

## **TABLES**

**Table ES.1**  
**Summary of Human Health Risk Results**  
**Romic Facility - Chandler, Arizona**

<b>Exposure Population</b>	<b>Cancer Risk</b>	<b>Chronic HI</b>	<b>Acute HI</b>
Sensitive Receptor - RME	1.8E-07	0.0012	---
Sensitive Receptor - AEI	4.1E-08	0.00087	---
Off-Site Resident - RME	1.8E-07	0.0012	---
Off-Site Resident - AEI	4.1E-08	0.00087	---
Off-Site Worker (Shift 1) - RME	1.8E-05	0.12	1.6
Off-Site Worker (Shift 1) - AEI	2.8E-06	0.071	1.6
Off-Site Worker (Shift 2) - RME	1.0E-05	0.092	1.0
Off-Site Worker (Shift 2) - AEI	1.6E-06	0.055	1.0
Off-Site Worker (Shift 3) - RME	1.5E-05	0.071	1.5
Off-Site Worker (Shift 3) - AEI	2.3E-06	0.042	1.5

**Notes:**

AEI = Average Exposed Individual

HI = Hazard Index

RME = Reasonable Maximum Exposure

**Table 2.1**  
**Sensitive Receptors**  
**Romic Facility - Chandler, Arizona**

<b>Facility Name</b>	<b>Address</b>	<b>UTMx (meter)</b>	<b>UTMy (meter)</b>
Triple R Child Care of Arizona	7100 West Chandler Boulevard	410,171	3,685,331
The Little Gym of Chandler	6125 West Chandler Boulevard, Suite 6	411,660	3,685,332
La Petite Academy	6185 West Detroit Street	411,469	3,685,693
The Garden's Well	5372 West Geronimo Street	412,994	3,683,987
Study Quest at St. John Bosco	16035 South 48th Street	408,730	3,684,787
Horizon Community Learning Center	16244 South 48th Street	408,723	3,684,789
K.E.S.D. #28 - Del Milenio Preschool	4630 East Frye Road	408,605	3,684,596
Kyrene del Milenio	4630 East Frye Road	408,605	3,684,596
Children's World Learning Center	150 North Elm Street	412,673	3,685,301
Adobe Montessori School	6400 West Del Rio Street	411,242	3,686,372
Childtime Childcare #1407	5792 West Oakland	412,500	3,685,873
Kyrene	739 North Cactus Way	411,580	3,686,403
K.E.S.D. #28 - Paloma - Kyrene Kids Club	5000 West Whitton	413,581	3,684,117
Kyrene de la Paloma Elementary	5000 West Whitton	413,581	3,684,117
Kid's Court	16638 South 44th Street	408,007	3,684,141
Renal Care Group - Ahwatukee	4629 East Chandler Boulevard, Suite 100	408,326	3,685,345
Desert Garden Assisted Living, Inc	16414 South 43rd Street	407,837	3,684,487
Ahwatukee Foothills Medical Center (Urgent Care)	4545 East Chandler Boulevard	408,180	3,685,346
Summit School of Ahwatukee	4515 East Muirwood Drive	408,013	3,685,091
Abundant Living II	4341 East Woodland Drive	407,953	3,684,965
K.E.S.D. #28 - Miranda - Kyrene Kids Club	5500 West Galveston Street	412,946	3,686,007
Kyrene de la Miranda Elementary	5500 West Galveston Street	412,946	3,686,007
Wendi Cleckner	5755 W. Ivanhoe Street	412,450	3,686,425
Home Away From Home	4349 East Muirwood	407,907	3,685,094
Step by Step	15448 South 44th Way	408,044	3,685,454
Desert Vista Adult Care	15001 South 46th Street	408,441	3,685,973
Evergreen Foothills Health and Rehabilitation Center	15810 South 42nd Street	407,688	3,685,077
A Step Ahead Child Care and Preschool	4221 East Chandler Boulevard	407,681	3,685,351
Kindercare Learning Center	15626 South 42nd Street	407,634	3,685,273
DBC/Mercury Way Group Home	4515 W. Mercury Way	414,254	3,684,992
The Lighthouse Manor	5980 West Orchid Lane	412,079	3,687,223
Kid Zone - Kyrene de las Manitas School	1201 West Courtney Lane	410,899	3,687,470
Kyrene de las Manitas Elementary	1201 West Courtney Lane	410,899	3,687,470
Desert Brook Assisted Living	4302 East White Aster Street	407,624	3,685,963
Summerhaven Assisted Living	473 West Courtney Lane	412,033	3,687,471
Desert Creek Assisted Living	1065 West Amanda Lane	411,057	3,687,678
Desert Pond Assisted Living	6361 West Post Road	411,531	3,687,670
Stat Clinic - Ahwatukee	4530 East Ray Road, Suite 100	408,307	3,686,974
Tutor Time Child Care Learning Center	3922 East Chandler Boulevard	407,049	3,685,356
Triple R Child Care Inc.	4510 East Ray Road	408,276	3,686,974
K.E.S.D. #28 - Kyrene Kids Club - Esperanza	14841 South 41st Place	407,369	3,686,149
Kyrene de la Esperanza Elementary	14841 South 41st Place	407,369	3,686,149
Alcohol Recovery Solutions	13838 S. 46th Place, Suite 120	408,371	3,687,194
Tutor Time Child Care Learning Center	4970 West Ray Road	413,607	3,686,950
Hawthorn Court at Ahwatukee	13822 South 46th Place	408,337	3,687,241
Just You and Me Kid	4519 East Bighorn Avenue	406,760	3,685,193
Colorful Kids	4939 West Ray Road, Suite #21	413,686	3,686,950
Kid Zone - Kyrene de la Mariposa	50 East Knox Road	412,896	3,687,561
Kyrene de la Mariposa Elementary	50 East Knox Road	412,896	3,687,561
Desert Foothills Adult Care Home I	4609 East Summerhaven Drive	408,441	3,687,432
Desert Foothills Adult Care Home	4639 E. Goldfinch Gate Lane	408,473	3,687,486
Sunrise Preschool #123	9880 South Rural Road #116	413,594	3,687,262
Desert Foothills Adult Care Home III	13422 South 46th Street	408,286	3,687,475
Lanie's Adult Care Home	232 West Caroline Lane	412,314	3,687,996
Kyrene de los Lagos Elementary	17001 South 34th Street	406,132	3,683,936
K.E.S.D. #28 - Brisas - Kyrene Kids Club	777 N. Desert Breeze Blvd	414,577	3,686,533
Neuro Institute	1221 West Warner Road, Suite 102	410,833	3,688,579
Sunrise Preschool #113	4111 East Ray Road	407,327	3,687,108
K.E.S.D. #28 - Kyrene de los Lagos - Kids Club	17001 South 34th Street	405,950	3,683,927
Warner Park Surgery Center	604 W. Warner Road, Building A	411,420	3,688,577

**Table 3.1**  
**Chemicals of Potential Concern<sup>a</sup>**  
**Romic Facility - Chandler, Arizona**

<b>CHEMICALS OF POTENTIAL CONCERN</b>	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	FORMIC ACID
1,1,1-TRICHLOROETHANE	GLYCERIN
1,1,2-TRICHLOROETHANE	GASOLINE
1,2-DICHLOROBENZENE	HEPTANE
1,2,4-TRIMETHYLBENZENE	HEXAMETHYLDISILAZANE
1,3,5-TRIMETHYLBENZENE	HEXANE
1,4-DIOXANE	HYDROCHLORIC ACID
1-METHOXY-2-PROPANOL (propylene glycol methyl ether)	HYDROFLUORIC ACID
2-BUTOXYETHANOL ACETATE	ISOBUTYL ACETATE
2-ETHOXYPROPANOL	ISOBUTYL ISOBUTYRATE
2-HEPTANONE	ISOPROPANOLAMINE
2-METHYL-1-PROPANOL	ISOPROPYL ACETATE
2-PENTANONE	JET FUEL/KEROSENE
2-PYRROLIDONE	METHANOL
4-HYDROXY-4-METHYL-2-PENTANONE	METHYL ETHYL KETONE
ACETIC ACID	METHYL ISOBUTYL KETONE
ACETONE	METHYLENE CHLORIDE
ACETONITRILE	MINERAL OIL
ALCOHOLS	NAPHTHA
AMYL ACETATE	NAPHTHALENE
BENZENE	N-BUTANOL
BIOCIDE (acrolein)	NITRIC ACID
BROMINATED BISPHENOL	N-METHYL-2-PYRROLIDONE
BUTYL ACETATE	N-PROPYL ACETATE
BUTYL CELLOSOLVE	PARAFFINIC HYDROCARBONS
CARBON TETRACHLORIDE	PETROLEUM OIL
CHLOROBENZENE	PHENOL
CHLOROFORM	PHENYLMERCURIC ACETATE
CRESOL	PHOSPHORIC ACID
CYCLOHEXANE	POLYDIMETHYL SILOXANE
CYCLOHEXANONE	PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE
DIBUTYL PHTHALATE	PROPYLENE OXIDE
DIESEL FUEL	PYRIDINE
DIETHYLENE GLYCOL	STODDARD SOLVENT
DIETHYLENE GLYCOL BUTYL ETHER	STYRENE
DIETHYLENETRIAMINE	SULFOLANE
DIMETHYLFORMAMIDE	SULFURIC ACID
ETHANOL	TETRACHLOROETHYLENE
ETHYL ACETATE	TETRAETHYL ORTHOSILICATE
ETHYL BENZENE	TETRAHYDROFURAN
ETHYL LACTATE	TOLUENE
ETHYL-3-ETHOXYPROPIONATE	TRICHLOROETHYLENE
ETHYLENE GLYCOL MONOETHYL ETHER ACETATE	TRIETHYLENETETRAMINE
ETHYLENE GLYCOL	XYLENES
FERRIC CHLORIDE	

**Note:**

<sup>a</sup> The basis for the selection of the chemicals of potential concern (COPCs) is detailed in the Chemical Selection Technica Memorandum (ENVIRON 2005).

**Source:**

ENVIRON International Corporation (ENVIRON). 2005. Technical Memorandum - Selection of Chemicals of Potential Concern, Romic Environmental Technologies Corporation (Southwest), Chandler, Arizona. July 20.

**Table 3.2**  
**Chronic Toxicity Values**  
**Romic Facility - Chandler, Arizona**

CHEMICAL	Molecular Weight	Represented by:	CAS #	Chronic Toxicity Criteria						
				Cancer Slope Factor (CSF) (mg/kg-day) <sup>-1</sup>			Noncancer Reference Dose (RfD) (mg/kg-day)		NonCancer Reference Concentration (RFC) (ug/m <sup>3</sup> )	
				Inhalation	Source	USEPA Weight of Evidence	Inhalation	Source	Inhalation	Source
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	187.3762		76131	----		----	8.57E+00	HEAST	3.00E+04	HEAST
1,1,1-TRICHLOROETHANE	133.41		71556	----		D	6.30E-01	pprtv	2.21E+03	Calculated
1,1,2-TRICHLOROETHANE	133.4047		79005	5.60E-02	IRIS	C	4.00E-03	IRIS (rr)	1.40E+01	Calculated
1,2-DICHLOROBENZENE	147.0036		95501	----		D	5.71E-02	HEAST	2.00E+02	HEAST
1,2,4-TRIMETHYLBENZENE	120.19	aerosols	95636	----		----	1.70E-03	pprtv	5.95E+00	Calculated
1,3,5-TRIMETHYLBENZENE	120.19		108678	----		----	1.70E-03	pprtv	5.95E+00	Calculated
1,4-DIOXANE	88.106		123911	1.10E-02	IRIS (rr)	B2	----		----	
1-METHOXY-2-PROPANOL (propylene glycol methyl ether)	90.12		107982	----		----	5.71E-01	IRIS	2.00E+03	IRIS
2-BUTOXYETHANOL ACETATE	160.2126	ethylene glycol monoethyl ether acetate (111-15-9) tox surrogate	112072	----		----	3.00E-01	HEAST (rr)	1.05E+03	Calculated
2-ETHOXYPROPANOL	104.17	2-ethoxy ethanol (110-80-5) (toxicological surrogate)	19089475	----		----	5.71E-02	IRIS	2.00E+02	IRIS
2-HEPTANONE	114.187	MIBK (108-10-1) tox surrogate	110430	----		ID	8.57E-01	IRIS	3.00E+03	IRIS
2-METHYL-1-PROPANOL	74.1224		78831	----		----	3.00E-01	IRIS (rr)	1,050	Calculated
2-PENTANONE	86.1334	(toxicological surrogate)	107879	----		ID	1.43E+00	IRIS	5000	IRIS
2-PYRROLIDONE	85.1054		616455	----		----	----		----	
4-HYDROXY-4-METHYL-2-PENTANONE	116.1596	MIBK (108-10-1) tox surrogate	123422	----		ID	8.57E-01	IRIS	3.00E+03	IRIS
ACETIC ACID	60.0524	Acetaldehyde (75-07-0)	64197	----		----	2.57E-03	IRIS	9.00E+00	IRIS
ACETONE	58.08		67641	----		ID	9.00E-01	IRIS (rr)	3.15E+03	Calculated
ACETONITRILE	41.05		75058	----		D	1.71E-02	IRIS	6.00E+01	IRIS
ALCOHOLS	60.10	represented by 2-propanol	67630	----		----	3.00E-01	IRIS (rr)	1.05E+03	Calculated
AMYL ACETATE	130.19	ethyl acetate (141-78-6) (toxicological surrogate)	628637	----		----	9.00E-01	IRIS (rr)	3.15E+03	Calculated
BENZENE	78.11		71432	2.70E-02	IRIS	A	8.57E-03	IRIS	3.00E+01	IRIS
BIOCIDE (acrolein)	56.064		107028	----		ID	5.71E-06	IRIS	2.00E-02	IRIS
BROMINATED BISPHENOL	543.87	Bisphenol A (80-05-7)	79947	----		----	----		----	
BUTYL ACETATE	116.16	ethyl acetate (141-78-6) (toxicological surrogate)	123864	----		----	9.00E-01	IRIS (rr)	3.15E+03	Calculated
BUTYL CELLOSOLVE	118.18	Ethylene glycol monobutyl ether	111762	----		C	3.71E+00	IRIS	1.30E+04	IRIS
CARBON TETRACHLORIDE	153.823		56235	5.30E-02	IRIS	B2	7.00E-04	IRIS (rr)	2.45E+00	Calculated
CHLOROBENZENE	112.5585		108907	----		D	1.70E-02	NCEA	5.95E+01	Calculated
CHLOROFORM	119.3779		67663	8.10E-02	IRIS	B2	1.40E-02	NCEA	4.90E+01	Calculated
CRESOL	324.4188	p-cresol (106-44-5)	1319773	----		C	5.00E-03	HEAST (rr)	1.75E+01	Calculated
CYCLOHEXANE	84.16		110827	----		ID	1.71E+00	IRIS	6.00E+03	IRIS
CYCLOHEXANONE	112.17		108941	----		----	5.00E+00	IRIS (rr)	1.75E+04	Calculated
DIBUTYL PHTHALATE	278.3474		84742	----		D	1.00E-01	IRIS (rr)	3.50E+02	Calculated
DIESEL FUEL	185.00		68476346	----		----	8.22E-01	ENVIRON	2.88E+03	Calculated
DIETHYLENE GLYCOL	106.12	Ethylene glycol monobutyl ether (111-76-2)	111466	----		C	3.71E+00	IRIS	1.30E+04	IRIS
DIETHYLENE GLYCOL BUTYL ETHER	162.2284		112345	----		----	5.70E-03	PPRTV	2.00E+01	Calculated
DIETHYLENTRIAMINE	103.1668	ethylene diamine (107-15-3)	111400	----		----	9.00E-02	PPRTV (rr)	3.15E+02	Calculated
DIMETHYLFORMAMIDE	73.09		68122	----		----	8.57E-03	IRIS	3.00E+01	IRIS

**Table 3.2**  
**Chronic Toxicity Values**  
**Romic Facility - Chandler, Arizona**

CHEMICAL	Molecular Weight	Represented by:	CAS #	Chronic Toxicity Criteria						
				Cancer Slope Factor (CSF) (mg/kg-day) <sup>-1</sup>			Noncancer Reference Dose (RfD) (mg/kg-day)		NonCancer Reference Concentration (RfC) (ug/m <sup>3</sup> )	
				Inhalation	Source	USEPA Weight of Evidence	Inhalation	Source	Inhalation	Source
ETHANOL	46.07	methanol (67-56-1) (toxicological surrogate)	64175	----		----	5.00E-01	IRIS (rr)	1.75E+03	Calculated
ETHYL ACETATE	88.11		141786	----		----	9.00E-01	IRIS (rr)	3.15E+03	Calculated
ETHYL BENZENE	106.17		100414	----		D	2.86E-01	IRIS	1.00E+03	IRIS
ETHYL LACTATE	118.13	ethyl acetate (141-78-6)	687478	----		----	9.00E-01	IRIS (rr)	3.15E+03	Calculated
ETHYL-3-ETHOXYPROPIONATE	146.19	Ethylene glycol monoethyl ether acetate	763699	----		----	3.00E-01	HEAST (rr)	1.05E+03	Calculated
ETHYLENE GLYCOL MONOETHYL ETHER ACETATE	132.16		111159	----		----	3.00E-01	HEAST (rr)	1.05E+03	Calculated
ETHYLENE GLYCOL	62.07		107211	----		----	2.00E+00	IRIS (rr)	7.00E+03	Calculated
FERRIC CHLORIDE	162.204		7705080	----		----	----		----	
FORMIC ACID	46.0256		64186	----		----	8.60E-04	PPRTV	3.01E+00	Calculated
GLYCERIN	92.0944	propylene glycol (57-55-6)	56815	----		----	8.60E-04	PPRTV	3.01E+00	Calculated
GASOLINE	108.00	Reid pressure 7 psi gasoline	8006619	----		----	2.50E+00	ENVIRON	8.73E+03	Calculated
HEPTANE	100.20	hexane (toxicological surrogate)	142825	----		----	5.71E-02	IRIS	2.00E+02	IRIS
HEXAMETHYLDISILAZANE	161.39		999973	----		----	----		----	
HEXANE	86.18		110543	----		----	5.71E-02	IRIS	2.00E+02	IRIS
HYDROCHLORIC ACID	36.4609		7647010	----		----	5.71E-03	IRIS	2.00E+01	IRIS
HYDROFLUORIC ACID	20.0063	hydrogen chloride (7647-01-0)	7664393	----		----	5.71E-03	IRIS	2.00E+01	IRIS
ISOBUTYL ACETATE	116.1596	ethyl acetate (141-78-6) (toxicological surrogate)	110190	----		----	9.00E-01	IRIS (rr)	3.15E+03	Calculated
ISOBUTYL ISOBUTYRATE	144.2132		97858	----		----	3.00E-01	HEAST (rr)	1.05E+03	Calculated
ISOPROPANOLAMINE	75.1102	cyclohexylamine (108-91-8)	78966	----		----	----		----	
ISOPROPYL ACETATE	102.1328		108214	----		----	9.00E-01	IRIS (rr)	3.15E+03	Calculated
JET FUEL/KEROSENE	165.00		8008206	----		----	2.47E-01	ENVIRON	8.64E+02	Calculated
METHANOL	32.04		67561	----		----	5.00E-01	IRIS (rr)	1.75E+03	Calculated
METHYL ETHYL KETONE	72.11		78933	----		ID	1.43E+00	IRIS	5.00E+03	IRIS
METHYL ISOBUTYL KETONE	100.16		108101	----		ID	8.57E-01	IRIS	3.00E+03	IRIS
METHYLENE CHLORIDE	84.93		75092	1.65E-03	IRIS	B2	8.57E-01	HEAST	3.00E+03	HEAST
MINERAL OIL	--		8012951	----		----	1.45E+00	ENVIRON	5.09E+03	Calculated
NAPHTHA	110.0		8030306	----		----	1.54E+00	ENVIRON	5.38E+03	Calculated
NAPHTHALENE	128.1732		91203	1.20E-01	Reg IX	C	8.57E-04	IRIS	3.00E+00	IRIS
N-BUTANOL	74.12		71363	----		D	2.60E-03	NCEA	9.10E+00	Calculated
NITRIC ACID	63.0128		7697372	----		----	----		----	
N-METHYL-2-PYRROLIDONE	99.13	N-nitrosopyrrolidine (930-55-2)	872504	----		----	----		----	
N-PROPYL ACETATE	102.13	(toxicological surrogate)	109604	----		----	9.00E-01	IRIS (rr)	3.15E+03	Calculated
PARAFFINIC HYDROCARBONS	72.15		64771728	----		----	3.67E+00	ENVIRON <sup>a</sup>	12,858	Calculated
PETROLEUM OIL	282.00	represented by motor oil	8002059	----		----	3.00E-02		1.05E+02	Calculated
PHENOL	94.1128		108952	----		D	3.00E-01	IRIS (rr)	1.05E+03	Calculated
PHENYLMERCURIC ACETATE	336.74		62384	----		----	8.00E-05	IRIS (rr)	2.80E-01	Calculated
PHOSPHORIC ACID	97.99506		7664382	----		----	2.86E-03	IRIS	1.00E+01	IRIS
POLYDIMETHYL SILOXANE	74.15		63148629	----		----	----		----	
PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE	132.16	Propylene glycol monomethyl ether (107-98-2)	108656	----		----	3.00E-01	HEAST (rr)	1.05E+03	Calculated

**Table 3.2**  
**Chronic Toxicity Values**  
**Romic Facility - Chandler, Arizona**

CHEMICAL	Molecular Weight	Represented by:	CAS #	Chronic Toxicity Criteria						
				Cancer Slope Factor (CSF) (mg/kg-day) <sup>-1</sup>			Noncancer Reference Dose (RfD) (mg/kg-day)		NonCancer Reference Concentration (RfC) (ug/m <sup>3</sup> )	
				Inhalation	Source	USEPA Weight of Evidence	Inhalation	Source	Inhalation	Source
PROPYLENE OXIDE	58.0798		75569	1.30E-02		B2	8.57E-03	IRIS	3.00E+01	IRIS
PYRIDINE	79.1012		110861	----		----	1.00E-03	IRIS (rr)	3.50E+00	Calculated
STODDARD SOLVENT	141.00		8052413	----		----	2.68E-01	ENVIRON	9.39E+02	Calculated
STYRENE	104.15		100425	----		----	2.86E-01	IRIS	1.00E+03	IRIS
SULFOLANE	120.17	Diphenyl sulfone (127-63-9)	126330	----		----	----		----	
SULFURIC ACID	98.0734		7664939	----		----	----		----	
TETRACHLOROETHYLENE	165.83		127184	2.10E-02	Reg IX	----	1.00E-02	Reg IX	3.50E+01	Reg IX
TETRAETHYL ORTHOSILICATE	208.33		78104	----		----	----		----	
TETRAHYDROFURAN	72.11		109999	6.80E-03	NCEA	----	8.60E-02	NCEA	3.01E+02	Calculated
TOLUENE	92.14		108883	----		D	1.14E-01	IRIS	4.00E+02	IRIS
TRICHLOROETHYLENE	131.39		79016	4.00E-01	NCEA	----	1.00E-02	NCEA	3.50E+01	Calculated
TRIETHYLENETETRAMINE	146.235	ethylene diamine (107-15-3)	112243	----		----	9.00E-02	PPRTV (rr)	3.15E+02	Calculated
XYLENES	106.16		1330207	----		ID	2.86E-02	IRIS	1.00E+02	IRIS

**Notes:**

mg/kg-day = milligrams per kilogram per day  
 ug/m<sup>3</sup> = micrograms per cubic meter  
 HEAST = Health Effects Assessment Summary Tables  
 ID = Inadequate data for determination of carcinogenic potential.  
 IRIS = Integrated Risk Information System  
 NCEA = National Center for Environmental Assessment  
 PPRTV = Provisional Peer Reviewed Toxicity Values as cited in USEPA Region 9 Preliminary remediation Goals (USEPA 2004)  
 Reg IX = USEPA Region 9 Preliminary Remediation Goals (USEPA 2004)  
 rr = route-to-route extrapolation from oral toxicity value.  
 USEPA = United States Environmental Protection Agency

<sup>a</sup> Toxicity values were derived by ENVIRON to represent petroleum mixtures using methodology presented by the Total Petroleum Hydrocarbon Criteria Working Group (TPHCWG 1997).

