
* not actual area count

#9203-11.2

Instrument Set-up

#9203-7.9

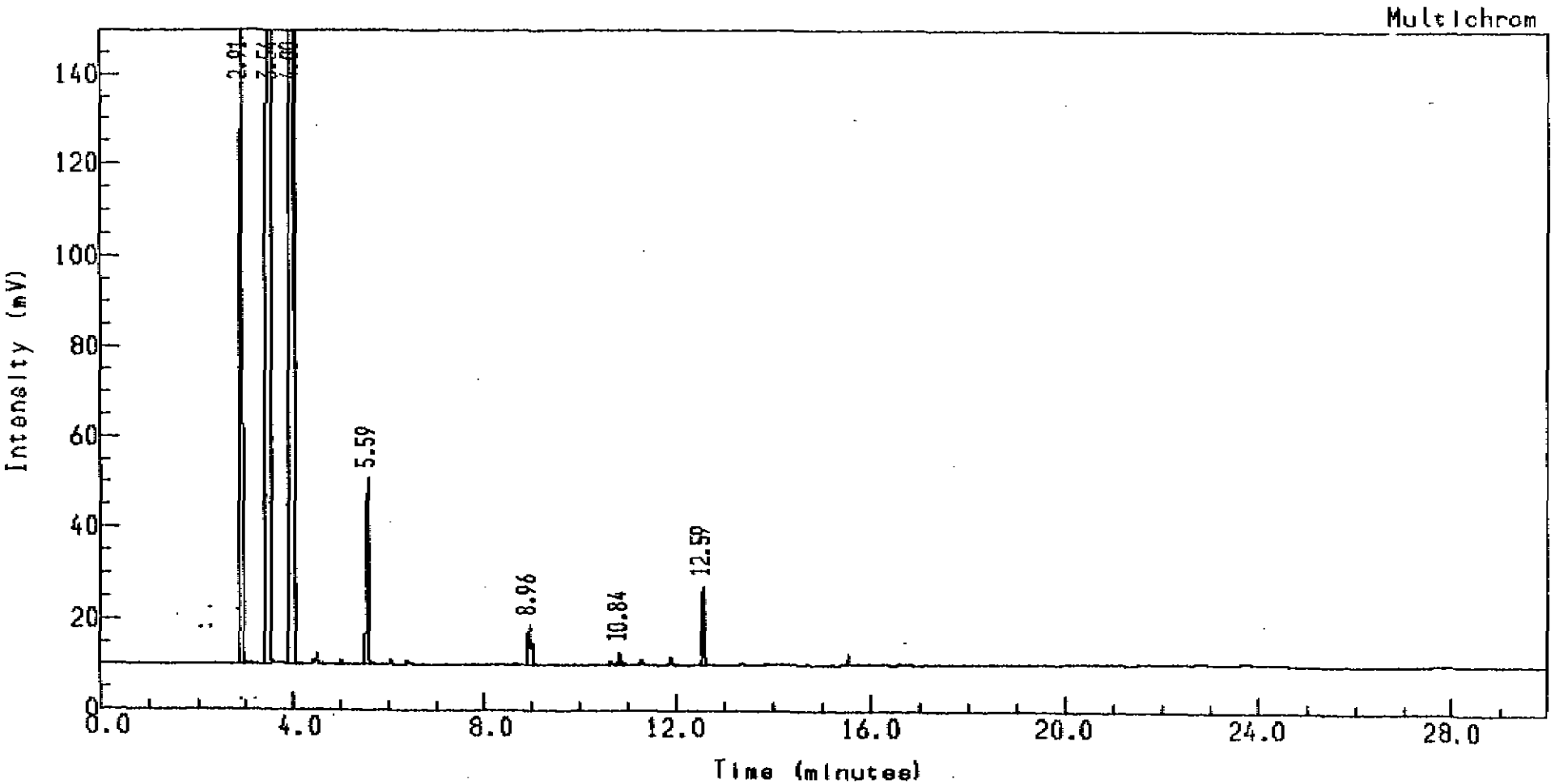
Standard A 1% by Wt. 1,1,1 Trichloroethane in Decane



* not actual area count

SAFETY-KLEEN CORP:. VAX MULTICHROM

Analysis Name : [REVIEW2] 2 GC5091189A,9,1.
44899N Amount : 1.000

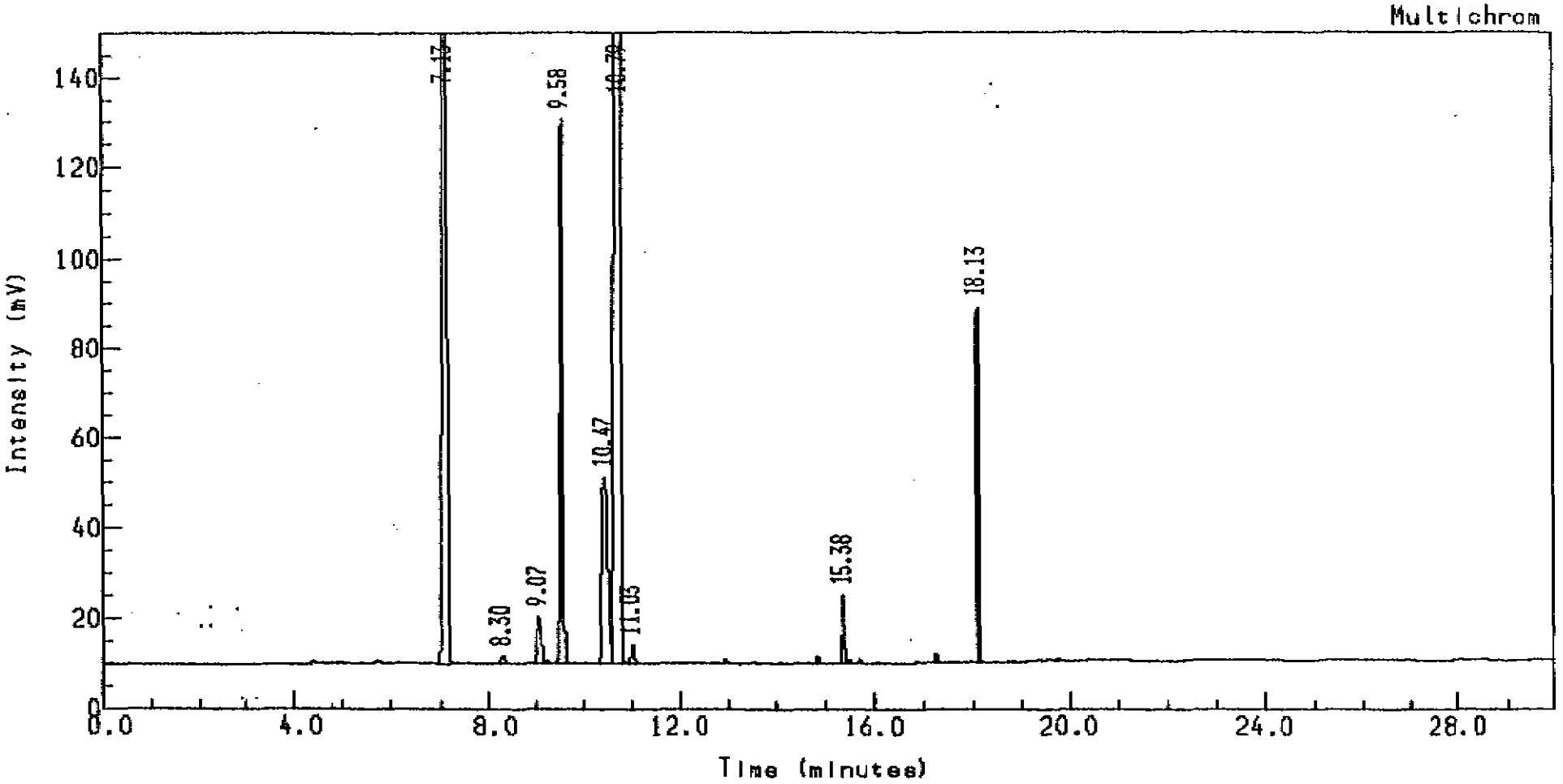


Instrument :
Channel Title : Channel #2
Lims ID :
Acquired on 12-SEP-1989 at 14:08
Reported on 9-OCT-1989 at 11:22

Method : FUELS
Calibration : FUEL989N
Run Sequence : GC50911A

SAFETY-KLEEN CORP:. VAX MULTICHROM

Analysis Name : [REVIEW2] 1 GC5091189A,9,1.
44899N Amount : 1.000



Instrument :
Channel Title : Channel #1
Lims ID :
Acquired on 12-SEP-1989 at 14:08
Reported on 9-OCT-1989 at 10:06

Method : FUELS
Calibration : FUELPOLR
Run Sequence : GC5091 1A

CALIBRATION TABLE

(GC #7 CH. 2 HP-5)

