APPENDIX A
MANUFACTURING SOLVENT USER SURVEY PACKAGE

EHPA

E.H. Pechan & Associates, Inc.

2880 Sunrise Blvd., Suite 220 • Rancho Cordova, CA 95742 • 916-852-1794 • Fax 916-852-9451

June 6, 1995

As indicated in the attached letter signed by Dr. John Holmes of the California Air Resources Board (ARB), E.H. Pechan & Associates Inc. (Pechan) is under contract to develop an emissions inventory for solvent cleaning and degreasing operations. In order to estimate emissions from solvent cleaning and degreasing operations, several hundred companies, including yours, have been selected at random to participate in this solvent users' survey. The survey results from your company will be combined with information received from other companies to develop improved estimates of emissions for the state. Only summaries of solvent and degreasing data will be published. Although some of the requested data is similar to information submitted by some companies to local districts during annual emissions reporting, please be assured that the information requested here is not available to Pechan from the local district in the necessary format and level of detail.

There are two survey questionnaires enclosed covering solvent usage in 1993. The first is used to report solvent use during the manufacturing of products. This includes the cleaning of parts during manufacturing and any final cleaning prior to packaging. The second questionnaire is for reporting solvent use during maintenance activities. Maintenance activities include the cleaning of machinery, tools, vehicle parts, or other equipment that are not incorporated into a product. These questionnaires were designed to obtain the minimum amount of information required for the project. Please enter all of the requested information for each line on the survey questionnaire.

On each of the questionnaires you have the option of assigning certain data as trade secret. Those data deemed trade secret, will be maintained as confidential (see attached Nondisclosure Agreement). However, in accordance with Section 91010 and Section 91100 of Title 17, and Section 6254.7 of the Government Code, emissions data cannot be classified as trade secret.

Please return both of the completed questionnaires by June 23, 1995 in the enclosed postage-paid envelope. A toll-free line has been set up to assist you with any technical issues regarding completion of the questionnaire. The number is 1-800-876-5836. Thank you for your assistance.

Sincerely,

Stephen M. Roe
Project Manager
ARB Emission Inventory Project

Enclosures

5537-C Hempstead Way
Springfield, VA 22151
Phone 703-642-1120
Fax 703-642-1258
E-mail pechanva@mail2.pechan.com

3500 Westgate Drive, Suite 103
Durham, NC 27707
Phone 919-493-3144
Fax 919-493-3182

NONDISCLOSURE AGREEMENT

Whereas, E.H. Pechan & Associates, Inc. (Pechan) is under contract No. 93-341 (the Contract) with the California Air Resources Board (ARB) to develop a solvent cleaning and degreasing emissions inventory and update method.

Whereas, in order to fully perform the Contract, it will be necessary for Pechan to have access to data in the possession of the ARB, the air pollution control and air quality management districts (the districts), and surveyed businesses which pertains to the emissions of solvents (including emission factors and process rates), and which has been designated confidential by the businesses which have furnished the data (the Confidential Data);

Now, Therefore, in consideration of the granting to Pechan of the Contract, Pechan agrees and represents as follows:

1. Pechan shall preserve in strict confidence all Confidential Data supplied to Pechan by the ARB, the districts, and businesses during the performance of the Contract, and shall not use any Confidential Data in such a manner as to disclose it to any person or entity except as specifically authorized in writing by a duly authorized representative of the ARB.

2. The Confidential Data shall only be supplied to Pechan employees or subcontractors working under the direct supervision of Pechan, and Pechan shall obtain from each employee or subcontractor who shall have access to the Confidential Data a Nondisclosure Agreement in the form attached hereto as Exhibit A.

3. Pechan shall return to the ARB all Confidential Data it or its subcontractors have received from the ARB, the districts and businesses when the Confidential Data are no longer required by Pechan for performance of the work required by the Contract, or upon completion of the Contract, whichever first occurs.

E.H. Pechan & Associates, Inc.

By: _____
Annette Najjar

Title: Contracts Administrator

Date: 3/22/95

STATE OF CALIFORNIA

PETE WILSON, Governor

AIR RESOURCES BOARD
2020 L STREET
P.O. BOX 2815
SACRAMENTO, CA 95812

(916) 445-0753
(916) 322-4357

March 15, 1995

Dear Respondent:

In order to do a more effective job of cleaning California's air, the Air Resources Board must periodically update its inventory of emissions. Most of this effort is directed toward measuring emissions from cars, trucks and other mobile sources. However, stationary-source emissions must also be updated from time to time.

As part of this effort, pursuant to Section 91100, Title 17 of the California Administrative Code, the California Air Resources Board (ARB) is responsible for the collection of air pollution related information from owners and operators of air pollution emission sources. The ARB has contracted with E.H. Pechan & Associates, Inc. (Pechan) as its agent to conduct a survey to determine emissions from solvent cleaning and degreasing operations for each county in the state. I am requesting your assistance in completing the enclosed questionnaire.

Instructions for completion of the questionnaire are also enclosed. Your firm's participation in this survey will be greatly appreciated. If you have any questions regarding the questionnaire please contact Pechan at (916) 852-1794.

If you would like to know more about our data-gathering needs or have any questions regarding ARB policy please contact me at (916) 445-0753.

Sincerely yours,

John R. Holmes, Ph.D.
Chief, Research Division

enclosure

E.H. PECHAN & ASSOCIATES, INC./CALIFORNIA AIR RESOURCES BOARD
SOLVENT USE AND DISPOSAL FOR 1993

INSTRUCTIONS

Please follow the instructions below (each number corresponds to a section on the questionnaire) for filling out Questionnaire I (blue sheet) and Questionnaire II (green sheet). Report Manufacturing Uses (1993 solvent use during the cleaning of parts or products for sale) on Questionnaire I and Maintenance Uses (1993 solvent used during the maintenance and repair of facility equipment) on Questionnaire II. An example is included on page 2 (back of this page). After completing the forms, please return only the forms, and any necessary Material Safety Data Sheets (MSDS) in the envelope provided.

1. **Facility Information** — Please fill out this section of both questionnaires with information relevant to the 1993 operations at your facility (i.e., do not include information for other facilities within your company). If the Standard Industrial Classification (SIC) code is not known, please write in the type of product manufactured or service provided and we will determine the SIC.

2. **Equipment/Operation** — From Table 1 (see page 3), enter the equipment/operation code that most closely describes the solvent cleaning or degreasing activities at your facility. Enter the number of devices using the same solvent. A device is a vapor degreaser, gun cleaner, parts washer, etc. For handwiping activities, group all handwiping processes that use the same solvent and list them as one device. If a device used different solvents during 1993, please provide the information on separate lines.

3. **Solvent** — Select from Table 2 (see page 4) the code corresponding to the solvent used in each equipment/operation. Table 2 provides codes for pure solvent systems and generic solvent mixtures. Solvents containing at least 90% of a predominant compound should be reported as a pure solvent system. Solvents containing less than 90% of a predominant compound should be reported as a mixture. NOTE: It is not necessary to provide a component breakdown for solvent mixtures.

   Non-aqueous mixtures (those not containing water) should be reported as mixtures of the predominant compound. For example, a mixture of 70% chlorofluorocarbon (CFC) and 30% alcohol should be reported as a CFC blend (Code 202 on Table 2). Solutions, such as a glycol ether solution containing 5% glycol ether and 95% water, should still be reported as a mixture of the predominant volatile organic compound (VOC) compound (e.g., glycol ether mixture, Code 204).

   a. From Table 2, enter the code for each solvent or generic solvent mixture. If the solvent or generic solvent mixture is not listed, enter Code 199 for an unlisted pure solvent, and Code 299 for an unlisted solvent mixture.

   b. For solvent codes greater than or equal to 199, enter the VOC content per volume of material in grams per liter (g/L). Do not use "VOC content less water and exempt solvents." If the VOC content is not known, please attach and return Sections I through III of the MSDS.

   c. Enter the units for the VOC content (g/L preferred).

4. **1993 Solvent Usage** — For each equipment and solvent pairing, enter the amount of solvent used to clean parts in Calendar Year 1993. Please specify amount in gallons (gal), if possible.

5. **Exhaust Control** — If the equipment/solvent pair is served by an exhaust system and control equipment (e.g., incinerator, carbon adsorber), please select the appropriate code from Table 3 (see page 4). Controls included in or on the device, such as freeboard chillers, recycling condensers, and lids, should not be reported. If Code 503 is selected (unlisted exhaust control type), please print the control type along side the code in the space provided. NOTE: Fans and blowers are not part of an exhaust control system and should not be reported.

6. **1993 Disposal Amount** — Indicate the methods, if any, by which you dispose of the solvents you use. If any solvent was sent to an off-site recycler in 1993, specify the amount in gallons. If the solvent was disposed of on- or off-site in 1993, specify this amount in gallons in the second column. Enter the units in the third column (gallons preferred).

7. **Trade Secret (TS)** — Check this box, if the information contained in this line should be considered trade secret (TS). NOTE: If this box is checked, you must attach justification why the information is considered trade secret.

If you have any questions, or need assistance completing this survey, please call 1-800-876-5836.

EXAMPLE: METAL FABRICATION FACILITY

Facility A produces finished metal parts for the aerospace industry. The facility's primary Standard Industrial Classification code is 3471. The facility employs 47 total employees with 41 of these performing non-administrative work. The facility would enter this information in Section I of both questionnaires. The facility identifies the following 1993 solvent cleaning and degreasing operations:

- one batch-loaded vapor degreaser (BVD) to clean parts prior to plating that used Trichloroethylene (TCE) during the first part of 1993 before switching over to perchloroethylene (PERC);
- another two BVDs using 1,1,1-trichloroethane (TCA) to clean parts prior to plating. None of the three BVDs mentioned above are served by an exhaust system;
- a batch-loaded cold cleaner (BCC) is also used to clean parts prior to painting. A solvent mixture containing glycol ethers is used in this device;
- facility operators also perform handwiping of parts using methyl ethyl ketone (MEK) prior to painting. This operation is performed in a paint booth that is exhausted to a carbon adsorber; and
- mineral spirits are used to handwipe tools and equipment during routine maintenance.

Solvents are also used to thin paints and to strip paint from painted parts, however, these uses are not considered to be part of the solvent cleaning and degreasing category, and thus are not reported.

The first five rows show completed entries for Facility A's manufacturing activities. The first row shows entries for the BVD/TCE equipment/solvent pair. Information on VOC content is not necessary for this pure solvent system. Solvent usage for 1993 was obtained from process records. No exhaust systems serve this equipment, so no exhaust system controls are reported. Finally, the amount of solvent sent to off-site disposal in 1993 was obtained from purchasing records.

The second row corresponds to the BVD/PERC pairing. Even though this is the same degreaser reported in the first row, it is entered again since it is paired with a different solvent. Information for the remaining columns was obtained from the same sources as for the BVD/TCE pair.

The third row shows entries for the two BVDs using TCA. Usage quantities and the amount of solvent sent off-site for recycling were obtained from purchasing records. The fourth row shows the data for the BCC/glycol ether pair. Since this solvent is a mixture, the VOC content per volume of material is needed (NOTE: This is not the same as VOC content less water and exempt solvents). This information was taken from the MSDS. The fifth row shows data for the handwiping activities. This is the only equipment/solvent pair served by an exhaust and air pollution control device. Therefore, the code for a carbon adsorption system is entered.

An example entry for maintenance activities is also included in the table below. All handwiping activities using mineral spirits are grouped into one row. Since 1993 data were not available from purchasing, process, or environmental records, the facility estimated 1993 usage based on current usage rates.

SOLVENT/EQUIPMENT PAIRING DATA FOR 1993 — **EXAMPLE**

2. Equipment/Operation		3. Solvent			4. 1993 Solvent Usage		5. Exhaust Control	6. 1993 Disposal Amount			7. TS
Code (from Table 1)	No. of Devices	a. Code (from Table 2)	b. VOC Content	c. Units	Amount	Units	Code (from Table 3)	Solvent Recycler	On-/Off-Site Disposal	Units	
MANUFACTURING EXAMPLES — QUESTIONNAIRE I											
BVD	1	116			154	gal			55	gal	
BVD	1	113			277	gal			120	gal	
BVD	2	101			660	gal		215		gal	
BCC	1	204	240	g/L	112	gal			75	gal	
HWS	1	107			159	gal	502	0	0	gal	

TABLE 1. EQUIPMENT/OPERATION TYPES

Equipment/Operation Type	Possible Synonym(s)	Code
Batch-Loaded Vapor Degreasers	Open-Top Vapor Degreasers, Enclosed Batch Design Vapor Degreasers, Advanced Vapor Degreasers	BVD
Conveyorized Vapor Degreasers	In-Line Vapor Degreasers	CVD
Gun Cleaning Equipment		GCE
Conveyorized Cold Cleaners	In-Line Cold Cleaners	CCC
Batch-Loaded Cold Cleaners	Remote Reservoir Cold Cleaners, Parts Washers, Water Cleaning Equipment, Semi-Aqueous Cleaning Equipment	BCC
Hand Wiping Stations, Handwiping - General	Wipe Cleaning, Solvent Flushing Operations, Coating Application Equipment Cleaning	HWS

EQUIPMENT/OPERATION DESCRIPTIONS

Degreaser means any equipment designed and used for holding a solvent in order to carry out solvent cleaning operations.

Vapor Degreaser means any degreaser designed to carry out parts cleaning with a boiling solvent. A heating element heats the solvent to a vapor. Cleaning normally occurs in the vapor zone, where the vapor condenses on the colder part which removes the soil as it drains. The parts are removed from the vapor zone clean and dry. In some cases, a spray wand is used to spray liquid solvent on the parts.