**Sources:**

National Center for Environmental Assessment (NCEA). 2004. Cited in USEPA Region 9 Preliminary Remediation Goals (PRGs) 2004. San Francisco, CA. October.  
 Total Petroleum Hydrocarbon Criteria Working Group Series (TPHCWGS). 1997. Volume 4, Development of Fraction Specific Reference Doses (RfDs) and Reference Concentrations (RfCs) for Total Petroleum Hydrocarbons (TPH). Amherst Scientific Publishers. Amherst, Massachusetts.  
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**Table 3.3**  
**Derivation of Inhalation Reference Doses for Various Total Petroleum Hydrocarbon Fractions**  
**Romic Facility - Chandler, Arizona**

Petroleum Hydrocarbon Fraction/ Constituent	Noncancer Reference Dose		Weight Fraction in Generic Product									Composition Weighted Inhalation RfD <sup>g</sup>						
	RfD <sub>(inh)</sub> (mg/kg-day)	Source	TPH- Gasoline <sup>a</sup>	Naptha <sup>b</sup>	TPH- Mineral Spirits <sup>c</sup>	TPH- Jet Fuel/ Kerosene <sup>d</sup>	Paraffinic Hydrocarbons <sup>e</sup>	TPH- Diesel <sup>a</sup>	Mineral Insulating Oil <sup>a</sup>	TPH- Motor Oil <sup>f</sup>	TPH- Gasoline	Naptha	TPH- Mineral Spirits	TPH- Jet Fuel/ Kerosene	Paraffinic Hydrocarbons	TPH- Diesel	Mineral Insulating Oil	TPH- Motor Oil
Aliphatic C5-C6	5.70E+00	ODEQ 2003	2.06E-01	1.06E-01	0.00E+00	0.00E+00	3.30E-01	0.00E+00	0.00E+00	0.00E+00	1.17E+00	6.04E-01	0.00E+00	0.00E+00	1.88E+00	0.00E+00	0.00E+00	0.00E+00
Aliphatic >C6-C8	5.70E+00	ODEQ 2003	2.20E-01	1.54E-01	1.30E-03	0.00E+00	3.05E-01	0.00E+00	0.00E+00	0.00E+00	1.25E+00	8.78E-01	7.41E-03	0.00E+00	1.74E+00	0.00E+00	0.00E+00	0.00E+00
Aliphatic >C8-C10	3.00E-01	ODEQ 2003	9.00E-02	1.51E-02	4.47E-01	0.00E+00	1.00E-01	2.00E-02	1.00E-03	0.00E+00	2.70E-02	4.53E-03	1.34E-01	0.00E+00	3.00E-02	6.00E-03	3.00E-04	0.00E+00
Aliphatic >C10-C12	3.00E-01	ODEQ 2003	3.00E-02	0.00E+00	3.82E-01	2.34E-01	9.00E-03	7.00E-02	3.00E-03	0.00E+00	9.00E-03	0.00E+00	1.15E-01	7.02E-02	2.70E-03	2.10E-02	9.00E-04	0.00E+00
Aliphatic >C12-C16	3.00E-01	ODEQ 2003	0.00E+00	0.00E+00	5.20E-03	5.42E-01	0.00E+00	3.50E-01	1.60E-01	0.00E+00	0.00E+00	0.00E+00	1.56E-03	1.63E-01	0.00E+00	1.05E-01	4.80E-02	0.00E+00
Aliphatic >C16-C21	2.00E+00	ODEQ 2003	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.40E-01	7.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.80E-01	1.40E+00	0.00E+00
Aliphatic >C21-C34	2.00E+00	ODEQ 2003	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aromatic >C8-C10	6.00E-02	ODEQ 2003	9.02E-02	1.66E-01	6.00E-02	0.00E+00	8.26E-02	2.52E-03	1.00E-03	0.00E+00	5.41E-03	9.96E-03	3.60E-03	0.00E+00	4.96E-03	1.51E-04	6.00E-05	0.00E+00
Aromatic >C10-C12	6.00E-02	ODEQ 2003	2.25E-02	5.70E-02	9.20E-02	6.60E-02	2.40E-02	7.40E-03	1.00E-03	0.00E+00	1.35E-03	3.42E-03	5.52E-03	3.96E-03	1.44E-03	4.44E-04	6.00E-05	0.00E+00
Aromatic >C12-C16	6.00E-02	ODEQ 2003	0.00E+00	0.00E+00	2.70E-03	1.54E-01	0.00E+00	8.00E-02	7.00E-03	0.00E+00	0.00E+00	0.00E+00	1.62E-04	9.24E-03	0.00E+00	4.80E-03	4.20E-04	0.00E+00
Aromatic >C16-C21	3.00E-02	ODEQ 2003	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.20E-01	8.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.60E-03	2.40E-03	0.00E+00
Aromatic >C21-C34	3.00E-02	ODEQ 2003	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.60E-02	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.38E-03	3.00E-02
n-Hexane	5.71E-02	IRIS	2.50E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzene	8.57E-03	IRIS	2.40E-02	3.00E-02	0.00E+00	0.00E+00	9.40E-03	2.90E-04	0.00E+00	0.00E+00	2.06E-04	2.57E-04	0.00E+00	0.00E+00	8.06E-05	2.49E-06	0.00E+00	0.00E+00
Toluene	1.14E-01	IRIS	1.20E-01	1.96E-01	0.00E+00	0.00E+00	4.97E-02	1.80E-03	0.00E+00	0.00E+00	1.37E-02	2.23E-02	0.00E+00	0.00E+00	5.67E-03	2.05E-04	0.00E+00	0.00E+00
Ethylbenzene	2.86E-01	IRIS	2.00E-02	4.45E-02	3.00E-04	0.00E+00	1.64E-02	6.80E-04	0.00E+00	0.00E+00	5.72E-03	1.27E-02	8.58E-05	0.00E+00	4.69E-03	1.94E-04	0.00E+00	0.00E+00
Total Xylenes	2.86E-02	IRIS	1.10E-01	2.28E-01	4.90E-03	0.00E+00	7.29E-02	5.00E-03	0.00E+00	0.00E+00	3.15E-03	6.53E-03	1.40E-04	0.00E+00	2.08E-03	1.43E-04	0.00E+00	0.00E+00
1,2,4-Trimethylbenzene	1.70E-03	PPRTV	3.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.10E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,3,5-Trimethylbenzene	1.70E-03	PPRTV	9.80E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.80E-03	0.00E+00	0.00E+00	1.67E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.06E-06	0.00E+00	0.00E+00
Naphthalene	8.60E-04	IRIS	2.50E-03	2.00E-03	0.00E+00	0.00E+00	4.00E-04	2.60E-03	0.00E+00	0.00E+00	2.15E-06	1.72E-06	0.00E+00	0.00E+00	3.44E-07	2.24E-06	0.00E+00	0.00E+00

**Overall Inhalation RfD (mg/kg-day)<sup>h</sup>**

**2.50E+00 1.54E+00 2.68E-01 2.47E-01 3.67E+00 8.22E-01 1.45E+00 3.00E-02**

**Notes:**

mg/kg-day = milligrams per kilogram per day  
 IRIS = Integrated Risk Information System (USEPA 2005)  
 ODEQ = Oregon Department of Environmental Quality  
 PPRTV = Provisional Peer Reviewed Toxicity Values (USEPA 2004)  
 TPH = Total Petroleum Hydrocarbons

- <sup>a</sup> Compositions for TPH-gas, TPH-diesel, and mineral insulating oil taken from page F-1 (ODEQ 2003)
- <sup>b</sup> Composition for naptha taken from TPHCWG 1997 (volume 4, page 132).
- <sup>c</sup> Composition for TPH-mineral spirits taken from TPHCWG 1997 (volume 4, page 126).
- <sup>d</sup> Composition for TPH-jet fuel/kerosene taken from TPHCWG 1997 (volume 4, page 136).
- <sup>e</sup> Composition for paraffinic hydrocarbons taken from TPHCWG 1997 (volume 4, page 129).
- <sup>f</sup> Conservatively assume that TPH-motor oil is composed entirely of the petroleum fraction with the lowest inhalation RfD.
- <sup>g</sup> Values calculated by multiplying the petroleum hydrocarbon fraction-specific RfD by the weight fraction percentage represented by that structural carbon range or component.
- <sup>h</sup> Overall inhalation RfD calculated by summing all composition weighted RfDs associated with a specific mixture (e.g., TPH-gasoline).

**Sources:**

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**Table 3.4**  
**Acute Toxicity Values**  
**Romic Facility - Chandler, Arizona**

CHEMICAL	CAS #	Acute Toxicity Criteria							
		OSHA PELs (ug/m <sup>3</sup> )	ACGIH TLVs (ug/m <sup>3</sup> )	Cal/EPA Acute Reference Exposure Level (REL) (ug/m <sup>3</sup> )	Texas Commission on Environmental Quality ESLs (ug/m <sup>3</sup> )	National Advisory Council AEGL-1 (ug/m <sup>3</sup> )	US Department of Energy		ATSDR Acute Minimum Risk Levels MRLs (ug/m <sup>3</sup> )
							ERPG-3 (ug/m <sup>3</sup> )	TEEL-3 (ug/m <sup>3</sup> )	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76131	7.60E+06	7.66E+06	---	3.80E+04	----	----	1.53E+07	----
1,1,1-TRICHLOROETHANE	71556	1.90E+06	1.91E+06	6.80E+04	1.08E+04	1.25E+06	1.91E+07	1.91E+07	1.09E+04
1,1,2-TRICHLOROETHANE	79005	4.50E+04	5.46E+04	---	5.50E+02	----	----	5.46E+05	----
1,2-DICHLOROBENZENE	95501	3.00E+05	1.50E+05	---	6.00E+02	----	----	1.20E+06	----
1,2,4-TRIMETHYLBENZENE	95636	----	1.23E+05	----	1.25E+03	----	----	7.37E+06	----
1,3,5-TRIMETHYLBENZENE	108678	----	----	----	1.25E+03	----	----	2.46E+06	----
1,4-DIOXANE	123911	3.60E+05	7.21E+04	3.00E+03	9.00E+02	6.13E+04	----	1.80E+06	7.21E+03
1-METHOXY-2-PROPANOL (propylene glycol methyl ether)	107982	----	3.69E+05	----	3.70E+03	----	----	2.76E+06	----
2-BUTOXYETHANOL ACETATE	112072	---	1.31E+05	---	3.10E+02	----	----	9.83E+05	----
2-ETHOXYPROPANOL	19089475	----	----	----	----	----	----	----	----
2-HEPTANONE	110430	4.65E+05	2.34E+05	---	3.00E+02	----	----	3.74E+06	----
2-METHYL-1-PROPANOL	78831	3.00E+05	1.52E+05	---	1.52E+03	----	----	4.85E+06	----
2-PENTANONE	107879	7.00E+05	7.05E+05	----	5.30E+03	----	----	5.28E+06	----
2-PYRROLIDONE	616455	----	----	----	1.40E+02	----	----	1.39E+05	----
4-HYDROXY-4-METHYL-2-PENTANONE	123422	2.40E+05	2.38E+05	---	1.33E+03	----	----	8.55E+06	----
ACETIC ACID	64197	2.50E+04	2.46E+04	---	2.50E+02	----	6.14E+05	6.14E+05	----
ACETONE	67641	2.40E+06	1.19E+06	----	5.90E+03	4.75E+05	----	2.02E+07	6.18E+04
ACETONITRILE	75058	7.00E+04	3.36E+04	----	3.40E+02	2.18E+04	----	8.40E+05	----
ALCOHOLS	67630	9.80E+05	4.92E+05	3.20E+03	7.85E+03	----	----	4.92E+06	----
AMYL ACETATE	628637	5.25E+05	2.66E+05	----	2.70E+01	----	----	5.32E+06	----
BENZENE	71432	3.25E+04	1.60E+03	1.30E+03	7.50E+01	1.66E+05	3.19E+06	3.19E+06	1.60E+02
BIOCIDE (acrolein)	107028	2.50E+02	---	1.90E-01	2.30E+00	6.88E+01	6.88E+03	6.88E+03	1.15E-01
BROMINATED BISPHENOL	79947	----	----	----	----	----	----	----	----
BUTYL ACETATE	123864	7.10E+05	7.13E+05	----	1.85E+03	----	1.43E+07	1.43E+07	----
BUTYL CELLOSOLVE	111762	2.40E+05	9.67E+04	1.40E+04	2.40E+02	----	----	3.38E+06	----
CARBON TETRACHLORIDE	56235	6.29E+04	3.15E+04	1.90E+03	1.30E+02	2.77E+05	4.72E+06	4.72E+06	----
CHLOROBENZENE	108907	3.50E+05	4.60E+04	---	4.60E+02	----	----	4.60E+06	----
CHLOROFORM	67663	2.40E+05	4.88E+04	1.50E+02	1.00E+02	3.12E+05	2.44E+07	2.44E+07	4.88E+02
CRESOL	1319773	2.20E+04	6.63E+04	---	5.00E+00	----	----	3.32E+06	----
CYCLOHEXANE	110827	1.05E+06	3.44E+05	----	1.40E+03	----	----	4.47E+06	----
CYCLOHEXANONE	108941	2.00E+05	8.03E+04	----	4.80E+02	----	----	2.81E+06	----
DIBUTYL PHTHALATE	84742	5.00E+03	5.00E+03	---	5.00E+01	----	----	5.00E+05	----
DIESEL FUEL		4.00E+05	1.80E+06	----	----	----	----	----	----
DIETHYLENE GLYCOL BUTYL ETHER	112345	----	----	----	1.06E+03	----	----	5.00E+05	----
DIETHYLENETRIAMINE	111400	---	4.22E+03	---	4.00E+01	----	----	4.22E+05	----
DIMETHYLFORMAMIDE	68122	3.00E+04	2.99E+04	----	3.00E+02	2.69E+05	5.98E+05	5.98E+05	----
ETHANOL	64175	1.90E+06	1.88E+06	2.80E+04	1.88E+04	9.99E+05	----	6.22E+06	----
ETHYL ACETATE	141786	1.40E+06	1.44E+06	----	1.44E+04	----	----	7.21E+06	----
ETHYL BENZENE	100414	4.35E+05	4.34E+05	----	2.00E+03	----	----	3.47E+06	----
ETHYL LACTATE	687478	----	----	----	----	----	----	----	----
ETHYL-3-ETHOXYPROPIONATE	763699	----	----	----	4.00E+02	----	----	5.00E+05	----

**Table 3.4**  
**Acute Toxicity Values**  
**Romic Facility - Chandler, Arizona**

CHEMICAL	CAS #	Acute Toxicity Criteria							
		OSHA PELs (ug/m <sup>3</sup> )	ACGIH TLVs (ug/m <sup>3</sup> )	Cal/EPA Acute Reference Exposure Level (REL) (ug/m <sup>3</sup> )	Texas Commission on Environmental Quality ESLs (ug/m <sup>3</sup> )	National Advisory Council AEGL-1 (ug/m <sup>3</sup> )	US Department of Energy		ATSDR Acute Minimum Risk Levels MRLs (ug/m <sup>3</sup> )
							ERPG-3 (ug/m <sup>3</sup> )	TEEL-3 (ug/m <sup>3</sup> )	
ETHYLENE GLYCOL MONOETHYL ETHER ACETATE	111159	5.40E+05	2.70E+04	1.40E+02	2.70E+02	----	----	2.70E+06	----
ETHYLENE GLYCOL	107211	----	----	----	2.60E+02	----	----	1.52E+05	1.27E+03
FERRIC CHLORIDE	7705080	---	---	---	---	----	----	2.00E+05	----
FORMIC ACID	64186	9.00E+03	9.41E+03	---	9.00E+01	----	----	5.65E+04	----
GLYCERIN	56815	5.00E+03	1.00E+04	---	5.00E+01	----	----	5.00E+05	----
GASOLINE		4.00E+05	1.80E+06	----	----	----	----	----	----
HEPTANE	142825	2.00E+06	1.64E+06	----	3.50E+03	1.16E+07	----	3.07E+06	----
HEXAMETHYLDISILAZANE	999973	----	----	----	2.00E+02	----	----	3.50E+05	----
HEXANE	110543	1.80E+06	1.76E+05	----	1.76E+03	1.16E+07	----	3.88E+06	----
HYDROCHLORIC ACID	7647010	7.00E+03	---	2.10E+03	7.50E+01	2.68E+03	2.24E+05	2.24E+05	----
HYDROFLUORIC ACID	7664393	2.45E+03	4.09E+02	2.40E+02	5.00E+00	8.18E+02	4.09E+04	4.09E+04	1.64E+01
ISOBUTYL ACETATE	110190	7.00E+05	7.13E+05	---	6.30E+02	----	----	6.18E+06	----
ISOBUTYL ISOBUTYRATE	97858	---	---	---	3.00E+03	----	----	5.00E+05	----
ISOPROPANOLAMINE	78966.00	----	----	----	2.00E+02	----	----	----	----
ISOPROPYL ACETATE	108214	9.50E+05	4.18E+05	---	3.76E+03	----	----	7.52E+06	----
JET FUEL/KEROSENE	8008206	----	----	----	1.00E+03	----	----	4.00E+05	----
METHANOL	67561	2.60E+05	2.62E+05	2.80E+04	2.62E+03	6.95E+05	6.55E+06	6.55E+06	----
METHYL ETHYL KETONE	78933	5.90E+05	5.90E+05	1.30E+04	3.90E+03	5.90E+05	----	8.85E+06	----
METHYL ISOBUTYL KETONE	108101	4.10E+05	2.05E+05	----	2.05E+03	----	----	2.05E+06	----
METHYLENE CHLORIDE	75092	4.41E+04	1.74E+05	1.40E+04	2.60E+02	6.95E+05	1.39E+07	1.39E+07	2.08E+03
MINERAL OIL	8012951	5.00E+03	5.00E+03	----	5.00E+01	----	----	5.00E+05	----
NAPHTHA	8030306	4.00E+05	1.80E+06	----	3.50E+03	----	----	4.50E+06	----
NAPHTHALENE	91203	5.00E+04	5.24E+04	---	4.40E+02	----	----	1.31E+06	----
N-BUTANOL	71363	3.00E+05	6.06E+04	----	6.10E+02	----	----	4.24E+06	----
NITRIC ACID	7697372	5.00E+03	5.15E+03	8.60E+01	5.00E+01	1.37E+03	2.01E+05	2.01E+05	----
N-METHYL-2-PYRROLIDONE	872504	----	----	----	8.00E+02	----	----	1.62E+06	----
N-PROPYL ACETATE	109604	8.40E+05	8.35E+05	----	6.30E+02	----	----	8.35E+06	----
PARAFFINIC HYDROCARBONS	64771728	----	----	----	5.00E+01	----	----	8.85E+05	----
PETROLEUM OIL	8002059	5.00E+03	5.00E+03	----	3.50E+03	----	----	5.00E+05	----
PHENOL	108952	1.90E+04	1.92E+04	5.80E+03	1.50E+02	5.77E+04	7.70E+05	7.70E+05	----
PHENYLMERCURIC ACETATE	62384	---	---	---	---	----	----	1.00E+04	----
PHOSPHORIC ACID	7664382	1.00E+03	1.00E+03	---	1.00E+01	----	----	5.00E+05	----
POLYDIMETHYL SILOXANE	63148629	----	----	----	----	----	----	2.50E+05	----
PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE	108656	----	----	----	6.60E+02	----	----	3.24E+06	----
PROPYLENE OXIDE	75569	2.40E+05	4.75E+03	3.10E+03	7.00E+01	1.73E+05	1.78E+06	1.78E+06	----
PYRIDINE	110861	1.50E+04	3.24E+03	---	7.00E+01	----	----	3.24E+06	----
STODDARD SOLVENT	8052413	2.90E+06	5.77E+05	0.00E+00	3.50E+03	----	----	5.00E+05	----
STYRENE	100425	4.33E+05	8.52E+04	2.10E+04	1.10E+02	8.52E+04	4.26E+06	4.26E+06	----
SULFOLANE	126330	----	----	----	2.00E+01	----	----	----	----
SULFURIC ACID	7664939	1.00E+03	2.00E+02	---	---	8.02E+02	3.00E+04	3.00E+04	----
TETRACHLOROETHYLENE	127184	6.89E+05	1.70E+05	2.00E+04	3.40E+02	2.37E+05	6.78E+06	6.78E+06	1.36E+03
TETRAETHYL ORTHOSILICATE	78104	8.50E+05	8.52E+04	0.00E+00	8.50E+02	----	2.56E+06	2.56E+06	----