No.	Calibration Peak Name		POLAR STABILWAX RT	HP-5 RT
1	MEOH	METHYL ALCOHOL	9.66	2.910
2	ETOH	ETHYL ALCOHOL	10.75	3.450
3	FMF	TRICL FL METHANE	3.50	3.850
4	ACE	ACETONE	7.13	3.930
5	ACN	ACETONITRILE	12.90	3.960
6	IPA	PROPYL ALCOHOL, ISO-	10.51	4.020
7	PENS	PENTANE	2.95	4.040
8	TBA	BUTYL ALOCHOL, T-	9.67	4.520
9	FTF	TRICL TRIFL ETHANE	3.52	4.600
10	MEAC	METHYL ACETATE	7.54	4.640
11	MECL	METHYLENE CHLORIDE	10.66	4.750
12	NPA	PROPYL ALOCHOL, N-	13.40	5.380
13	NM	NITROMETHANE	15.87	5.610
14	MEK	METHYL ETHYL KETONE	9.71	6.550
15	BO	BUTYLENE OXIDE	7.81	6.590
16	HEXS	HEXANE	3.35	6.600
17	SBA	BUTYL ALCOHOL, S-	13.06	6.720
18	DIOL	DIOXOLANE, 1,3-	11.72	7.140
19	ETAC	ETHYL ACETATE	9.32	7.210
20	CHCL	CHLOROFORM	13.14	7.300
21	THF	TETRAHYDROFURAN	8.50	7.750
22	IBA	ISOBUTYL ALCOHOL	14.47	7.770
23	EGME	EG METHYL ETHER	16.19	7.990
24	111	111-TRICHLOROETHANE	9.16	8.480
25	EDC	ETHYLENE DICHLORIDE	14.23	8.570
26	IPAC	PROPYL ACETATE, ISO-	9.67	9.000
27	BENZ	BENZENE	11.09	9.050
28	CHEX	CYCLOHEXANE	4.75	9.060
29	CCL4	CARBONTETRACHLORIDE	9.09	9.070
30	NBA	N-BUTYL ALOCOHOL	15.43	9.090
31	PGME	PG METHYL ETHER	15.32	9.580
32	IOCT	ISOOCTANE	3.83	9.810
33	HEPS	HEPTANE	4.23	10.260
34	TCE	TRICHLOROETHYLENE	12.48	10.370
35	DIOX	DIOXANE, 1,4-	14.20	10.630
36	MEMA	METHYL METHACRYLATE	12.76	10.760
37	NPAC	PROPYL ACETATE, N-	11.92	10.780
38	EGEE	EG ETHYL ETHER	16.83	10.880
39	EG	ETHYLENE GLYCOL	21.08	10.890
40	IAA	ISOAMYL ALOCOHOL	16.41	11.500
41	PG	PROPYLENE GLYCOL	20.70	11.690
42	MIBK	METH ISOBUT KETONE	12.86	11.760
43	SBAC	BUTYL ACETATE, SEC-	12.19	12.200
44	TOL	TOLUENE	13.74	12.670
45	IBAC	ISOBUTYL ACETATE	12.90	12.690
46	DMF	DIMETHYL FORMAMIDE	18.49	13.000
47	MBK	METHYL BUTYL KETONE	14.47	13.120
48	MORP	MORPHOLINE	17.17	13.340
49	EGDE	EG DIETHYL ETHER	13.02	13.350

50	OCTS	OCTANES	6.28	13.440
51	MO	MESITYL OXIDE	15.59	13.460
52	EGPE	EG PROPYL ETHER	17.87	13.670
53	NBAC	BUTYL ACETATE, N-	14.23	13.720
54	PERC	PERCHLOROETHYLENE	13.32	13.860
55	LHC	LIGHT HYDROCARBONS		14.000
56	DAA	DIACETONE ALCOHOL	18.80	14.550
57	MCB	CHLOROBENZENE	17.00	14.770
58	MIAK	METH ISOAMYLKETONE	15.64	14.810
59	PGMA	PG METHYL ACETATE	16.76	14.950
60	ETB	ETHYL BENZENE	15.48	15.000
61	IAAC	AMYL ACETATE, ISO-	15.20	15.120
62	XYLS	XYLENE, P-	15.69	15.210
63	MNAK	METH N-AMYL KETONE	16.26	15.370
64	CHA	CYCLOHEXANOL	19.08	15.470
65	STY	STYRENE	17.53	15.600
66	NONS	NONANES	9.26	15.600
67	EGEA	EG ETHYL ACETATE	17.69	15.680
68	XYLS	XYLENE, O-	16.54	15.700
69	EGBE	EG BUTYL ETHER	19.00	15.740
70	CHK	CYCLOHEXANONE	18.26	15.780
71	NAAC	AMYL ACETATE, N-	16.04	15.790
72	IBIB	BUTYL BUTYRATE, I-	14.58	15.830
73	HG	HEXYLENE GLYCOL	20.98	16.030
74	BULT	BUTYROLACTONE	21.93	16.130
75	CUM	CUMENE	16.28	16.210
76	DGME	DI EG METHYL ETHER	20.88	16.340
77	DGDM	DI EG DIMETH ETHER	18.13	16.360
78	CTS	CHLOROTOLUENE, O-	18.25	16.780
79	CTS	CHLOROTOLUENE, M-	18.39	16.800
80	CTS	CHLOROTOLUENE, P-	18.40	16.830
81	DIBK	DIISOBUTYL KETONE	16.14	16.830
82	PHL	PHENOL	25.17	16.960
83	EEP	ETH ETHOXYPROPIONAT	18.17	16.970
84	DEG	DIETHYLENE GLYCOL	24.80	17.030
85	DPME	DI PG METH ETHER-1	19.68	17.210
86	DECS	DECANES	12.26	17.230
87	PC	PROPYLENE CARBONATE	24.16	17.270
88	DPME	DI PG METH ETHER-2	19.75	17.330
89	DGEE	DI EG ETHYL ETHER	21.14	17.360
90	TMBS	TRIMETHYL BENZENE	17.92	17.390
91	DPME	DI PG METH ETHER-3	20.13	17.460
92	DCBS	DICHLOROBENZENE,M-	19.53	17.620
93	EHA	ETHYL HEXYL ALCOHOL	19.65	17.650
94	DBE	DIMETHYL SUCCINATE	20.87	17.660
95	DCBS	DICHLOROBENZENE, P-	19.81	17.710
96	DPG	DIPROPYLENE GLY (1)	23.01	17.720
97	GLY	GLYCERINE		17.890
98	BZA	BENZYL ALCOHOL	23.88	17.900
99	NMP	METH PYRROLIDONE,N-	22.29	17.990
100	DPG	DIPROPYLENE GLY (2)	23.63	18.030
101	CSLS	CRESOL, O-	25.11	18.049
102	ODCB	DICHLOROBENZENE, O-	20.39	18.120
103	CSLS	CRESOL, P-	26.29	18.258
104	CSLS	CRESOL, M-	26.44	18.262
105	EGBA	EG BUTYL ACETATE	19.47	18.347
106	C11S	UNDECANES	14.47	18.502
107	LIM	LIMONENE	16.65	18.840
108	DBE	DIMETHYL GLUAMATE	21.89	18.907
109	NVP	VINYLPYRROLIDONE,N-	23.20	18.914

110	IPHR	ISOPHORONE	21.55	19.130
111	XYNS	DIMETHYL PHENOL,24-	26.17	19.190
112	XYNS	DIMETHYL PHENOL,35-	27.83	19.400
113	C12S	DODECANES	16.21	19.590
114	DGBE	DI EG BUTYL ETHER	22.80	19.610
115	DGBA	DI EG BUTYL ACETATE	22.82	19.620
116	TERA	ALPHA TERPINEOL	21.99	19.850
117	NAPH	NAPHTHALENE	23.20	20.010
118	DBE	DIMETHYL ADIPATE	23.04	20.040
119	TEG	TRIETHYLENE GLYCOL	31.18	20.270
120	MS	MINERAL SPIRITS		20.400
121	MHC	MEDIUM HYDROCARBONS		20.400
122	C13S	TRIDECANES	17.61	20.620
123	MNS	METH NAPHTHALENE,2-	24.49	21.200
124	MNS	METH NAPHTHALENE,1-	25.01	21.440
125	PHE	PHENYL ETHER	26.33	22.250
126	DMPL	DIMETHYL PHTHALATE	31.12	22.640
127	DTBP	DI-T-BUT PHENOL,24-	23.60	23.030
128	BHT	BUT HYDROXY TOL	24.08	23.220
129	PLAN	PHTHALIC ANHYDRIDE		23.600
130	HGDL	HG DIACRYLATE	28.65	23.650
131	DEPL	DIETHYL PHTHALATE	32.70	24.220
132	BZPN	BENZOPHENONE		25.280
133	PCP	PENTACHLOROPHENOL	35.00	27.910
134	HHC	HEAVY HYDROCARBONS		30.000

Summing Multiple Peaks
Quantifying
External Standard
Group Calculations
Group ID DPME not in group table
Group ID DPME not in group table

Injection Report

Acquired on 12-SEP-1989 at 14:08

Analyst Name : RMB/WLC
Lims Id :
Comment :
Method Title : SAFETY KLEEN FUEL ANALYSIS METHOD
Sample Name : 44899N
Sample Id :
Sample Type : Sample Amount=1.00000
Bottle No : 69

PEAK INFORMATION

Peak	GRP	RT mins	Area uVs	%	Peak name
1		7.129	2071874	26.29	
2		8.302	10739	0.14	
3		9.067	66799	0.85	
4		9.582	537613	6.82	
5		10.471	330141	4.19	
6		10.787	2142744	27.18	
7		11.031	18193	0.23	
8		15.378	32703	0.41	
9		18.129	133541	1.69	

Totals

Unknowns	0	N/A
Quantified	5344347	67.80
Grand Total	5344347	67.80

PEAK GROUP INFORMATION

No peak group information.

ANALYSIS SUMMARY

Method..... FUELS
Run sequence..... GC5091 1A
Calibration..... FUELPOLR
External standard calibration using area
Uncalibrated peaks use user factor (78822.0000)

Reported on 9-OCT-1989 at 09:50

Injection Report

Acquired on 12-SEP-1989 at 14:08

Analyst Name : RMB/WLC
Lims Id :
Comment :
Method Title : SAFETY KLEEN FUEL ANALYSIS METHOD
Sample Name : 44899N
Sample Id :
Sample Type : Sample Amount=1.00000
Bottle No : 69

PEAK INFORMATION

Peak	GRP	RT mins	Area uVs	%	Peak name
1		2.907	485303	10.08	
2		3.542	1940371	40.29	
3		4.000	2169935	45.06	
4		5.587	119196	2.48	
5		8.956	37538	0.78	
6		10.844	11474	0.24	
7		12.587	51668	1.07	

Totals

nknowns	0	N/A
Quantified	4815483	100.00
Grand Total	4815483	100.00

PEAK GROUP INFORMATION

No peak group information.