Batch-Loaded Vapor Degreaser (BVD): A vapor degreaser that is loaded with parts in a batch-wise fashion. These degreasers are also termed open-top vapor degreasers because the top of the degreaser is open for batch loading. These equipment have no lids or enclosures that can be used to seal the open top during operation.

Conveyorized Vapor Degreaser (CVD): A vapor degreaser which uses an integral, continuous, mechanical system for moving parts to be cleaned into and out of a solvent vapor cleaning zone.

Cold Cleaners mean any degreasers that use solvents that are either cold or are heated to below their boiling point.

Gun Cleaning Equipment (GCE): A cold cleaner specifically designed to clean coating or adhesive application spray guns. These equipment are associated with maintenance use only.

Conveyorized Cold Cleaner (CCC): A cold cleaner that uses an integral, continuous, mechanical system for moving materials or parts to be cleaned into and out of a liquid solvent cleaning zone.

Batch-Loaded Cold Cleaner (BCC): A cold cleaner that is designed to contain liquid solvent at a temperature below its boiling point and is used for cleaning objects in a batch-type operation. Included in this category are "Parts Washers" which can refer to any container, from a bucket or beaker, to a metal tray in a work area, in which parts cleaning is carried out. This category also includes remote reservoir cold cleaners and non-conveyorized water-based solvent cleaners.

Hand Wiping Stations, Handwiping - General (HWS): solvent cleaning, generally done by hand or without the use of any of the above-listed equipment.

TABLE 2. SOLVENT LIST

VOC Data Needed*	Solvent	Abbreviations, Synonyms, Comments	Coc
		Pure Solvent Systems	
	1,1,1-Trichloroethane	TCA, methyl chloroform	10
	1,1,2-Trichloro-1,2,2-trifluoroethane	trichlorotrifluoroethane, CFC-113, Freon 113, FC-113	10
	1,1-Dichloro-1-fluoroethane	HCFC-141b, dichlorofluoroethane	10
	Acetone		10
	Ethyl alcohol	ethanol	10
	Isopropyl alcohol	IPA, isopropanol	10
	Methyl ethyl ketone	MEK, 2-butanone, ethyl methyl ketone	10
	Methyl isobutyl ketone	MIBK, hexone	10
	Methylene chloride	METH, dichloromethane	10
	Mineral spirits	petroleum spirits, lacquer spirits, mineral thinner, mineral turpentine, Painters naphtha, VM&P naphtha, Varnish Makers and Painters naphtha, solvent naphtha, white spirits, benzine	1
	n-Hexane		1
	n-Methyl -2-pyrrolidinone	NMP, M-pyrol	1
	Perchloroethylene	PERC, tetrachloroethylene	1
	Safety Kleen		1
	Toluene	toluol	1
	Trichloroethylene	TCE, ethylene trichloride	1
	Petroleum Distillates	naphtha, aromatic naphtha, aromatic solvent, benzin, petroleum ether, hi-flash naphthaethylene	1
	Xylene	xylol, dimethylbenzene, o-xylene, m-xylene, p-xylene, xylene mixed isomers	1
X	UNLISTED PURE SOLVENT	any pure solvent system not listed above	1
		Generic Solvent Mixtures	
X	Alcohol blends	blends of ethanol, propanol, etc.	2
X	Chlorofluorocarbon blends	CFCs, CFC blends	2
X	Dibasic ester solutions	DBE (combination of three dibasic esters): dimethyl gluterate; dimethyl adipate; dimethyl succinate	2
X	Glycol ethers and glycol ether acetates	ethylene glycol ethyl ether acetate, 2-ethoxy ethanol acetate, 2-ethoxyethyl acetate, ethylene glycol monobutyl ether, ethylene glycol monomethyl ether, Ethylene glycol monoethyl ether acetate, methoxy carbitol, methyl carbitol, butyl carbitol, butoxy ethoxy ethanol, diethylene glycol butyl ether acetate, propylene glycol methyl ether, Cellosolve, methyl Cellosolve, 2-methoxy ethanol, ethylene glycol methyl ether, EGME, Cellosolve acetate, 2-methoxy ethanol acetate, ethylene glycol methyl ether acetate, Ethylene glycol monomethyl ether acetate	2
X	Hydrochlorofluorocarbon blends	HCFCs, HCFC blends	
X	Methylene bromide	often mixed with terpenes or other high boiling compounds	
X	o-Dichlorobenzene	synthetic solvent mixture	
X	Other halogenated blends	monochlorotoluene blend, chlorobenzotrifluoride blend, other halogenated (chlorinated, brominated, or fluorinated) blends	
X	Perfluorocarbon blends	PFCs, PFC blends	
X	Terpenes	citrus/pine derived solutions; d-limonene solutions	
X	Water-based solutions	any water-based solution not listed above, excluding soaps/detergents	
X	UNLISTED MIXTURE	any solvent mixture not appearing on the list above	

** Please indicate solvent VOC content on the questionnaires or attach Sections I-III of the MSDS to the survey questionnaire if your firm uses one of these solvents.*

TABLE 3. EXHAUST SYSTEM CONTROLS LIST

Description
Catalytic/Noncatalytic Incinerator
Carbon Adsorber
Unlisted Exhaust Control (Not for use if only a blower is present)

Table 1 -- See Other Side

E.H. Pechan & Associates, Inc./California Air Resources Board
Manufacturing Solvent Use and Disposal for 1993

QUESTIONNAIRE I. — **MANUFACTURING USES (solvent use during the cleaning of parts or products for sale). See attached Instructions (Yellow Sheet, Page 1). See the example given on Page 2 (Yellow Sheet).**

If you have questions, or need assistance completing this survey, please call 1-800-876-5836.

1. 1993 Facility Information

Primary SIC code (if known) _____

Type of product or service _____

Total number of personnel at your facility (including administrative personnel) _____

Number of personnel engaged only in production or service (do not include administrative personnel) _____

SOLVENT/EQUIPMENT PAIRING DATA FOR 1993

2. Equipment/Operation		3. Solvent			4. 1993 Solvent Usage		5. Exhaust Control	6. 1993 Disposal Amount			7. TS
Code (from Table 1)	No. of Devices	a. Code (from Table 2)	b. VOC Content	c. Units	Amount	Units	Code (from Table 3)	Solvent Recycler	On-/Off-Site Disposal	Units	

(Additional space provided on back)

SOLVENT/EQUIPMENT PAIRING DATA FOR 1993

2. Equipment/Operation		3. Solvent			4. 1993 Solvent Usage		5. Exhaust Control	6. 1993 Disposal Amount			7. TS
Code (from Table 1)	No. of Devices	a. Code (from Table 2)	b. VOC Content	c. Units	Amount	Units	Code (from Table 3)	Solvent Recycler	On-/Off-Site Disposal	Units	

E.H. Pechan & Associates, Inc./California Air Resources Board
Maintenance Solvent Use and Disposal for 1993

QUESTIONNAIRE II. — **MAINTENANCE USES (solvent use during the maintenance and repair of facility equipment). See attached Instructions (Yellow Sheet, Page 1). See the example given on Page 2 (Yellow Sheet).**

If you have questions, or need assistance completing this survey, please call 1-800-876-5836.

1. 1993 Facility Information

Primary SIC code (if known) _____

Type of product or service _____

Total number of personnel at your facility (including administrative personnel) _____

Number of personnel engaged only in production or service (do not include administrative personnel) _____

SOLVENT/EQUIPMENT PAIRING DATA FOR 1993

2. Equipment/Operation		3. Solvent			4. 1993 Solvent Usage		5. Exhaust Control	6. 1993 Disposal Amount			7. TS
Code (from Table 1)	No. of Devices	a. Code (from Table 2)	b. VOC Content	c. Units	Amount	Units	Code (from Table 3)	Solvent Recycler	On-/Off-Site Disposal	Units	

(Additional space provided on back)

SOLVENT/EQUIPMENT PAIRING DATA FOR 1993

2. Equipment/Operation		3. Solvent			4. 1993 Solvent Usage		5. Exhaust Control	6. 1993 Disposal Amount			7. TS
Code (from Table 1)	No. of Devices	a. Code (from Table 2)	b. VOC Content	c. Units	Amount	Units	Code (from Table 3)	Solvent Recycler	On-/Off-Site Disposal	Units	

APPENDIX B
EMISSION MODEL TABLES

Appendix B1 - Manufacturing Solvent Usage
TCA - Cold Cleaning
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1	AF		2.82	
	EF		11.1	
	UF		0.04	
2	AF		2.82	
	EF		11.1	
	UF		0.04	
3	AF		2.82	
	EF		11.1	
	UF		0.04	
4	AF		2.82	
	EF		11.1	
	UF		0.04	
5	AF		2.82	
	EF		11.1	
	UF		0.04	
6	AF		2.82	
	EF		11.1	
	UF		0.04	
7				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% TCA	100% BCC

Appendix B1 - Manufacturing Solvent Usage
TCA - Vapor Degreasing
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1	AF		3.07	
	EF		11.1	
	UF		0.12	
2	AF		21.8	
	EF		11.1	
	UF		0.18	
3	AF		3.07	
	EF		11.1	
	UF		0.12	
4	AF		3.07	
	EF		11.1	
	UF		0.12	
5	AF		6.95	
	EF		11.1	
	UF		0.47	
6	AF		3.07	
	EF		11.1	
	UF		0.12	
7	AF		3.07	
	EF		11.1	
	UF		0.12	

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

MIG	Region	Estimated Breakdown of 1993 TOG Emissions by: Solvent	Equipment
1,3,4,6,7	All	100% TCA	99% BVD 1% CVD
2	All	100% TCA	>99% BVD <<1% CVD
5	All	100% TCA	100% BVD

Appendix B1 - Manufacturing Solvent Usage
TCA - Handwiping
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1	AF	4.17	0.32	
	EF	11.1	11.1	
	UF	0.25	0.15	
2	AF	14.3		
	EF	10.9		
	UF	0.08		
3	AF	14.3		
	EF	10.9		
	UF	0.08		
4	AF	4.17	0.32	
	EF	11.1	11.1	
	UF	0.25	0.15	
5	AF	4.17	0.32	
	EF	11.1	11.1	
	UF	0.25	0.15	
6	AF	4.17	0.32	
	EF	11.1	11.1	
	UF	0.25	0.15	
7	AF	14.3		
	EF	10.9		
	UF	0.08		

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

MIG	Region	Estimated Breakdown of 1993 TOG Emissions by: Solvent	Equipment
1,4,5,6	1	100% TCA	100% HWS
1,4,5,6	2,3	100% TCA	100% HWS
2,3,7	All	100% TCA	100% HWS

Appendix B1 - Manufacturing Solvent Usage
CFC/CFC Blends - Cold Cleaning
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1				
2				
3	AF	2.64		
	EF	13.1		
	UF	0.10		
4	AF	2.64		
	EF	13.1		
	UF	0.10		
5	AF	2.64		
	EF	13.1		
	UF	0.10		
6	AF	2.64		
	EF	13.1		
	UF	0.10		
7				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% CFC	97% BCC 3% CCC

Appendix B1 - Manufacturing Solvent Usage
CFC/CFC Blends - Vapor Degreasing
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1				
2	AF	0.92		
	EF	13.1		
	UF	0.16		
3	AF	0.92		
	EF	13.1		
	UF	0.16		
4	AF	0.92		
	EF	13.1		
	UF	0.16		
5	AF	0.92		
	EF	13.1		
	UF	0.16		
6	AF	0.92		
	EF	13.1		
	UF	0.16		
7				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
>99% CFC	95% BVD
<<1% CFC Blends	5% CVD

Appendix B1 - Manufacturing Solvent Usage
CFC/CFC Blends - Handwiping
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1				
2				
3	AF	0.52		
	EF	12.6		
	UF	0.14		
4	AF	0.52		
	EF	12.6		
	UF	0.14		
5	AF	0.52		
	EF	12.6		
	UF	0.14		
6	AF	0.52		
	EF	12.6		
	UF	0.14		
7	AF	0.52		
	EF	12.6		
	UF	0.14		

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
60% CFC	100% HWS
40% CFC Blends	

Appendix B1 - Manufacturing Solvent Usage
HCFC - Vapor Degreasing
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1				
2	AF		3.85	
	EF		10.1	
	UF		0.05	
3	AF		3.85	
	EF		10.1	
	UF		0.05	
4	AF		3.85	
	EF		10.1	
	UF		0.05	
5				
6	AF		3.85	
	EF		10.1	
	UF		0.05	
7				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% HCFC	93% BVD
	7% CVD

Appendix B1 - Manufacturing Solvent Usage
HCFC - Handwiping
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1				
2				
3				
4				
5				
6	**AF**	**0.62**		
	EF	**10.1**		
	UF	**0.01**		
7	**AF**	**0.62**		
	EF	**10.1**		
	UF	**0.01**		

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% HCFC	100% HWS

Appendix B1 - Manufacturing Solvent Usage
Ketones - Cold Cleaning
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1				
2	AF		1.30	
	EF		6.63	
	UF		0.02	
3	AF		1.30	
	EF		6.63	
	UF		0.02	
4	AF		1.30	
	EF		6.63	
	UF		0.02	
5	AF		1.30	
	EF		6.63	
	UF		0.02	
6	AF		1.30	
	EF		6.63	
	UF		0.02	
7	AF		1.30	
	EF		6.63	
	UF		0.02	

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
92% Acetone	100% BCC
8% MEK	

Appendix B1 - Manufacturing Solvent Usage
Ketones - Handwiping
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1	AF		0.92	
	EF		6.46	
	UF		0.34	
2	AF		4.77	
	EF		6.62	
	UF		0.32	
3	AF		4.77	
	EF		6.62	
	UF		0.32	
4	AF		0.92	
	EF		6.46	
	UF		0.34	
5	AF		4.77	
	EF		6.62	
	UF		0.32	
6	AF		0.92	
	EF		6.46	
	UF		0.34	
7	AF		4.77	
	EF		6.62	
	UF		0.32	