**Table 3.4**  
**Acute Toxicity Values**  
**Romic Facility - Chandler, Arizona**

CHEMICAL	CAS #	Acute Toxicity Criteria							
		OSHA PELs (ug/m <sup>3</sup> )	ACGIH TLVs (ug/m <sup>3</sup> )	Cal/EPA Acute Reference Exposure Level (REL) (ug/m <sup>3</sup> )	Texas Commission on Environmental Quality ESLs (ug/m <sup>3</sup> )	National Advisory Council AEGL-1 (ug/m <sup>3</sup> )	US Department of Energy		ATSDR Acute Minimum Risk Levels MRLs (ug/m <sup>3</sup> )
							ERPG-3 (ug/m <sup>3</sup> )	TEEL-3 (ug/m <sup>3</sup> )	
TETRAHYDROFURAN	109999	5.90E+05	1.47E+05	---	5.90E+03	---	---	5.90E+06	---
TOLUENE	108883	7.66E+05	1.88E+05	3.70E+04	1.88E+03	7.54E+05	3.77E+06	3.77E+06	3.77E+03
TRICHLOROETHYLENE	79016	5.46E+05	2.69E+05	---	1.35E+03	6.99E+05	2.69E+07	2.69E+07	1.07E+04
TRIETHYLENETETRAMINE	112243	---	---	---	2.40E+02	---	---	5.00E+05	---
XYLENES	1330207	4.35E+05	4.34E+05	2.20E+04	3.70E+03	5.64E+05	---	3.91E+06	4.34E+03

**Notes:**

ug/m<sup>3</sup> = micrograms per cubic meter

ACGIH = American Conference of Governmental Industrial Hygienists  
 AEGL = Acute Exposure Guideline Level (USEPA 2005)  
 Cal/EPA = California Environmental Protection Agency  
 ERPG = Emergency Response Planning Guideline  
 ESL = Effects Screening Levels (TCEQ 2003)  
 MRL - Minimal Risk Level

OSHA = Occupational Safety and Health Administration  
 PEL = Permissible Exposure Level (29 CFR § 1910.1000)  
 REL = Reference Exposure Level  
 Temporary Emergency Exposure Limits  
 TLV = Threshold Limit Value  
 US = United States

**Sources:**

American Conference of Governmental Industrial Hygienists (ACGIH). 2005. *TLVs® and BEIs® Based on the Documentation of the Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices*. Cincinnati, OH.

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 Available at: [http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=9992](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9992)

National Center for Environmental Assessment (NCEA). 2004. Cited in USEPA Region 9 Preliminary Remediation Goals (PRGs) 2004. San Francisco, CA. October.

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**Table 3.5**  
**Worker Occupational Standards**  
**Romic Facility - Chandler, Arizona**

Chemicals	PEL <sup>a</sup> (mg/m <sup>3</sup> )	STEL <sup>b</sup> (mg/m <sup>3</sup> )
Acetone	2400	1815
Isopropyl Alcohol	980	980
Methylene Chloride	87	435 <sup>c</sup>
Methanol	N/A	328
Methyl Ethyl Ketone	590	885
Toluene	47	N/A
Total Hydrocarbons (as n-Hexane)	N/A	N/A

**Notes:**

mg/m<sup>3</sup> = milligrams per cubic meter

N/A = Not available

<sup>a</sup> Code of Federal Regulations (CFR). 2005. Title 29, Department of Labor. Part 1910, Occupational Safety and Health Standards. Subpart Z, Toxic and Hazardous Substances. Section 1910.1000, Air Contaminants. Table Z-1, Limits for Air Contaminants.

<sup>b</sup> American Conference of Governmental Industrial Hygienists (ACGIH). 2005. Threshold Limit Values and Biological Exposure Indices.

<sup>c</sup> Code of Federal Regulations (CFR). 2005. Title 29, Department of Labor. Part 1910.1052.

**Table 4.1**  
**Exposure Assumptions - Average Exposed Individual (AEI)**  
**Romic Facility - Chandler, Arizona**

Parameter	Potentially Exposed Populations <sup>a</sup>		
	Off-site Resident		Off-Site Worker
	Adult Resident	Child Resident	
<b>Inhalation of Particulates and Gases</b>			
Inhalation Rate (m <sup>3</sup> /hour)	0.63	0.30	1.5
Exposure Time (hours/day)	24	24	8
<b>Population-Specific Assumptions</b>			
Exposure Frequency (days/yr)	350	350	250
Exposure Duration (years) <sup>b</sup>	7	2	9
Body Weight (kg)	70	15	70
Averaging Time - Carcinogens (days)	25,550	25,550	25,550
Averaging Time - Noncarcinogens (days)	2,555	730	3,285

**Notes:**

<sup>a</sup> For a further description of exposure parameters, see Section 4.4 of text.

<sup>b</sup> Exposure duration for lifetime residents is assumed to be nine years total. For carcinogens, exposures are combined for children (two years) and adults (seven years).

**Table 4.2**  
**Exposure Assumptions - Reasonable Maximum Exposure (RME)**  
**Romic Facility - Chandler, Arizona**

Parameter	Potentially Exposed Populations		
	Off-site Resident		Off-Site Worker
	Adult Resident	Child Resident	
<b>Inhalation of Particulates and Gases</b>			
Inhalation Rate (m <sup>3</sup> /hour)	0.83	0.42	2.5
Exposure Time (hours/day)	24	24	8
<b>Population-Specific Assumptions</b>			
Exposure Frequency (days/yr)	350	350	250
Exposure Duration (years)	24	6	25
Body Weight (kg)	70	15	70
Averaging Time - Carcinogens (days)	25,550	25,550	25,550
Averaging Time - Noncarcinogens (days)	8,760	2,190	9,125

**Notes:**

- <sup>a</sup> For a further description of exposure parameters, see Section 4.4 of text.
- <sup>b</sup> Exposure duration for lifetime residents is assumed to be nine years total. For carcinogens, exposures are combined for children (six years) and adults (twenty four years).



**Table 5.1  
Aerosol Can Crushing Emissions  
Romic Facility - Chandler, Arizona**

<b>Chemical</b>	<b>% Content (Combined)</b>	<b>Uncontrolled Emission Rate (grams/second) Annual Average <sup>a</sup></b>	<b>Uncontrolled Emission Rate (grams/second) Maximum Hourly <sup>a</sup></b>
1,2,4-trimethylbenzene	3.50E-03	3.74E-06	1.09E-04
acetone	5.24E-02	5.61E-05	1.64E-03
ethanol	3.46E-01	3.70E-04	1.08E-02
ethylbenzene	5.24E-02	5.61E-05	1.64E-03
hexane	5.24E-02	5.61E-05	1.64E-03
methanol	1.75E-02	1.87E-05	5.46E-04
naptha	1.40E-01	1.50E-04	4.37E-03
Stoddard solvent	1.92E-01	2.06E-04	6.01E-03
toluene	2.10E-02	2.24E-05	6.55E-04
xylene	1.22E-01	1.31E-04	3.82E-03

**Note:**

<sup>a</sup> The emissions from the aerosol can crushing are vented through the distillation processes. The uncontrolled emissions are the emissions before going through the VOC abatement/carbon bed control system installed at the distillation processes.



**Table 5.2**  
**Truck Washout Emissions – Input Parameters**  
**Romic Facility - Chandler, Arizona**

Parameter	Value	Units	Notes
<i>Number of trucks washed</i>	30	trucks/month	
Proportion of trucks high vapor pressure low viscosity <sup>a</sup>	0.67	unitless	USEPA AP-42 Section 4.8 ("Acetone", Table 4.8-2)
Emission Factor	156	grams/truck	Adjusted for 30 minute washout time
Proportion of trucks lower vapor pressure low viscosity <sup>b</sup>	0.33	unitless	USEPA AP-42 Section 4.8 ("Perchloroethylene", Table 4.8-2)
Emission Factor	108	grams/truck	Adjusted for 30 minute washout time
Emission Rates	3120	grams/month	Monthly average for high vapor pressure trucks
	1080	grams/month	Monthly average for lower vapor pressure trucks
	4200	grams/month	Monthly average total emission rates
	0.0012	grams/second	Annual average for high vapor pressure trucks
	0.00041	grams/second	Annual average for lower vapor pressure trucks
	0.0016	grams/second	Total annual average emission rate
	0.043	grams/second	Hourly emission rate for high vapor pressure trucks <sup>c</sup>
0.030	grams/second	Hourly emission rate for lower vapor pressure trucks <sup>c</sup>	

**Notes:**

- <sup>a</sup> Approximately 2/3 of the trucks held high vapor pressure products; half of these held organic waste and half held blended fuel.
- <sup>b</sup> Approximately 1/3 of the trucks held low-weight solvent with lower vapor pressure (e.g., Stoddard solvent).
- <sup>c</sup> The hourly emission rates are calculated assuming one truck is washed per hour.

**Source:**

United States Environmental Protection Agency (USEPA). 2005. Compilation of Air Pollutant Emission Factors AP-42. July 2005.



**Table 5.3  
Truck Washout Emissions by Chemical  
Romic Facility - Chandler, Arizona**

**Volatile Organic Compound Emission Rate for high vapor pressure trucks <sup>a</sup>:** 1.19E-03 grams per second (annual average)  
4.11E-04 grams per second (maximum hourly)  
**Volatile Organic Compound Emission Rate for lower vapor pressure trucks <sup>a</sup>:** 4.33E-02 grams per second (annual average)  
3.00E-02 grams per second (maximum hourly)

CHEMICAL	Trucks Transported Blended Fuel			Trucks Transported Organic Waste			Trucks Transported Low-Weight Solvent			Total Emission Rate (grams/second) Annual Average	Total Emission Rate (grams/second) Maximum Hourly
	Mol Fraction in Vapor	Emission Rate (grams/second) Annual Average <sup>b</sup>	Emission Rate (grams/second) Maximum Hourly <sup>b</sup>	Mol Fraction in Vapor	Emission Rate (grams/second) Annual Average <sup>b</sup>	Emission Rate (grams/second) Maximum Hourly <sup>b</sup>	Mol Fraction in Vapor	Emission Rate (grams/second) Annual Average <sup>c</sup>	Emission Rate (grams/second) Maximum Hourly <sup>c</sup>		
ISOBUTYL ISOBUTYRATE	3.87E-08	2.30E-11	1.59E-11	---	---	---	---	---	---	2.30E-11	1.59E-11
ISOPARAFFINIC HYDROCARBONS	2.73E-01	1.62E-04	1.12E-04	1.10E-03	6.56E-07	4.54E-07	---	---	---	1.63E-04	1.12E-04
ISOPROPYL ACETATE	5.75E-06	3.41E-09	2.36E-09	1.22E-05	7.27E-09	5.03E-09	---	---	---	1.07E-08	5.03E-09
JET FUEL/KEROSENE	5.77E-04	3.43E-07	2.37E-07	---	---	---	---	---	---	3.43E-07	2.37E-07
METHANOL	1.06E-01	6.30E-05	4.36E-05	2.03E-02	1.20E-05	8.33E-06	---	---	---	7.51E-05	4.36E-05
METHYL ETHYL KETONE	3.93E-02	2.33E-05	1.61E-05	5.94E-02	3.53E-05	2.44E-05	---	---	---	5.86E-05	2.44E-05
METHYL ISOBUTYL KETONE	1.66E-03	9.87E-07	6.84E-07	3.16E-04	1.87E-07	1.30E-07	---	---	---	1.17E-06	6.84E-07
NAPHTHA	5.72E-03	3.39E-06	2.35E-06	2.76E-02	1.64E-05	1.14E-05	---	---	---	1.98E-05	1.14E-05
NAPHTHALENE	1.83E-08	1.08E-11	7.50E-12	---	---	---	---	---	---	1.08E-11	7.50E-12
NITRIC ACID	1.32E-05	7.86E-09	5.44E-09	---	---	---	---	---	---	7.86E-09	5.44E-09
N-BUTANOL	5.68E-04	3.37E-07	2.33E-07	3.80E-04	2.26E-07	1.56E-07	---	---	---	5.62E-07	2.33E-07
N-METHYL-2-PYRROLIDONE	1.26E-04	7.46E-08	5.17E-08	1.46E-02	8.68E-06	6.01E-06	---	---	---	8.75E-06	6.01E-06
N-PROPYL ACETATE	1.04E-04	6.20E-08	4.29E-08	1.51E-03	8.94E-07	6.19E-07	---	---	---	9.56E-07	6.19E-07
PARAFFIN OIL	3.78E-03	2.24E-06	1.55E-06	---	---	---	---	---	---	2.24E-06	1.55E-06
PERCHLOROETHYLENE	1.32E-03	7.85E-07	5.44E-07	1.13E-02	6.70E-06	4.64E-06	---	---	---	7.49E-06	4.64E-06
PETROLEUM OIL PRODUCTS	4.03E-06	2.39E-09	1.65E-09	2.01E-06	1.20E-09	8.28E-10	---	---	---	3.59E-09	1.65E-09
PHENOL	1.90E-07	1.13E-10	7.79E-11	1.68E-07	9.97E-11	6.91E-11	---	---	---	2.12E-10	7.79E-11
PHOSPHORIC ACID	---	---	---	2.56E-07	1.52E-10	1.05E-10	---	---	---	1.52E-10	1.05E-10
POLYDIMETHYL SILOXANE	3.18E-07	1.89E-10	1.31E-10	---	---	---	---	---	---	1.89E-10	1.31E-10
PROPYLENE GLYCOL METHYL ETHER ACETATE	3.73E-04	2.22E-07	1.53E-07	8.21E-04	4.87E-07	3.37E-07	---	---	---	7.09E-07	3.37E-07
PROPYLENE OXIDE	5.06E-04	3.00E-07	2.08E-07	---	---	---	---	---	---	3.00E-07	2.08E-07
PYRIDINE	2.90E-05	1.72E-08	1.19E-08	---	---	---	---	---	---	1.72E-08	1.19E-08
STODDARD SOLVENT	3.96E-04	2.35E-07	1.63E-07	7.46E-03	4.43E-06	3.06E-06	1	4.33E-02	3.00E-02	4.33E-02	3.00E-02
STYRENE	6.45E-05	3.83E-08	2.65E-08	---	---	---	---	---	---	3.83E-08	2.65E-08
SULFOLANE	3.31E-07	1.96E-10	1.36E-10	3.38E-06	2.01E-09	1.39E-09	---	---	---	2.20E-09	1.39E-09
SULFURIC ACID	4.26E-09	2.53E-12	1.75E-12	---	---	---	---	---	---	2.53E-12	1.75E-12
TETRAETHYL ORTHOSILICATE	1.72E-05	1.02E-08	7.05E-09	3.58E-07	2.13E-10	1.47E-10	---	---	---	1.04E-08	7.05E-09
TETRAHYDROFURAN	4.12E-03	2.45E-06	1.69E-06	1.54E-03	9.14E-07	6.33E-07	---	---	---	3.36E-06	1.69E-06
TOLUENE	1.21E-02	7.17E-06	4.96E-06	6.62E-03	3.93E-06	2.72E-06	---	---	---	1.11E-05	4.96E-06
TRICHLOROETHENE	9.49E-03	5.64E-06	3.90E-06	1.52E-02	9.05E-06	6.27E-06	---	---	---	1.47E-05	6.27E-06
TRIETHYLENETETRAMINE	4.90E-09	2.91E-12	2.01E-12	---	---	---	---	---	---	2.91E-12	2.01E-12
XYLENES	1.89E-03	1.12E-06	7.75E-07	9.63E-03	5.72E-06	3.96E-06	---	---	---	6.84E-06	3.96E-06

**Notes:**

- <sup>a</sup> The volatile organic compound emission rates are calculated on Table 5.2.
- <sup>b</sup> Approximately 2/3 of the trucks held high vapor pressure products; half of these held organic waste and half held blended fuel.
- <sup>c</sup> Approximately 1/3 of the trucks held low-weight solvent with lower vapor pressure (e.g., Stoddard solvent).

**Table 5.4**  
**Rail Loading Emissions by Chemical**  
**Romic Facility - Chandler, Arizona**

<b>Chemical</b>	<b>CASRN</b>	<b>Uncontrolled Emission Rate (grams/second) Annual Average <sup>e</sup></b>	<b>Uncontrolled Emission Rate (grams/seconds) Maximum Hourly <sup>e,f</sup></b>
1,2,4-Trimethylbenzene	95636	8.93E-10	6.52E-08
1,2-dichlorobenzene	95501	1.88E-09	1.37E-07
1,3,5-trimethylbenzene	108678	2.66E-07	1.94E-05
1-methoxy-2-propanol	107982	1.03E-03	7.51E-02
2-butoxyethanol acetate	112072	8.79E-10	6.42E-08
2-ethoxyethyl acetate	111159	2.77E-07	2.02E-05
2-heptanone	110430	2.90E-07	2.12E-05
2-methoxyethanol	109864	7.01E-06	5.12E-04
2-pentanone	107879	4.36E-04	3.18E-02
4-hydroxy-4-methyl-2-pentanone	123422	3.15E-09	2.30E-07
Acetic acid	64197	3.88E-06	2.83E-04
Acetone	67641	9.73E-03	7.11E-01
Acetonitrile	75058	9.36E-04	6.84E-02
alcohols <sup>a</sup>	67630	2.44E-03	1.78E-01
amyl acetate	628637	5.57E-06	4.06E-04
Benzene	71432	2.03E-04	1.48E-02
brominated bisphenol	79947	4.70E-17	3.43E-15
Butanol-(1)	71363	3.32E-05	2.42E-03
butoxy ethanol	111762	1.19E-07	8.67E-06
butyl acetate	123864	3.64E-05	2.66E-03
Carbon tetrachloride	56235	1.09E-07	7.97E-06
Chlorobenzene	108907	8.81E-08	6.43E-06
Chloroform	67663	7.05E-05	5.15E-03
Cresol (-m)	108394	2.25E-09	1.64E-07
Cyclohexane	110827	4.73E-05	3.45E-03
Cyclohexanone	108941	7.23E-06	5.28E-04
dibutyl phthalate	84742	1.52E-14	1.11E-12
diethylene glycol	111466	1.29E-10	9.39E-09
diethylene glycol butyl ether	112345	1.32E-09	9.64E-08
Dimethyl formamide	68122	1.39E-05	1.02E-03
Dioxane (1,4)	123911	3.56E-06	2.60E-04
Distillate fuel oil no. 2	68476346	7.01E-06	5.12E-04
Ethyl acetate	141786	4.04E-04	2.95E-02
Ethyl alcohol	64175	9.20E-04	6.71E-02
ethyl lactate	687478	9.92E-05	7.24E-03
ethyl-3-ethoxypropionate	763699	1.34E-07	9.78E-06
Ethylbenzene	100414	7.91E-06	5.78E-04
ethylene glycol	107211	3.72E-07	2.72E-05
ethylene glycol ethyl ether acetate	111159	1.00E-07	7.32E-06
ferric chloride	7705080	2.53E-07	1.84E-05
Formic acid	64186	7.88E-09	5.75E-07
Gasoline (RVP 7)	8006619	3.54E-03	2.58E-01
glycerin	56815	4.84E-14	3.53E-12
Heptane (-n)	142825	3.86E-05	2.81E-03
hexamethyldisilazane	999973	5.34E-07	3.90E-05
Hexane (-n)	110543	2.15E-04	1.57E-02
hydrochloric acid	7647010	5.01E-10	3.66E-08
hydrofluoric acid	7664393	3.03E-07	2.21E-05
isobutyl acetate	110190	2.01E-06	1.47E-04
Iso-butyl alcohol	78831	4.00E-09	2.92E-07
isobutyl isobutyrate	97858	1.84E-09	1.34E-07

**Table 5.4**  
**Rail Loading Emissions by Chemical**  
**Romic Facility - Chandler, Arizona**

<b>Chemical</b>	<b>CASRN</b>	<b>Uncontrolled Emission Rate (grams/second) Annual Average<sup>e</sup></b>	<b>Uncontrolled Emission Rate (grams/seconds) Maximum Hourly<sup>e,f</sup></b>
Isoparaffinic Hydrocarbons	64771728	9.95E-05	7.26E-03
isopropyl acetate	108214	6.05E-07	4.42E-05
Jet kerosene	8008206	8.56E-06	6.25E-04
Jet naphtha (JP-4)	8030306	2.28E-03	1.66E-01
Methyl alcohol	67561	2.51E-03	1.83E-01
Methyl ethyl ketone	78933	2.05E-03	1.50E-01
Methyl isobutyl ketone	108101	1.24E-04	9.06E-03
Methylene chloride	75092	4.03E-03	2.94E-01
Naphthalene	91203	1.05E-08	7.68E-07
nitric acid (0.5-5.0%)	7697372	5.82E-09	4.25E-07
n-methyl-2-pyrrolidone	872504	2.27E-05	1.66E-03
n-propyl acetate	109604	7.55E-06	5.51E-04
paraffin oil <sup>b</sup>	8012951	1.50E-04	1.09E-02
petroleum oil products <sup>c</sup>	8002059	6.25E-07	4.56E-05
phenol	108952	1.63E-08	1.19E-06
polydimethylsiloxane	63148629	1.30E-08	9.47E-07
propylene glycol methyl ether acetate	108656	2.72E-05	1.98E-03
Propylene oxide	75569	2.44E-05	1.78E-03
Pyridine	110861	2.26E-06	1.65E-04
stoddard solvent <sup>d</sup>	8052413	1.21E-03	8.85E-02
Styrene	100425	5.36E-06	3.91E-04
sulfolane	126330	2.09E-08	1.53E-06
sulfuric acid	7664939	8.46E-12	6.18E-10
Tetrachloroethylene	127184	1.64E-04	1.20E-02
tetraethyl orthosilicate	78104	2.76E-06	2.02E-04
Tetrahydrofuran	109999	2.11E-04	1.54E-02
tetrahydrothiophene	110010	3.02E-06	2.20E-04
Toluene	108883	8.29E-04	6.05E-02
Trichloro(1,1,2)trifluoroethane	76131	1.11E-07	8.11E-06
Trichloroethane (1,1,1)	71556	1.41E-04	1.03E-02
Trichloroethane (1,1,2)	79005	7.93E-09	5.79E-07
Trichloroethylene	79016	9.17E-04	6.69E-02
trichlorotrifluoroethane	26523648	1.43E-05	1.04E-03
triethylenetetramine	112243	3.94E-10	2.88E-08
Xylenes (mixed isomers)	1330207	1.61E-04	1.18E-02

**Notes:**

<sup>a</sup> Isopropanol used as a surrogate for modeling alcohols.