ANALYSIS SUMMARY

Method..... FUELS
Run sequence..... GC50911A
Calibration..... FUEL989N
Normalised % calibration using area
Uncalibrated peaks use user factor (70000.0000)

EXHIBIT C-5-f

HALOGENATED ORGANIC VOLATILES

TITLE: STANDARD OPERATING PROCEDURE FOR THE DETERMINATION OF HALOGENATED VOLATILE ORGANIC COMPOUNDS IN USED OILS AND NON-HALOGENATED RECYCLABLE SOLVENTS

(KEY WORDS: USED OILS, SOLVENTS, CAPILLARY GC/ECD, HALOGENATED ORGANICS)
(BASED ON: USEPA 8000, USEPA 8120)

1. SCOPE AND APPLICATION

1.1 This procedure is used to identify and quantify specific halogenated volatile organic compounds in used oils and non-halogenated recyclable solvents by Capillary Gas Chromatography (GC) using an Electron Capture Detector (ECD).

1.2 The compounds encompassed by this method are:

NAME	CODE	CAS#
Trichlorofluoromethane	FMF	75694
1,1,2-Trichloro-1,2,2-Trifluoroethane	FTF	76131
Methylene Chloride *	MECL	75092
1,1,1-Trichloroethane	111	71556
Carbon tetrachloride	CCL4	56235
Trichloroethylene	TCE	79016
1,1,2-Trichloroethane	112	79005
Tetrachloroethylene	PERC	127184
1,3-Dichlorobenzene	MDCB	541731
1,4-Dichlorobenzene	PDCB	106467
1,2-Dichlorobenzene	ODCB	95501
1,3,5-Trichlorobenzene	TCBS	108703
1,2,4-Trichlorobenzene	TCB1	120821
1,2,3-Trichlorobenzene	TCBS	87616

*- PQL may be close to regulatory level of interest for used oil (100 ug/mL).

1.3 These compounds are the typical solvents encountered and listed as USEPA Hazardous Waste Nos. F001 and F002.

1.4 The method may be extended to analyze other halogenated organic compounds as long as all of the quality control criteria are established and met.

1.5 As one example of the application of this method, the amount of each halogenated volatile organic compound will determine the operational scheme for processing used oils, e.g.: re-refining, fuel for boilers, blended fuel, or other recycling options.

1.6 The method requires the use of a confirmation column (polar column, RTX-1701) for prequalification samples. Quantitation of MeCl and retention time confirmation of all other compounds is performed using the confirmation column.

2. SAFETY AND WASTE HANDLING

2.1 **Fire:** CAUTION: Some of the materials are highly flammable. Be sure there are no open flames nearby while testing or cleaning is going on. The fumes released may be flammable and migrate to open flames.

Fire: If any spill occurs, wipe up with an absorbent wipe. Used wipes and plastic pipettes must be placed in a metal container lined with a plastic trash bag. The metal top must be kept on the container at all times except to add or to remove the contents. In the event of a fire, the top should quickly smother it. Any fires involving these materials must be treated as Class A fires. The contents must be removed daily and may be discarded in the regular trash.

Fire: Since a gas chromatographic instrument is an electrical device, no open containers of liquid are to be placed near the instrument.

Burns: Injectors and detectors are extremely hot during operation. They must be cooled before any septa, injectors, or detectors are replaced or repaired.

Burns: Do not attempt to open the oven compartment until the oven temperature is below 50°C.

2.2 **Eye Contact:** Special eye protection procedures are required when using concentrated acids and bases. Refer to the corporate safety policy concerning the handling of strong acids and bases.

2.3 **Hand Contact:** Use of disposable vinyl or latex gloves provides adequate protection from contact with the samples and minor exposure to sulfuric acid; however any time that the gloves come into contact with sulfuric acid, they should be changed within a reasonable amount of time. All skin contact must be washed off immediately.

2.4 **Respiratory:** Exposure to the vapors from the sample should be kept to a minimum by working in a well-ventilated area. The sample container must be opened in a hood and only long enough to obtain a sample. A fitted respirator must be available for use in case of sample spills.

Respiratory: Appropriate precautions must be taken before operating the gas chromatograph. The effluent from the ECD and capillary vents must be vented to an exhaust or charcoal split vent trap. A canopy hood for venting the hot exhaust oven air should be installed.

Respiratory: Sample vials awaiting loading into a GC are to be placed into a closed container or in well-ventilated hood. After use, gas chromatographic sample vials must be placed into a solvent-resistant container located in a well-ventilated area.

2.5 **Waste Disposal:** The remainder of the sample in the original container must be returned to sample storage for future testing or later disposal.

2.6 **Toxics:** The material safety data sheets for each chemical reagent and the compounds in each submitted sample should be read to ensure proper handling and storage.

2.7 **Radiation:** Electron Capture Detectors must be leak-tested every six months with records documented. If the detector/GC is ever moved to a new site, the license, through the manufacturer, must be updated. Any detectors that are to be permanently removed from service will be returned to the manufacturer. The detector must never be discarded.

3. SUMMARY OF METHOD

3.1 Samples are diluted with solvent, and in many cases, this is followed by a sulfuric acid and silica gel cleanup. The extract is then analyzed using a gas chromatograph equipped with an electron capture detector (ECD).

3.2 The ECD detectors, when run under the conditions given in the method, have demonstrated for the majority of the compounds listed in section 1.2 acceptable linearity from 5 to 40 ppm (See Table 1). The ranges can be optimized for individual components to take advantage of wider working ranges, providing that the calibration linearity requirements are met.

4. SAMPLE HANDLING AND PRESERVATION

4.1 Samples must be stored at a temperature between 40°F and 90°F. Short term elevated/reduced temperatures experienced during sample shipment will not significantly affect sample integrity.

4.2 Erroneous results may be obtained if precautions are not taken to avoid the loss of volatile material. Do not open containers unnecessarily. Results for samples from leaky containers must be marked to indicate that the sample integrity was not maintained during shipping and storage.

4.3 Plastic containers or lids may NOT be used for the storage of samples due to the possibility of contamination from the phthalate esters and other hydrocarbons within the plastic. For shipment of samples, use a wide mouth glass bottle (preferably plastic-coated) with a TEFLON lined cap. For samples to be used on location, any clean glass bottle is satisfactory, but some secondary containment must be provided when transporting the sample. The bottle should be filled at least 75% full but not more than 90% full.

4.4 A 10 mL sample is required for analysis.

5. INTERFERENCES

5.1 The Electron Capture Detector (ECD) responds to a variety of electrophilic substances containing halogens, nitrogen, oxygen, sulfur, and conjugated double bond systems.

5.2 Residual oxygen in the carrier gas can react with components of the sample producing oxidation products to which the ECD will respond. Impure carrier gas may cause excessive noise and premature deterioration of the detector.

5.3 Solvents, reagents, glassware, and other sample processing hardware may yield artifacts and/or interferences. All these materials must be demonstrated to be free from significant interferences under the conditions of analysis by analyzing reagent blanks.

5.4 Interferences by phthalate esters and chlorinated paraffins can pose major problems when using the Electron Capture Detector (ECD). These compounds generally appear in the chromatogram as large late-eluting peaks and as broad, non-reproducible peaks from previous injections. Plastics, in particular, must be avoided because phthalates are commonly used as plasticizers and are easily extracted from plastic materials.

5.5 Co-elution is possible. For most applications, this method will provide a conservative answer (i.e., reported concentrations will usually be equal to or greater than the true answer). Confirmation of peak identification and/or quantitation can be obtained by using an alternative column or submitting the sample for GC/MS analysis.

5.6 The prequalification analysis requires the use of 30 m polar column as the confirmation column.

5.7 Some of the halogenated volatile organic compounds undergo acid hydrolysis during the acid clean-up process, causing a low recovery.

6. APPARATUS

6.1 **Gas Chromatograph:** a temperature programmable gas chromatograph suitable for split injections; equipped with an Electron Capture Detector.

Hewlett Packard 5880 Gas Chromatograph or;
Hewlett Packard 5890 Gas Chromatograph.

6.2 **Data System:** A data system capable of measuring peak areas.

Hewlett Packard Model 3396 Integrator or;
Hewlett Packard Chem Station or;
Hewlett Packard 5880A Series Terminal or;
VG Multichrom Data System

6.3 **Autosampler:** Hewlett Packard Model 7673A or B.

6.4 **Regulator:** N_2, 3000 psi (Amerigas, Cat# VTS450D580).

6.5 **Gas Purifier:** To remove moisture and particulates organic, oxygen (AllTech Associates, Inc., Cat. #8123, #8115, #4001)

6.6 **Bubble Flow Meter:** To measure gas flow. (Hewlett Packard, Cat. #HPL0101-0113)

6.7 **Stop Watch:** Or built-in stop watch in HP 5890 GC.

6.8 **Capillary Column:** Crosslinked 95% Dimethyl-(5%) diphenyl-polysiloxane, 50m X 0.32mm X 1um film
HP-5, HP part no. 190915-215 or
RTX-5, Restek Cat. 10257-105 or
DB-5, J & W, CMS Cat# 123-5053

Same, except 30 m X 0.25 mm X 0.25 um film
RTX-5, Restek Cat. #10223
DB-5, J&W, CMS Cat. #256-358

RTX-1701, 50 m X 0.32 mm X 1.0 um film,
Restek Cat. #12057-105
DB-1701; CMS Cat. #123-0753

RTX-1701, 30 m X 0.25 mm X 0.25 um film
Restek Cat. #12023
DB-1701; CMS Cat. #122-0732

6.9 **Charcoal Split Vent Trap:** (Alltech Cat. #5870)

6.10 **Analytical Balance:** Mettler AE200, capable of weighing to 0.0001 g. (Fisher Cat. #01-909-405)

6.11 **Reference Masses:** 5 grams, 500 milligrams, and 100 milligrams, International Organization for Legal Metrology (IOLM) specifications, 1-2-2-5 Series, Class E2. (VWR Cat. No. 12715-029) or NBS Class S Reference Masses or ASTM Class 1 (VWR Cat. No. 12626-155).