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

MIG	Region	Estimated Breakdown of 1993 TOG Emissions by: Solvent	Equipment
1,4,6	All	87% Acetone 13% MEK	100% HWS
2,3,5,7	All	69% Acetone 30% MEK <<1% MIBK	100% HWS

Appendix B1 - Manufacturing Solvent Usage
Alcohols/Alcohol Blends - Cold Cleaning
Emission Model Variables

MIG		REGION 1	2	3
1				
2	**AF**		**7.92**	
	EF		**6.31**	
	UF		**0.15**	
3	**AF**		**7.92**	
	EF		**6.31**	
	UF		**0.15**	
4	**AF**		**1.28**	
	EF		**6.46**	
	UF		**0.20**	
5	**AF**		**7.92**	
	EF		**6.31**	
	UF		**0.15**	
6	**AF**		**7.92**	
	EF		**6.31**	
	UF		**0.15**	
7				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

MIG	**Region**	Estimated Breakdown of 1993 TOG Emissions by: Solvent	Equipment
2,3,5,6	All	30% Ethanol	70% BCC
		38% IPA	30% CCC
		32% Alcohol Blends	
4	All	4% Ethanol	96% BCC
		90% IPA	4% CCC
		5% Alcohol Blends	
		1% Other Unlisted	

Appendix B1 - Manufacturing Solvent Usage
Alcohols/Alcohol Blends - Handwiping
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1	AF		1.49	
	EF		6.35	
	UF		0.31	
2	AF		1.49	
	EF		6.35	
	UF		0.31	
3	AF		0.43	
	EF		6.49	
	UF		0.54	
4	AF		1.49	
	EF		6.35	
	UF		0.31	
5	AF		0.43	
	EF		6.49	
	UF		0.54	
6	AF		0.43	
	EF		6.49	
	UF		0.54	
7	AF		1.49	
	EF		6.35	
	UF		0.31	

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

MIG	Region	Estimated Breakdown of 1993 TOG Emissions by: Solvent	Equipment
1,2,4,7	All	24% Ethanol 46% IPA 12% Alcohol Blends 18% Other Unlisted	100% HWS
3,5,6	All	4% Ethanol 94% IPA 1% Alcohol Blends 1% Other Unlisted	100% HWS

Appendix B1 - Manufacturing Solvent Usage
Methylene Chloride - Cold Cleaning
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1				
2				
3	AF	1.31		
	EF	11.1		
	UF	0.01		
4	AF	1.31		
	EF	11.1		
	UF	0.01		
5				
6	AF	1.31		
	EF	11.1		
	UF	0.01		
7				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% Methylene Chloride	100% BCC

Appendix B1 - Manufacturing Solvent Usage
Methylene Chloride - Handwiping
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1	AF		2.83	
	EF		11.1	
	UF		0.11	
2	AF		2.83	
	EF		11.1	
	UF		0.11	
3	AF		2.83	
	EF		11.1	
	UF		0.11	
4	AF		2.83	
	EF		11.1	
	UF		0.11	
5	AF		2.83	
	EF		11.1	
	UF		0.11	
6	AF		2.83	
	EF		11.1	
	UF		0.11	
7	AF		2.83	
	EF		11.1	
	UF		0.11	

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% Methylene Chloride	100% HWS

Appendix B1 - Manufacturing Solvent Usage
Petroleum Distillates - Cold Cleaning
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1				
2	AF	9.23	1.62	
	EF	6.40	6.43	
	UF	0.11	0.24	
3	AF	9.23	1.62	
	EF	6.40	6.43	
	UF	0.11	0.24	
4	AF	15.0		
	EF	6.69		
	UF	0.23		
5	AF	15.0		
	EF	6.69		
	UF	0.23		
6	AF	3.20		
	EF	6.54		
	UF	0.08		
7	AF	3.20		
	EF	6.54		
	UF	0.08		

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

MIG	Region	Estimated Breakdown of 1993 TOG Emissions by: Solvent	Equipment
2,3	1	33% Mineral Spirits 65% Safety Kleen 2% Petroleum Distillates	95% BCC 5% CCC
2,3	2,3	34% Mineral Spirits 33% Safety Kleen 31% Petroleum Distillates 2% Other Unlisted	98% BCC 2% CCC
4,5	All	13% Mineral Spirits 83% Safety Kleen 3% Petroleum Distillates 1% Other Unlisted	100% BCC
6,7	All	10% Mineral Spirits 89% Safety Kleen <<1% Petroleum Distillates <1% Other Unlisted	98% BCC 2% CCC

Appendix B1 - Manufacturing Solvent Usage
Petroleum Distillates - Handwiping
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1	AF	2.19	4.84	
	EF	6.43	6.37	
	UF	0.09	0.11	
2	AF	21.7	6.06	
	EF	6.37	6.39	
	UF	0.08	0.21	
3	AF	2.19	4.84	
	EF	6.43	6.37	
	UF	0.09	0.11	
4	AF	1.10		
	EF	6.26		
	UF	0.04		
5	AF	21.7	6.06	
	EF	6.37	6.39	
	UF	0.08	0.21	
6	AF	1.10		
	EF	6.26		
	UF	0.04		
7	AF	21.7	6.06	
	EF	6.37	6.39	
	UF	0.08	0.21	

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

MIG	Region	Estimated Breakdown of 1993 TOG Emissions by: Solvent	Equipment
1,3	1	82% Mineral Spirits 18% Petroleum Distillates	100% HWS
1,3	2,3	42% Mineral Spirits 40% Safety Kleen 17% Petroleum Distillates <1% Other Unlisted	100% HWS
2,5,7	1	99% Mineral Spirits <1% Petroleum Distillates <<1% Other Unlisted	100% HWS
2,5,7	2,3	58% Mineral Spirits 22% Safety Kleen 16% Petroleum Distillates 4% Other Unlisted	100% HWS
4,6	All	69% Mineral Spirits 8% Safety Kleen 22% Petroleum Distillates <1% Other Unlisted	100% HWS

Appendix B1 - Manufacturing Solvent Usage
Miscellaneous Pure Solvents - Cold Cleaning
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1				
2	**AF**		**0.53**	
	EF		**6.53**	
	UF		**0.05**	
3				
4	**AF**		**0.53**	
	EF		**6.53**	
	UF		**0.05**	
5				
6				
7				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
11% n-Hexane	100% BCC
4% NMP	
85% Other Unlisted	

Appendix B1 - Manufacturing Solvent Usage
Miscellaneous Pure Solvents - Handwiping
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1	AF	1.95		
	EF	6.96		
	UF	0.03		
2	AF	1.95		
	EF	6.96		
	UF	0.03		
3	AF	1.95		
	EF	6.96		
	UF	0.03		
4	AF	1.95		
	EF	6.96		
	UF	0.03		
5	AF	1.95		
	EF	6.96		
	UF	0.03		
6	AF	1.95		
	EF	6.96		
	UF	0.03		
7	AF	1.95		
	EF	6.96		
	UF	0.03		

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
3% n-Hexane	100% HWS
97% Other Unlisted	

Appendix B1 - Manufacturing Solvent Usage
PERC - Vapor Degreasing
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1				
2	**AF**		**7.40**	
	EF		**13.0**	
	UF		**0.02**	
3				
4				
5	**AF**		**7.40**	
	EF		**13.0**	
	UF		**0.02**	
6				
7	**AF**		**7.40**	
	EF		**13.0**	
	UF		**0.02**	

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% PERC	>99% BVD
	<<1% CVD

Appendix B1 - Manufacturing Solvent Usage
PERC - Handwiping
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1				
2	AF	0.62		
	EF	13.5		
	UF	0.01		
3				
4	AF	0.62		
	EF	13.5		
	UF	0.01		
5	AF	0.62		
	EF	13.5		
	UF	0.01		
6				
7				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% PERC	100% HWS

Appendix B1 - Manufacturing Solvent Usage
Toluene/Xylene - Cold Cleaning
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1				
2	AF	1.45		
	EF	7.16		
	UF	0.01		
3	AF	1.45		
	EF	7.16		
	UF	0.01		
4	AF	1.45		
	EF	7.16		
	UF	0.01		
5				
6	AF	1.45		
	EF	7.16		
	UF	0.01		
7				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
72% Toluene	100% BCC
28% Xylene	

Appendix B1 - Manufacturing Solvent Usage
Toluene/Xylene - Handwiping
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1				
2	AF	1.32		
	EF	7.11		
	UF	0.13		
3	AF	1.32		
	EF	7.11		
	UF	0.13		
4	AF	1.32		
	EF	7.11		
	UF	0.13		
5	AF	1.32		
	EF	7.11		
	UF	0.13		
6	AF	1.32		
	EF	7.11		
	UF	0.13		
7				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
62% Toluene	100% HWS
38% Xylene	

Appendix B1 - Manufacturing Solvent Usage
TCE - Vapor Degreasing
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1				
2	AF		9.73	
	EF		12.2	
	UF		0.01	
3				
4				
5	AF		9.73	
	EF		12.2	
	UF		0.01	
6	AF		9.73	
	EF		12.2	
	UF		0.01	
7				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% TCE	100% BVD

Appendix B1 - Manufacturing Solvent Usage

TCE - Handwiping
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1	AF		1.09	
	EF		11.0	
	UF		0.03	
2	AF		1.09	
	EF		11.0	
	UF		0.03	
3				
4				
5	AF		1.09	
	EF		11.0	
	UF		0.03	
6				
7				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% TCE	100% HWS

Appendix B1 - Manufacturing Solvent Usage
Glycol Ethers - Cold Cleaning
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1				
2	AF		0.70	
	EF		3.15	
	UF		0.03	
3	AF		0.70	
	EF		3.15	
	UF		0.03	
4	AF		0.70	
	EF		3.15	
	UF		0.03	
5				
6	AF		0.70	
	EF		3.15	
	UF		0.03	
7				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% Glycol Ethers	67% BCC
	33% CCC

Appendix B1 - Manufacturing Solvent Usage
Glycol Ethers - Handwiping
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1	AF	0.67		
	EF	5.84		
	UF	0.10		
2	AF	0.67		
	EF	5.84		
	UF	0.10		
3	AF	0.67		
	EF	5.84		
	UF	0.10		
4	AF	0.67		
	EF	5.84		
	UF	0.10		
5	AF	0.67		
	EF	5.84		
	UF	0.10		
6	AF	0.67		
	EF	5.84		
	UF	0.10		
7	AF	0.67		
	EF	5.84		
	UF	0.10		

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% Glycol Ethers	100% HWS

Appendix B1 - Manufacturing Solvent Usage
PFC Blends - Vapor Degreasing
Emission Model Variables

MIG		REGION 1	2	3
1				
2				
3	**AF**	**0.36**		
	EF	**14.2**		
	UF	**0.23**		
4				
5				
6				
7				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% PFC Blends	100% BVD

Appendix B1 - Manufacturing Solvent Usage
Terpenes - Cold Cleaning
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1				
2	AF	2.00		
	EF	4.43		
	UF	0.09		
3	AF	2.00		
	EF	4.43		
	UF	0.09		
4	AF	2.00		
	EF	4.43		
	UF	0.09		
5	AF	2.00		
	EF	4.43		
	UF	0.09		
6	AF	2.00		
	EF	4.43		
	UF	0.09		
7				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% Terpenes	70% BCC 30% CCC

Appendix B1 - Manufacturing Solvent Usage
Terpenes - Handwiping
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1	AF		0.11	
	EF		6.39	
	UF		0.01	
2	AF		0.11	
	EF		6.39	
	UF		0.01	
3	AF		0.11	
	EF		6.39	
	UF		0.01	
4	AF		0.11	
	EF		6.39	
	UF		0.01	
5	AF		0.11	
	EF		6.39	
	UF		0.01	
6	AF		0.11	
	EF		6.39	
	UF		0.01	
7				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% Terpenes	100% HWS

Appendix B1 - Manufacturing Solvent Usage
Miscellanous Blends - Cold Cleaning
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1				
2	AF	2.39		
	EF	7.73		
	UF	0.10		
3	AF	2.39		
	EF	7.73		
	UF	0.10		
4	AF	2.39		
	EF	7.73		
	UF	0.10		
5	AF	2.39		
	EF	7.73		
	UF	0.10		
6	AF	2.39		
	EF	7.73		
	UF	0.10		
7				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% Other Unlisted	90% BCC 10% CCC

Appendix B1 - Manufacturing Solvent Usage
Miscellanous Blends - Vapor Degreasing
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1				
2				
3				
4	**AF**		**0.81**	
	EF		**8.18**	
	UF		**0.01**	
5				
6	**AF**		**0.81**	
	EF		**8.18**	
	UF		**0.01**	
7				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% Other Unlisted	100% BVD

Appendix B1 - Manufacturing Solvent Usage
Miscellanous Blends - Handwiping
Emission Model Variables

MIG		REGION 1	REGION 2	REGION 3
1	AF		3.11	
	EF		6.46	
	UF		0.24	
2	AF		3.11	
	EF		6.46	
	UF		0.24	
3	AF		3.11	
	EF		6.46	
	UF		0.24	
4	AF		3.11	
	EF		6.46	
	UF		0.24	
5	AF		3.11	
	EF		6.46	
	UF		0.24	
6	AF		3.11	
	EF		6.46	
	UF		0.24	
7	AF		3.11	
	EF		6.46	
	UF		0.24	

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% Other Unlisted	100% HWS

Appendix B2 - Maintenance Solvent Usage
TCA - Cold Cleaning
Emission Model Variables