<sup>b</sup> Mineral oil used as a surrogate for modeling paraffin oil.

<sup>c</sup> Petroleum oil used as a surrogate for modeling petroleum oil products.

<sup>d</sup> Jet naphtha used as a surrogate for modeling stoddard solvent.

<sup>e</sup> The emissions from the rail loading are vented through the distillation processes. The uncontrolled emissions are the emissions before going through the VOC abatement/carbon bed control system installed at the distillation processes.

<sup>f</sup> Assumes railcar loading takes 2 hours for each railcar. For 60 railcars. 120 hours per year was assumed for the duration of railcar loading to estimate maximum hourly emissions.

**Table 5.5**  
**On-Site Tanker Truck Emissions by Chemical**  
**Romic Facility - Chandler, Arizona**

<b>Chemical</b>	<b>CASRN</b>	<b>Uncontrolled Emission Rate (grams/second) Annual Average<sup>e</sup></b>	<b>Uncontrolled Emission Rate (grams/seconds) Maximum Hourly<sup>e,f</sup></b>
1,2,4-Trimethylbenzene	95636	2.41E-10	1.76E-08
1,2-dichlorobenzene	95501	5.06E-10	3.69E-08
1,3,5-trimethylbenzene	108678	7.22E-08	5.27E-06
1-methoxy-2-propanol	107982	3.17E-04	2.31E-02
2-butoxyethanol acetate	112072	3.77E-10	2.75E-08
2-heptanone	110430	7.70E-08	5.62E-06
2-methoxyethanol	109864	1.98E-06	1.45E-04
2-pentanone	107879	1.30E-04	9.46E-03
4-hydroxy-4-methyl-2-pentanone	123422	8.32E-10	6.07E-08
Acetic acid	64197	1.11E-06	8.12E-05
Acetone	67641	3.09E-03	2.26E-01
Acetonitrile	75058	2.90E-04	2.12E-02
alcohols <sup>a</sup>	67630	6.86E-04	5.01E-02
amyl acetate	628637	2.39E-06	1.74E-04
Benzene	71432	6.32E-05	4.61E-03
brominated bisphenol	79947	2.02E-17	1.47E-15
Butanol-(1)	71363	8.42E-06	6.15E-04
butoxy ethanol	111762	2.94E-08	2.14E-06
butyl acetate	123864	1.03E-05	7.55E-04
Carbon tetrachloride	56235	3.45E-08	2.52E-06
Chlorobenzene	108907	2.56E-08	1.87E-06
Chloroform	67663	2.23E-05	1.63E-03
Cresol (-m)	108394	5.35E-10	3.90E-08
Cyclohexane	110827	1.48E-05	1.08E-03
Cyclohexanone	108941	2.11E-06	1.54E-04
dibutyl phthalate	84742	1.77E-15	1.29E-13
diethylene glycol	111466	2.20E-11	1.60E-09
diethylene glycol butyl ether	112345	2.52E-10	1.84E-08
Dimethyl formamide	68122	3.79E-06	2.76E-04
Dioxane (1,4)	123911	1.07E-06	7.81E-05
Distillate fuel oil no. 2	68476346	2.09E-06	1.53E-04
Ethyl acetate	141786	1.23E-04	9.01E-03
Ethyl alcohol	64175	2.64E-04	1.93E-02
ethyl lactate	687478	4.25E-05	3.10E-03
ethyl-3-ethoxypropionate	763699	5.74E-08	4.19E-06
Ethylbenzene	100414	2.27E-06	1.66E-04
ethylene glycol	107211	8.98E-08	6.55E-06
ethylene glycol ethyl ether acetate	111159	1.62E-07	1.18E-05
ferric chloride	7705080	1.08E-07	7.91E-06
Formic acid	64186	2.42E-09	1.77E-07
Gasoline (RVP 7)	8006619	1.19E-03	8.71E-02
glycerin	56815	2.07E-15	1.51E-13
Heptane (-n)	142825	1.16E-05	8.48E-04
hexamethyldisilazane	999973	2.29E-07	1.67E-05
Hexane (-n)	110543	6.81E-05	4.97E-03
hydrochloric acid	7647010	2.15E-10	1.57E-08
hydrofluoric acid	7664393	1.30E-07	9.48E-06
isobutyl acetate	110190	5.95E-07	4.35E-05
Iso-butyl alcohol	78831	1.03E-09	7.52E-08
isobutyl isobutyrate	97858	5.10E-10	3.72E-08
Isoparaffinic Hydrocarbons	64771728	3.19E-05	2.33E-03

**Table 5.5**  
**On-Site Tanker Truck Emissions by Chemical**  
**Romic Facility - Chandler, Arizona**

Chemical	CASRN	Uncontrolled Emission Rate (grams/second) Annual Average <sup>e</sup>	Uncontrolled Emission Rate (grams/seconds) Maximum Hourly <sup>e,f</sup>
isopropyl acetate	108214	1.84E-07	1.34E-05
Jet kerosene	8008206	2.43E-06	1.77E-04
Jet naphtha (JP-4)	8030306	7.46E-04	5.45E-02
Methyl alcohol	67561	7.45E-04	5.44E-02
Methyl ethyl ketone	78933	6.30E-04	4.60E-02
Methyl isobutyl ketone	108101	3.58E-05	2.61E-03
Methylene chloride	75092	1.31E-03	9.57E-02
Naphthalene	91203	2.70E-09	1.97E-07
nitric acid (0.5-5.0%)	7697372	2.50E-09	1.82E-07
n-methyl-2-pyrrolidone	872504	9.75E-06	7.12E-04
n-propyl acetate	109604	2.22E-06	1.62E-04
paraffin <sup>b</sup>	8012951	6.43E-05	4.69E-03
petroleum oil products <sup>c</sup>	8002059	2.68E-07	1.96E-05
phenol	108952	3.82E-09	2.79E-07
polydimethylsiloxane	63148629	5.56E-09	4.06E-07
propylene glycol methyl ether acetate	108656	1.16E-05	8.50E-04
Propylene oxide	75569	8.02E-06	5.85E-04
Pyridine	110861	6.60E-07	4.82E-05
stoddard solvent <sup>d</sup>	8052413	3.97E-04	2.90E-02
Styrene	100425	1.53E-06	1.12E-04
sulfolane	126330	1.30E-06	9.51E-05
sulfuric acid	7664939	3.63E-12	2.65E-10
Tetrachloroethylene	127184	4.81E-05	3.51E-03
tetraethyl orthosilicate	78104	7.41E-07	5.41E-05
Tetrahydrofuran	109999	6.67E-05	4.87E-03
tetrahydrothiophene	126330	1.29E-06	9.44E-05
Toluene	108883	2.48E-04	1.81E-02
Trichloro(1,1,2)trifluoroethane	76131	6.15E-06	4.49E-04
Trichloroethane (1,1,1)	71556	4.39E-05	3.20E-03
Trichloroethane (1,1,2)	79005	2.32E-09	1.69E-07
Trichloroethylene	79016	2.79E-04	2.04E-02
triethylenetetramine	112243	1.69E-10	1.23E-08
Xylenes (mixed isomers)	1330207	4.60E-05	3.36E-03

**Notes:**

- <sup>a</sup> Isopropanol used as a surrogate for modeling alcohols.
- <sup>b</sup> Mineral oil used as a surrogate for modeling paraffin oil.
- <sup>c</sup> Petroleum oil used as a surrogate for modeling petroleum oil products.
- <sup>d</sup> Jet naphtha used as a surrogate for modeling stoddard solvent.
- <sup>e</sup> The emissions from the tanker truck loading are vented through the distillation processes. The uncontrolled emissions are the emissions before going through the VOC abatement/carbon bed control system installed at the distillation processes.
- <sup>f</sup> Assumes tanker truck loading takes an equivalent amount of time as railcar loading. Thus, 120 hours per year was assumed for the duration of tanker truck loading to estimate maximum hourly emissions.

**Table 5.6**  
**Labpack Consolidation Emissions – Input Parameters**  
**Romic Facility - Chandler, Arizona**

<b>Parameter</b>	<b>Value</b>	<b>Units</b>	<b>Notes</b>
Monthly throughput	1667	gallons	Based on 2006 3-month representative period
Monthly throughput of volatile organics	1333	gallons	Comprising primarily acetone, ethyl acetate, isopropanol and mineral spirits
Evaporative loss	2%		Assumed similar to paint and varnish manufacturing loss fraction (United States Environmental Protection Agency [USEPA] AP-42 Section 6.4)
Emission rate	20.0	gallons per month	
	0.83	gallons per day	Six work days per week; four weeks per month; eight hours per day
Specific gravity	0.79		Assuming acetone
Annual average emission rate	0.023	grams per second	
Hourly average emission rate	0.086	grams per second	

**Note:**

% = percent

**Source:**

United States Environmental Protection Agency (USEPA). 2005. Compilation of Air Pollutant Emission Factors AP-42. July 2005.



**Table 5.7**  
**Labpack Consolidation Emissions by Chemical**  
**Romic Facility - Chandler, Arizona**

**Volatile Organic Compound Emission Rates:**                    **0.023 grams per second (annual average)**  
**0.086 grams per second (maximum hourly)**

<b>Chemical</b>	<b>Molecular Weight (grams/mole)</b>	<b>Vapor Pressure (mmHg)</b>	<b>Total Pounds</b>	<b>Equilibrium Mol Fraction in Vapor</b>	<b>Mass of Individual Chemical in Vapor (grams/mole vapor)</b>	<b>Mass Fraction of Individual Chemical in Vapor</b>	<b>Emission Rate (grams/second) Annual Average</b>	<b>Emission Rate (grams/second) Maximum Hourly</b>
acetone	58.08	232.00	1	6.87E-01	3.99E+01	6.23E-01	1.41E-02	5.36E-02
ethyl acetate	88.11	93.20	1	1.82E-01	1.60E+01	2.50E-01	5.67E-03	2.15E-02
isopropanol	60.10	45.00	1	1.29E-01	7.74E+00	1.21E-01	2.74E-03	1.04E-02
mineral spirits	141.00	2.00	1	2.44E-03	3.44E-01	5.37E-03	1.22E-04	4.62E-04

**Note:**  
mmHg = millimeter mercury

**Table 5.8**  
**Waste Paint Consolidation Emissions – Input Parameters**  
**Romic Facility - Chandler, Arizona**

Parameter	Value	Units	Notes
Material collected	400	gallons/day	maximum
	100000	gallons/year	maximum
Volatile Organic Compound (VOC) content	340	grams/liter	typical maximum
Emission factor	1.5%	loss factor	United States Environmental Protection Agency (USEPA) AP-42 Section 6.4 Paint and Varnish Manufacturing
Annual average emission rate	0.061	grams/second	
Hourly average emission rate	0.27	grams/second	8 hours per day

**Note:**

% = percent

**Table 5.9  
Waste Paint Consolidation Emissions by Chemical  
Romic Facility - Chandler, Arizona**

**Volatile Organic Compound Emission Rates:**

**0.061 grams/second (annual average)  
0.27 grams/second (maximum hourly)**

<b>Chemical</b>	<b>%Component</b>	<b>Uncontrolled Emission Rate (grams/second) Annual Average <sup>a</sup></b>	<b>Emission Rate (grams/second) Maximum Hourly <sup>a</sup></b>
stoddard solvent	31%	6.10E-02	2.67E-01
ethyl benzene	0.10%	1.97E-04	8.62E-04

**Notes:**

% = percent

<sup>a</sup> The emissions from the waste paint consolidation are vented through the distillation processes. The uncontrolled emissions are the emissions before going through the VOC abatement/carbon bed control system installed at the distillation processes.

**Table 5.10**  
**Troughs Emissions – Input Parameters**  
**Romic Facility - Chandler, Arizona**

<b>Trough Number</b>	<b>Organic Material Streams</b>	<b>Wastewater</b>	<b>% of Organics in a Weighted Sample of Material Streams Through Each Tank Farm <sup>a,b</sup></b>	<b>Total Number of Tank Turnover Per Tank Farm (and Hence Per Trough) <sup>c</sup></b>	<b>Wetted Area of Each Trough (square meters) <sup>d</sup></b>	<b>Annual Volume of Organic Material Lost to Trough (cubic meters) <sup>e</sup></b>	<b>Approximate Mass of Organic Material Lost to Trough (grams) <sup>f</sup></b>	<b>Total Emission Rate (grams/second) Annual Average</b>
Trough 1	67%	33%	73%	245	0.20	0.04	31556	1.00E-03
Trough 2	67%	33%	73%	245	0.09	0.02	15215	4.82E-04
Trough 3	67%	33%	73%	190	0.06	0.01	8015	2.54E-04
Trough 4	82%	18%	85%	161	0.17	0.02	20737	6.58E-04
Trough 5	100%	0%	100%	493	0.07	0.04	33010	1.05E-03

**Notes:**

% = percent

<sup>a</sup> Wastewater stream is, on average, 80% water by mass (it was assumed that this was approximately equivalent to the fraction by volume as well) It is assumed that 100% of all other material streams is organic. This is conservative because there is water and non-selected compounds in the other waste streams (blended fuel and organic waste).

<sup>b</sup> This is the fraction of material in a sample of the total material through each tank farm that is organic.

<sup>c</sup> It was assumed that each tank turnover represents a transfer of material through piping/apparatus which could potentially drip into the trough.

<sup>d</sup> It was assumed that the wetted area of each trough was approximately 10% of the whole area.

<sup>e</sup> It was assumed that each "drip" event would result in a 1 millimeter thick layer of fluid covering the area of the trough.

<sup>f</sup> It was assumed that the density of the organic materials, as a mixture, was 0.9.

**Table 5.11**  
**Troughs Emissions by Chemical**  
**Romic Facility - Chandler, Arizona**

<b>Tank Farm</b>	<b>Trough Number</b>	<b>Chemical</b>	<b>Tank Emission Rates (grams/second)</b>	<b>Fugitive Emissions Rates (grams/second) Annual Average</b>	<b>Fugitive Emissions (grams/second) Maximum Hourly</b>
FARM_A/B	Trough 1	1,2,4-Trimethylbenzene	3.28E-07	1.09E-08	1.09E-08
FARM_A/B	Trough 1	1,2-dichlorobenzene	2.36E-09	7.85E-11	7.85E-11
FARM_A/B	Trough 1	1,3,5-trimethylbenzene	4.27E-08	1.42E-09	1.42E-09
FARM_A/B	Trough 1	1-methoxy-2-propanol	1.93E-04	6.40E-06	6.40E-06
FARM_A/B	Trough 1	2-butoxyethanol acetate	3.72E-10	1.23E-11	1.23E-11
FARM_A/B	Trough 1	2-ethoxypropanol	7.35E-06	2.44E-07	2.44E-07
FARM_A/B	Trough 1	2-heptanone	1.42E-07	4.73E-09	4.73E-09
FARM_A/B	Trough 1	2-methoxyethanol	1.24E-06	4.11E-08	4.11E-08
FARM_A/B	Trough 1	2-pentanone	7.96E-05	2.64E-06	2.64E-06
FARM_A/B	Trough 1	2-pyrrolidone	3.73E-08	1.24E-09	1.24E-09
FARM_A/B	Trough 1	4-hydroxy-4-methyl-2-pentanone	4.92E-10	1.63E-11	1.63E-11
FARM_A/B	Trough 1	Acetic acid	9.33E-06	3.10E-07	3.10E-07
FARM_A/B	Trough 1	Acetone	7.60E-03	2.52E-04	2.52E-04
FARM_A/B	Trough 1	Acetonitrile	2.30E-04	7.64E-06	7.64E-06
FARM_A/B	Trough 1	alcohols	1.20E-03	3.99E-05	3.99E-05
FARM_A/B	Trough 1	amyl acetate	1.41E-06	4.69E-08	4.69E-08
FARM_A/B	Trough 1	Benzene	6.73E-05	2.23E-06	2.23E-06
FARM_A/B	Trough 1	biocide (as acrolein)	1.91E-07	6.34E-09	6.34E-09
FARM_A/B	Trough 1	brominated bisphenol	1.19E-17	3.96E-19	3.96E-19
FARM_A/B	Trough 1	Butanol-(1)	2.26E-05	7.50E-07	7.50E-07
FARM_A/B	Trough 1	butoxy ethanol	2.27E-06	7.54E-08	7.54E-08
FARM_A/B	Trough 1	butyl acetate	6.89E-05	2.29E-06	2.29E-06
FARM_A/B	Trough 1	Carbon tetrachloride	2.04E-08	6.77E-10	6.77E-10
FARM_A/B	Trough 1	Chlorobenzene	4.02E-08	1.34E-09	1.34E-09
FARM_A/B	Trough 1	Chloroform	2.26E-05	7.51E-07	7.51E-07
FARM_A/B	Trough 1	Cresol (-m)	1.04E-09	3.44E-11	3.44E-11
FARM_A/B	Trough 1	Cyclohexane	2.97E-04	9.84E-06	9.84E-06
FARM_A/B	Trough 1	Cyclohexanone	3.97E-06	1.32E-07	1.32E-07
FARM_A/B	Trough 1	Decane (-n)	2.79E-05	9.25E-07	9.25E-07
FARM_A/B	Trough 1	dibutyl phthalate	1.32E-15	4.39E-17	4.39E-17
FARM_A/B	Trough 1	diethylene glycol	2.24E-08	7.44E-10	7.44E-10
FARM_A/B	Trough 1	diethylene glycol butyl ether	8.49E-09	2.82E-10	2.82E-10
FARM_A/B	Trough 1	diethylenetriamine	2.38E-09	7.88E-11	7.88E-11
FARM_A/B	Trough 1	Dimethyl formamide	2.46E-06	8.17E-08	8.17E-08
FARM_A/B	Trough 1	Dioxane (1,4)	6.33E-07	2.10E-08	2.10E-08
FARM_A/B	Trough 1	Distillate fuel oil no. 2	1.27E-05	4.21E-07	4.21E-07
FARM_A/B	Trough 1	Ethyl acetate	1.22E-04	4.05E-06	4.05E-06
FARM_A/B	Trough 1	Ethyl alcohol	2.89E-04	9.60E-06	9.60E-06
FARM_A/B	Trough 1	ethyl lactate	4.16E-05	1.38E-06	1.38E-06
FARM_A/B	Trough 1	ethyl-3-ethoxypropionate	1.89E-07	6.26E-09	6.26E-09
FARM_A/B	Trough 1	Ethylbenzene	3.36E-06	1.11E-07	1.11E-07
FARM_A/B	Trough 1	ethylene glycol	1.05E-05	3.48E-07	3.48E-07
FARM_A/B	Trough 1	ethylene glycol ethyl ether acetate	6.13E-07	2.04E-08	2.04E-08
FARM_A/B	Trough 1	ferric chloride	7.22E-07	2.40E-08	2.40E-08
FARM_A/B	Trough 1	Formic acid	1.43E-09	4.75E-11	4.75E-11
FARM_A/B	Trough 1	Gasoline (RVP 7)	9.17E-03	3.05E-04	3.05E-04
FARM_A/B	Trough 1	glycerin	6.36E-15	2.11E-16	2.11E-16
FARM_A/B	Trough 1	Heptane (-n)	1.18E-05	3.93E-07	3.93E-07
FARM_A/B	Trough 1	hexamethyldisilazane	2.28E-06	7.55E-08	7.55E-08
FARM_A/B	Trough 1	Hexane (-n)	4.89E-05	1.62E-06	1.62E-06
FARM_A/B	Trough 1	hydrochloric acid	5.32E-09	1.76E-10	1.76E-10
FARM_A/B	Trough 1	hydrofluoric acid	3.81E-06	1.27E-07	1.27E-07
FARM_A/B	Trough 1	isobutyl acetate	3.52E-07	1.17E-08	1.17E-08
FARM_A/B	Trough 1	Iso-butyl alcohol	1.73E-06	5.74E-08	5.74E-08
FARM_A/B	Trough 1	isobutyl isobutyrate	3.02E-10	1.00E-11	1.00E-11
FARM_A/B	Trough 1	isopropanolamine	4.53E-08	1.50E-09	1.50E-09
FARM_A/B	Trough 1	isopropyl acetate	5.05E-06	1.68E-07	1.68E-07
FARM_A/B	Trough 1	Jet kerosene	1.79E-05	5.93E-07	5.93E-07
FARM_A/B	Trough 1	Jet naphtha (JP-4)	1.60E-03	5.30E-05	5.30E-05
FARM_A/B	Trough 1	Methyl alcohol	9.31E-04	3.09E-05	3.09E-05