6.12 **Vortex Mixer:** (VWR Cat. #58815-178)

6.13 **Vials:** Glass, with TEFLON lined cap
22 ml (National Scientific Cat. # B7800-5)
40 ml (National Scientific Cat. # B7800-6)

6.14 **Vials:** GC autosampler with caps
1-2 ml (National Scientific, Cat. # 4011-1 and Cat. #4011-1A)

6.15 **Disposable Pipets:** Pasteur. (Baxter Cat. #P5214-10)

6.16 **Spatula:** Stainless steel. (Baxter Cat. #S1505-1)

6.17 **Centrifuge:** (Baxter Cat. #C1416-2)

6.18 **Dispenser:** For sulfuric acid. (Fisher Cat. #13-687-35)

6.19 **Disposable Gloves:**
Vinyl: (VWR, Cat. #32915-461, 32915-483, 32915-508)
Latex: (VWR, Cat. #32917-875, 32917-897, 32917-911)

6.20 **Dispenser:** For Hexane (Baxter Cat.# P4970-20)

6.21 **Volumetric Flask:** 100 mL, Square Shaped, Class A, Ground Glass Stopper (Fisher Cat.# 10-219A).

7. REAGENTS

7.1 **Hexane:** (Pesticide Grade). (Baxter, Cat. # 4159-1NY)

7.2 **Sulfuric Acid:** Concentrated, ACS grade. (Baxter, Cat. #5557-9NY)

7.3 **Sodium Sulfate:** Granular, anhydrous, ACS. (Fisher, Cat. #5557-9NY)

7.4 **Silica Gel:** (Baker, Cat. #JT3404-1) To activate: heat at 160°C for 3 hours. Cool in desiccator.

7.5 Sodium Chloride: Crystals (Baxter, Cat. #7581-2.5NY)

7.6 Individual Reagents: Reagent Grade - typically 98% or better purity. Any standard listed as 98% or higher should be considered as 100%.

Name	Aldrich Cat.	Purity
Trichlorofluoromethane	25,499-1	99+
1,1,2-Trichloro-1,2,2-Trifluoroethane	24,050-8	99+
Methylene Chloride	27,099-7	99+
1,1,1-Trichloroethane	29,899-9	99+
Carbon tetrachloride	28,911-6	99+
Trichloroethylene	25,140-2	99+
Tetrachloroethylene	15,499-7	99+
1,3-Dichlorobenzene	11,380-8	98
1,4-Dichlorobenzene	D5,682-9	99+
1,2-Dichlorobenzene	24,276-4	99
1,1,2 Trichloroethane	T5,475-5	98
1,3,5-Trichlorobenzene	T5,460-7	99
1,2,4-Trichlorobenzene	13,204-7	99
1,2,3-Trichlorobenzene	T5,440-2	99

7.7 Stock Standards:

7.7.1 Stock Standard A [10,000 mg/L (Nominal 1%)]

1,3,5-Trichlorobenzene (TCBS)
1,2,4-Trichlorobenzene (TCB1)
1,2,3-Trichlorobenzene (TCBS)
1,2-Dichlorobenzene (ODCB)
1,3-Dichlorobenzene (MDCB)
1,4-Dichlorobenzene (PDCB)
Tetrachloroethylene (PERC)
1,1,2-Trichloroethane (112)
Trichloroethylene (TCE)
1,1,1-Trichloroethane (111)
1,1,2-Trichloro-1,2,2-Trifluoroethane (FTF)

NOTE: A BALANCE CHECK MUST BE MADE PRIOR TO WEIGHING

Chill each of the standards prior to weighing. The FREONs should be kept in the freezer to lower their volatility. The hexane in the flask will minimize the loss of standards during the weighing process. A chilled syringe will be required to dispense the FREONs.

Add approximately 50 mL of hexane to a 100 mL volumetric flask covered with a stopper and tare the balance.

Accurately weigh approximately 1.0 g of each of the standards in the order listed in this section. Using this order will help minimize error due to evaporation during the weighing process.

Add the first standard using a pipette or syringe and record the weight to the nearest 0.01 g. Tare the balance and repeat the process for each standard. **Set the stopper on the flask while determining the weight**.

After all of the standards have been weighed, fill the flask with hexane to the mark. Mix well. Calculate the concentration in weight/volume.

7.7.2 - Stock Standard B

Methylene Chloride (MECL) 25,000 mg/L - Nominal 2.5 % (w/v)
Trichlorofluoromethane (FMF) 5,000 mg/L - Nominal 0.5 %(w/v)
Carbon Tetrachloride (CCL4) 5,000 mg/L - Nominal 0.5 % (w/v)

Follow the procedure for making Stock Standard A, except accurately weigh approximately 2.5 g of methylene chloride and 0.5 g each of trichlorofluoromethane and carbon tetrachloride.

7.7.3. Stock Standards should be stored in tightly sealed vials with TEFLON-lined caps at a temperature of about 4 °C with minimal headspace.

Names, sources, lot numbers, and purities of all reagents used to make the **Stock Standards** as well as concentrations, analyst name, and date of preparation for all solutions must be clearly identified and documented in a log book. Labels should include identification of standards, nominal concentration, date and name of analyst.

NOTE: All standards that are not ampuled, must be made fresh every six months.

7.8 **Intermediate Standard:** An **Intermediate Standard A** of 100 mg/L concentration (Nominal .01%) and an **Intermediate Standard B** of 50 mg/L FMF, 50 mg/L CCL4, and 250 mg/L MECL are prepared in hexane by making a 1:100 dilution of the **Stock Standards A and B.**

Pipet 1.0 mL **Stock Standard A** into a 100 mL volumetric flask containing about 50 mL hexane. Add hexane to fill to the mark. Mix well. Repeat the same procedure for **Stock Standard B.**

The **Intermediate Standards** should be stored in tightly sealed vials with TEFLON-lined cap at a temperature of about 4°C.

The **Stock Standards** used to make the **Intermediate Standards** as well as actual concentrations, analyst name, and date of preparation must be clearly identified and documented in a log book. Labels should include identification of standards, nominal concentration, date and name of analyst.

7.9 **Working Standard: Working Standards** are made from the **Intermediate Standards** and diluted in hexane at five levels for **Intermediate Standards A and B** in 50 mL volumetric flasks. Each standard is prepared by using the indicated amounts of **Intermediate Standard Solution** and then diluting with hexane to the final volume as shown.

7.9.1 An example of Working Standard A

Volume of Intermediate Standard A (mL)	Final Volume (mL)	Working Standards Concentration (mg/L)	Equivalent Sample Concentration (mg/L)
20	50	40	400
15	50	30	300
10	50	20	200
5	50	10	100
2.5	50	5	50

7.9.2 An example of Working Standard B

Volume of Intermediate Standard B (mL)	Final Volume (mL)	Working Standards Concentration (mg/L)			Equivalent Sample Concentration (mg/L)		
		FMF	MECL	CCL4	FMF	MECL	CCL4
25	50	25	125	25	250	1250	250
20	50	20	100	20	200	1000	200
10	50	10	50	10	100	500	100
5	50	5	25	5	50	250	50
1	50	1	5	1	10	50	10

NOTE: The equivalent sample concentration assumes that the sample was diluted 10 fold with hexane prior to injection.

The **Intermediate Standard Solutions** used to make the **Working Standards** as well as actual concentrations, analyst name, and date of preparation must be clearly identified and documented in a log book. Labels should include identification of standards, nominal concentration, date and name of analyst.

7.10 **Calibration Check Standard (CCS):** The 10 mg/L solution of the **Working Standard Solution A** is the **Calibration Check Standard.**

> **Note: For prequalification analysis using a polar confirmation column the 50 ug/mL midpoint standard B (MeCl) is the calibration check standard (CCS).**

7.11 **Stock Solution - Brine Solvent:**
To prepare a stock solution of saturated sodium chloride (Brine Solvent), add 35 g NaCl to 100 mL of Deionized water. Mix well.

7.12 **Matrix Spiking Standard Concentrate:** This standard is prepared from the following compounds:

1,1,1-Trichloroethane
Methylene Chloride
1,2-Dichlorobenzene

> **Note: Prequalification analysis - In the matrix spike standard , only MeCl is quantitated (using the polar column).**

Into a 100 mL volumetric flask, weigh accurately equal amounts (approximately 40 g) of the above components and fill to the mark with hexane. Record the weight to the nearest 0.1 g.

Spiking Standard Concentrate should be stored in tightly sealed vials with TEFLON-lined caps at a temperature of about 4°C. Names, sources, lot numbers, and purities of all reagents used to make the stock standards as well as concentrations, analyst name, and date of preparation for all solutions must be clearly identified and documented in a log book. Labels should include identification of standards, nominal concentration, date and name of analyst.

7.13 **Matrix Spiking Standard:** Nominal 400 or 4000 mg/L solution - In a 100 mL volumetric flask, add 1.0 mL of the **Spiking Standard Concentrate** and dilute to the mark with hexane. This is a 4000 mg/L solution for use with solvents requiring 100-fold dilution. If samples are to be run as 10-fold dilutions, further dilute this matrix spiking standard by pipetting 10 mL into a 100 mL volumetric flask and adding hexane to the mark to generate a 400 mg/L Spiking Standard.

Standards should be stored in tightly sealed vials with TEFLON-lined caps at a temperature of about 4 C.

Names, sources, lot numbers, and purities of all reagents used to make the Spiking Standard as well as concentrations, analyst name, and date of preparation for all solutions must be clearly identified and documented in a log book.
Labels should include identification of standards, nominal concentration, date and name of analyst.

7.14 **Quality Control Standard (QCS):** An independently-prepared standard obtained from the Technical Center. It contains MeCl, 1,2,4-TCBS, CCl4 and ODCB each at 10 ug/mL.