GROUP		REGION 1	2	3
1	**AF**		**2.90**	
	EF		**11.1**	
	UF		**0.28**	
2				
3				
4				
5	**AF**		**2.90**	
	EF		**11.1**	
	UF		**0.28**	
6	**AF**		**2.90**	
	EF		**11.1**	
	UF		**0.28**	
7				
8				
9				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% TCA	99% BCC
	1% GCE

Appendix B2 - Maintenance Solvent Usage
TCA - Vapor Degreasing
Emission Model Variables

GROUP		REGION 1	REGION 2	REGION 3
1				
2	AF	4.16		
	EF	11.1		
	UF	0.01		
3	AF	4.16		
	EF	11.1		
	UF	0.01		
4				
5				
6	AF	4.16		
	EF	11.1		
	UF	0.01		
7				
8				
9				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% TCA	100% BVD

Appendix B2 - Maintenance Solvent Usage

TCA - Handwiping
Emission Model Variables

GROUP		REGION 1	REGION 2	REGION 3
1	AF		1.05	
	EF		11.1	
	UF		0.05	
2	AF		1.05	
	EF		11.1	
	UF		0.05	
3	AF		1.05	
	EF		11.1	
	UF		0.05	
4	AF		1.05	
	EF		11.1	
	UF		0.05	
5	AF		1.05	
	EF		11.1	
	UF		0.05	
6	AF		1.05	
	EF		11.1	
	UF		0.05	
7				
8	AF		3.27	
	EF		11.1	
	UF		0.01	
9	AF		7.66	
	EF		11.1	
	UF		0.02	

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% TCA	100% HWS

Appendix B2 - Maintenance Solvent Usage
CFC/CFC Blends - Cold Cleaning
Emission Model Variables

GROUP		REGION 1	REGION 2	REGION 3
1				
2				
3				
4	**AF**	**0.14**		
	EF	**13.1**		
	UF	**0.01**		
5				
6	**AF**	**0.14**		
	EF	**13.1**		
	UF	**0.01**		
7				
8				
9				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% CFC	100% BCC

Appendix B2 - Maintenance Solvent Usage
CFC/CFC Blends - Vapor Degreasing
Emission Model Variables

GROUP		REGION 1	REGION 2	REGION 3
1				
2				
3	**AF**		**0.27**	
	EF		**13.1**	
	UF		**0.02**	
4	**AF**		**0.27**	
	EF		**13.1**	
	UF		**0.02**	
5				
6	**AF**		**0.27**	
	EF		**13.1**	
	UF		**0.02**	
7				
8				
9				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% CFC	100% BVD

Appendix B2 - Maintenance Solvent Usage
CFC/CFC Blends - Handwiping
Emission Model Variables

GROUP		REGION 1	REGION 2	REGION 3
1				
2				
3				
4	**AF**	**0.08**		
	EF	**13.1**		
	UF	**0.03**		
5	**AF**	**0.08**		
	EF	**13.1**		
	UF	**0.03**		
6	**AF**	**0.08**		
	EF	**13.1**		
	UF	**0.03**		
7				
8				
9				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
99% CFC	100% HWS
1% CFC Blends	

Appendix B2 - Maintenance Solvent Usage

HCFC - Handwiping
Emission Model Variables

GROUP		REGION 1	REGION 2	REGION 3
1				
2				
3				
4	**AF**	**0.09**		
	EF	**10.1**		
	UF	**0.01**		
5				
6	**AF**	**0.09**		
	EF	**10.1**		
	UF	**0.01**		
7	**AF**	**0.09**		
	EF	**10.1**		
	UF	**0.01**		
8				
9				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% HCFC	100% HWS

Appendix B2 - Maintenance Solvent Usage
Ketones - Cold Cleaning
Emission Model Variables

GROUP		REGION 1	2	3
1				
2	AF	24.8		
	EF	6.60		
	UF	0.05		
3	AF	24.8		
	EF	6.60		
	UF	0.05		
4	AF	24.8		
	EF	6.60		
	UF	0.05		
5	AF	24.8		
	EF	6.60		
	UF	0.05		
6	AF	24.8		
	EF	6.60		
	UF	0.05		
7				
8				
9	AF	4.80		
	EF	6.60		
	UF	0.02		

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

	Solvent	Equipment
Groups 1-7	99% Acetone	8% BCC
	1% MEK	92% GCE
	<<1% MIBK	
Group 9	99% Acetone	100% BCC
	1% MEK	

Appendix B2 - Maintenance Solvent Usage
Ketones - Handwiping
Emission Model Variables

GROUP		REGION 1	REGION 2	REGION 3
1	AF		1.91	
	EF		6.60	
	UF		0.18	
2	AF		1.91	
	EF		6.60	
	UF		0.18	
3	AF		1.91	
	EF		6.60	
	UF		0.18	
4	AF		1.91	
	EF		6.60	
	UF		0.18	
5	AF		1.91	
	EF		6.60	
	UF		0.18	
6	AF		1.91	
	EF		6.60	
	UF		0.18	
7	AF		1.91	
	EF		6.60	
	UF		0.18	
8	AF		1.00	
	EF		6.60	
	UF		0.01	
9	AF		1.00	
	EF		6.60	
	UF		0.02	

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

	Solvent	Equipment
Groups 1-7	89% Acetone 7% MEK 4% MIBK	100% HWS
Group 8	>99% Acetone <<1% MEK	100% HWS
Group 9	67% Acetone 33% MEK	100% HWS

Appendix B2 - Maintenance Solvent Usage
Alcohols/Alcohol Blends - Cold Cleaning
Emission Model Variables

GROUP		REGION 1	REGION 2	REGION 3
1	**AF**		**0.62**	
	EF		**6.50**	
	UF		**0.02**	
2	**AF**		**0.62**	
	EF		**6.50**	
	UF		**0.02**	
3	**AF**		**0.62**	
	EF		**6.50**	
	UF		**0.02**	
4	**AF**		**0.62**	
	EF		**6.50**	
	UF		**0.02**	
5				
6				
7	**AF**		**0.62**	
	EF		**6.50**	
	UF		**0.02**	
8				
9	**AF**		**3.00**	
	EF		**6.50**	
	UF		**0.01**	

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

	Solvent	Equipment
Groups 1-7	15% Ethanol	61% BCC
	85% IPA	39% GCE
Group 9	100% IPA	100% BCC

Appendix B2 - Maintenance Solvent Usage
Alcohols/Alcohol Blends - Handwiping
Emission Model Variables

GROUP		REGION 1	2	3
1	AF	0.47		
	EF	6.40		
	UF	0.19		
2	AF	0.47		
	EF	6.40		
	UF	0.19		
3	AF	0.47		
	EF	6.40		
	UF	0.19		
4	AF	0.47		
	EF	6.40		
	UF	0.19		
5	AF	0.47		
	EF	6.40		
	UF	0.19		
6	AF	0.47		
	EF	6.40		
	UF	0.19		
7	AF	0.47		
	EF	6.40		
	UF	0.19		
8	AF	0.23		
	EF	6.50		
	UF	0.01		
9	AF	1.03		
	EF	6.50		
	UF	0.01		

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

	Solvent	Equipment
Groups 1-7	6% Ethanol 93% IPA 1% Alcohol Blends	100% HWS
Group 8	100% IPA	100% HWS
Group 9	100% IPA	100% HWS

Appendix B2 - Maintenance Solvent Usage
Methylene Chloride - Handwiping
Emission Model Variables

GROUP		REGION 1	REGION 2	REGION 3
1				
2				
3	**AF**	**0.22**		
	EF	**6.93**		
	UF	**0.08**		
4				
5	**AF**	**0.22**		
	EF	**6.93**		
	UF	**0.08**		
6				
7				
8				
9				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% Methylene Chloride	100% HWS

Appendix B2 - Maintenance Solvent Usage
Petroleum Distillates - Cold Cleaning
Emission Model Variables

GROUP		REGION 1	REGION 2	REGION 3
1	AF		3.35	
	EF		6.49	
	UF		0.22	
2	AF		3.35	
	EF		6.49	
	UF		0.22	
3	AF		3.35	
	EF		6.49	
	UF		0.22	
4	AF		3.35	
	EF		6.49	
	UF		0.22	
5	AF		3.35	
	EF		6.49	
	UF		0.22	
6	AF		3.35	
	EF		6.49	
	UF		0.22	
7	AF		3.35	
	EF		6.49	
	UF		0.22	
8	AF		5.00	
	EF		6.60	
	UF		0.68	
9	AF		11.2	
	EF		6.60	
	UF		0.61	

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

	Solvent	Equipment
Groups 1-7	13% Mineral Spirits	94% BCC
	81% Safety Kleen	<1% CCC
	5% Petroleum distillates	5% GCE
	<1% Other Unlisted	
Group 8	7% Mineral Spirits	100% BCC
	88% Safety Kleen	
	5% Petroleum Distillates	
Group 9	24% Mineral Spirits	100% BCC
	75% Safety Kleen	
	<<1% Petroleum Distillates	

Appendix B2 - Maintenance Solvent Usage
Petroleum Distillates - Handwiping
Emission Model Variables

GROUP		REGION 1	REGION 2	REGION 3
1	AF		3.17	
	EF		6.43	
	UF		0.12	
2	AF		3.17	
	EF		6.43	
	UF		0.12	
3	AF		3.17	
	EF		6.43	
	UF		0.12	
4	AF		3.17	
	EF		6.43	
	UF		0.12	
5	AF		3.17	
	EF		6.43	
	UF		0.12	
6	AF		3.17	
	EF		6.43	
	UF		0.12	
7	AF		3.17	
	EF		6.43	
	UF		0.12	
8	AF		2.00	
	EF		6.60	
	UF		0.27	
9	AF		2.00	
	EF		6.60	
	UF		0.01	

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

	Solvent	Equipment
Groups 1-7	72% Mineral Spirits	100% HWS
	23% Safety Kleen	
	3% Petroleum Distillates	
	2% Other Unlisted	
Group 8	54% Mineral Spirits	100% HWS
	41% Safety Kleen	
	5% Petroleum Distillates	
Group 9	42% Mineral Spirits	100% HWS
	7% Safety Kleen	
	51% Petroleum Distillates	

Appendix B2 - Maintenance Solvent Usage
Miscellaneous Pure Solvents - Cold Cleaning
Emission Model Variables

GROUP		REGION 1	REGION 2	REGION 3
1				
2	**AF**		**0.09**	
	EF		**7.58**	
	UF		**0.01**	
3				
4	**AF**		**0.09**	
	EF		**7.58**	
	UF		**0.01**	
5				
6				
7				
8				
9				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
58% NMP	42% BCC
42% Other Unlisted	58% GCE

Appendix B2 - Maintenance Solvent Usage
Miscellaneous Pure Solvents - Hand Wiping
Emission Model Variables

GROUP		REGION 1	REGION 2	REGION 3
1	AF		0.10	
	EF		7.11	
	UF		0.08	
2	AF		0.10	
	EF		7.11	
	UF		0.08	
3	AF		0.10	
	EF		7.11	
	UF		0.08	
4	AF		0.10	
	EF		7.11	
	UF		0.08	
5	AF		0.10	
	EF		7.11	
	UF		0.08	
6				
7				
8				
9				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
<<1% NMP	100% HWS
>99% Other Unlisted	

Appendix B2 - Maintenance Solvent Usage
Toluene/Xylene - Cold Cleaning
Emission Model Variables

GROUP		REGION 1	REGION 2	REGION 3
1	AF		0.57	
	EF		7.10	
	UF		0.01	
2	AF		0.57	
	EF		7.10	
	UF		0.01	
3	AF		0.57	
	EF		7.10	
	UF		0.01	
4	AF		0.57	
	EF		7.10	
	UF		0.01	
5				
6				
7	AF		0.57	
	EF		7.10	
	UF		0.01	
8				
9				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
7% Toluene	59% BCC
93% Xylene	41% GCE

Appendix B2 - Maintenance Solvent Usage
Toluene/Xylene - Handwiping
Emission Model Variables

GROUP		REGION 1	REGION 2	REGION 3
1	AF		1.31	
	EF		6.65	
	UF		0.02	
2	AF		1.31	
	EF		6.65	
	UF		0.02	
3	AF		1.31	
	EF		6.65	
	UF		0.02	
4	AF		1.31	
	EF		6.65	
	UF		0.02	
5	AF		1.31	
	EF		6.65	
	UF		0.02	
6				
7				
8				
9				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
93% Toluene	100% HWS
7% Xylene	

Appendix B2 - Maintenance Solvent Usage

TCE - Handwiping
Emission Model Variables

GROUP		REGION 1	REGION 2	REGION 3
1	**AF**		**0.77**	
	EF		**12.2**	
	UF		**0.001**	
2				
3				
4				
5	**AF**		**0.77**	
	EF		**12.2**	
	UF		**0.001**	
6				
7				
8				
9				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% TCE	100% HWS

Appendix B2 - Maintenance Solvent Usage
Glycol Ethers - Cold Cleaning
Emission Model Variables

GROUP		REGION 1	REGION 2	REGION 3
1	AF		2.42	
	EF		4.62	
	UF		0.02	
2	AF		2.42	
	EF		4.62	
	UF		0.02	
3	AF		2.42	
	EF		4.62	
	UF		0.02	
4				
5	AF		2.42	
	EF		4.62	
	UF		0.02	
6				
7				
8				
9				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% Glycol Ethers	96% BCC
	<1% CCC
	3% GCE

Appendix B2 - Maintenance Solvent Usage
Glycol Ethers - Handwiping
Emission Model Variables