**Table 5.11**  
**Troughs Emissions by Chemical**  
**Romic Facility - Chandler, Arizona**

Tank Farm	Trough Number	Chemical	Tank Emission Rates (grams/second)	Fugitive Emissions Rates (grams/second) Annual Average	Fugitive Emissions (grams/second) Maximum Hourly
FARM_A/B	Trough 1	Methyl ethyl ketone	1.32E-03	4.39E-05	4.39E-05
FARM_A/B	Trough 1	Methyl isobutyl ketone	2.33E-05	7.73E-07	7.73E-07
FARM_A/B	Trough 1	Methylene chloride	2.31E-03	7.68E-05	7.68E-05
FARM_A/B	Trough 1	Naphthalene	7.63E-09	2.53E-10	2.53E-10
FARM_A/B	Trough 1	nitric acid (0.5-5.0%)	1.65E-08	5.48E-10	5.48E-10
FARM_A/B	Trough 1	n-methyl-2-pyrrolidone	4.92E-05	1.63E-06	1.63E-06
FARM_A/B	Trough 1	n-propyl acetate	6.12E-06	2.03E-07	2.03E-07
FARM_A/B	Trough 1	paraffin oil	3.80E-05	1.26E-06	1.26E-06
FARM_A/B	Trough 1	petroleum oil products	1.17E-06	3.90E-08	3.90E-08
FARM_A/B	Trough 1	phenol	1.43E-07	4.73E-09	4.73E-09
FARM_A/B	Trough 1	phenylmercuric acetate	2.38E-16	7.89E-18	7.89E-18
FARM_A/B	Trough 1	phosphoric acid	1.16E-08	3.84E-10	3.84E-10
FARM_A/B	Trough 1	polydimethylsiloxane	3.45E-09	1.14E-10	1.14E-10
FARM_A/B	Trough 1	propylene glycol methyl ether acetate	9.74E-06	3.23E-07	3.23E-07
FARM_A/B	Trough 1	Propylene oxide	4.74E-06	1.57E-07	1.57E-07
FARM_A/B	Trough 1	Pyridine	6.67E-07	2.22E-08	2.22E-08
FARM_A/B	Trough 1	stoddard solvent	1.16E-03	3.86E-05	3.86E-05
FARM_A/B	Trough 1	Styrene	3.16E-06	1.05E-07	1.05E-07
FARM_A/B	Trough 1	sulfolane	1.94E-06	6.45E-08	6.45E-08
FARM_A/B	Trough 1	sulfuric acid	2.36E-11	7.83E-13	7.83E-13
FARM_A/B	Trough 1	Tetrachloroethylene	8.13E-05	2.70E-06	2.70E-06
FARM_A/B	Trough 1	tetraethyl orthosilicate	8.79E-07	2.92E-08	2.92E-08
FARM_A/B	Trough 1	Tetrahydrofuran	4.07E-05	1.35E-06	1.35E-06
FARM_A/B	Trough 1	Toluene	8.41E-04	2.79E-05	2.79E-05
FARM_A/B	Trough 1	Trichloro(1,1,2)trifluoroethane	2.14E-08	7.10E-10	7.10E-10
FARM_A/B	Trough 1	Trichloroethane (1,1,1)	3.82E-05	1.27E-06	1.27E-06
FARM_A/B	Trough 1	Trichloroethane (1,1,2)	1.37E-09	4.55E-11	4.55E-11
FARM_A/B	Trough 1	Trichloroethylene	1.90E-04	6.30E-06	6.30E-06
FARM_A/B	Trough 1	trichlorotrifluoroethane	2.16E-05	7.16E-07	7.16E-07
FARM_A/B	Trough 1	triethylenetetramine	1.02E-10	3.39E-12	3.39E-12
FARM_A/B	Trough 1	Xylenes (mixed isomers)	1.22E-04	4.05E-06	4.05E-06
FARM_A/B	Trough 2	1,2,4-Trimethylbenzene	3.28E-07	5.25E-09	5.25E-09
FARM_A/B	Trough 2	1,2-dichlorobenzene	2.36E-09	3.78E-11	3.78E-11
FARM_A/B	Trough 2	1,3,5-trimethylbenzene	4.27E-08	6.84E-10	6.84E-10
FARM_A/B	Trough 2	1-methoxy-2-propanol	1.93E-04	3.09E-06	3.09E-06
FARM_A/B	Trough 2	2-butoxyethanol acetate	3.72E-10	5.95E-12	5.95E-12
FARM_A/B	Trough 2	2-ethoxypropanol	7.35E-06	1.18E-07	1.18E-07
FARM_A/B	Trough 2	2-heptanone	1.42E-07	2.28E-09	2.28E-09
FARM_A/B	Trough 2	2-methoxyethanol	1.24E-06	1.98E-08	1.98E-08
FARM_A/B	Trough 2	2-pentanone	7.96E-05	1.27E-06	1.27E-06
FARM_A/B	Trough 2	2-pyrrolidone	3.73E-08	5.97E-10	5.97E-10
FARM_A/B	Trough 2	4-hydroxy-4-methyl-2-pentanone	4.92E-10	7.88E-12	7.88E-12
FARM_A/B	Trough 2	Acetic acid	9.33E-06	1.49E-07	1.49E-07
FARM_A/B	Trough 2	Acetone	7.60E-03	1.22E-04	1.22E-04
FARM_A/B	Trough 2	Acetonitrile	2.30E-04	3.68E-06	3.68E-06
FARM_A/B	Trough 2	alcohols	1.20E-03	1.92E-05	1.92E-05
FARM_A/B	Trough 2	amyl acetate	1.41E-06	2.26E-08	2.26E-08
FARM_A/B	Trough 2	amyl alcohol	1.66E-07	2.66E-09	2.66E-09
FARM_A/B	Trough 2	Benzene	6.73E-05	1.08E-06	1.08E-06
FARM_A/B	Trough 2	biocide (as acrolein)	1.91E-07	3.06E-09	3.06E-09
FARM_A/B	Trough 2	brominated bisphenol	1.19E-17	1.91E-19	1.91E-19
FARM_A/B	Trough 2	Butanol-(1)	2.26E-05	3.62E-07	3.62E-07
FARM_A/B	Trough 2	butoxy ethanol	2.27E-06	3.63E-08	3.63E-08
FARM_A/B	Trough 2	butyl acetate	6.89E-05	1.10E-06	1.10E-06
FARM_A/B	Trough 2	Carbon tetrachloride	2.04E-08	3.26E-10	3.26E-10
FARM_A/B	Trough 2	chloroalkanes	6.26E-06	1.00E-07	1.00E-07
FARM_A/B	Trough 2	Chlorobenzene	4.02E-08	6.44E-10	6.44E-10
FARM_A/B	Trough 2	Chloroform	2.26E-05	3.62E-07	3.62E-07
FARM_A/B	Trough 2	Cresol (-m)	1.04E-09	1.66E-11	1.66E-11

**Table 5.11**  
**Troughs Emissions by Chemical**  
**Romic Facility - Chandler, Arizona**

<b>Tank Farm</b>	<b>Trough Number</b>	<b>Chemical</b>	<b>Tank Emission Rates (grams/second)</b>	<b>Fugitive Emissions Rates (grams/second) Annual Average</b>	<b>Fugitive Emissions (grams/second) Maximum Hourly</b>
FARM_A/B	Trough 2	Cyclohexane	2.97E-04	4.75E-06	4.75E-06
FARM_A/B	Trough 2	Cyclohexanone	3.97E-06	6.36E-08	6.36E-08
FARM_A/B	Trough 2	Decane (-n)	2.79E-05	4.46E-07	4.46E-07
FARM_A/B	Trough 2	dibutyl phthalate	1.32E-15	2.12E-17	2.12E-17
FARM_A/B	Trough 2	diethylene glycol	2.24E-08	3.59E-10	3.59E-10
FARM_A/B	Trough 2	diethylene glycol butyl ether	8.49E-09	1.36E-10	1.36E-10
FARM_A/B	Trough 2	diethylenetriamine	2.38E-09	3.80E-11	3.80E-11
FARM_A/B	Trough 2	Dimethyl formamide	2.46E-06	3.94E-08	3.94E-08
FARM_A/B	Trough 2	Dioxane (1,4)	6.33E-07	1.01E-08	1.01E-08
FARM_A/B	Trough 2	Distillate fuel oil no. 2	1.27E-05	2.03E-07	2.03E-07
FARM_A/B	Trough 2	Ethyl acetate	1.22E-04	1.95E-06	1.95E-06
FARM_A/B	Trough 2	Ethyl alcohol	2.89E-04	4.63E-06	4.63E-06
FARM_A/B	Trough 2	ethyl lactate	4.16E-05	6.66E-07	6.66E-07
FARM_A/B	Trough 2	ethyl-3-ethoxypropionate	1.89E-07	3.02E-09	3.02E-09
FARM_A/B	Trough 2	Ethylbenzene	3.36E-06	5.37E-08	5.37E-08
FARM_A/B	Trough 2	ethylene glycol	1.05E-05	1.68E-07	1.68E-07
FARM_A/B	Trough 2	ethylene glycol ethyl ether acetate	6.13E-07	9.82E-09	9.82E-09
FARM_A/B	Trough 2	ferric chloride	7.22E-07	1.16E-08	1.16E-08
FARM_A/B	Trough 2	Formic acid	1.43E-09	2.29E-11	2.29E-11
FARM_A/B	Trough 2	Gasoline (RVP 7)	9.17E-03	1.47E-04	1.47E-04
FARM_A/B	Trough 2	glycerin	6.36E-15	1.02E-16	1.02E-16
FARM_A/B	Trough 2	Heptane (-n)	1.18E-05	1.89E-07	1.89E-07
FARM_A/B	Trough 2	hexamethyldisilazane	2.28E-06	3.64E-08	3.64E-08
FARM_A/B	Trough 2	Hexane (-n)	4.89E-05	7.83E-07	7.83E-07
FARM_A/B	Trough 2	hydrochloric acid	5.32E-09	8.51E-11	8.51E-11
FARM_A/B	Trough 2	hydrofluoric acid	3.81E-06	6.10E-08	6.10E-08
FARM_A/B	Trough 2	isobutyl acetate	3.52E-07	5.64E-09	5.64E-09
FARM_A/B	Trough 2	Iso-butyl alcohol	1.73E-06	2.77E-08	2.77E-08
FARM_A/B	Trough 2	isobutyl isobutyrate	3.02E-10	4.83E-12	4.83E-12
FARM_A/B	Trough 2	isopropanolamine	4.53E-08	7.25E-10	7.25E-10
FARM_A/B	Trough 2	isopropyl acetate	5.05E-06	8.08E-08	8.08E-08
FARM_A/B	Trough 2	Jet kerosene	1.79E-05	2.86E-07	2.86E-07
FARM_A/B	Trough 2	Jet naphtha (JP-4)	1.60E-03	2.56E-05	2.56E-05
FARM_A/B	Trough 2	Methyl alcohol	9.31E-04	1.49E-05	1.49E-05
FARM_A/B	Trough 2	Methyl ethyl ketone	1.32E-03	2.12E-05	2.12E-05
FARM_A/B	Trough 2	Methyl isobutyl ketone	2.33E-05	3.72E-07	3.72E-07
FARM_A/B	Trough 2	Methylene chloride	2.31E-03	3.70E-05	3.70E-05
FARM_A/B	Trough 2	Naphthalene	7.63E-09	1.22E-10	1.22E-10
FARM_A/B	Trough 2	nitric acid (0.5-5.0%)	1.65E-08	2.64E-10	2.64E-10
FARM_A/B	Trough 2	n-methyl-2-pyrrolidone	4.92E-05	7.87E-07	7.87E-07
FARM_A/B	Trough 2	n-propyl acetate	6.12E-06	9.80E-08	9.80E-08
FARM_A/B	Trough 2	paraffin oil	3.80E-05	6.09E-07	6.09E-07
FARM_A/B	Trough 2	petroleum oil products	1.17E-06	1.88E-08	1.88E-08
FARM_A/B	Trough 2	phenol	1.43E-07	2.28E-09	2.28E-09
FARM_A/B	Trough 2	phenylmercuric acetate	2.38E-16	3.80E-18	3.80E-18
FARM_A/B	Trough 2	phosphoric acid	1.16E-08	1.85E-10	1.85E-10
FARM_A/B	Trough 2	polydimethylsiloxane	3.45E-09	5.51E-11	5.51E-11
FARM_A/B	Trough 2	propylene glycol methyl ether acetate	9.74E-06	1.56E-07	1.56E-07
FARM_A/B	Trough 2	Propylene oxide	4.74E-06	7.59E-08	7.59E-08
FARM_A/B	Trough 2	Pyridine	6.67E-07	1.07E-08	1.07E-08
FARM_A/B	Trough 2	stoddard solvent	1.16E-03	1.86E-05	1.86E-05
FARM_A/B	Trough 2	Styrene	3.16E-06	5.05E-08	5.05E-08
FARM_A/B	Trough 2	sulfolane	1.94E-06	3.11E-08	3.11E-08
FARM_A/B	Trough 2	sulfuric acid	2.36E-11	3.77E-13	3.77E-13
FARM_A/B	Trough 2	Tetrachloroethylene	8.13E-05	1.30E-06	1.30E-06
FARM_A/B	Trough 2	tetraethyl orthosilicate	8.79E-07	1.41E-08	1.41E-08
FARM_A/B	Trough 2	Tetrahydrofuran	4.07E-05	6.51E-07	6.51E-07
FARM_A/B	Trough 2	Toluene	8.41E-04	1.35E-05	1.35E-05
FARM_A/B	Trough 2	Trichloro(1,1,2)trifluoroethane	2.14E-08	3.42E-10	3.42E-10
FARM_A/B	Trough 2	Trichloroethane (1,1,1)	3.82E-05	6.12E-07	6.12E-07

**Table 5.11  
Troughs Emissions by Chemical  
Romic Facility - Chandler, Arizona**

<b>Tank Farm</b>	<b>Trough Number</b>	<b>Chemical</b>	<b>Tank Emission Rates (grams/second)</b>	<b>Fugitive Emissions Rates (grams/second) Annual Average</b>	<b>Fugitive Emissions (grams/second) Maximum Hourly</b>
FARM_A/B	Trough 2	Trichloroethane (1,1,2)	1.37E-09	2.20E-11	2.20E-11
FARM_A/B	Trough 2	Trichloroethylene	1.90E-04	3.04E-06	3.04E-06
FARM_A/B	Trough 2	trichlorotrifluoroethane	2.16E-05	3.45E-07	3.45E-07
FARM_A/B	Trough 2	triethylenetetramine	1.02E-10	1.63E-12	1.63E-12
FARM_A/B	Trough 2	Xylenes (mixed isomers)	1.22E-04	1.95E-06	1.95E-06
FARM_C1	Trough 3	1,2,4-Trimethylbenzene	2.22E-07	3.60E-09	3.60E-09
FARM_C1	Trough 3	1,2-dichlorobenzene	1.39E-09	2.27E-11	2.27E-11
FARM_C1	Trough 3	1-methoxy-2-propanol	2.49E-06	4.04E-08	4.04E-08
FARM_C1	Trough 3	2-heptanone	3.68E-08	5.98E-10	5.98E-10
FARM_C1	Trough 3	2-methoxyethanol	4.40E-08	7.15E-10	7.15E-10
FARM_C1	Trough 3	2-pyrrolidone	2.52E-08	4.10E-10	4.10E-10
FARM_C1	Trough 3	Acetic acid	5.86E-06	9.53E-08	9.53E-08
FARM_C1	Trough 3	Acetone	7.45E-04	1.21E-05	1.21E-05
FARM_C1	Trough 3	Acetonitrile	3.91E-05	6.35E-07	6.35E-07
FARM_C1	Trough 3	alcohols	2.08E-04	3.38E-06	3.38E-06
FARM_C1	Trough 3	Benzene	2.02E-05	3.29E-07	3.29E-07
FARM_C1	Trough 3	biocide (as acrolein)	1.29E-07	2.10E-09	2.10E-09
FARM_C1	Trough 3	Butanol-(1)	2.38E-07	3.87E-09	3.87E-09
FARM_C1	Trough 3	butoxy ethanol	4.48E-09	7.29E-11	7.29E-11
FARM_C1	Trough 3	butyl acetate	5.87E-06	9.55E-08	9.55E-08
FARM_C1	Trough 3	Chlorobenzene	1.69E-08	2.75E-10	2.75E-10
FARM_C1	Trough 3	Chloroform	6.08E-06	9.89E-08	9.89E-08
FARM_C1	Trough 3	Cresol (-m)	4.86E-10	7.91E-12	7.91E-12
FARM_C1	Trough 3	Cyclohexane	1.94E-04	3.16E-06	3.16E-06
FARM_C1	Trough 3	Cyclohexanone	1.53E-06	2.48E-08	2.48E-08
FARM_C1	Trough 3	Decane (-n)	6.07E-06	9.88E-08	9.88E-08
FARM_C1	Trough 3	diethylene glycol	9.93E-09	1.61E-10	1.61E-10
FARM_C1	Trough 3	diethylene glycol butyl ether	4.77E-09	7.75E-11	7.75E-11
FARM_C1	Trough 3	diethylenetriamine	1.60E-09	2.61E-11	2.61E-11
FARM_C1	Trough 3	Dimethyl formamide	1.12E-07	1.82E-09	1.82E-09
FARM_C1	Trough 3	Distillate fuel oil no. 2	7.72E-06	1.26E-07	1.26E-07
FARM_C1	Trough 3	Ethyl acetate	3.08E-05	5.01E-07	5.01E-07
FARM_C1	Trough 3	Ethyl alcohol	8.87E-05	1.44E-06	1.44E-06
FARM_C1	Trough 3	ethyl lactate	1.27E-06	2.06E-08	2.06E-08
FARM_C1	Trough 3	Ethylbenzene	1.33E-06	2.17E-08	2.17E-08
FARM_C1	Trough 3	ethylene glycol	1.79E-05	2.92E-07	2.92E-07
FARM_C1	Trough 3	ferric chloride	4.44E-07	7.22E-09	7.22E-09
FARM_C1	Trough 3	Gasoline (RVP 7)	5.72E-03	9.30E-05	9.30E-05
FARM_C1	Trough 3	glycerin	3.47E-15	5.64E-17	5.64E-17
FARM_C1	Trough 3	Heptane (-n)	3.23E-06	5.25E-08	5.25E-08
FARM_C1	Trough 3	Hexane (-n)	5.19E-06	8.44E-08	8.44E-08
FARM_C1	Trough 3	hydrochloric acid	3.50E-09	5.70E-11	5.70E-11
FARM_C1	Trough 3	hydrofluoric acid	2.43E-06	3.95E-08	3.95E-08
FARM_C1	Trough 3	Iso-butyl alcohol	1.17E-06	1.90E-08	1.90E-08
FARM_C1	Trough 3	isopropyl acetate	3.33E-06	5.41E-08	5.41E-08
FARM_C1	Trough 3	Jet kerosene	1.11E-05	1.81E-07	1.81E-07
FARM_C1	Trough 3	Jet naphtha (JP-4)	2.93E-04	4.77E-06	4.77E-06
FARM_C1	Trough 3	Methyl alcohol	8.89E-05	1.45E-06	1.45E-06
FARM_C1	Trough 3	Methyl ethyl ketone	4.28E-05	6.96E-07	6.96E-07
FARM_C1	Trough 3	Methyl isobutyl ketone	1.27E-06	2.07E-08	2.07E-08
FARM_C1	Trough 3	Methylene chloride	9.71E-04	1.58E-05	1.58E-05
FARM_C1	Trough 3	Naphthalene	4.08E-09	6.63E-11	6.63E-11
FARM_C1	Trough 3	nitric acid (0.5-5.0%)	1.01E-08	1.65E-10	1.65E-10
FARM_C1	Trough 3	n-methyl-2-pyrrolidone	2.10E-05	3.42E-07	3.42E-07
FARM_C1	Trough 3	n-propyl acetate	2.54E-06	4.14E-08	4.14E-08
FARM_C1	Trough 3	petroleum oil products	6.83E-07	1.11E-08	1.11E-08
FARM_C1	Trough 3	phenol	9.47E-08	1.54E-09	1.54E-09
FARM_C1	Trough 3	phenylmercuric acetate	1.60E-16	2.61E-18	2.61E-18
FARM_C1	Trough 3	phosphoric acid	7.81E-09	1.27E-10	1.27E-10
FARM_C1	Trough 3	polydimethylsiloxane	1.03E-10	1.68E-12	1.68E-12
FARM_C1	Trough 3	propylene glycol methyl ether acetate	1.37E-06	2.23E-08	2.23E-08
FARM_C1	Trough 3	Pyridine	1.87E-07	3.04E-09	3.04E-09