8. PREVENTIVE MAINTENANCE

8.1 **Daily:** Clean all contamination, both spillage and routine handling, from the hood and instrument surfaces. Check for proper autosampler syringe operation (plunger is not sticky and syringe is correctly aligned with injection port). Refill hexane syringe wash solvent in the autosampler. Clean the autosampler waste vials.

8.2 Change the septum and check the inserts after 50 to 75 injections. Change the inserts as necessary.

8.3 New columns should be conditioned under the manufacture's recommended conditions with carrier gas flowing and with the column outlet disconnected from the detector. Be sure that any other columns present in the oven are stable under the conditions used. A column will stabilize faster if injection cycles are begun with blank injections rather than using extended conditioning at a fixed temperature.

8.4 Monitor the background on the ECD. Periodically clean the ECD by heating the detector up to 350°C for 15 to 30 min.

8.5 Semi-Annually: As required by license agreement, a wipe test must be performed on each ECD. Results must be documented.

8.6 All maintenance must be documented in the instrument logbook.

9. TROUBLESHOOTING AND CORRECTIVE ACTION

9.1 If the quantitation obtained on the control samples is not within the control limits, check for septum leakage, faulty syringe operation, loss of column integrity, and changes in make-up gas flow.

9.2 The standards are prepared from volatile materials. While the maximum shelf life is six months, problems due to loss of the most volatile components may be observed earlier and require the preparation of new standards.

10. QUALITY CONTROL

10.1 **Balance Check Daily:** Prior to weighing any standards or samples, check the operation of the balance by zeroing the balance, and adding a 5 g and then a 500 milligram mass. The balance must be within ±0.5% of the expected mass to be acceptable for use for this method. The acceptable ranges are 4.975-5.025 g and 0.4975-0.5025 g for 5 g and 500 mg respectively. If the masses are off by more than 1 mg, but still within the acceptable range, the balance may be used but corrective action must be taken to correct the problem.

10.2 **Daily - Calibration Check:** The calibration is verified on each working day by injecting the **CCS (10 mg/L Working Standard A and 50 ug/mL of MeCl midpoint Standard B for confirmation column)** on each channel being used for this analysis.

Calculated amount of each analyte **must be ≤±20%** of the initial calibration.

All compounds must be calculated for **Percent Difference (%D)** in **CCS**. All compounds have to be **≤20%**.

If the calculated amount exceeds these limits, other actions, such as rerunning a full calibration standard, must be taken until the system can be shown to be in control.

10.3 **Reagent Blank:** A **Reagent Blank** (hexane) must be prepared and injected every time the reagents are changed. This is to check for instrument performance and solvent contaminants (also must be run on the confirmation column RTX 1701).

10.4 **Daily - Method Blank:** A **Method Blank** (hexane) must be prepared by processing the solvent through the same clean-up as that used for the samples, every day when samples are cleaned up. This is to detect for possible contamination picked up during the sample clean-up process. If no clean up is used, a solvent blank can be used instead (also must be run on the confirmation column RTX 1701).

10.5 **Matrix Spiked Samples:** Every twenty samples, analyze a matrix spiked sample. These results must be documented in a log book.

The acceptance criteria for spiked analyses are:

	% Recovery
1,1,1-Trichloroethane	50-150
Methylene Chloride	80-120
1,2-Dichlorobenzene	80-120

Analyze a matrix spiked sample on both the polar (RTX-1701) and non-polar column, and calculate recoveries of 111, ODCB from non-polar and MeCL from polar column analysis for prequalification only.

Note: 111 recovery has been calculated from several SK lab's data. MeCl and ODCB limits will be updated based upon SK data.

If the concentration of any of the matrix spike compounds in the unspiked sample exceed five times the spike amount of 10 mg/L in the final dilution, then the results are suspect and must be reviewed. Results for samples with excessive native material that are out of control must be reviewed and documented following lab policy on corrective action.

The percent recovery is calculated as follows:

$$\% \text{ Recovery} = 100\% * [(A-B)/T]$$

Where:

A = Concentration of Spiked Sample
B = Background Concentration
T = Known True Value of the Spike

Preparation of Matrix Spike Samples: Using a disposable pipette, add 3.0 mL, approximately 2.7 g, of sample to a tared 40 mL vial and accurately weigh to the nearest 0.01 g. Add 1.0 mL of the **Matrix Spiking Standard** to the sample preparation vial. The spiked sample is then treated as a regular sample. The spiked amount of each analyte in the final solution will be about 13 ug/mL.

10.6 **Monthly - Quality Control Standard: The QCS should be treated as a standard.** The compounds present in the QCS are: methylene chloride, carbon tetrachloride, 1,2-Dichlorobenzene, 1,2,4-Trichlorobenzene each at 10 mg/L. The control limits are ≤20% for each compound. This serves as a second source check on the calibration standards.

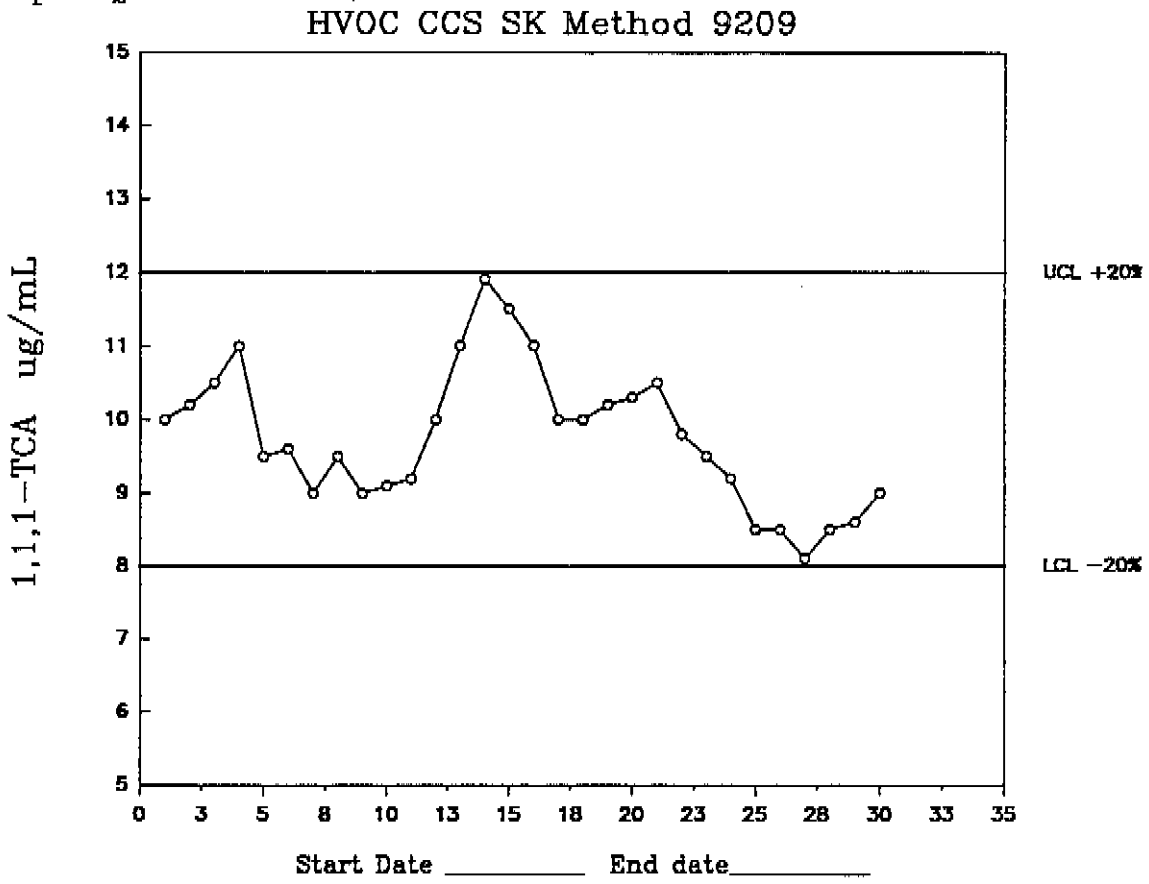
QCS for MeCl must be run on the polar column (RTX-1701) for prequalification analysis.

10.7 **Quality Control Charts: QC charts** will be plotted only for non-polar column*, using SIGMA PLOT (mandatory) for the following:

a) 1,1,1-Trichloroethane - From CCS - Daily
b) 1,1,1-Trichloroethane, Methylene Chloride, 1,2-Dichlorobenzene- From Matrix Spike - Every 20 samples
c) QCS compounds - Once per month plus every calibration curve generation.

*** Note: Laboratories performing Prequalification Analysis will plot the MeCl recovery from the polar column (RTX-1701) analysis.**

Plot amounts using the SIGMA PLOT templates. An example QC chart follows.



10.8 Prequalification Analysis

Quantitation of MeCl Using Thirty Meter Confirmation Column: When using a 30 meter column to analyze prequalification samples, the use of a confirmation column for identification is mandatory. MeCL must be calibrated on the second column (RTX-1701).

Due to low sensitivity of MeCl a different detector range is required for low level analysis.

A five point calibration for MeCL must be established using Standard B following the guidelines in section 11.4. The Calibration Check Standard (CCS) is the mid-point Standard B (50 ug/mL); control limits are ±20%. Note the different concentration range applicable for MeCl in section 7.9.2.

All blanks, samples, matrix spikes and the QCS must be analyzed using the confirmation column. All QC limits apply to both the primary and

the confirmation column. The second column (RTX-1701) is still used as a confirmation column to confirm the retention time of the remaining compounds (Standard A).