GROUP		REGION 1	REGION 2	REGION 3
1				
2	AF		0.84	
	EF		5.60	
	UF		0.10	
3	AF		0.84	
	EF		5.60	
	UF		0.10	
4	AF		0.84	
	EF		5.60	
	UF		0.10	
5	AF		0.84	
	EF		5.60	
	UF		0.10	
6				
7	AF		0.84	
	EF		5.60	
	UF		0.10	
8				
9				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% Glycol Ethers	100% HWS

Appendix B2 - Maintenance Solvent Usage
Terpenes - Cold Cleaning
Emission Model Variables

GROUP		REGION 1	2	3
1				
2	AF	0.44		
	EF	3.32		
	UF	0.04		
3	AF	0.44		
	EF	3.32		
	UF	0.04		
4	AF	0.44		
	EF	3.32		
	UF	0.04		
5	AF	0.44		
	EF	3.32		
	UF	0.04		
6				
7				
8				
9				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% Terpenes	100% BCC

Appendix B2 - Maintenance Solvent Usage
Terpenes - Handwiping
Emission Model Variables

GROUP		REGION 1	REGION 2	REGION 3
1				
2	**AF**		**1.53**	
	EF		**6.08**	
	UF		**0.05**	
3				
4	**AF**		**1.53**	
	EF		**6.08**	
	UF		**0.05**	
5	**AF**		**1.53**	
	EF		**6.08**	
	UF		**0.05**	
6				
7	**AF**		**1.53**	
	EF		**6.08**	
	UF		**0.05**	
8				
9				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% Terpenes	100% HWS

Appendix B2 - Maintenance Solvent Usage
Miscellaneous Blends - Cold Cleaning
Emission Model Variables

GROUP		REGION 1	REGION 2	REGION 3
1	AF		0.37	
	EF		6.90	
	UF		0.19	
2	AF		0.37	
	EF		6.90	
	UF		0.19	
3	AF		0.37	
	EF		6.90	
	UF		0.19	
4	AF		0.37	
	EF		6.90	
	UF		0.19	
5	AF		0.37	
	EF		6.90	
	UF		0.19	
6	AF		0.37	
	EF		6.90	
	UF		0.19	
7	AF		0.37	
	EF		6.90	
	UF		0.19	
8				
9				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% Other Unlisted	7% BCC 93% GCE

Appendix B2 - Maintenance Solvent Usage
Miscellaneous Blends - Handwiping
Emission Model Variables

GROUP		REGION 1	REGION 2	REGION 3
1	AF		0.70	
	EF		6.91	
	UF		0.21	
2	AF		0.70	
	EF		6.91	
	UF		0.21	
3	AF		0.70	
	EF		6.91	
	UF		0.21	
4	AF		0.70	
	EF		6.91	
	UF		0.21	
5	AF		0.70	
	EF		6.91	
	UF		0.21	
6				
7	AF		0.70	
	EF		6.91	
	UF		0.21	
8				
9				

AF = Activity Factor in gal solvent loss/employee/year
EF = Emission Factor in lb TOG/gal solvent
UF = User Fraction

Estimated Breakdown of 1993 TOG Emissions by:

Solvent	Equipment
100% Other Unlisted	100% HWS

APPENDIX C
UNCERTAINTY MODELING RESULTS

C-1 TCE-BVD Uncertainty Analysis

C-2 TCA-HWS Uncertainty Analysis

C-3 Misc. Blends-BCC Uncertainty Analysis

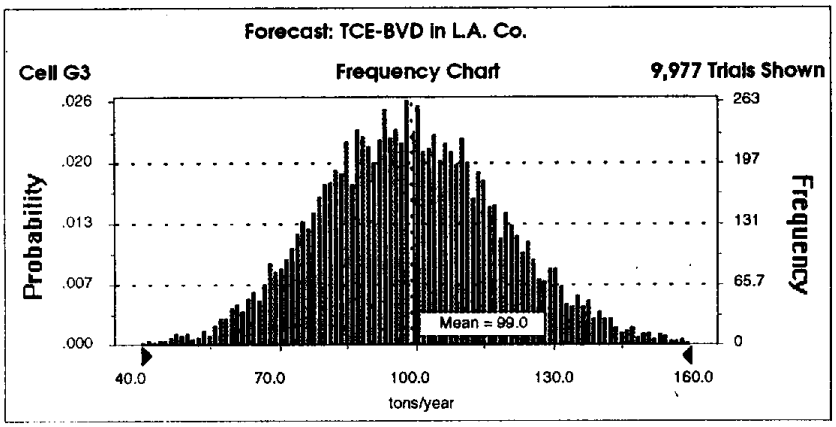
Appendix C-1
TCE-BVD Uncertainty Analysis

Crystal Ball Report
Simulation started on 11/20/95 at 13:14:23
Simulation stopped on 11/20/95 at 13:23:35

Forecast: TCE-BVD in L.A. Co. **Cell: G3**

Summary:
Display Range is from 40.0 to 160.0 tons/year
Entire Range is from 26.2 to 178.9 tons/year
After 10,000 Trials, the Std. Error of the Mean is 0.2

Statistics:	Value
Trials	10000
Mean	99.0
Median (approx.)	98.4
Mode (approx.)	98.7
Standard Deviation	20.2
Variance	408.2
Skewness	0.13
Kurtosis	2.96
Coeff. of Variability	0.20
Range Minimum	26.2
Range Maximum	178.9
Range Width	152.7
Mean Std. Error	0.20



Forecast: TCE-BVD in L.A. Co. (cont'd) **Cell: G3**

Percentiles:

Percentile	tons/year (approx.)
0.0%	26.2
2.5%	60.9
5.0%	66.8
50.0%	98.4
95.0%	133.3
97.5%	140.1
100.0%	178.9

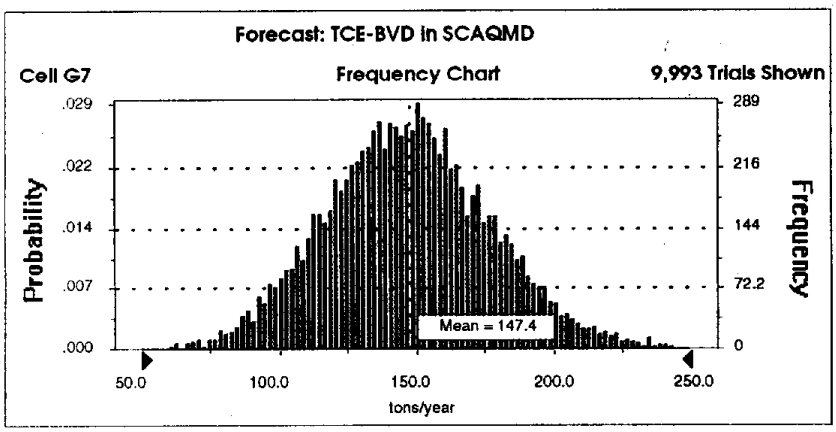
End of Forecast

Appendix C-1
TCE-BVD Uncertainty Analysis

Forecast: TCE-BVD in SCAQMD **Cell: G7**

Summary:
Display Range is from 50.0 to 250.0 tons/year
Entire Range is from 29.8 to 266.1 tons/year
After 10,000 Trials, the Std. Error of the Mean is 0.3

Statistics:	Value
Trials	10000
Mean	147.4
Median (approx.)	147.0
Mode (approx.)	153.8
Standard Deviation	30.1
Variance	907.4
Skewness	0.14
Kurtosis	3.03
Coeff. of Variability	0.20
Range Minimum	29.8
Range Maximum	266.1
Range Width	236.3
Mean Std. Error	0.30



Forecast: TCE-BVD In SCAQMD (cont'd) **Cell: G7**

Percentiles:

Percentile	tons/year (approx.)
0.0%	29.8
2.5%	90.2
5.0%	98.9
50.0%	147.0
95.0%	197.7
97.5%	208.9
100.0%	266.1

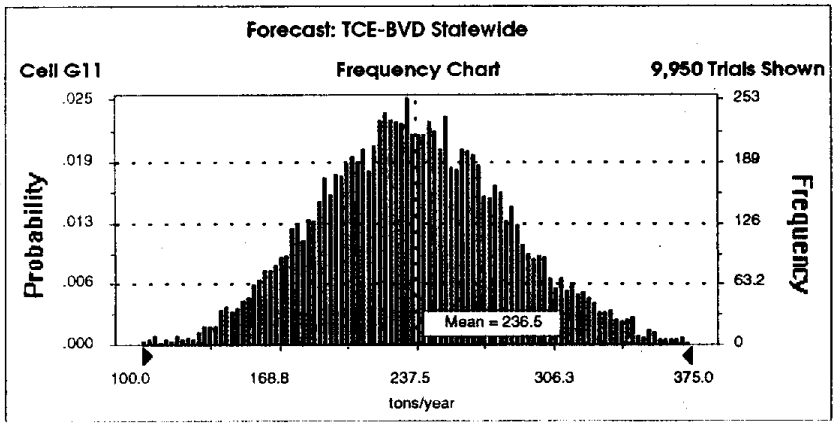
End of Forecast

Appendix C-1
TCE-BVD Uncertainty Analysis

Forecast: TCE-BVD Statewide **Cell: G11**

Summary:
Display Range is from 100.0 to 375.0 tons/year
Entire Range is from 57.0 to 434.9 tons/year
After 10,000 Trials, the Std. Error of the Mean is 0.5

Statistics:	Value
Trials	10000
Mean	236.5
Median (approx.)	235.1
Mode (approx.)	232.7
Standard Deviation	48.2
Variance	2322.9
Skewness	0.12
Kurtosis	3.05
Coeff. of Variability	0.20
Range Minimum	57.0
Range Maximum	434.9
Range Width	377.9
Mean Std. Error	0.48



Forecast: TCE-BVD Statewide (cont'd) **Cell: G11**

Percentiles:

Percentile	tons/year (approx.)
0.0%	57.0
2.5%	145.1
5.0%	159.1
50.0%	235.1
95.0%	318.3
97.5%	334.3
100.0%	434.9

End of Forecast

Appendix C-1
TCE-BVD Uncertainty Analysis

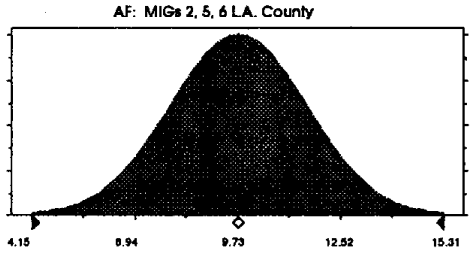
Assumptions

Assumption: AF: MIGs 2, 5, 6 L.A. County **Cell: B3**

Normal distribution with parameters:

Mean	9.73
Standard Dev.	1.86

Selected range is from -Infinity to +Infinity
Mean value in simulation was 9.73

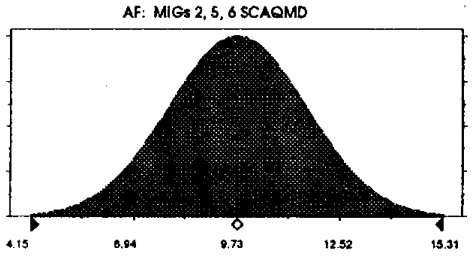


Assumption: AF: MIGs 2, 5, 6 SCAQMD **Cell: B7**

Normal distribution with parameters:

Mean	9.73
Standard Dev.	1.86

Selected range is from -Infinity to +Infinity
Mean value in simulation was 9.73

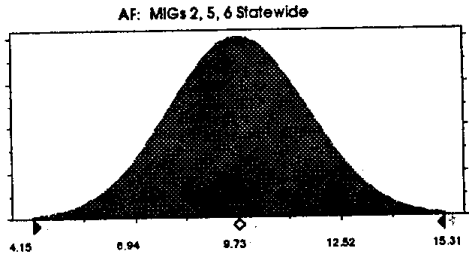


Assumption: AF: MIGs 2, 5, 6 Statewide **Cell: B11**

Normal distribution with parameters:

Mean	9.73
Standard Dev.	1.86

Selected range is from -Infinity to +Infinity
Mean value in simulation was 9.73

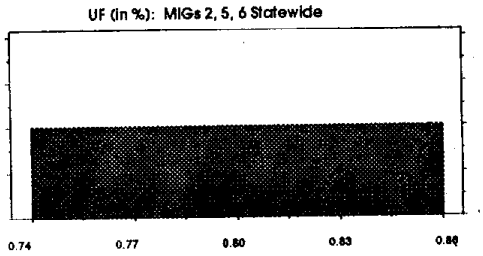


Assumption: UF (in %): MIGs 2, 5, 6 Statewide **Cell: D3**

Uniform distribution with parameters:

Minimum	0.74
Maximum	0.86

Mean value in simulation was 0.80

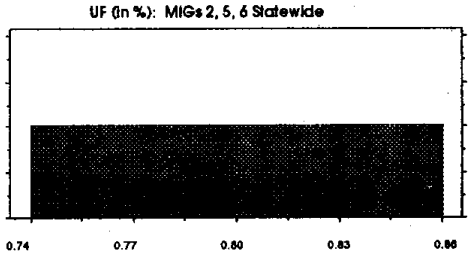


Assumption: UF (In %): MIGs 2, 5, 6 Statewide **Cell: D7**

Uniform distribution with parameters:

Minimum	0.74
Maximum	0.86

Mean value in simulation was 0.80

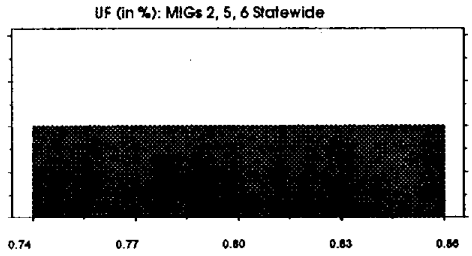


Assumption: UF (in %): MIGs 2, 5, 6 Statewide **Cell: D11**

Uniform distribution with parameters:

Minimum	0.74
Maximum	0.86

Mean value in simulation was 0.80

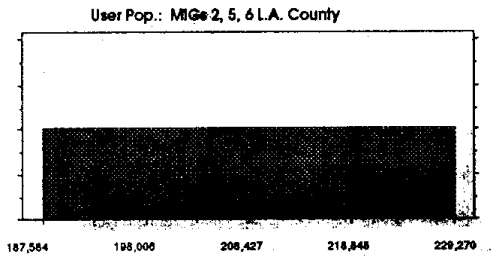


Assumption: User Pop.: MIGs 2, 5, 6 L.A. County **Cell: E3**

Uniform distribution with parameters:

Minimum	187,584
Maximum	229,270

Mean value in simulation was 208,429

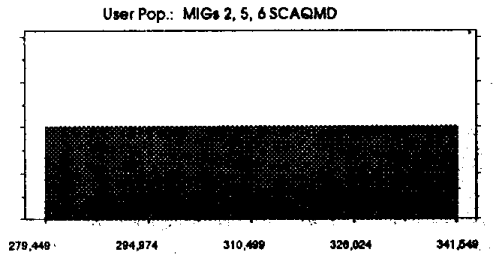


Assumption: User Pop.: MIGs 2, 5, 6 SCAQMD **Cell: E7**

Uniform distribution with parameters:

Minimum	279,449
Maximum	341,549

Mean value in simulation was 310,497



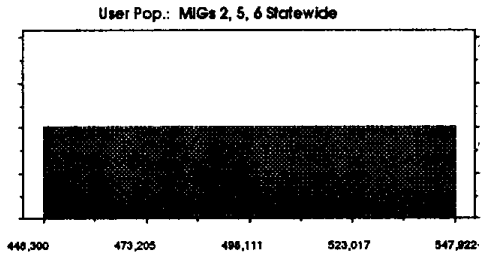
Appendix C-1
TCE-BVD Uncertainty Analysis

Assumption: User Pop.: MIGs 2, 5, 6 Statewide **Cell: E11**

Uniform distribution with parameters:

Minimum	448,300
Maximum	547,922

Mean value in simulation was 498,113



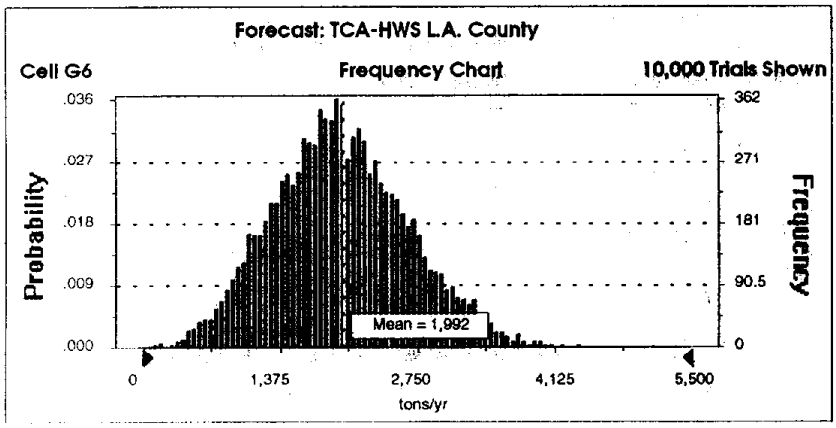
End of Assumptions

Crystal Ball Report
Simulation started on 11/27/95 at 10:11:43
Simulation stopped on 11/27/95 at 10:32:57

Forecast: TCA-HWS L.A. County **Cell: G6**

Summary:
Display Range is from 0 to 5,500 tons/yr
Entire Range is from 48 to 5,325 tons/yr
After 10,000 Trials, the Std. Error of the Mean is 7

Statistics:	Value
Trials	10000
Mean	1,992
Median (approx.)	1,966
Mode (approx.)	1,974
Standard Deviation	677
Variance	457,860
Skewness	0.26
Kurtosis	3.06
Coeff. of Variability	0.34
Range Minimum	48
Range Maximum	5,325
Range Width	5,277
Mean Std. Error	6.77



Forecast: TCA-HWS L.A. County (cont'd) **Cell: G6**

Percentiles:

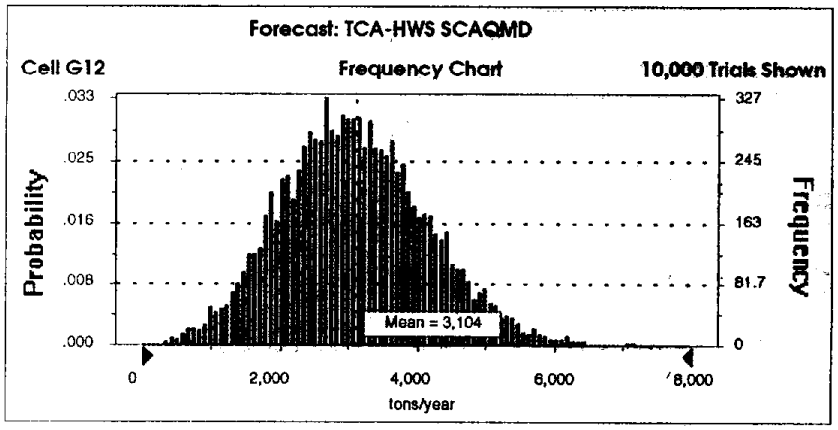
Percentile	tons/yr (approx.)
0.0%	48
2.5%	758
5.0%	922
50.0%	1,966
95.0%	3,162
97.5%	3,370
100.0%	5,325

End of Forecast

Forecast: TCA-HWS SCAQMD **Cell: G12**

Summary:
Display Range is from 0 to 8,000 tons/year
Entire Range is from 247 to 7,932 tons/year
After 10,000 Trials, the Std. Error of the Mean is 11

Statistics:	Value
Trials	10000
Mean	3,104
Median (approx.)	3,051
Mode (approx.)	2,975
Standard Deviation	1,066
Variance	1,136,462
Skewness	0.30
Kurtosis	3.07
Coeff. of Variability	0.34
Range Minimum	247
Range Maximum	7,932
Range Width	7,685
Mean Std. Error	10.66



Forecast: TCA-HWS SCAQMD (cont'd) **Cell: G12**

Percentiles:

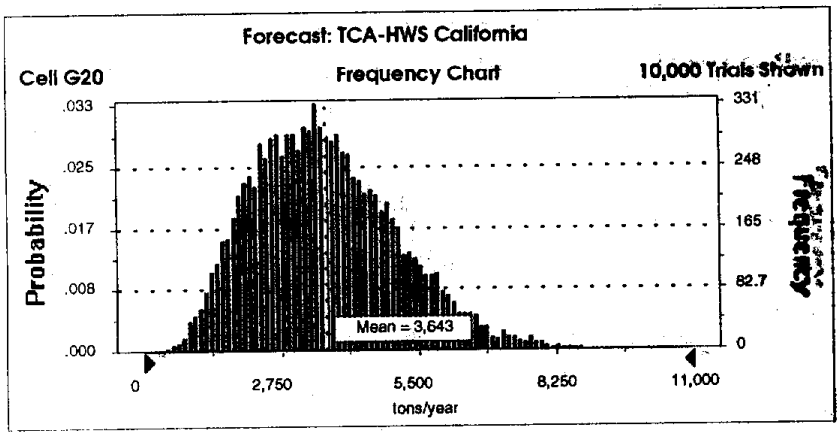
Percentile	tons/year (approx.)
0.0%	247
2.5%	1,154
5.0%	1,451
50.0%	3,051
95.0%	4,950
97.5%	5,310
100.0%	7,932

End of Forecast

Forecast: TCA-HWS California **Cell: G20**

Summary:
Display Range is from 0 to 11,000 tons/year
Entire Range is from 212 to 10,561 tons/year
After 10,000 Trials, the Std. Error of the Mean is 14

Statistics:	Value
Trials	10000
Mean	3,643
Median (approx.)	3,515
Mode (approx.)	2,644
Standard Deviation	1,429
Variance	2,041,173
Skewness	0.50
Kurtosis	3.05
Coeff. of Variability	0.39
Range Minimum	212
Range Maximum	10,561
Range Width	10,349
Mean Std. Error	14.29



Forecast: TCA-HWS California (cont'd) **Cell: G20**

Percentiles:

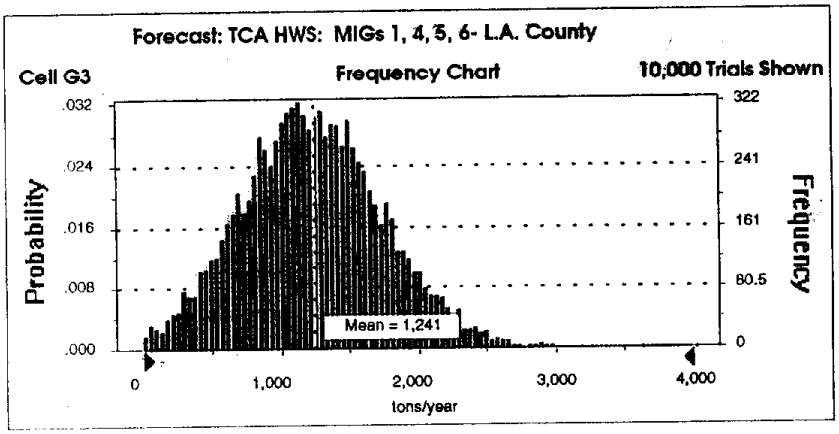
Percentile	tons/year (approx.)
0.0%	212
2.5%	1,301
5.0%	1,554
50.0%	3,515
95.0%	6,191
97.5%	6,738
100.0%	10,561

End of Forecast

Forecast: TCA HWS: MIGs 1, 4, 5, 6- L.A. County **Cell: G3**

Summary:
Display Range is from 0 to 4,000 tons/year
Entire Range is from 2 to 3,674 tons/year
After 10,000 Trials, the Std. Error of the Mean is 5

Statistics:	Value
Trials	10000
Mean	1,241
Median (approx.)	1,228
Mode (approx.)	1,122
Standard Deviation	508
Variance	257,931
Skewness	0.20
Kurtosis	2.94
Coeff. of Variability	0.41
Range Minimum	2
Range Maximum	3,674
Range Width	3,673
Mean Std. Error	5.08



Forecast: TCA HWS: MIGs 1, 4, 5, 6- L.A. County (cont'd) **Cell: G3**

Percentiles:

Percentile	tons/year (approx.)
0.0%	2
2.5%	289
5.0%	421
50.0%	1,228
95.0%	2,101
97.5%	2,274
100.0%	3,674

End of Forecast

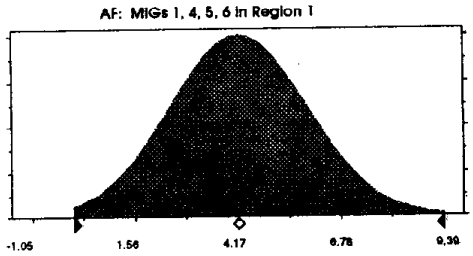
Assumptions

Assumption: AF: MIGs 1, 4, 5, 6 in Region 1 **Cell: B3**

Normal distribution with parameters:

Mean	4.17
Standard Dev.	1.74

Selected range is from 0.00 to +Infinity
Mean value in simulation was 4.21

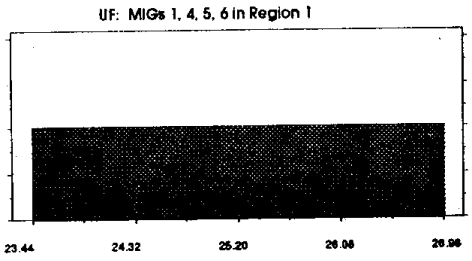


Assumption: UF: MIGs 1, 4, 5, 6 in Region 1 **Cell: D3**

Uniform distribution with parameters:

Minimum	23.44
Maximum	26.96

Mean value in simulation was 25.20

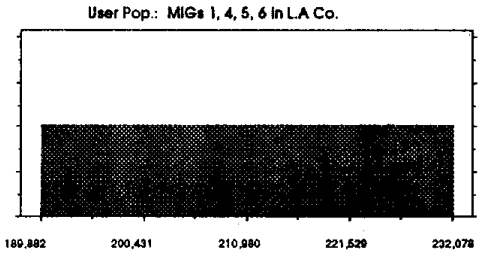


Assumption: User Pop.: MIGs 1, 4, 5, 6 in L.A Co. **Cell: E3**

Uniform distribution with parameters:

Minimum	189,882
Maximum	232,078

Mean value in simulation was 210,982

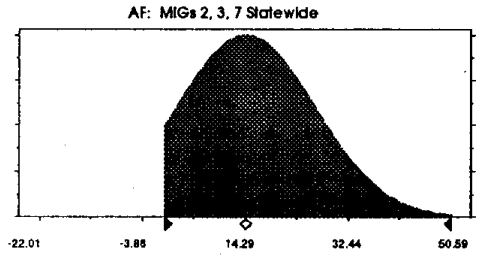


Assumption: AF: MIGs 2, 3, 7 Statewide **Cell: B4**

Normal distribution with parameters:

Mean	14.29
Standard Dev.	12.10

Selected range is from 0.00 to +Infinity
Mean value in simulation was 17.01

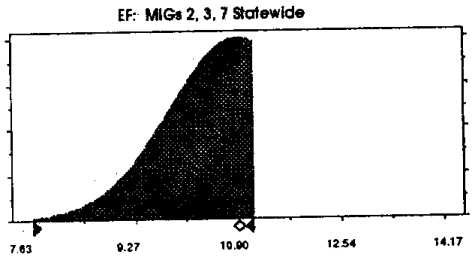


Assumption: EF: MIGs 2, 3, 7 Statewide **Cell: C4**

Normal distribution with parameters:

Mean	10.90
Standard Dev.	1.09

Selected range is from 0.00 to 11.11
Mean value in simulation was 10.16

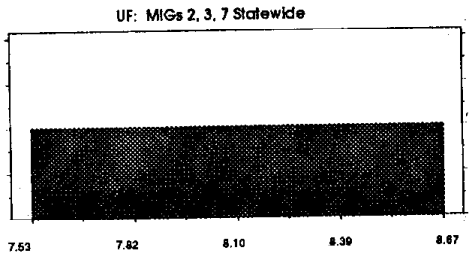


Assumption: UF: MIGs 2, 3, 7 Statewide **Cell: D4**

Uniform distribution with parameters:

Minimum	7.53
Maximum	8.67

Mean value in simulation was 8.10

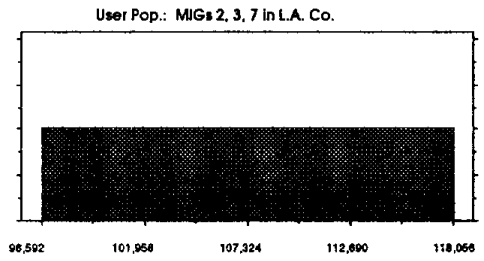


Assumption: User Pop.: MIGs 2, 3, 7 in L.A. Co. **Cell: E4**

Uniform distribution with parameters:

Minimum	96,592
Maximum	118,056

Mean value in simulation was 107,326

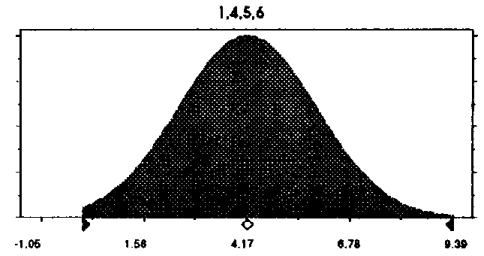


Assumption: 1,4,5,6 **Cell: B9**

Normal distribution with parameters:

Mean	4.17
Standard Dev.	1.74

Selected range is from 0.00 to +Infinity
Mean value in simulation was 4.21

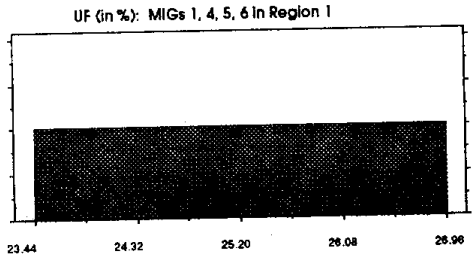


Assumption: UF (in %): MIGs 1, 4, 5, 6 in Region 1 **Cell: D9**

Uniform distribution with parameters:

Minimum	23.44
Maximum	26.96

Mean value in simulation was 25.20

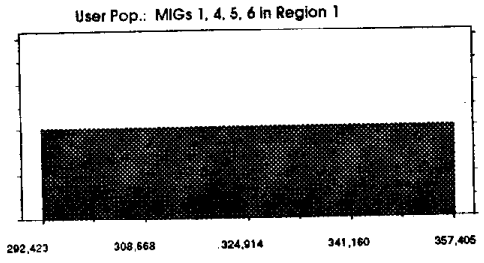


Assumption: User Pop.: MIGs 1, 4, 5, 6 in Region 1 **Cell: E9**

Uniform distribution with parameters:

Minimum	292,423
Maximum	357,405

Mean value in simulation was 324,915

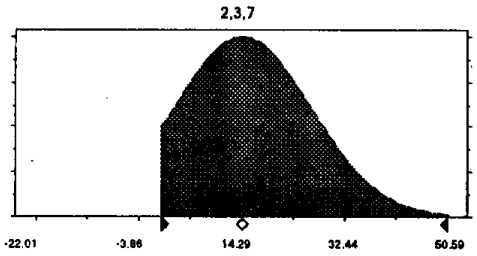


Assumption: 2,3,7 **Cell: B10**

Normal distribution with parameters:

Mean	14.29
Standard Dev.	12.10

Selected range is from 0.00 to +Infinity
Mean value in simulation was 17.02

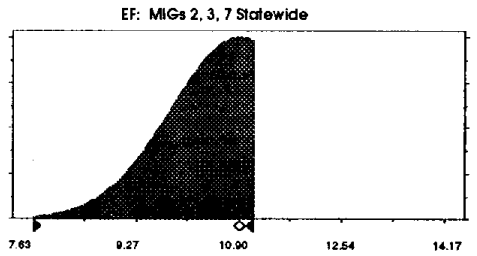


Assumption: EF: MIGs 2, 3, 7 Statewide **Cell: C10**

Normal distribution with parameters:

Mean	10.90
Standard Dev.	1.09

Selected range is from 0.00 to 11.11
Mean value in simulation was 10.16

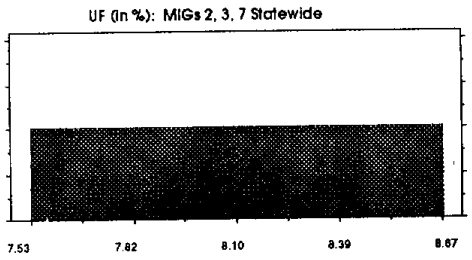


Assumption: UF (in %): MIGs 2, 3, 7 Statewide **Cell: D10**

Uniform distribution with parameters:

Minimum	7.53
Maximum	8.67

Mean value in simulation was 8.10

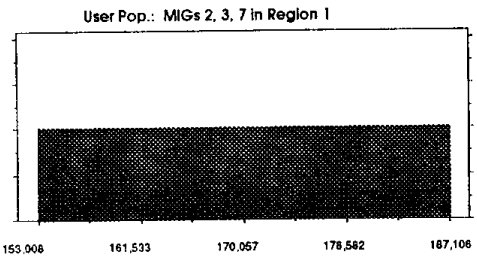


Assumption: User Pop.: MIGs 2, 3, 7 in Region 1 **Cell: E10**

Uniform distribution with parameters:

Minimum	153,008
Maximum	187,106

Mean value in simulation was 170,055

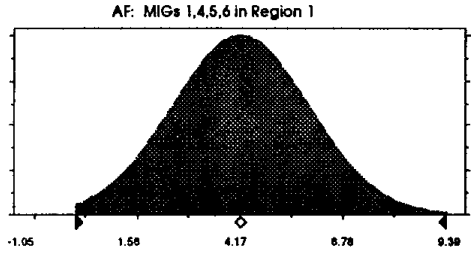


Assumption: AF: MIGs 1,4,5,6 in Region 1 **Cell: B16**

Normal distribution with parameters:

Mean	4.17
Standard Dev.	1.74

Selected range is from 0.00 to +Infinity
Mean value in simulation was 4.21

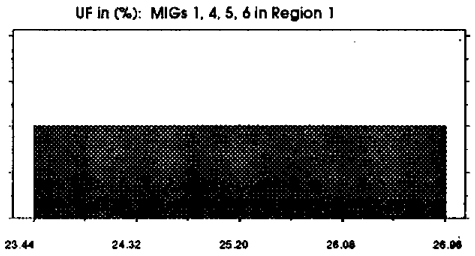


Assumption: UF in (%): MIGs 1, 4, 5, 6 in Region 1 **Cell: D16**

Uniform distribution with parameters:

Minimum	23.44
Maximum	26.96

Mean value in simulation was 25.20

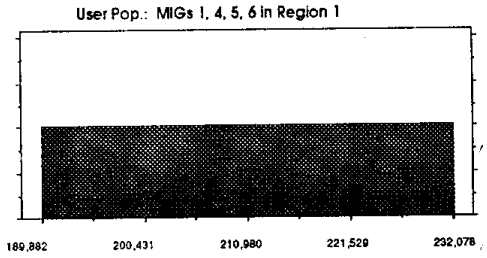


Assumption: User Pop.: MIGs 1, 4, 5, 6 in Region 1 **Cell: E16**

Uniform distribution with parameters:

Minimum	189,882
Maximum	232,078

Mean value in simulation was 210,978

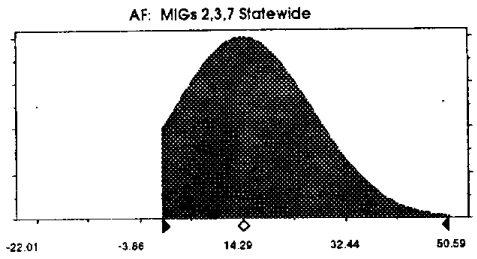


Assumption: AF: MIGs 2,3,7 Statewide **Cell: B17**

Normal distribution with parameters:

Mean	14.29
Standard Dev.	12.10

Selected range is from 0.00 to +Infinity
Mean value in simulation was 17.02

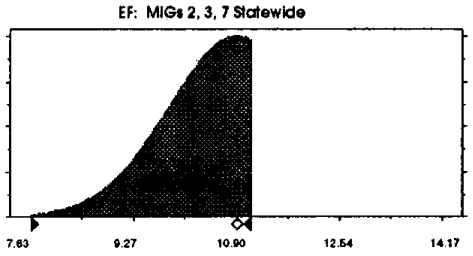


Assumption: EF: MIGs 2, 3, 7 Statewide **Cell: C17**

Normal distribution with parameters:

Mean	10.90
Standard Dev.	1.09

Selected range is from 0.00 to 11.11
Mean value in simulation was 10.16

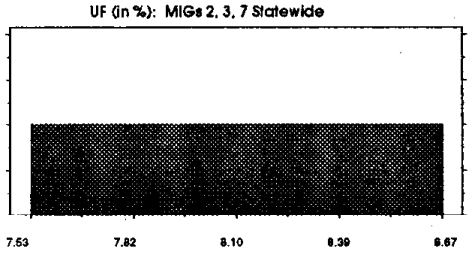


Assumption: UF (in %): MIGs 2, 3, 7 Statewide **Cell: D17**

Uniform distribution with parameters:

Minimum	7.53
Maximum	8.67

Mean value in simulation was 8.10

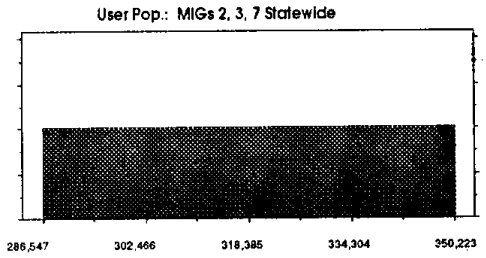


Assumption: User Pop.: MIGs 2, 3, 7 Statewide **Cell: E17**

Uniform distribution with parameters:

Minimum	286,547
Maximum	350,223

Mean value in simulation was 318,384

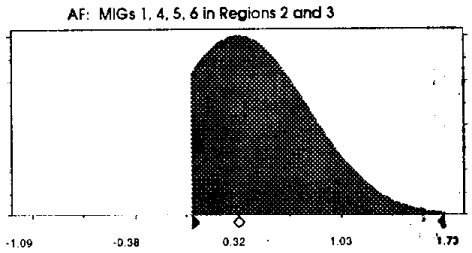


Assumption: AF: MIGs 1, 4, 5, 6 in Regions 2 and 3 **Cell: B18**

Normal distribution with parameters:

Mean	0.32
Standard Dev.	0.47

Selected range is from 0.00 to +Infinity
Mean value in simulation was 0.52

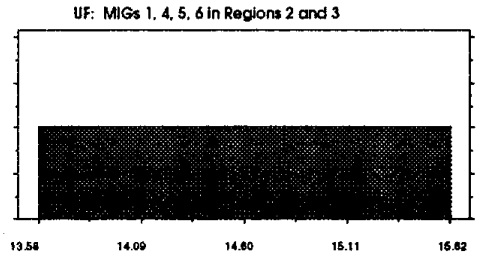


Assumption: UF: MIGs 1, 4, 5, 6 in Regions 2 and 3 **Cell: D18**

Uniform distribution with parameters:

Minimum	13.58
Maximum	15.62

Mean value in simulation was 14.60

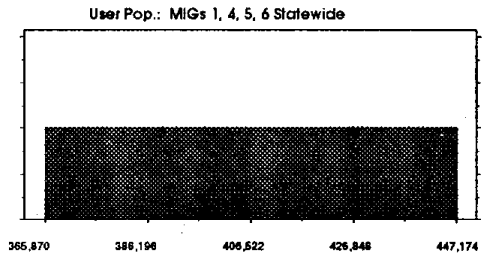


Assumption: User Pop.: MIGs 1, 4, 5, 6 Statewide **Cell: E18**

Uniform distribution with parameters:

Minimum	365,870
Maximum	447,174

Mean value in simulation was 406,521



End of Assumptions

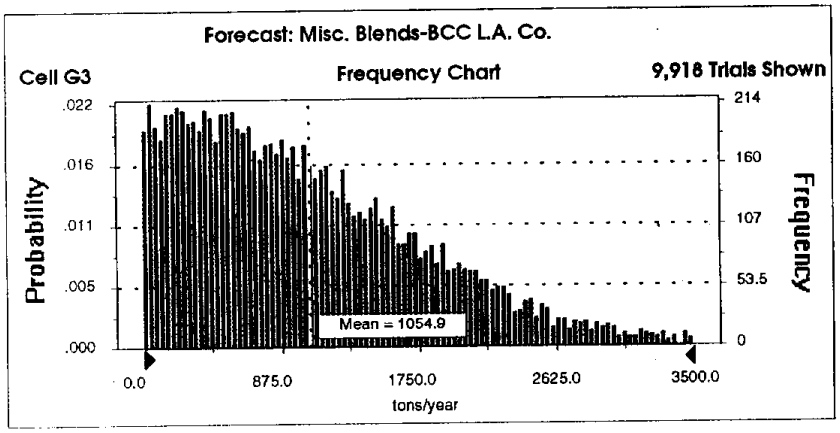
Appendix C-3
Misc. Blends-BCC Uncertainty Analysis