**Table 5.11  
Troughs Emissions by Chemical  
Romic Facility - Chandler, Arizona**

<b>Tank Farm</b>	<b>Trough Number</b>	<b>Chemical</b>	<b>Tank Emission Rates (grams/second)</b>	<b>Fugitive Emissions Rates (grams/second) Annual Average</b>	<b>Fugitive Emissions (grams/second) Maximum Hourly</b>
FARM_C1	Trough 3	stoddard solvent	5.88E-03	9.55E-05	9.55E-05
FARM_C1	Trough 3	Styrene	1.52E-06	2.47E-08	2.47E-08
FARM_C1	Trough 3	sulfolane	7.90E-07	1.29E-08	1.29E-08
FARM_C1	Trough 3	sulfuric acid	1.45E-11	2.35E-13	2.35E-13
FARM_C1	Trough 3	Tetrachloroethylene	2.67E-05	4.33E-07	4.33E-07
FARM_C1	Trough 3	tetraethyl orthosilicate	2.97E-07	4.83E-09	4.83E-09
FARM_C1	Trough 3	Tetrahydrofuran	2.57E-07	4.18E-09	4.18E-09
FARM_C1	Trough 3	Toluene	1.22E-05	1.98E-07	1.98E-07
FARM_C1	Trough 3	Trichloroethane (1,1,1)	4.98E-06	8.10E-08	8.10E-08
FARM_C1	Trough 3	Trichloroethylene	6.93E-06	1.13E-07	1.13E-07
FARM_C1	Trough 3	Xylenes (mixed isomers)	6.16E-06	1.00E-07	1.00E-07
FARM_C3	Trough 4	1,2,4-Trimethylbenzene	1.06E-07	9.91E-09	9.91E-09
FARM_C3	Trough 4	1,2-dichlorobenzene	6.66E-10	6.24E-11	6.24E-11
FARM_C3	Trough 4	1-methoxy-2-propanol	4.11E-06	3.84E-07	3.84E-07
FARM_C3	Trough 4	2-butoxyethanol acetate	1.96E-10	1.83E-11	1.83E-11
FARM_C3	Trough 4	2-ethoxypropanol	9.64E-06	9.02E-07	9.02E-07
FARM_C3	Trough 4	2-heptanone	9.01E-08	8.43E-09	8.43E-09
FARM_C3	Trough 4	2-methoxyethanol	2.10E-08	1.97E-09	1.97E-09
FARM_C3	Trough 4	2-pentanone	4.71E-06	4.40E-07	4.40E-07
FARM_C3	Trough 4	2-pyrrolidone	1.20E-08	1.13E-09	1.13E-09
FARM_C3	Trough 4	Acetic acid	2.80E-06	2.62E-07	2.62E-07
FARM_C3	Trough 4	Acetone	7.50E-04	7.02E-05	7.02E-05
FARM_C3	Trough 4	Acetonitrile	1.95E-05	1.83E-06	1.83E-06
FARM_C3	Trough 4	alcohols	2.06E-04	1.93E-05	1.93E-05
FARM_C3	Trough 4	Benzene	9.65E-06	9.03E-07	9.03E-07
FARM_C3	Trough 4	biocide (as acrolein)	6.17E-08	5.77E-09	5.77E-09
FARM_C3	Trough 4	Butanol-(1)	4.34E-07	4.07E-08	4.07E-08
FARM_C3	Trough 4	butoxy ethanol	4.12E-09	3.85E-10	3.85E-10
FARM_C3	Trough 4	butyl acetate	2.95E-06	2.76E-07	2.76E-07
FARM_C3	Trough 4	Chlorobenzene	8.09E-09	7.57E-10	7.57E-10
FARM_C3	Trough 4	Chloroform	3.55E-06	3.32E-07	3.32E-07
FARM_C3	Trough 4	Cresol (-m)	2.32E-10	2.17E-11	2.17E-11
FARM_C3	Trough 4	Cyclohexane	9.29E-05	8.69E-06	8.69E-06
FARM_C3	Trough 4	Cyclohexanone	1.49E-06	1.39E-07	1.39E-07
FARM_C3	Trough 4	Decane (-n)	2.91E-06	2.72E-07	2.72E-07
FARM_C3	Trough 4	dibutyl phthalate	7.81E-16	7.31E-17	7.31E-17
FARM_C3	Trough 4	diethylene glycol	8.01E-08	7.49E-09	7.49E-09
FARM_C3	Trough 4	diethylene glycol butyl ether	4.94E-09	4.63E-10	4.63E-10
FARM_C3	Trough 4	diethylenetriamine	7.66E-10	7.17E-11	7.17E-11
FARM_C3	Trough 4	Dimethyl formamide	1.48E-07	1.39E-08	1.39E-08
FARM_C3	Trough 4	Distillate fuel oil no. 2	3.69E-06	3.45E-07	3.45E-07
FARM_C3	Trough 4	Ethyl acetate	1.97E-05	1.84E-06	1.84E-06
FARM_C3	Trough 4	Ethyl alcohol	4.46E-05	4.18E-06	4.18E-06
FARM_C3	Trough 4	ethyl lactate	1.98E-05	1.85E-06	1.85E-06
FARM_C3	Trough 4	ethyl-3-ethoxypropionate	2.03E-07	1.90E-08	1.90E-08
FARM_C3	Trough 4	Ethylbenzene	6.99E-07	6.55E-08	6.55E-08
FARM_C3	Trough 4	ethylene glycol	1.27E-05	1.19E-06	1.19E-06
FARM_C3	Trough 4	ethylene glycol ethyl ether acetate	6.79E-07	6.36E-08	6.36E-08
FARM_C3	Trough 4	ferric chloride	2.12E-07	1.99E-08	1.99E-08
FARM_C3	Trough 4	Gasoline (RVP 7)	2.73E-03	2.56E-04	2.56E-04
FARM_C3	Trough 4	glycerin	1.66E-15	1.55E-16	1.55E-16
FARM_C3	Trough 4	Heptane (-n)	1.83E-06	1.72E-07	1.72E-07
FARM_C3	Trough 4	hexamethyldisilazane	2.81E-06	2.63E-07	2.63E-07
FARM_C3	Trough 4	Hexane (-n)	3.89E-06	3.64E-07	3.64E-07
FARM_C3	Trough 4	hydrochloric acid	1.67E-09	1.57E-10	1.57E-10
FARM_C3	Trough 4	hydrofluoric acid	1.35E-06	1.26E-07	1.26E-07
FARM_C3	Trough 4	Iso-butyl alcohol	5.58E-07	5.22E-08	5.22E-08
FARM_C3	Trough 4	isopropanolamine	5.95E-08	5.56E-09	5.56E-09

**Table 5.11  
Troughs Emissions by Chemical  
Romic Facility - Chandler, Arizona**

Tank Farm	Trough Number	Chemical	Tank Emission Rates (grams/second)	Fugitive Emissions Rates (grams/second) Annual Average	Fugitive Emissions (grams/second) Maximum Hourly
FARM_C3	Trough 4	isopropyl acetate	1.61E-06	1.51E-07	1.51E-07
FARM_C3	Trough 4	Jet kerosene	5.30E-06	4.96E-07	4.96E-07
FARM_C3	Trough 4	Jet naphtha (JP-4)	3.16E-04	2.96E-05	2.96E-05
FARM_C3	Trough 4	Methyl alcohol	4.99E-05	4.67E-06	4.67E-06
FARM_C3	Trough 4	Methyl ethyl ketone	6.91E-05	6.47E-06	6.47E-06
FARM_C3	Trough 4	Methyl isobutyl ketone	9.68E-07	9.06E-08	9.06E-08
FARM_C3	Trough 4	Methylene chloride	6.17E-04	5.78E-05	5.78E-05
FARM_C3	Trough 4	Naphthalene	1.95E-09	1.82E-10	1.82E-10
FARM_C3	Trough 4	nitric acid (0.5-5.0%)	4.85E-09	4.54E-10	4.54E-10
FARM_C3	Trough 4	n-methyl-2-pyrrolidone	3.76E-05	3.52E-06	3.52E-06
FARM_C3	Trough 4	n-propyl acetate	2.89E-06	2.71E-07	2.71E-07
FARM_C3	Trough 4	petroleum oil products	3.32E-07	3.11E-08	3.11E-08
FARM_C3	Trough 4	phenol	4.54E-08	4.25E-09	4.25E-09
FARM_C3	Trough 4	phenylmercuric acetate	7.67E-17	7.18E-18	7.18E-18
FARM_C3	Trough 4	phosphoric acid	3.74E-09	3.50E-10	3.50E-10
FARM_C3	Trough 4	polydimethylsiloxane	4.94E-11	4.63E-12	4.63E-12
FARM_C3	Trough 4	propylene glycol methyl ether acetate	1.74E-06	1.63E-07	1.63E-07
FARM_C3	Trough 4	Pyridine	8.93E-08	8.36E-09	8.36E-09
FARM_C3	Trough 4	stoddard solvent	4.55E-04	4.26E-05	4.26E-05
FARM_C3	Trough 4	Styrene	7.27E-07	6.80E-08	6.80E-08
FARM_C3	Trough 4	sulfolane	3.82E-07	3.57E-08	3.57E-08
FARM_C3	Trough 4	sulfuric acid	6.92E-12	6.47E-13	6.47E-13
FARM_C3	Trough 4	Tetrachloroethylene	3.42E-05	3.20E-06	3.20E-06
FARM_C3	Trough 4	tetraethyl orthosilicate	1.43E-07	1.34E-08	1.34E-08
FARM_C3	Trough 4	Tetrahydrofuran	1.38E-06	1.29E-07	1.29E-07
FARM_C3	Trough 4	Toluene	1.29E-05	1.21E-06	1.21E-06
FARM_C3	Trough 4	Trichloroethane (1,1,1)	1.01E-05	9.41E-07	9.41E-07
FARM_C3	Trough 4	Trichloroethylene	2.63E-05	2.46E-06	2.46E-06
FARM_C3	Trough 4	trichlorotrifluoroethane	2.35E-05	2.20E-06	2.20E-06
FARM_C3	Trough 4	triethylenetetramine	2.80E-12	2.62E-13	2.62E-13
FARM_C3	Trough 4	Xylenes (mixed isomers)	1.54E-05	1.44E-06	1.44E-06
FARM_D3	Trough 5	1-methoxy-2-propanol	1.12E-08	6.77E-10	6.77E-10
FARM_D3	Trough 5	diethylene glycol butyl ether	7.76E-12	4.67E-13	4.67E-13
FARM_D3	Trough 5	2-butoxyethanol acetate	9.04E-13	5.44E-14	5.44E-14
FARM_D3	Trough 5	2-ethoxypropanol	4.46E-08	2.68E-09	2.68E-09
FARM_D3	Trough 5	2-heptanone	2.57E-10	1.55E-11	1.55E-11
FARM_D3	Trough 5	2-pentanone	1.78E-08	1.07E-09	1.07E-09
FARM_D3	Trough 5	Acetone	1.55E-06	9.32E-08	9.32E-08
FARM_D3	Trough 5	Acetonitrile	3.42E-09	2.06E-10	2.06E-10
FARM_D3	Trough 5	Butanol-(1)	1.11E-09	6.67E-11	6.67E-11
FARM_D3	Trough 5	butoxy ethanol	6.72E-12	4.04E-13	4.04E-13
FARM_D3	Trough 5	butyl acetate	5.44E-10	3.28E-11	3.28E-11
FARM_D3	Trough 5	Chloroform	2.51E-09	1.51E-10	1.51E-10
FARM_D3	Trough 5	Cyclohexanone	2.83E-09	1.70E-10	1.70E-10
FARM_D3	Trough 5	Decane (-n)	2.54E-11	1.53E-12	1.53E-12
FARM_D3	Trough 5	dibutyl phthalate	1.68E-18	1.01E-19	1.01E-19
FARM_D3	Trough 5	diethylene glycol	4.03E-11	2.42E-12	2.42E-12
FARM_D3	Trough 5	Dimethyl formamide	3.39E-10	2.04E-11	2.04E-11
FARM_D3	Trough 5	Ethyl acetate	1.91E-08	1.15E-09	1.15E-09
FARM_D3	Trough 5	Ethyl alcohol	8.39E-09	5.05E-10	5.05E-10
FARM_D3	Trough 5	ethyl lactate	8.85E-08	5.33E-09	5.33E-09
FARM_D3	Trough 5	ethyl-3-ethoxypropionate	9.37E-10	5.64E-11	5.64E-11
FARM_D3	Trough 5	Ethylbenzene	2.32E-10	1.40E-11	1.40E-11
FARM_D3	Trough 5	ethylene glycol	3.86E-05	2.32E-06	2.32E-06
FARM_D3	Trough 5	ethylene glycol ethyl ether acetate	3.14E-09	1.89E-10	1.89E-10
FARM_D3	Trough 5	Heptane (-n)	1.11E-09	6.67E-11	6.67E-11
FARM_D3	Trough 5	hexamethyldisilazane	1.30E-08	7.82E-10	7.82E-10
FARM_D3	Trough 5	Hexane (-n)	5.53E-09	3.33E-10	3.33E-10
FARM_D3	Trough 5	hydrofluoric acid	8.69E-10	5.23E-11	5.23E-11
FARM_D3	Trough 5	isopropanolamine	2.75E-10	1.66E-11	1.66E-11

**Table 5.11  
Troughs Emissions by Chemical  
Romic Facility - Chandler, Arizona**

<b>Tank Farm</b>	<b>Trough Number</b>	<b>Chemical</b>	<b>Tank Emission Rates (grams/second)</b>	<b>Fugitive Emissions Rates (grams/second) Annual Average</b>	<b>Fugitive Emissions (grams/second) Maximum Hourly</b>
FARM_D3	Trough 5	isopropyl acetate	7.71E-11	4.64E-12	4.64E-12
FARM_D3	Trough 5	Isopropyl alcohol	3.92E-07	2.36E-08	2.36E-08
FARM_D3	Trough 5	Jet naphtha (JP-4)	7.08E-07	4.26E-08	4.26E-08
FARM_D3	Trough 5	Methyl alcohol	2.79E-08	1.68E-09	1.68E-09
FARM_D3	Trough 5	Methyl ethyl ketone	1.87E-07	1.13E-08	1.13E-08
FARM_D3	Trough 5	Methyl isobutyl ketone	1.33E-09	8.03E-11	8.03E-11
FARM_D3	Trough 5	Methylene chloride	6.11E-07	3.68E-08	3.68E-08
FARM_D3	Trough 5	n-methyl-2-pyrrolidone	7.28E-08	4.38E-09	4.38E-09
FARM_D3	Trough 5	n-propyl acetate	6.30E-09	3.79E-10	3.79E-10
FARM_D3	Trough 5	petroleum oil products	2.63E-11	1.59E-12	1.59E-12
FARM_D3	Trough 5	phenol	6.64E-13	4.00E-14	4.00E-14
FARM_D3	Trough 5	phosphoric acid	1.59E-14	9.55E-16	9.55E-16
FARM_D3	Trough 5	propylene glycol methyl ether acetate	5.03E-09	3.03E-10	3.03E-10
FARM_D3	Trough 5	stoddard solvent	1.73E-02	1.04E-03	1.04E-03
FARM_D3	Trough 5	sulfolane	1.88E-11	1.13E-12	1.13E-12
FARM_D3	Trough 5	Tetrachloroethylene	8.07E-08	4.86E-09	4.86E-09
FARM_D3	Trough 5	tetraethyl orthosilicate	3.04E-12	1.83E-13	1.83E-13
FARM_D3	Trough 5	Tetrahydrofuran	4.90E-09	2.95E-10	2.95E-10
FARM_D3	Trough 5	Toluene	2.67E-08	1.61E-09	1.61E-09
FARM_D3	Trough 5	Trichloroethane (1,1,1)	2.98E-08	1.79E-09	1.79E-09
FARM_D3	Trough 5	Trichloroethylene	8.80E-08	5.30E-09	5.30E-09
FARM_D3	Trough 5	trichlorotrifluoroethane	1.09E-07	6.55E-09	6.55E-09
FARM_D3	Trough 5	triethylenetetramine	1.30E-14	7.81E-16	7.81E-16
FARM_D3	Trough 5	Xylenes (mixed isomers)	4.62E-08	2.78E-09	2.78E-09



**Table 5.12b**  
**Tank Parameters Used in TANKS - Horizontal**  
**Romic Facility - Chandler, Arizona**

Tank	Shell Length (feet)	Shell Diameter (inches)	Shell Diameter (feet)	Working Volume (gallons)	Turnovers per Year <sup>c</sup>	Net Throughput (gallons per year)	Tank Underground?	Tank Heated?	Shell Color	Shell Condition	Vacuum Setting <sup>e</sup> (psig)	Pressure Setting <sup>e</sup> (psig)
Railcar <sup>a</sup>	59.92	121	10.08	21,000	60	1,260,000	No	No	Red/Primer <sup>d</sup>	good	-0.3	0.3
Tank Truck <sup>b</sup>	41	55	4.56	5,000	252	1,260,000	No	No	White	good	-0.3	0.3

**Notes:**

psig = pound per square inch gauge

<sup>a</sup> Railcar dimensions from: <http://www.ge.com/capital/rail/equipment/tankcar/specs/tcspec7.shtml>

<sup>b</sup> Tanker truck dimensions from: [http://www.gsnet.com/inventory/Trailers/TankerChemicalTransport/100079324\\_1980\\_144\\_L0549.asp](http://www.gsnet.com/inventory/Trailers/TankerChemicalTransport/100079324_1980_144_L0549.asp)

<sup>c</sup> ENVIRON assumes 60 railcars will be filled in one year. Tanker truck turnovers were assumed to be such that the total volume handled is equal to the total volume of 60 railcars.

<sup>d</sup> "Red/Primer" selected for shell color as "black" is not a selection in TANKS.

<sup>e</sup> TANKS uses default vacuum setting of -0.03 psig and default pressure setting of 0.03 psig.

**Table 5.13**  
**Typical Annual Distribution of Tank Service**  
**Romic Facility - Chandler, Arizona**

Tank Number	Tank Farm	Tank Volume (gallon)	Total Annual Throughput (gallon)	Throughput By Stream (gallon)						
				(A) Blended Fuel	(B) EG Combined	(C) Lacquer Thinner	(D) NMP/DEG/ water	(E) Stoddard Solvent	(F) Waste Water	(G) Organic
101	A	5,800	195,088	2,365	113,112	1,971	0	0	45,718	2,759
102	A	5,572	70,314	1,847	9,517	710	43,751	0	6,676	0
103	B	5,800	257,355	4,159	20,276	14,038	0	2,600	157,013	19,757
104	B	5,751	177,035	5,007	24,678	84,762	2,146	0	25,035	19,313
105	A	5,330	153,853	148,880	0	0	0	0	0	0
108	D1	5,220	144,427	144,427	0	0	0	0	0	0
109	D1	5,220	144,427	144,427	0	0	0	0	0	0
112	B	14,861	230,464	0	0	0	0	0	230,464	0
113	C1	15,000	255,249	0	0	0	0	0	255,249	0
121	C1	5,949	52,212	0	0	0	0	0	49,575	0
122	C1	6,500	82,134	0	0	0	72,012	0	0	0
123	C1	6,405	120,011	0	0	0	0	113,222	0	0
124	C1	9,000	413,687	0	412,851	0	0	0	0	0
137	D1	17,550	485,573	485,573	0	0	0	0	0	0
138	D1	17,550	485,573	485,573	0	0	0	0	0	0
200	Distillation Area	2,264	15,614	0	0	0	15,614	0	0	0
201	A	4,975	8,970	0	0	8,354	399	0	0	0
202	A	3,826	11,069	0	0	0	0	0	0	11,069
203	B	4,312	37,339	0	0	0	26,919	0	0	0
204	B	4,666	118,284	0	239	12,451	42,022	0	0	35,796
210	Distillation Area	1,883	11,297	0	0	0	2,723	0	0	8,574
212	C3	6,504	60,878	0	0	0	29,640	0	0	28,902
213	C3	8,445	173,087	0	0	0	151,058	0	0	0
214	C3	6,662	122,628	0	122,628	0	0	0	0	0
215	C3	8,086	57,890	0	0	0	3,275	0	33,331	3,625
216	C3	8,086	104,381	0	0	0	50,187	0	40,909	0
217	D3	4,606	251,491	0	201,701	0	0	0	0	0
218	D3	7,540	141,525	0	0	0	0	141,525	0	0
219	D3	7,589	197,251	0	197,251	0	0	0	0	0
220	D3	5,358	64,251	0	0	0	0	48,805	0	519
221	D3	10,870	112,809	0	109,846	0	0	0	0	0
222	D3	7,489	200,347	0	200,347	0	0	0	0	0
301	F	3,690	153,750	0	0	0	0	0	0	0
302	F	3,690	153,750	0	0	0	153,750	0	0	0
303	F	3,690	153,750	0	0	143,189	6,833	0	0	0
311	F	7,650	318,750	0	0	0	278,182	0	0	0
312	F	7,650	318,750	0	318,750	0	0	0	0	0
313	F	7,650	318,750	0	0	0	18,030	0	183,523	19,962
321	F	7,650	318,750	0	0	0	153,258	0	124,924	0
322	F	7,650	318,750	0	255,644	0	0	0	0	0
323	F	7,650	318,750	0	0	0	0	318,750	0	0
401	E	3,690	153,750	0	0	0	0	0	0	0
402	E	3,690	153,750	0	0	0	0	0	0	0
403	E	3,690	153,750	0	0	0	0	0	0	0
411	E	7,650	318,750	0	0	0	0	0	0	0
412	E	7,650	318,750	0	0	0	0	0	0	0
413	E	7,650	318,750	0	0	0	0	0	0	0

**Notes:**

EG = ethylene glycol  
NMP = n-methyl-2-pyrrolidone  
DEG = diethylene glycol



**Table 5.14**  
**Tank Farms Speciated Emissions**  
**Romic Facility - Chandler, Arizona**

Chemical	Annual and Hourly Emissions [grams/ second]							
	Tank Farm							
	A	B	C1	C3	D1	D3	F	Distillation Area
phenylmercuric acetate	3.16E-17	2.06E-16	1.61E-16	7.67E-17	--	--	1.42E-16	--
phosphoric acid	1.54E-09	1.00E-08	7.81E-09	3.74E-09	--	1.59E-14	6.92E-09	6.40E-13
polydimethylsiloxane	2.87E-09	5.71E-10	1.03E-10	4.94E-11	2.00E-08	--	9.16E-11	--
propylene glycol methyl ether acetate	6.37E-06	3.37E-06	1.37E-06	1.74E-06	4.19E-05	5.03E-09	1.38E-06	2.03E-07
propylene oxide	4.11E-06	6.32E-07	--	--	2.89E-05	--	--	--
pyridine	3.75E-07	2.92E-07	1.87E-07	8.93E-08	2.38E-06	--	1.66E-07	--
stoddard solvent <sup>d</sup>	2.80E-04	8.82E-04	5.88E-03	4.55E-04	1.43E-03	1.73E-02	1.40E-02	6.09E-05
styrene	1.08E-06	2.07E-06	1.52E-06	7.27E-07	5.51E-06	--	1.35E-06	--
sulfolane	8.24E-07	1.12E-06	7.91E-07	3.82E-07	4.69E-06	1.88E-11	7.01E-07	7.59E-10
sulfuric acid	4.71E-12	1.89E-11	1.45E-11	6.92E-12	1.31E-11	--	1.28E-11	--
tetrachloroethylene	3.21E-05	4.91E-05	2.67E-05	3.42E-05	1.73E-04	8.07E-08	2.64E-05	3.41E-06
tetraethyl orthosilicate	4.39E-07	4.40E-07	2.97E-07	1.43E-07	2.67E-06	3.04E-12	2.63E-07	1.30E-10
tetrahydrofuran	3.44E-05	6.27E-06	2.57E-07	1.38E-06	2.40E-04	4.90E-09	3.95E-07	2.05E-07
toluene	2.86E-04	5.56E-04	1.22E-05	1.29E-05	8.93E-04	2.67E-08	4.49E-04	1.13E-06
trichloro(1,1,2)trifluoroethane	1.85E-08	2.85E-09	--	--	1.30E-07	--	--	--
trichloroethane (1,1,1)	2.43E-05	1.40E-05	4.98E-06	1.01E-05	1.58E-04	2.98E-08	5.42E-06	1.25E-06
trichloroethane (1,1,2)	1.19E-09	1.83E-10	--	--	8.35E-09	--	--	--
trichloroethylene	1.47E-04	4.30E-05	6.93E-06	2.63E-05	1.00E-03	8.80E-08	9.14E-06	3.70E-06
trichlorotrifluoroethane	6.03E-06	1.55E-05	--	2.35E-05	2.20E-05	1.09E-07	3.71E-06	4.39E-06
triethylenetetramine	8.70E-11	1.51E-11	--	2.80E-12	6.08E-10	1.30E-14	4.42E-13	5.23E-13
xylenes (mixed isomers)	4.41E-05	7.79E-05	6.16E-06	1.54E-05	1.66E-04	4.62E-08	5.78E-05	1.96E-06

**Notes:**

- <sup>a</sup> Isopropanol used as a surrogate for modeling alcohols.
- <sup>b</sup> Mineral oil used as a surrogate for modeling paraffin oil.
- <sup>c</sup> Petroleum oil used as a surrogate for modeling petroleum oil products.
- <sup>d</sup> Jet naphtha used as a surrogate for modeling stoddard solvent.