11. PROCEDURE

11.1 Sample Preparation

a. Using a disposable, graduated pipette, add 3 mL (approximately 2.7 g) of sample into a tared 40 mL vial. Accurately weigh the sample to the nearest 0.01 g (if the sample contains more than 25% water, e.g. water / ethylene glycol/oil, add 3 mL of saturated sodium chloride to the sample). Using a repipettor, add 27 mL of hexane to obtain a 30-mL mixture (the 3 mL Brine solution, if used, is **not** included in the 30-mL total).

b. Screw the TEFLON-lined cap onto sample vial and shake or vortex for 60 seconds.

c. Secondary Dilutions - If accurate quantitation is desired, it is necessary that the analytes be within the linear range of the detector (see Table 1). If further dilutions are necessary, use standard volumetric dilution procedures. [For solvents, a further 10-fold dilution is usually necessary. Pipet 1.0 mL of the solution from (b) into a 22-mL vial containing 9.0 mL hexane.].

d. Repeat step (b).

e. Perform further dilutions by repeating steps (c) and (d) as necessary to get analytes into linear range.

f. If the material is known ahead of time to have high levels of halogenated solvents and low levels are not important, it is acceptable to perform a larger initial dilution. When both low and high concentrations of analytes are needed, it may be required to analyze the sample at different dilutions to quantitate within the calibration range. However, the minimum aliquot of the original sample to be diluted is 3 g in an attempt to address the need for a representative subsample.

g. An example sample preparation worksheet is included as an attachment.

11.2 Sample Dilution Factors

a. Calculate the Dilution Factor (DF) for each individual dilution step as follows:

$$DF_i = \text{Initial DF} = \frac{\text{Total Volume}}{\text{Sample Weight}}$$

$$DFn = \text{Secondary DF} = \frac{\text{Total Volume}}{\text{Concentrate Vol.}}$$

b. Calculate the overall Sample Dilution Factor by multiplying each of the calculated dilution factors (DF_i * DF_1 * DF_2 * . . .) together.

For example, if a sample was prepared by using two 10 fold dilutions, the Sample Dilution Factor is 10x10 or 100.

11.3 Sample Clean-Up (Refer to Section 10 For Method Blanks)

NOTE: Use sample clean-up only where necessary. Normally, used lube oils require clean-up, while recyclable non-halogenated solvents do not.

a. Transfer approximately 10 mL of the hexane (upper) layer to a vial, add about 3 mL concentrated sulfuric acid. Vortex well. Wait about two minutes to allow phases to separate. Centrifuge, if necessary. (NOTE: acid clean-up not appropriate for immersion cleaner and most other solvents.)

b. Transfer the organic phase to another vial and add approximately 0.25 g activated silica gel and 0.25 g anhydrous sodium sulfate. Vortex and allow the solids to settle. Centrifuge, if necessary.

c. Use a pipet to transfer the hexane layer to a properly labeled GC vial so as to fill it at least 1/2, but no more than 3/4 full.

11.4 Instrument Parameters: The following two sections describe generic instrument set-up parameters. Some specific examples are included as attachments.

11.4.1 Generic GC Conditions for Use With A 50 m Capillary Column

COLUMN:
Crosslinked 5% phenylmethyl silicone (RTX-5, DB-5)
Film thickness: 1.0 microns
ID: 0.32 mm
Length: 50 meters

INJECTOR INLET 225°C
DETECTOR 300°C
OVEN TEMPERATURE PROFILE:
Initial
    Initial value 40°C
    Initial time 6.0 minutes
Level 1
    Program rate 10°C/minute

    Final value 100°C
    Final time 0.0 minutes
Level 2
    Program rate 20°C/minute
    Final value 280°C
    Final time 10.0 minutes

Carrier gas: Nitrogen
Head pressure: 18.5 psi (Approx.)
Column flow: 2.5 mL/min (Approx.)
Split vent: 75 mL/min (Approx.)
Split ratio: 30 to 1 (Approx.)
Septum purge: 1.4 - 1.8 mL/min
Make-up gas: Nitrogen
Make-up gas: 40 - 60 mL/min
Sample injection: 1.0 uL
Threshold: 2 (Suggested)
Peak width: 0.02 (Suggested)

11.4.2 Generic GC Conditions For Use With A 30 m Capillary Column

COLUMN:
Crosslinked 5% phenylmethyl silicone (RTX-5, DB-5)
Film thickness: 0.25 microns
ID: 0.25 mm
Length: 30 meters

INJECTOR INLET 225°C
DETECTOR 300°C
OVEN TEMPERATURE PROFILE:
Initial
- Initial value 40°C
- Initial time 4.0 minutes

Level 1
- Program rate 20°C/minute
- Final value 180°C
- Final time 0.0 minutes

Level 2
- Program rate 50°C/minute
- Final value 280°C
- Final time 5.0 minutes

Carrier gas: Nitrogen
Head pressure: 16 psi (Approx.)
Column flow: 1.4 mL/min (Approx.)
Split vent: 43 mL/min (Approx.)
Split ratio: 30 to 1 (Approx.)

Septum purge: 1.4 - 1.8 mL/min
Make-up gas: Nitrogen
Make-up gas: 40 - 60 mL/min
Sample injection: 1.0 uL
Threshold: 4 (Suggested)
Peak width: 0.02 (Suggested)

11.5 GC Analysis - Instrument Set-Up & Recalibration: Program the calibration table and oven temperature profile. Adjust the head pressure to yield a retention time of 8.6±0.3 min. and 2.7±0.3 min. for 1,1,1-trichloroethane using the 50-m and 30-m columns, respectively. Adjust the split vent to yield a split ratio of-30±3 (split ratio = split vent flow/column flow). Document the set-up parameters of head pressure and split ratio in the log book. They must not be changed without documentation of the change and the reason for the change.

Inject the standards and controls as listed in the following run profile:

Reagent Blank (hexane)
5 mg/L Standard A
10 mg/L Standard A
20 mg/L Standard A
30 mg/L Standard A
40 mg/L Standard A
Reagent Blank (optional)
5 mg/L Standard B *
25 mg/L Standard B *
50 mg/L Standard B *
100 mg/L Standard B*
125 mg/L Standard B*
Quality Control Standard

*** Concentration of MeCl**

Note: Prequalification analysis:
Only standards B will be used for confirmation column. Both Standard A and B must be analyzed on primary column.

11.6 Calibration: A five point calibration curve is run at 5, 10, 20, 30, 40 mg/L for each analyte of interest in Standard A and 1, 5, 10, 20, 25 mg/L for FMF and CCL4 in Std. B.

A five point calibration curve for MeCl is run at 5, 25, 50, 100, 125 mg/L for confirmation column (RTX-1701). Set up a calibration table in the method file of the integrator or data system that is to be used. Refer to the integrator or data system manual for the steps outlining setting up a calibration table. Calculate the response factors for each analyte.

Calculate the average response factor and standard deviation for each analyte using the following calculation:

$$S = \sqrt{\sum_{i=1}^{n} \frac{(X_i - \bar{X})^2}{n-1}}$$

where:

S = standard deviation
X_i = each observed value
$\bar{X}$ = the arithmetic mean of observed values
n = total number of calibration points

Calculate the %RSD from the calibration table for each analyte from the formula below. The acceptance criteria for each analyte is $\leq \pm 20\%$. If the %RSD is greater than 20% then the calibration curve for that analyte is not valid and a new curve must be run. The %RSD is used to define linearity of instrumental response across a concentration range.

RSD is obtained by dividing the standard deviation (S), by the mean ($\bar{X}$), and expressing the ratio as a percent:

$$\%RSD = \frac{S}{\bar{X}} * 100\%$$

When samples are to be analyzed, instrument control is verified by analyzing the CCS and the percent difference (%D) is calculated from the formula below. The acceptance criteria is $\leq$20% for each analyte in the CCS. When an analyte is out of control the analytical system must be checked for problems, corrective action taken and a new 5 point calibration curve run for all compounds if the CCS has %D's >20%.

%D is derived from the difference between the calculated amount from the initial calibration and the known amount.

$$\%D = \frac{Amt - STD}{STD} * 100\%$$

where:

Amt = calculated amount from calibration curve

STD = known amount of the standard (CCS)

11.7 **GC Analysis: Samples:** Inject the samples and controls on each GC channel as listed in the following run profile:

Reagent Blank (Optional*)
Calibration Check Standard (Daily)
Sample 1-20
Matrix Spike (20th Sample)
Method Blank
Sample 21-40
Matrix Spike (40th sample)
Reagent Blank (Optional)

[NOTE: Reagent Blank optional unless this is the first use of a new batch of reagents.]

Use this sequence as long the controls are satisfactory. If any of the controls are not met, take the appropriate corrective action before proceeding. The sequence is not to extend to more than one day (twenty-four hours).

12. CALCULATIONS

12.1 Under normal operations, the concentrations will be given by the data system, using the calibration curve verified daily by the **Calibration Check Standard (CCS)**. The following data system linearity requirements can be used :

Linear thru zero
Point to Point
Quadratic Equation

The type of curve chosen must remain the same throughout the life of a calibration curve and be used in all calculations.

12.2 **External Standard Method (ESTD):** If one needs to confirm the results calculated from the calibration curve, it is possible to inject one of the **Working Standards** near the expected concentration and perform an external standard calculation by hand. This calculation assumes the same injection volume is used for both the standard and sample. Compound concentration is determined by the following calculation:

$$C\ samp\ (mg/Kg) = \frac{A\ samp\ (counts)\ X\ C\ std\ (ug/mL)\ X\ DVol\ (mL)}{A\ std\ (counts)\ X\ Sample\ Weight\ (g)}$$

where:
C samp = Concentration of compound in sample
C std = Concentration of compound in standard
A samp = Peak area of compound in sample
A std = Peak area of compound in standard
DVol = Dilution volume

12.3 **Compound Confirmation:** The identification of all analytes found in pre-qualification sample(s) must be confirmed using a second column (RTX-1701). $MeCl_2$ must be quantitated on the secondary column and all other compounds quantitated on the primary column.

12.4 **Data Reporting:** Results should be reported based on the dilution required for each analyte of interest to fall within the calibration range of the channel used.