Crystal Ball Report
Simulation started on 11/27/95 at 10:50:35
Simulation stopped on 11/27/95 at 11:02:20

Forecast: Misc. Blends-BCC L.A. Co. **Cell: G3**

Summary:
Display Range is from 0.0 to 3500.0 tons/year
Entire Range is from 0.1 to 5329.4 tons/year
After 10,000 Trials, the Std. Error of the Mean is 7.8

Statistics:	Value
Trials	10000
Mean	1054.9
Median (approx.)	904.6
Mode (approx.)	186.7
Standard Deviation	783.4
Variance	613738.8
Skewness	1.01
Kurtosis	4.08
Coeff. of Variability	0.74
Range Minimum	0.1
Range Maximum	5329.4
Range Width	5329.2
Mean Std. Error	7.83



Forecast: Misc. Blends-BCC L.A. Co. (cont'd) **Cell: G3**

Percentiles:

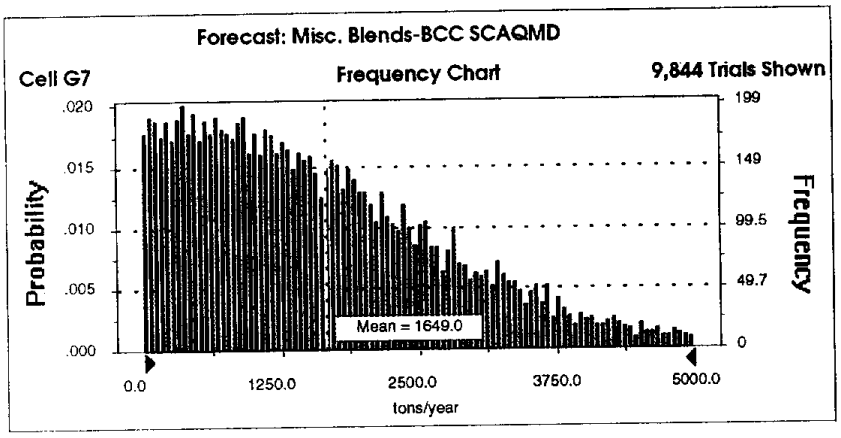
Percentile	tons/year (approx.)
0.0%	0.1
2.5%	45.3
5.0%	85.2
50.0%	904.6
95.0%	2530.0
97.5%	2927.7
100.0%	5329.4

End of Forecast

Forecast: Misc. Blends-BCC SCAQMD **Cell: G7**

Summary:
Display Range is from 0.0 to 5000.0 tons/year
Entire Range is from 0.0 to 8960.8 tons/year
After 10,000 Trials, the Std. Error of the Mean is 12.3

Statistics:	Value
Trials	10000
Mean	1649.0
Median (approx.)	1411.9
Mode (approx.)	313.7
Standard Deviation	1226.4
Variance	1503963.9
Skewness	1.03
Kurtosis	4.12
Coeff. of Variability	0.74
Range Minimum	0.0
Range Maximum	8960.8
Range Width	8960.8
Mean Std. Error	12.26



Forecast: Misc. Blends-BCC SCAQMD (cont'd) **Cell: G7**

Percentiles:

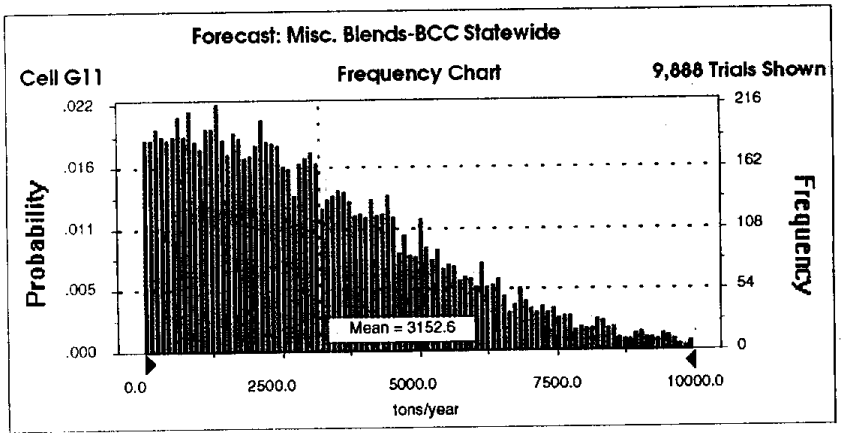
Percentile	tons/year (approx.)
0.0%	0.0
2.5%	69.2
5.0%	136.1
50.0%	1411.9
95.0%	3985.1
97.5%	4629.8
100.0%	8960.8

End of Forecast

Forecast: Misc. Blends-BCC Statewide **Cell: G11**

Summary:
Display Range is from 0.0 to 10000.0 tons/year
Entire Range is from 0.2 to 16482.4 tons/year
After 10,000 Trials, the Std. Error of the Mean is 23.4

Statistics:	Value
Trials	10000
Mean	3152.6
Median (approx.)	2684.3
Mode (approx.)	1401.2
Standard Deviation	2339.6
Variance	5473929.2
Skewness	1.01
Kurtosis	4.03
Coeff. of Variability	0.74
Range Minimum	0.2
Range Maximum	16482.4
Range Width	16482.2
Mean Std. Error	23.40



Forecast: Misc. Blends-BCC Statewide (cont'd) **Cell: G11**

Percentiles:

Percentile	tons/year (approx.)
0.0%	0.2
2.5%	132.6
5.0%	268.2
50.0%	2684.3
95.0%	7609.5
97.5%	8729.6
100.0%	16482.4

End of Forecast

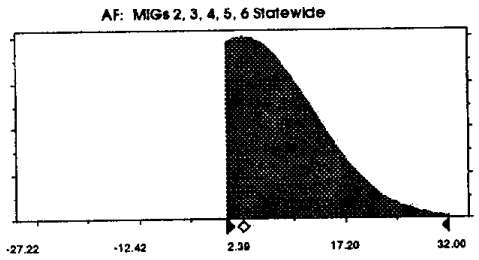
Assumptions

Assumption: AF: MIGs 2, 3, 4, 5, 6 Statewide **Cell: B3**

Normal distribution with parameters:

Mean	2.39
Standard Dev.	9.87

Selected range is from 0.00 to +Infinity
Mean value in simulation was 8.81

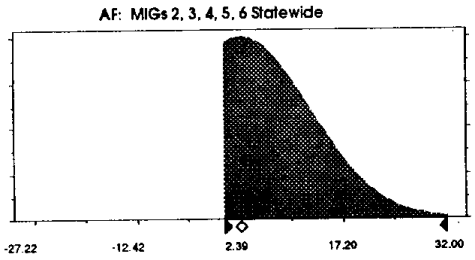


Assumption: AF: MIGs 2, 3, 4, 5, 6 Statewide **Cell: B7**

Normal distribution with parameters:

Mean	2.39
Standard Dev.	9.87

Selected range is from 0.00 to +Infinity
Mean value in simulation was 8.81

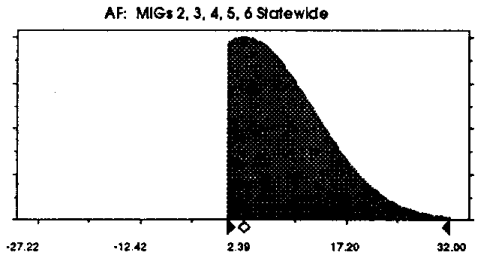


Assumption: AF: MIGs 2, 3, 4, 5, 6 Statewide **Cell: B11**

Normal distribution with parameters:

Mean	2.39
Standard Dev.	9.87

Selected range is from 0.00 to +Infinity
Mean value in simulation was 8.81

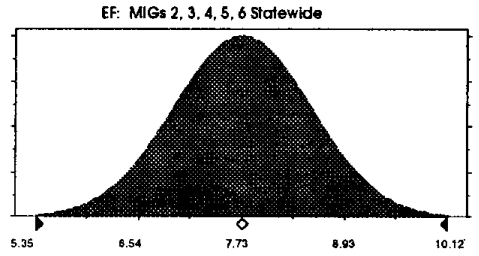


Assumption: EF: MIGs 2, 3, 4, 5, 6 Statewide **Cell: C3**

Normal distribution with parameters:

Mean	7.73
Standard Dev.	0.80

Selected range is from 0.00 to +Infinity
Mean value in simulation was 7.73

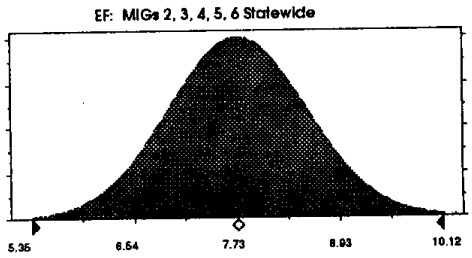


Assumption: EF: MIGs 2, 3, 4, 5, 6 Statewide **Cell: C7**

Normal distribution with parameters:

Mean	7.73
Standard Dev.	0.80

Selected range is from 0.00 to +Infinity
Mean value in simulation was 7.73

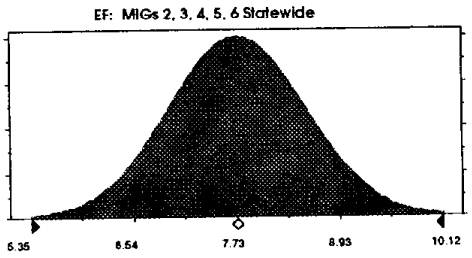


Assumption: EF: MIGs 2, 3, 4, 5, 6 Statewide **Cell: C11**

Normal distribution with parameters:

Mean	7.73
Standard Dev.	0.80

Selected range is from 0.00 to +Infinity
Mean value in simulation was 7.73

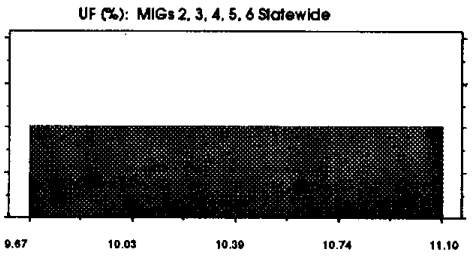


Assumption: UF (%): MIGs 2, 3, 4, 5, 6 Statewide **Cell: D3**

Uniform distribution with parameters:

Minimum	9.67
Maximum	11.10

Mean value in simulation was 10.39

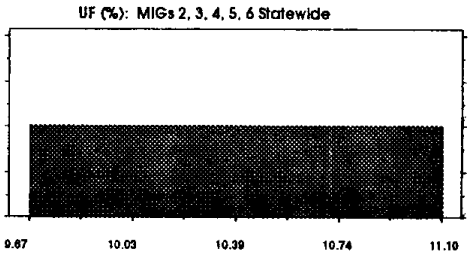


Assumption: UF (%): MIGs 2, 3, 4, 5, 6 Statewide **Cell: D7**

Uniform distribution with parameters:

Minimum	9.67
Maximum	11.10

Mean value in simulation was 10.39

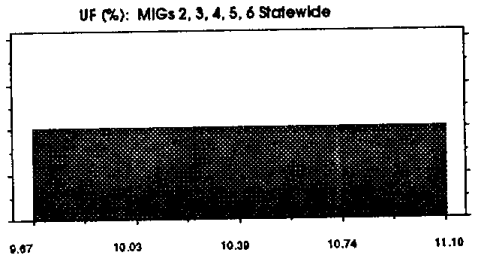


Assumption: UF (%): MIGs 2, 3, 4, 5, 6 Statewide **Cell: D11**

Uniform distribution with parameters:

Minimum	9.67
Maximum	11.10

Mean value in simulation was 10.39

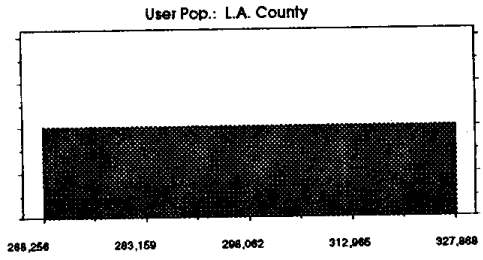


Assumption: User Pop.: L.A. County **Cell: E3**

Uniform distribution with parameters:

Minimum	268,256
Maximum	327,868

Mean value in simulation was 298,064

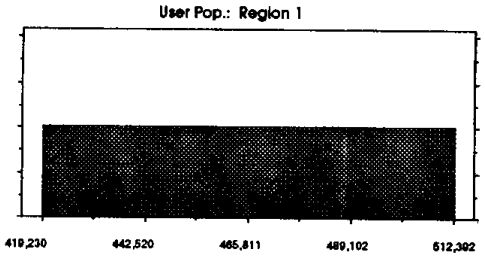


Assumption: User Pop.: Region 1 **Cell: E7**

Uniform distribution with parameters:

Minimum	419,230
Maximum	512,392

Mean value in simulation was 465,816

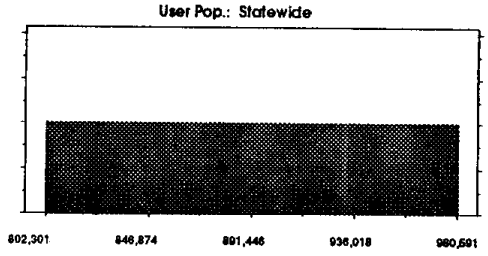


Assumption: User Pop.: Statewide **Cell: E11**

Uniform distribution with parameters:

Minimum	802,301
Maximum	980,591

Mean value in simulation was 891,439



End of Assumptions