**Table 5.15**  
**Drum Storage Emissions – Input Parameters**  
**Romic Facility - Chandler, Arizona**

<b>Storage Area</b>	<b>Maximum Number of Drums/Vessels</b>
Storage Building #1	2208 drums
Storage Building #2	1000 drums

**Note:**

Emission Factor for Fugitives from Drum/Vessel Storage:  
8.00E-06 kilogram/hour/source

**Source:**

*United States Environmental Protection Agency. 1995. Protocol for Equipment Leak Emission Estimates. Table 2-3. EPA-454/R-95-017. November. "Marketing Terminal Average Emission Factors" (Light liquid service - connector)*

**Table 5.16  
Drum Storage Emissions by Chemical  
Romic Facility - Chandler, Arizona**

**Volatile Organic Compounds Emission Rates:**

4.91E-03 grams/second (Storage Building #1)  
2.22E-03 grams/second (Storage Building #2)

CHEMICAL	Molecular Weight (grams/mole)	Equilibrium Mole Fraction in Vapor <sup>a</sup>	Mass of Individual Chemical in Vapor (grams/mole vapor)	Mass Fraction of Individual Chemical in Vapor	Emission Rate (grams/second) Storage Building #1	Emission Rate (grams/second) Storage Building #2
1,1,1-TRICHLOROETHANE	133.41	4.05E-03	5.41E-01	7.63E-03	3.75E-05	1.70E-05
1-METHOXY-2-PROPANOL	90.12	4.09E-04	3.68E-02	5.20E-04	2.55E-06	1.16E-06
2-(2-BUTOXYETHOXY)ETHANOL	160.21	2.14E-05	3.42E-03	4.83E-05	2.37E-07	1.07E-07
2-ETHOXYPROPANOL	104.17	7.94E-03	8.28E-01	1.17E-02	5.73E-05	2.60E-05
2-HEPTANONE	114.19	1.18E-04	1.35E-02	1.91E-04	9.35E-07	4.23E-07
2-PENTANONE	86.13	4.07E-03	3.51E-01	4.95E-03	2.43E-05	1.10E-05
ACETONE	58.08	5.21E-01	3.03E+01	4.28E-01	2.10E-03	9.50E-04
ACETONITRILE	41.05	1.57E-03	6.43E-02	9.08E-04	4.45E-06	2.02E-06
DICHLOROFLUOROMETHANE	112.17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BUTYL ACETATE	116.16	9.28E-05	1.08E-02	1.52E-04	7.47E-07	3.38E-07
CHLOROFORM	119.38	3.36E-04	4.01E-02	5.66E-04	2.78E-06	1.26E-06
CYCLOHEXANONE	112.17	4.49E-04	5.03E-02	7.11E-04	3.49E-06	1.58E-06
DIBUTYL PHTHALATE	278.35	4.24E-12	1.18E-09	1.67E-11	8.18E-14	3.70E-14
DICHLOROMETHANE	84.93	1.41E-01	1.20E+01	1.70E-01	8.32E-04	3.77E-04
DIETHYLENE GLYCOL	106.12	2.88E-05	3.06E-03	4.31E-05	2.12E-07	9.59E-08
DIMETHYLFORMAMIDE	73.09	8.98E-05	6.56E-03	9.27E-05	4.55E-07	2.06E-07
ETHANOL	46.07	3.58E-03	1.65E-01	2.33E-03	1.14E-05	5.17E-06
ETHYL ACETATE	88.11	4.18E-03	3.68E-01	5.20E-03	2.55E-05	1.15E-05
ETHYL BENZENE	106.17	4.18E-05	4.44E-03	6.27E-05	3.08E-07	1.39E-07
ETHYL LACTATE	118.13	1.39E-02	1.64E+00	2.32E-02	1.14E-04	5.16E-05
ETHYL-3-ETHOXYPROPIONATE	146.19	7.94E-05	1.16E-02	1.64E-04	8.04E-07	3.64E-07
ETHYLENE GLYCOL	62.07	1.72E-05	1.07E-03	1.51E-05	7.40E-08	3.35E-08
ETHYLENE GLYCOL BUTYL ETHER	118.18	1.38E-06	1.64E-04	2.31E-06	1.13E-08	5.13E-09
ETHYLENE GLYCOL BUTYL ETHER ACETATE	160.21	1.05E-07	1.68E-05	2.37E-07	1.16E-09	5.27E-10
ETHYLENE GLYCOL ETHYL ETHER ACETATE	132.16	4.41E-04	5.83E-02	8.23E-04	4.04E-06	1.83E-06
FORMALDEHYDE	30.03	1.53E-06	4.59E-05	6.49E-07	3.18E-09	1.44E-09
HEPTANE	100.20	1.93E-04	1.93E-02	2.73E-04	1.34E-06	6.06E-07
HEXAMETHYLDISILAZANE	161.39	1.49E-03	2.41E-01	3.40E-03	1.67E-05	7.56E-06
HEXANE	86.18	1.25E-03	1.07E-01	1.52E-03	7.44E-06	3.37E-06
HYDROFLUORIC ACID (0.25%)	20.01	---	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ISOPROPANOL	60.10	1.29E-01	7.74E+00	1.09E-01	5.36E-04	2.43E-04
ISOPROPANOLAMINE	75.11	6.80E-05	5.10E-03	7.21E-05	3.54E-07	1.60E-07
ISOPARAFFINIC HYDROCARBONS	72.15	9.51E-04	6.86E-02	9.68E-04	4.75E-06	2.15E-06
ISOPROPYL ACETATE	102.13	1.05E-05	1.08E-03	1.52E-05	7.46E-08	3.38E-08
METHANOL	32.04	1.74E-02	5.59E-01	7.89E-03	3.87E-05	1.75E-05
METHYL ETHYL KETONE	72.11	5.11E-02	3.69E+00	5.21E-02	2.55E-04	1.16E-04
METHYL ISOBUTYL KETONE	100.16	2.72E-04	2.72E-02	3.84E-04	1.89E-06	8.54E-07
NAPHTHA	110.00	2.38E-02	2.61E+00	3.69E-02	1.81E-04	8.20E-05
N-BUTANOL	74.12	3.27E-04	2.42E-02	3.42E-04	1.68E-06	7.60E-07

**Table 5.16**  
**Drum Storage Emissions by Chemical**  
**Romic Facility - Chandler, Arizona**

**Volatile Organic Compounds Emission Rates:**

4.91E-03 grams/second (Storage Building #1)  
2.22E-03 grams/second (Storage Building #2)

CHEMICAL	Molecular Weight (grams/mole)	Equilibrium Mole Fraction in Vapor <sup>a</sup>	Mass of Individual Chemical in Vapor (grams/mole vapor)	Mass Fraction of Individual Chemical in Vapor	Emission Rate (grams/second) Storage Building #1	Emission Rate (grams/second) Storage Building #2
N-METHYL-2-PYRROLIDONE	99.13	1.26E-02	1.25E+00	1.76E-02	8.64E-05	3.91E-05
N-PROPYL ACETATE	102.13	1.30E-03	1.32E-01	1.87E-03	9.17E-06	4.15E-06
PERCHLOROETHYLENE	165.83	9.72E-03	1.61E+00	2.28E-02	1.12E-04	5.06E-05
PETROLEUM OIL PRODUCTS	282.00	1.73E-06	4.89E-04	6.90E-06	3.39E-08	1.53E-08
PHENOL	94.11	1.45E-07	1.36E-05	1.92E-07	9.42E-10	4.27E-10
PHOSPHORIC ACID	98.00	2.20E-07	2.16E-05	3.05E-07	1.50E-09	6.78E-10
PROPYLENE GLYCOL METHYL ETHER ACETATE	132.16	7.06E-04	9.34E-02	1.32E-03	6.47E-06	2.93E-06
STODDARD SOLVENT	141.00	6.42E-03	9.05E-01	1.28E-02	6.27E-05	2.84E-05
SULFOLANE	120.17	2.91E-06	3.49E-04	4.93E-06	2.42E-08	1.10E-08
TETRAETHYL ORTHOSILICATE	208.33	3.08E-07	6.42E-05	9.06E-07	4.45E-09	2.01E-09
TETRAHYDROFURAN	72.11	1.33E-03	9.56E-02	1.35E-03	6.62E-06	3.00E-06
TOLUENE	92.14	5.70E-03	5.25E-01	7.41E-03	3.64E-05	1.65E-05
TRICHLOROETHYLENE	131.39	1.31E-02	1.72E+00	2.43E-02	1.19E-04	5.41E-05
TRICHLOROTRIFLUOROETHANE	187.38	1.08E-02	2.02E+00	2.85E-02	1.40E-04	6.34E-05
TRIETHYLENETETRAMINE	146.24	1.65E-09	2.41E-07	3.40E-09	1.67E-11	7.55E-12
XYLENES	106.16	8.29E-03	8.80E-01	1.24E-02	6.10E-05	2.76E-05

**Note:**

<sup>a</sup> The maximum partial pressure of each components from either the representative organic wastestream or blended fuel wastestream was selected to represent the chemical in the emissions from this source.

**Table 5.17**  
**Tank Components - Emission Factors**  
**Romic Facility - Chandler, Arizona**

Component Type	Emission Factor (kilograms/hour/source)
<i>Permitted RCRA Tanks<sup>a</sup></i>	
valves (liquid service)	4.90E-07
valves (gas service)	6.60E-07
pressure relief devices	7.50E-06
pumps	7.50E-06
connectors	6.10E-07
<i>Non-RCRA Tanks<sup>b</sup></i>	
valves	4.30E-05
valves (gas service)	1.30E-05
pressure relief devices	1.30E-05
pumps	5.40E-04
connectors	8.00E-06

**Notes:**

<sup>a</sup> Permitted existing RCRA Tanks are 101, 102, 103, 104, 105, 112, 113, 121,122,123,124  
Proposed tanks which will be RCRA-permitted are 108, 109, 137, 138, Tank Farm F and E  
These factors are from Table 2-11 (Default Zero Values: SOCM I Process Units)  
United States Environmental Protection Agency. 1995. Protocol for Equipment Leak  
Emission Estimates. Table 2-11. EPA-454/R-95-017. November.  
These factors would be used to represent emissions while the tank is in "organic" service  
(ie., storing organic product or wastestream).

<sup>b</sup> Non-RCRA tanks would be represented with emission factors from Table 2-3 (Marketing  
Terminal Averaging Emission Factors). United States Environmental Protection Agency. 1995.  
Protocol for Equipment Leak Emission Estimates. Table 2-3. EPA-454/R-95-017. November.  
These factors would be used to represent emissions while the tank is in "organic" service  
(ie., storing organic product or wastestream). Table 2-3 of this reference summarizes  
marketing terminals' emission factors; a marketing terminal is essentially a tank farm with  
dispensing equipment. This is similar to the storage tank farms at the facility.

**Table 5.18  
Tank Components – Summary of Count  
Romic Facility - Chandler, Arizona**

Tank Farm	Tank	Valves (Liquid Service)	Flanges/Connectors	Valves (Gas Service)	Pump
A	101	3	8	0	0
	102	3	9	0	0
	105	3	8	0	0
	201	4	9	0	0
	202	4	9	0	0
	Trough/Filter	4	2	0	0
Tank Farm A Total:		21	45	0	0
B	103	6	13	0	0
	104	5	13	0	0
	112	6	4	0	0
	203	4	9	0	0
	204	4	9	0	0
	Troughs	0	1	0	0
Tank Farm B Total:		25	48	0	0
C1	113	4	9	0	0
	121	4	9	0	0
	122	4	9	0	0
	123	4	9	0	0
	124	4	9	0	0
	Troughs	22	11	0	2
Tank Farm C1 Total		22	11	0	2
C2	Troughs	15	6	0	0
C3	211	4	9	0	0
	212	4	9	0	0
	213	4	9	0	0
	214	4	9	0	0
	215	4	9	0	0
	216	4	9	0	0
	Troughs	9	4	0	0
Tank Farm C3 Total		33	58	0	0
E	401	4	9	0	0
	402	4	9	0	0
	403	4	9	0	0
	411	4	9	0	0
	412	4	9	0	0
	413	4	9	0	0
Tank Farm E Total		24	54	0	0
F	301	4	9	0	0
	302	4	9	0	0
	303	4	9	0	0
	311	4	9	0	0
	312	4	9	0	0
	313	4	9	0	0
	321	4	9	0	0
	322	4	9	0	0
Tank Farm F Total		36	81	0	0

**Table 5.18**  
**Tank Components – Summary of Count**  
**Romic Facility - Chandler, Arizona**

Tank Farm	Tank	Valves (Liquid Service)	Flanges/Connectors	Valves (Gas Service)	Pump
D1	108	4	9	0	0
	109	4	9	0	0
	137	4	9	0	0
	138	4	9	0	0
Tank Farm D1 Total		16	36	0	0
D3 (ethylene glycol)	217	4	9	0	0
	218	4	9	0	0
	219	4	9	0	0
	220	4	9	0	0
	221	4	9	0	0
	222	4	9	0	0
	Trough	0	1	0	3
Tank Farm D3 Total		24	198	0	0
Distillation Processing		5	3	0	0
Distillation Column		19	185	1	5
Thin Film Evaporator		44	297	5	2
Vacuum Pot		36	361	7	2

**Note:**

<sup>a</sup> The number of components is based on the records maintained for the leak detection program for the RCRA-permitted tanks. The average number of each type of components associated with a tank was calculated based on the known count of components for the RCRA-permitted tanks. These averages were used to estimate the number of components associated with unpermitted tanks. The average number of valves per tank is 4 and the average number of flanges/connectors per tank is 9.

**Table 5.19  
Tank Components - Emission Estimates  
Romic Facility - Chandler, Arizona**

Tank Farm	Tank	Valves (Liquid Service)	Flanges/Connectors	Valves (Gas Service)	Pump
A	101	1.47E-06	4.88E-06	0.00E+00	0.00E+00
	102	1.47E-06	5.49E-06	0.00E+00	0.00E+00
	105	1.47E-06	4.88E-06	0.00E+00	0.00E+00
	201	1.72E-04	7.20E-05	0.00E+00	0.00E+00
	202	1.72E-04	7.20E-05	0.00E+00	0.00E+00
	Trough/Filter	1.72E-04	1.60E-05	0.00E+00	0.00E+00
<b>Tank Farm A Total:</b>		5.20E-04	1.75E-04	0.00E+00	0.00E+00
B	103	2.94E-06	7.93E-06	0.00E+00	0.00E+00
	104	2.45E-06	7.93E-06	0.00E+00	0.00E+00
	112	2.94E-06	2.44E-06	0.00E+00	0.00E+00
	203	1.72E-04	7.20E-05	0.00E+00	0.00E+00
	204	1.72E-04	7.20E-05	0.00E+00	0.00E+00
	Troughs	0.00E+00	8.00E-06	0.00E+00	0.00E+00
<b>Tank Farm B Total:</b>		3.52E-04	1.70E-04	0.00E+00	0.00E+00
C1	113	1.96E-06	5.49E-06	0.00E+00	0.00E+00
	121	1.96E-06	5.49E-06	0.00E+00	0.00E+00
	122	1.96E-06	5.49E-06	0.00E+00	0.00E+00
	123	1.96E-06	5.49E-06	0.00E+00	0.00E+00
	124	1.96E-06	5.49E-06	0.00E+00	0.00E+00
	Troughs	9.46E-04	8.80E-05	0.00E+00	1.08E-03
<b>Tank Farm C1 Total</b>		9.56E-04	1.15E-04	0.00E+00	1.08E-03
<b>Tank Farm C2 Total</b>	Troughs	6.45E-04	4.80E-05	0.00E+00	0.00E+00
C3	211	1.72E-04	7.20E-05	0.00E+00	0.00E+00
	212	1.72E-04	7.20E-05	0.00E+00	0.00E+00
	213	1.72E-04	7.20E-05	0.00E+00	0.00E+00
	214	1.72E-04	7.20E-05	0.00E+00	0.00E+00
	215	1.72E-04	7.20E-05	0.00E+00	0.00E+00
	216	1.72E-04	7.20E-05	0.00E+00	0.00E+00
	Troughs	3.87E-04	3.20E-05	0.00E+00	0.00E+00
<b>Tank Farm C3 Total</b>		1.42E-03	4.64E-04	0.00E+00	0.00E+00
F	301	1.96E-06	5.49E-06	0.00E+00	0.00E+00
	302	1.96E-06	5.49E-06	0.00E+00	0.00E+00
	303	1.96E-06	5.49E-06	0.00E+00	0.00E+00
	311	1.96E-06	5.49E-06	0.00E+00	0.00E+00
	312	1.96E-06	5.49E-06	0.00E+00	0.00E+00
	313	1.96E-06	5.49E-06	0.00E+00	0.00E+00
	321	1.96E-06	5.49E-06	0.00E+00	0.00E+00
	322	1.96E-06	5.49E-06	0.00E+00	0.00E+00
	323	1.96E-06	5.49E-06	0.00E+00	0.00E+00
<b>Tank Farm F Total</b>		1.76E-05	4.94E-05	0.00E+00	0.00E+00
D1	108	1.96E-06	5.49E-06	0.00E+00	0.00E+00
	109	1.96E-06	5.49E-06	0.00E+00	0.00E+00
	137	1.96E-06	5.49E-06	0.00E+00	0.00E+00
	138	1.96E-06	5.49E-06	0.00E+00	0.00E+00
<b>Tank Farm D1 Total</b>		7.84E-06	2.20E-05	0.00E+00	0.00E+00

**Table 5.19  
Tank Components - Emission Estimates  
Romic Facility - Chandler, Arizona**

<b>Tank Farm</b>	<b>Tank</b>	<b>Valves (Liquid Service)</b>	<b>Flanges/Connectors</b>	<b>Valves (Gas Service)</b>	<b>Pump</b>
<b>D3</b> (ethylene glycol tanks)	217	1.72E-04	7.20E-05	0.00E+00	0.00E+00
	218	1.72E-04	7.20E-05	0.00E+00	0.00E+00
	219	1.72E-04	7.20E-05	0.00E+00	0.00E+00
	220	1.72E-04	7.20E-05	0.00E+00	0.00E+00
	221	1.72E-04	7.20E-05	0.00E+00	0.00E+00
	222	1.72E-04	7.20E-05	0.00E+00	0.00E+00
	Troughs	0.00E+00	8.00E-06	0.00E+00	1.62E-03
<b>Tank Farm D3 Total</b>		1.03E-03	4.40E-04	0.00E+00	1.62E-03
Distillation Processing		2.45E-06	1.83E-06	0.00E+00	0.00E+00
Distillation Column		9.31E-06	1.13E-04	7.50E-06	3.75E-05
Thin Film Evaporator		2.16E-05	1.81E-04	3.75E-05	1.50E-05
Vacuum Pot		1.76E-05	2.20E-04	5.25E-05	1.50E-05

**Note:**

<sup>a</sup> The number of components is based on the records maintained for the leak detection program for the RCRA-permitted tanks. The average number of each type of components associated with a tank was calculated based on the known count of components for the RCRA-permitted tanks. These averages were used to estimate the number of components associated with unpermitted tanks. The average number of valves per tank is 4 and the average number of flanges/connectors per tank is 9.