13. REFERENCES

13.1 Method 8000, Gas Chromatography, USEPA Test Methods for Evaluating Solid Waste, 1986.

13.2 Method 8120, Chlorinated Hydrocarbons, USEPA Test Methods for Evaluating Solid Waste, 1986.

13.3 ASTM E-260-73. "General Gas Chromatography Procedure".

13.4 ASTM E-355-77, "Gas Chromatography Terms and Relationships".

METHOD FILE FOR GC/ECD SET UP IN CHEMSTATION
(30 m Capillary Column)

DATA:CHLOROIL

[METHOD]

DATA:EC/FID.M

[APPLICATIONS]

GCACQ	DATA:EC/FID.A	YES
DATAED	DATA:EC/FID.E	NO
REPORT	DATA:EC/FID.R	NO

[DATA FILES]

RAWDATA	DATA:TESTA01A.D
REPORT	DATA:TESTA01A.ASO
INTEGRATION	DATA:TESTA01A.I
CALIBRATION	DATA:CHLOROIL.Q

DATA:CHLOROIL

Description:

Last Changed By:

Date Last Changed:

* HP 5890A Injection Port Setpoints Dual auto injectors

Injection Port A: Split/Splitless
Injection mode : Split mode

Injector A Temp : 225°C Zone is: On

Injection Port B: Split/Splitless
Injection mode : Split mode

Injector B Temp : 225°C Zone is: On

* HP 7673A Controller Setpoints

Injector A :	Installed	Injector B:	Installed
Sampler Tray :	Installed		
Sample Washes :	3	Viscosity:	0
Sample Pumps :	3	Sample Volume:	1
Solvent A Washes: (Hexane)	5	Solvent B Washes: (Hexane)	5

METHOD FILE FOR GC/ECD SET UP IN CHEMSTATION
(30 m Capillary Column)
[Continued]

* Oven Temperature Program:

Oven Temp:	40°C	Cryo: Off
Initial Temp:	40°C	Initial Time: 4.0
Rate:	20	
Final Temp:	180°C	Final Time: 0.00
Rate A:	50	
Final Temp A:	280°C	Final Time A: 5.0
Equilibrium Time:	1.00 (5 min. for bake-out)	

* HP 5890A Detector Setpoints

Detector A:	ECD		R.I. Column A: Not Present
Detector A	Temp:	300°C	Zone is: On
Detector B:	ECD		R.I. Column B: Not Present
Detector B	Temp:	300°C	Zone is: On

* HP 5890A Signal Setpoints

Signal 2: Detector B Signal is: On

*Crt Plot Setpoints

Signal: 1 Detector B

Crt Time Window	:	20.00
Crt Attn	:	2^8
Crt Offset	:	5%
Minimum Peak Width:		0.020 min

METHOD SET UP IN HP 3396 INTEGRATOR
(30 m Capillary Column)

```
* LIST:  METH OIL.MET @

RUN PARAMETERS
ZERO     =  0
ATT 2^   =  5
CHT SP   =  1.0
AR REJ   =  100
THRSH    =  2
PK WD    =  0.04

TIMETABLE EVENTS

25.000 STOP (5 MIN BAKE-OUT)

CALIBRATION

INTEGRATION PLOT TYPE..............FILTERED

RUN DATA STORAGE
Store Signal Data...................NO
Store processed peaks...............NO

REPORT OPTIONS
Suppress local report...............NO
HEIGHT% report......................NO
Report uncalibrated peaks...........YES
Extended report.....................YES

POST-RUN LIST OPTIONS
Store post-run report...............NO
External post-run report............NO
List run parameters.................YES
List Timetable......................YES
List calibration table..............NO
List remote method..................NO
Form-feed before report.............YES
Form-feed after report..............YES
Skip perforations in report........YES
Skip perforations in plot..........NO
```

METHOD SET UP IN HP 3396 INTEGRATOR
(30 m Capillary Column)
[Continued]

INET CONFIGURATION

ENTRY	MODEL	ADDR	DATA PATH	STATUS
4	3396A	0	C1 CONS CH 0	ACTIVE
5	5890A	10	C1 PROD CH 0	ACTIVE
6	5890A	10	C1 PROD CH 1	IDLE
7	3396A	0	KO PROD CH 0	ACTIVE
8	7673A	8	KO CONS CH 0	ACTIVE
9	5890A	10	KO CONS CH 0	ACTIVE

HP 5890A GAS CHROMATOGRAPH
LOOP ADDRESS: 10

OVEN TEMP = 40°C SETPT = 40
EQUIB TIME = 1.00 CRYO OFF
OVEN MAXIMUM= 350°C
INITIAL TEMP= 40°C
INITIAL TIME= 4.0

TEMP PRGM:	RATE	FINAL TEMP	FINAL TIME	
	20.0	180°C	0.00	
RAMP A	50.0	280°C	5.0	(5MIN BAKE-OUT)

RUN LENGTH = 18.00 MIN

INJ A TEMP = 225°C SETPT = 225°C
INJ B TEMP = 225°C SETPT = 225°C
DET A TEMP = 300°C SETPT = 300°C
DET B TEMP = 300°C SETPT = 300°C

FLOW A = 115.6 (N2)
FLOW B = 102.9 (N2)

SIGNAL 1 = B (ECD)
INET FULL RANGE DATA ON
RANGE = 0
ZERO = 0.0
ATTN = 0

SIGNAL 2 = A
RANGE = 5
ZERO = 0.0
ATTN = 0

DETECTOR A = ECD (ON)
DETECTOR B = ECD (ON)

PURGE A = ON
PURGE B = ON

TABLE 1

NAME	CODE	CAS#	MDL ug/mL	DETECTOR WORKING RANGE ug/mL (est.)
Trichlorofluoromethane	FMF	75694	0.44	1.0 - 25
1,1,2-Trichloro-1,2,2-Trifluoroethane	FTF	76131	0.31	5.0 - 40
Methylene Chloride	MECL	75092	0.93	5.0 - 100
1,1,1-Trichloroethane	111	71556	0.63	5.0 - 40
Carbon tetrachloride	CCL4	56235	0.60	1.0 - 25
Trichloroethylene	TCE	79016	0.38	5.0 - 40
1,1,2-Trichloroethane	112	79005	0.41	5.0 - 40
Tetrachloroethylene	PERC	127184	0.38	5.0 - 40
1,3-Dichlorobenzene	MDCB	541731	0.19	5.0 - 40
1,4-Dichlorobenzene	PDCB	106467	0.53	5.0 - 40
1,2-Dichlorobenzene	ODCB	95501	0.47	5.0 - 40
1,3,5-Trichlorobenzene	TCBS	108703	1.23	5.0 - 40
1,2,4-Trichlorobenzene	TCBS	120821	1.16	5.0 - 40
1,2,3-Trichlorobenzene	TCBS	87616	0.91	5.0 - 40

RETENTION TIMES FOR TARGET COMPOUNDS
(minutes)

		DB-5 TYPE COLUMN		DB-1701 TYPE COLUMN	
CODE	CAS#	30 m	50 m	30 m	50 m
FMF	75694	1.80	4.05	1.49	3.60
FTF	76131	1.91	4.76	1.55	5.47
MECL	75092	1.95	4.92	1.76	7.19
111	71556	2.76	8.58	2.29	9.99
CCL4	56235	2.91	9.25	2.29	10.02
TCE	79016	3.45	10.53	2.94	11.97
112	79005	4.96	12.71	5.46	15.06
PERC	127184	5.70	13.99	4.84	14.74
MDCB	541731	8.75	17.80	8.49	18.46
PDCB	106467	8.83	17.9	8.61	19.39
ODCB	95501	9.10	18.27	8.96	19.25
TCBS	108703	10.13	19.61	9.70	20.66
TCBS	120821	10.59	20.18	10.30	21.49
TCBS	87616	10.92	20.65	10.75	22.15

ANALYST TRAINING FORM

Trainee: _____

Trainer: _____ Date: _____

Analysis: HVOC Method: 9209

1. The following sections of the method were explained by the trainer and understood by the trainee:

	Trainer	Trainee
Scope & Application	_____	_____
Safety & Waste Handling	_____	_____
Summary of Method	_____	_____
Sample Handling & Pres.	_____	_____
Interferences	_____	_____
Apparatus	_____	_____
reagents	_____	_____
Preventive Maint &	_____	_____
Troubleshooting / Corrective Action	_____	_____
Quality Control	_____	_____
Procedure	_____	_____
Calculations	_____	_____
References	_____	_____
Attachments	_____	_____

2. Trainee observed analysis performed by Trainer:

_____ _____

3. Trainee repeats analysis. Comparative results:

Sample ID	TRAINER RESULTS	TRAINEE RESULTS
	_____	_____
	_____	_____
	_____	_____
	_____	_____
OTHER	_____	_____

Analyst certified to perform method: (by/on) _____

Additional training recommended: (by/on) _____

(Attach additional comparative results)

GC SEQUENCE LOGBOOK 823D
SK 9209 FOR HVOC's
ON GC

LOGBOOK #:_____
PAGE #:_____

DATE_____ MODEL: HP 5890 A SERIAL #:_____

RUN #	SAMPLE DESCRIPTION	CONTROL #	LOGBOOK #	PAGE #	COMMENTS	INITIALS

HVO LOG/CALCULATION WORKSHEETS

Logbook: _____
Page: _____

Date/Time: _____/_____

HVO CAlibration #: _____

GC ID: _____

Column ID: _____

QC Info: _____

INSTRUCTIONS: READ SOP

TARE BALANCE. Weigh vial and cap. Record in column (A).
TARE VIAL/CAP. Weigh 3.0 gm sample. Record in column (B)
TARE VIAL/CAP. Weigh 0.5gm Spiking Solution as required. Record in column (C)
TARE BALANCE. Add 27 ml Acetone/Hexane. Weigh vial/cap. Record in column (D)
If second dilution required: TARE VIAL/CAP. Weigh 1.0 gm of 1st dilution. Record in column (F). Add solvent to bring final weight to 10gm. Record in column (G).
Calculate dilution factor (H).
Enter dilution factor (H) into integrator SEQ. table under "MUL FACTOR".

Spike Info.: Batch # _____ CONC.: 1,1,1 _____ ug/gm (l) TCE _____ ug/gm (l) PERC _____ ug/gm (l)

Lab #	(A) Vial/Cap gm	(B) Sample Wt gm	(C) Spike Wt gm	(D) Gross wt gm	(E) Final Wt D–A	(F) Dilution 2 Initial	(G) Dilution 2 Final	(H) Dilutn Factr (E/B) x (G/F)	Comment

_____ _____

Analyst Date Reviewed by Date

GC COLUMN HISTORY LOG

Logbook:_____
Page #: _____

Column #	Date Received	Date Installed	GC Code	Description	Source	Catalog /Lot #

List Control File

1st Ramp

Temperature..... 40 °C
Minutes..... 4.00 mins
Rate..... 20.0 °C/min

2nd Ramp

Temperature..... 180 °C
Minutes..... 0.00 mins
Rate..... 50.0 °C/min

3rd Ramp

Temperature..... 280 °C
Minutes..... 5.00 mins
Rate..... 0.0 °C/min

Final Conditions

Temperature..... 280 °C
Minutes..... 10.00 mins

General

Oven Control..... Yes
Oven Maximum..... 300
Cryogenic..... No
Equilibrium Time..... 1.00 mins

Detector A

State..... On
Polarity..... Off
Time..... 0.00 mins
Temperature Control..... On
Temperature..... 300 °C

Injector A

State..... On
Temperature Control..... On
Temperature..... 225 °C

Purge A

Purge Control..... On
Purge On Time..... 0.00 mins
Purge Off Time..... 25.00 mins

Signal A

Select..... 1
Range..... 5
Attenuation..... 0

Detector B

State..... On
Polarity..... Off
Time..... 0.00 mins
Temperature Control..... On
Temperature..... 300 °C

Injector B

State..... On
Temperature Control..... On
Temperature..... 225 °C

Purge B

Purge Control..... On
Purge On Time..... 0.00 mins
Purge Off Time..... 25.00 mins

Signal B

Select..... 2
Range..... 5
Attenuation..... 0

List Method File

ACQUISITION PARAMETERS

GC 21 CHANNEL 43 METHOD 9209 HVOC BY ECD (HP-5 COLUMN)

Data Collection :
- Length of run..... 18.00 mins
- Post injection delay..... 0.00 mins
- Time to next run..... 18.01 mins
- Width at half height..... 1.00 secs

Baseline Offset :
- Adjust baseline..... Yes
- Baseline offset..... 1.00 %

POST PROCESSING PARAMETERS

Post Injection Actions :
- Subtract blank (AB)..... No
- Peak process (AP)..... Yes
- Calibrate (AC)..... No
- Quantify (AQ)..... Yes
- Analysis report (AR)..... No
- Dual detector report (AD)..... No
- Combined report (AX)..... Yes
- Plot data (PL)..... No
- Template plot (PT)..... No
- Dual plot (PD)..... No
- Post inj. user program (UA)..... No

Post Sample Actions :
- Averaged report (AT)..... No
- Post samp. user program (UA).... No

Post Analysis Actions :
- Analysis list (AL)..... No
- Analysis summary (AY)..... No
- Isometric plot (PI)..... No
- Post anal. user program (UA).... No

PEAK PROCESSING PARAMETERS

Auto Process Parameters :
- Peak threshold..... 7.00
- Baseline test..... 11
- Peak trend..... 2

Separation Parameters :
- Shoulder sensitivity..... 0.10
- Rider sensitivity..... 0.05

Rejection Parameters :
- Minimum peak width..... 0.0 secs
- Minimum peak height..... 0.0 uV
- Minimum peak area..... 100.0 uVs
- Ignore flattop peak..... No

User Imposed Action Control :

Force baseline..... Yes
Suppress integration..... Yes
Tangent skimming..... Yes
Shoulder detection..... Yes
Data bunching..... Yes
Negative detection..... No

Integration Modes :
Retention time integration..... No
Square root area and height..... No

PROCESSING ACTIONS

Time (mins)	Force Baseline	Integrate Suppress	Tangent Skim	Bunch Size	Shoulder Detect	Negative Detect
12.00	-------	Start Immed	-------	0	-------	-------
18.00	-------	End Supp	-------	0	-------	-------

REPORT PARAMETERS

Report Table Format Control :
Peak number..... Yes
Calibration flags..... No
Retention time..... Yes
Corrected time..... No
Expected time..... No
Retention value..... No
Area..... Yes
Area %..... No
Height..... No
Amount..... Yes
Peak name..... Yes
Response factor..... No
Width at half height..... No
Peak type flags..... No

Restrictions :
Report threshold..... 0.00 mV
Number of decimal places..... 2
Report samples only..... No

Additional Information :
Unknowns..... Yes
Missing peaks..... No
Extended report..... No
Report groups..... No

Header Information :
System title..... All injections
Run information..... All injections
Analysis information..... All injections
Sample information..... All injections

PRINTER PLOT PARAMETERS

Plot Style :
- Style of plot..... Normal

Y Scaling :
- Scaling mode..... User scale
- Maximum height..... 40.000 mV
- Minimum height..... 0.000 mV

Plot Time Window :
- User defined time range..... No

Plot Features :
- Data Plot mode..... Raw
- Baselines..... Base
- Peak annotation..... Time
- Annotation threshold..... 1.00 mV
- Shaded..... No
- Grid..... No

Isometric offset :
- Offset angle..... 90 degrees
- Y offset..... 0.50 mV
- Hidden lines..... Yes
- Normalisation factor..... None

APPENDIX C-6

QUARTERLY TESTING PROGRAM SAMPLING RATES

Appendix C-6

Quarterly Testing Program

Estimated Sampling Frequencies by Customer and by Container

To estimate the frequency of sampling outlined by the quarterly testing program, Safety-Kleen utilized data on the number of customers and containers received at each of the four North Carolina Branch Facilities for the first three quarters of 1992. The estimated sampling frequencies were calculated on the basis of the number of customers and the number of containers received, using data that excluded Safety-Kleen as a customer (i.e., wastes terminated at a Branch Facility) and data that included Safety-Kleen as a customer. Accurate data on spent antifreeze/glycol waste is unavailable at this time. Also, the available data does not differentiate between spent paint spray gun cleaner and paint waste. Frequencies were calculated using sample numbers for both waste streams; therefore, these frequencies thus represent an average of the true waste stream specific frequencies.

Spent Mineral Spirits

- Number of samples = (15/quarter)(3 quarters)(4 facilities) = 180

- Total SQG/LQG Customers/Containers excluding Safety-Kleen as a generator:

  - Total SQG/LQG Customers = 1,994
  - Total SQG/LQG Containers = 57,134

- Total SQG/LQG Customers/Containers including Safety-Kleen as a generator:

  - Total SQG/LQG Customers = 1,994
  - Total SQG/LQG Containers = 57,134

Spent 699 Immersion Cleaner

- Number of samples = (1/quarter)(3 quarters)(4 facilities) = 12

- Total SQG/LQG Customers/Containers excluding Safety-Kleen as a generator:

  - Total SQG/LQG Customers = 269
  - Total SQG/LQG Containers = 1,377

- Total SQG/LQG Customers/Containers including Safety-Kleen as a generator:

- Total SQG/LQG Customers = 277
- Total SQG/LQG Containers = 4,248

Spent Paint Spray Gun Cleaner and Paint Waste

- Number of samples = (2/quarter)(3 quarters)(4 facilities) = 24

- Total SQG/LQG Customers/Containers excluding Safety-Kleen as a generator:

- Total SQG/LQG Customers = 657
- Total SQG/LQG Containers = 12,413

- Total SQG/LQG Customers/Containers including Safety-Kleen as a generator:

- Total SQG/LQG Customers = 679
- Total SQG/LQG Containers = 27,843

Dry Cleaner Wastes

- Number of inspections = (8/quarter)(3 quarters)(4 facilities) = 96

- Total SQG/LQG Customers/Containers excluding Safety-Kleen as a generator:

- Total SQG/LQG Customers = 605
- Total SQG/LQG Containers = 9,419

- Total SQG/LQG Customers/Containers including Safety-Kleen as a generator:

- Total SQG/LQG Customers = 623
- Total SQG/LQG Containers = 14,644

Percentage of samples per customers and per containers, excluding Safety-Kleen[1/]:

	Customers (%)	Containers (%)
Spent Mineral Spirits	9.0	0.3
Spent 699 Immersion Cleaner	4.5	0.9
Paint Related Wastes	3.7	0.2
Dry Cleaning Waste	15.9	1.0

Percentage of samples per customers and per containers, including Safety-Kleen[1/]:

	Customers (%)	Containers (%)
Spent Mineral Spirits	9.0	0.3
Spent 699 Immersion Cleaner	4.3	0.3
Paint Related Wastes	3.5	0.1
Dry Cleaning Waste	15.4	0.7

[1/] Data rounded to nearest 0.1%.

APPENDIX C-7

DRY CLEANING WASTE INSPECTION LOG FORM

DRY CLEANER WASTE INSPECTION FORM

SAFETY-KLEEN BRANCH FACILITY: _____

SAMPLER(S) _____
_____

DATE: _____

CUSTOMER FACILITY: _____
_____
_____
_____
_____

TYPE OF WASTE (check one):

TYPE OF SOLVENT (if known, check all that apply):

Perchloroethylene ____
Naphtha-based ____
Freon ____

Does the waste meet the appropriate acceptance criteria (refer to Table C-9 of the Waste Analysis Plan:

Yes ____ No ____

If no, provide a description of the characteristic(s) which failed the acceptance criteria:

_____
_____
_____
_____
_____
_____
_____