**Table 5.20  
Tank Farms Components Emissions by Chemical  
Romic Facility - Chandler, Arizona**

Chemical	Annual and Hourly Emissions (gallons/second)							
	Tank Farm							Distillation Area
	A	B	C1	C3	D1	D3	F	
propylene oxide	8.27E-08	4.47E-09	--	--	5.96E-09	--	--	--
pyridine	7.54E-09	2.06E-09	7.14E-09	6.65E-09	4.91E-10	--	1.08E-10	--
stoddard solvent <sup>d</sup>	5.62E-06	6.24E-06	2.25E-04	3.39E-05	2.95E-07	8.57E-04	9.11E-06	3.74E-05
styrene	2.18E-08	1.47E-08	5.81E-08	5.41E-08	1.14E-09	--	8.76E-10	--
sulfolane	1.66E-08	7.92E-09	3.02E-08	2.84E-08	9.68E-10	9.29E-13	4.56E-10	4.56E-10
sulfuric acid	9.46E-14	1.33E-13	5.53E-13	5.15E-13	2.69E-15	--	8.34E-15	--
tetrachloroethylene	6.45E-07	3.48E-07	1.02E-06	2.55E-06	3.58E-08	3.99E-09	1.71E-08	2.09E-06
tetraethyl orthosilicate	8.82E-09	3.11E-09	1.14E-08	1.06E-08	5.51E-10	1.50E-13	1.71E-10	7.97E-11
tetrahydrofuran	6.92E-07	4.44E-08	9.83E-09	1.02E-07	4.96E-08	2.42E-10	2.57E-10	1.26E-07
toluene	5.74E-06	3.93E-06	4.66E-07	9.59E-07	1.84E-07	1.32E-09	2.92E-07	6.92E-07
trichloro(1,1,2)trifluoroethane	3.72E-10	2.02E-11	--	--	2.68E-11	--	--	--
trichloroethane (1,1,1)	4.88E-07	9.88E-08	1.90E-07	7.48E-07	3.26E-08	1.47E-09	3.53E-09	7.67E-07
trichloroethane (1,1,2)	2.39E-11	1.29E-12	--	--	1.72E-12	--	--	--
trichloroethylene	2.95E-06	3.04E-07	2.65E-07	1.96E-06	2.07E-07	4.35E-09	5.95E-09	2.27E-06
trichlorotrifluoroethane	1.21E-07	1.10E-07	--	1.75E-06	4.54E-09	5.38E-09	2.41E-09	2.70E-06
triethylenetetramine	1.75E-12	1.07E-13	--	2.09E-13	1.26E-13	6.41E-16	2.87E-16	3.21E-13
xylenes (mixed isomers)	8.86E-07	5.51E-07	2.35E-07	1.15E-06	3.42E-08	2.28E-09	3.76E-08	1.20E-06

**Notes:**

- <sup>a</sup> Isopropanol used as a surrogate for modeling alcohols.
- <sup>b</sup> Mineral oil used as a surrogate for modeling paraffin oil.
- <sup>c</sup> Petroleum oil used as a surrogate for modeling petroleum oil products.
- <sup>d</sup> Jet naptha used as a surrogate for modeling stoddard solvent.

**Table 5.21**  
**Sampling Emissions – Input Parameters**  
**Romic Facility - Chandler, Arizona**

Parameter	Symbol	Value	Units	Note
Density	r	13.716	kilograms/cubic meter	a
Acceleration of Gravity	g	9.8	meters/square second	-
Angle of Inclination from Horizontal	f	90	degrees	c
Surface Tension	s	2.16E-02	kilograms/square second	b
Viscosity	m	2.92E-04	kilogram-meter/second	b
Withdrawal Velocity	v	0.30	meters/second	d
Length of sampling tube - drum sampling	L	1	meter	e
Length of sampling tube - tanker truck/railcar	L	2	meter	e
Diameter of sampling tube - drum sampling	D	0.0127	meter	e
Diameter of sampling tube - tanker truck/railcar	D	0.0254	meter	e
<b>Drum Sampling</b>				
Capillary Number	Ca	0.004	-	f
Film Thickness	h	3.08E-04	meter	g
Volume of Liquid on sampling tube	V	1.23E-05	cubic meter	-
Mass of Liquid on sampling tube	m	0.00017	kilograms/sample	-
Daily Samples		116	drums/day	
Annual Samples		42340	drums/year	
VOC Emission Rate		0.00023	grams/second (annual average)	h
		0.00023	grams/second (maximum hourly)	h
<b>Tanker Truck/Railcar Sampling</b>				
Capillary Number	Ca	0.004	-	f
Film Thickness	h	3.08E-04	meter	g
Volume of Liquid on sampling tube	V	4.91E-05	cubic meter	-
Mass of Liquid on sampling tube	m	0.00067	kilograms/sample	-
Tanker Trucks Samples		10	trucks/day	
		1000	trucks/year	
Tanker Truck Sampling - VOC Emission Rate		0.000021	grams/second (annual average)	h
		0.000187	grams/second (maximum hourly)	h
Railcar Samples		5	railcars/month	
		60	railcars/year	
Railcar Sampling - VOC Emission Rate		0.00000128	grams/second (annual average)	i
		0.000187	grams/second (maximum hourly)	i

**Notes:**

<sup>a</sup> Value for gasoline from Perry's Chemical Engineers' Handbook page 2-120.

<sup>b</sup> Values for gasoline (surface tension value is in contact with air) obtained from: White, Frank M. *Fluid Mechanics*. New York: McGraw-Hill, Inc., 1986.

<sup>c</sup> Assumed the sampling tube will be pulled straight out of the drum vertically.

<sup>d</sup> Assumed a withdrawal rate of 1 foot per second

<sup>e</sup> Facility estimate

<sup>f</sup> The capillary number is equal to mv/s (see Perry's Chemical Engineers' Handbook page 6-42).

<sup>g</sup> Film thickness is estimated from the following equation:

$$h \text{ (rg/s)}^{1/2} = (0.944 * Ca^{2/3}) / (1 - \cos f)^{1/2}$$

where Ca is less than about 0.01 and 0.03

This equation is for calculating film-thickness adhering to flat plates withdrawn from a liquid and comes from Perry's Chemical Engineers' Handbook page 6-42. The equation applicable to cylinders withdrawn from liquids was not used because it states that "a cylinder surface with  $R(\text{rg/s})^{1/2} > 3$  may be treated as a flat plate" (where R is the radius of the cylinder). For this situation,  $R(\text{rg/s})^{1/2} = 3.63$

<sup>h</sup> Assumes that 100% of the liquid on the sampling tube evaporates, and comprises only selected chemicals (100% VOCs)

<sup>i</sup> All of the railcars sampled have blended fuel - in deriving the total VOC emission rate, we assumed that 100% of the liquid on the sampling tube evaporates, and comprises only selected chemicals (100% VOCs for blended fuel)

**Table 5.22**  
**Tanker Truck Sampling Emissions by Chemical**  
**Romic Facility - Chandler, Arizona**

**Volatile Organic Compound Emission Rates:**

2.13E-05 grams per second (annual average)  
1.87E-04 grams per second (maximum hourly)

CHEMICAL	Molecular Weight (grams/mole)	Maximum Partial Pressure (mmHg) <sup>a</sup>	Equilibrium Mole Fraction in Vapor	Mass of Individual Chemical in Vapor (grams/mole vapor)	Mass Fraction of Individual Chemical in Vapor	Emission Rate (grams/second) Annual Average	Emission Rate (grams/second) Maximum Hourly
1,1,1-TRICHLOROETHANE	133.41	3.14E+00	3.08E-03	4.11E-01	4.06E-03	8.67E-08	7.60E-07
TRIFLUOROETHANE	187.38	1.70E-01	1.67E-04	3.13E-02	3.09E-04	6.60E-09	5.78E-08
1,1,2-TRICHLOROETHANE	133.40	6.39E-06	6.27E-09	8.36E-07	8.26E-09	1.76E-13	1.54E-12
1,2,4-TRIMETHYLBENZENE	120.19	3.73E+00	3.66E-03	4.40E-01	4.35E-03	9.28E-08	8.13E-07
1,2-DICHLOROBENZENE	147.00	1.19E-02	1.17E-05	1.72E-03	1.69E-05	3.62E-10	3.17E-09
1,3,5-TRIMETHYLBENZENE	120.19	1.99E-04	1.96E-07	2.35E-05	2.32E-07	4.96E-12	4.34E-11
1,4-DIOXANE	88.11	3.73E-03	3.66E-06	3.22E-04	3.18E-06	6.80E-11	5.95E-10
1-METHOXY-2-PROPANOL	90.12	2.49E-01	2.44E-04	2.20E-02	2.17E-04	4.64E-09	4.06E-08
2-BUTOXYETHANOL ACETATE	160.21	2.60E-06	2.55E-09	4.08E-07	4.03E-09	8.60E-14	7.54E-13
2-ETHOXYPROPANOL	104.17	1.25E-01	1.23E-04	1.28E-02	1.26E-04	2.70E-09	2.36E-08
2-HEPTANONE	114.19	2.45E-02	2.40E-05	2.74E-03	2.71E-05	5.78E-10	5.07E-09
2-METHYL-1-PROPANOL	74.12	1.00E-02	9.83E-06	7.29E-04	7.20E-06	1.54E-10	1.35E-09
2-PENTANONE	86.13	6.41E-01	6.29E-04	5.42E-02	5.35E-04	1.14E-08	1.00E-07
4-HYDROXY-4-METHYL-2-PENTANONE	116.16	2.00E-06	1.97E-09	2.28E-07	2.25E-09	4.81E-14	4.22E-13
ACETIC ACID	60.05	5.66E-03	5.56E-06	3.34E-04	3.30E-06	7.04E-11	6.16E-10
ACETONE	58.08	2.25E+01	2.21E-02	1.28E+00	1.27E-02	2.71E-07	2.37E-06
ACETONITRILE	130.19	1.98E-01	1.94E-04	2.53E-02	2.49E-04	5.32E-09	4.66E-08
ACROLEIN	56.06	1.82E-03	1.79E-06	1.00E-04	9.91E-07	2.12E-11	1.85E-10
ALCOHOLS	60.10	6.91E+00	6.79E-03	4.08E-01	4.03E-03	8.60E-08	7.53E-07
AMYL ACETATE	130.19	7.36E-03	7.22E-06	9.40E-04	9.28E-06	1.98E-10	1.74E-09
BENZENE	78.11	1.24E+01	1.21E-02	9.47E-01	9.35E-03	2.00E-07	1.75E-06
BROMINATED BISPHENOL	543.87	1.49E-14	1.46E-17	7.94E-15	7.84E-17	1.67E-21	1.47E-20
BUTYL CELLOSOLVE	118.18	1.53E-04	1.50E-07	1.77E-05	1.75E-07	3.73E-12	3.27E-11
BUTYL ACETATE	116.16	5.56E+01	5.46E-02	6.34E+00	6.26E-02	1.34E-06	1.17E-05
CARBON TETRACHLORIDE	153.82	7.45E-05	7.31E-08	1.12E-05	1.11E-07	2.37E-12	2.08E-11
CHLOROBENZENE	112.56	2.58E-02	2.53E-05	2.85E-03	2.82E-05	6.01E-10	5.27E-09
CHLOROFORM	119.38	4.96E-01	4.87E-04	5.81E-02	5.74E-04	1.22E-08	1.07E-07
CRESOL	324.42	3.78E-06	3.71E-09	1.20E-06	1.19E-08	2.54E-13	2.22E-12
CYCLOHEXANE	84.16	2.68E+00	2.63E-03	2.21E-01	2.19E-03	4.67E-08	4.09E-07
CYCLOHEXANONE	112.17	7.23E-03	7.09E-06	7.96E-04	7.86E-06	1.68E-10	1.47E-09
DIBUTYL PHTHALATE	278.35	9.67E-11	9.49E-14	2.64E-11	2.61E-13	5.57E-18	4.88E-17
DICHLOROMETHANE	84.93	4.58E+01	4.49E-02	3.81E+00	3.77E-02	8.04E-07	7.04E-06

**Table 5.22**  
**Tanker Truck Sampling Emissions by Chemical**  
**Romic Facility - Chandler, Arizona**

**Volatile Organic Compound Emission Rates:**

2.13E-05 grams per second (annual average)  
1.87E-04 grams per second (maximum hourly)

CHEMICAL	Molecular Weight (grams/mole)	Maximum Partial Pressure (mmHg) <sup>a</sup>	Equilibrium Mole Fraction in Vapor	Mass of Individual Chemical in Vapor (grams/mole vapor)	Mass Fraction of Individual Chemical in Vapor	Emission Rate (grams/second) Annual Average	Emission Rate (grams/second) Maximum Hourly
DIESEL	185.00	1.98E-01	1.94E-04	3.59E-02	3.54E-04	7.56E-09	6.63E-08
DIETHYLENE GLYCOL	106.12	4.54E-04	4.46E-07	4.73E-05	4.67E-07	9.97E-12	8.73E-11
DIETHYLENE GLYCOL BUTYL ETHER	162.23	3.56E-04	3.49E-07	5.66E-05	5.59E-07	1.19E-11	1.05E-10
DIETHYLENE TRIAMINE	103.17	7.60E-06	7.46E-09	7.70E-07	7.60E-09	1.62E-13	1.42E-12
DIMETHYLFORMAMIDE	73.09	2.16E-02	2.12E-05	1.55E-03	1.53E-05	3.27E-10	2.87E-09
ETHANOL	46.07	2.44E+00	2.39E-03	1.10E-01	1.09E-03	2.32E-08	2.03E-07
ETHYL ACETATE	88.11	5.85E-01	5.74E-04	5.06E-02	5.00E-04	1.07E-08	9.35E-08
ETHYL BENZENE	106.17	8.72E+00	8.56E-03	9.08E-01	8.97E-03	1.91E-07	1.68E-06
ETHYL LACTATE	118.13	2.19E-01	2.15E-04	2.54E-02	2.51E-04	5.36E-09	4.70E-08
ETHYL-3-ETHOXYPROPIONATE	146.19	1.25E-03	1.23E-06	1.80E-04	1.77E-06	3.79E-11	3.32E-10
ETHYLENE GLYCOL	62.07	4.57E-04	4.49E-07	2.78E-05	2.75E-07	5.87E-12	5.14E-11
ETHYLENE GLYCOL ETHYL ETHER ACETATE	132.16	7.43E-03	7.29E-06	9.64E-04	9.52E-06	2.03E-10	1.78E-09
FERRIC CHLORIDE	162.20	2.43E-03	2.39E-06	3.87E-04	3.82E-06	8.16E-11	7.15E-10
FORMIC ACID	46.03	1.19E-05	1.17E-08	5.37E-07	5.30E-09	1.13E-13	9.92E-13
GASOLINE	108.00	1.19E+02	1.17E-01	1.26E+01	1.24E-01	2.66E-06	2.33E-05
GLYCERIN	92.09	2.65E-05	2.60E-08	2.39E-06	2.36E-08	5.05E-13	4.42E-12
HEPTANE	100.20	4.37E-02	4.29E-05	4.30E-03	4.24E-05	9.06E-10	7.93E-09
HEXAMETHYLDISILAZANE	161.39	2.36E-02	2.31E-05	3.73E-03	3.68E-05	7.86E-10	6.89E-09
HEXANE	86.18	4.66E+02	4.58E-01	3.95E+01	3.90E-01	8.32E-06	7.29E-05
HYDROCHLORIC ACID	36.46	2.36E-06	2.32E-09	8.45E-08	8.35E-10	1.78E-14	1.56E-13
ISOBUTYL ACETATE	116.16	4.60E-03	4.51E-06	5.24E-04	5.18E-06	1.11E-10	9.68E-10
ISOBUTYL ISOBUTYRATE	144.21	3.67E-06	3.60E-09	5.19E-07	5.13E-09	1.09E-13	9.59E-13
ISOPARAFFINIC HYDROCARBONS	72.15	2.58E+01	2.53E-02	1.83E+00	1.81E-02	3.85E-07	3.38E-06
ISOPROPANOLAMINE	75.11	1.07E-03	1.05E-06	7.90E-05	7.80E-07	1.67E-11	1.46E-10
ISOPROPYL ACETATE	102.13	9.95E-02	9.76E-05	9.97E-03	9.85E-05	2.10E-09	1.84E-08
JET FUEL/KEROSENE	165.00	6.93E-01	6.80E-04	1.12E-01	1.11E-03	2.36E-08	2.07E-07
METHANOL	32.04	1.01E+01	9.87E-03	3.16E-01	3.12E-03	6.67E-08	5.84E-07
METHYL ETHYL KETONE	72.11	3.72E+00	3.65E-03	2.63E-01	2.60E-03	5.55E-08	4.86E-07
METHYL ISOBUTYL KETONE	100.16	1.57E-01	1.55E-04	1.55E-02	1.53E-04	3.26E-09	2.86E-08
NAPHTHA	110.00	5.89E-01	5.78E-04	6.36E-02	6.28E-04	1.34E-08	1.17E-07
NAPHTHALENE	128.17	5.61E-02	5.50E-05	7.05E-03	6.96E-05	1.49E-09	1.30E-08
N-BUTANOL	74.12	5.37E-02	5.27E-05	3.91E-03	3.86E-05	8.24E-10	7.22E-09
N-METHYL-2-PYRROLIDONE	99.13	1.98E-01	1.95E-04	1.93E-02	1.90E-04	4.07E-09	3.56E-08
N-PROPYL ACETATE	102.13	1.06E-01	1.04E-04	1.07E-02	1.05E-04	2.25E-09	1.97E-08
NITRIC ACID	63.01	1.25E-03	1.23E-06	7.76E-05	7.66E-07	1.63E-11	1.43E-10
PARAFFIN OIL	72.15	3.58E-01	3.51E-04	2.53E-02	2.50E-04	5.34E-09	4.68E-08

**Table 5.22**  
**Tanker Truck Sampling Emissions by Chemical**  
**Romic Facility - Chandler, Arizona**

**Volatile Organic Compound Emission Rates:**

2.13E-05 grams per second (annual average)  
1.87E-04 grams per second (maximum hourly)

CHEMICAL	Molecular Weight (grams/mole)	Maximum Partial Pressure (mmHg) <sup>a</sup>	Equilibrium Mole Fraction in Vapor	Mass of Individual Chemical in Vapor (grams/mole vapor)	Mass Fraction of Individual Chemical in Vapor	Emission Rate (grams/second) Annual Average	Emission Rate (grams/second) Maximum Hourly
PERCHLOROETHYLENE	165.83	1.39E+02	1.37E-01	2.27E+01	2.24E-01	4.78E-06	4.19E-05
PETROLEUM OIL PRODUCTS	282.00	2.69E-03	2.65E-06	7.46E-04	7.37E-06	1.57E-10	1.38E-09
PHENOL	94.11	1.14E-03	1.11E-06	1.05E-04	1.04E-06	2.21E-11	1.94E-10
PHENYLMERCURIC ACETATE	336.74	1.86E-11	1.83E-14	6.15E-12	6.07E-14	1.30E-18	1.14E-17
PHOSPHORIC ACID	98.00	1.25E-11	1.23E-14	1.21E-12	1.19E-14	2.54E-19	2.23E-18
POLYDIMETHYL SILOXANE	74.15	8.66E-01	8.50E-04	6.31E-02	6.23E-04	1.33E-08	1.16E-07
PROPYLENE GLYCOL METHYL ETHER ACETATE	132.16	3.53E-02	3.47E-05	4.59E-03	4.53E-05	9.67E-10	8.47E-09
PYRIDINE	79.10	2.75E-03	2.70E-06	2.13E-04	2.11E-06	4.50E-11	3.94E-10
STODDARD SOLVENT	141.00	1.01E-01	9.93E-05	1.40E-02	1.38E-04	2.95E-09	2.58E-08
STYRENE	104.15	4.03E+00	3.96E-03	4.12E-01	4.07E-03	8.69E-08	7.62E-07
SULFOLANE	120.17	5.93E-03	5.83E-06	7.00E-04	6.91E-06	1.48E-10	1.29E-09
SULFURIC ACID	36.46	4.04E-07	3.96E-10	1.44E-08	1.43E-10	3.04E-15	2.67E-14
TETRAETHYL ORTHOSILICATE	208.33	1.62E-03	1.59E-06	3.32E-04	3.28E-06	7.00E-11	6.13E-10
TETRAHYDROFURAN	72.11	3.90E-01	3.83E-04	2.76E-02	2.73E-04	5.82E-09	5.10E-08
TOLUENE	92.14	2.61E+01	2.57E-02	2.36E+00	2.33E-02	4.98E-07	4.37E-06
TRICHLOROETHENE	131.39	6.51E+00	6.39E-03	8.40E-01	8.29E-03	1.77E-07	1.55E-06
TRIETHYLENETETRAMINE	146.24	4.63E-07	4.55E-10	6.65E-08	6.57E-10	1.40E-14	1.23E-13
XYLENES	106.16	4.72E+01	4.63E-02	4.92E+00	4.85E-02	1.04E-06	9.08E-06

**Notes:**

mmHg = millimeter mercury

<sup>a</sup> The maximum partial pressure of each components from either the representative organic wastestream, wastewater or blended fuel wastestream was selected to represent the chemical in the emissions from this source.



**Table 5.23**  
**Railcar Sampling Emissions by Chemical**  
**Romic Facility - Chandler, Arizona**

**Volatile Organic Compound Emission Rates:**

1.28E-06 grams/second (annual average)  
1.87E-04 grams/second (maximum hourly)

Chemical	Molecular Weight (grams/mole)	Equilibrium Mole Fraction in Vapor <sup>a</sup>	Mass of Individual Chemical in Vapor (grams/mole vapor)	Mass Fraction of Individual Chemical in Vapor	Emission Rate (grams/second) Annual Average	Emission Rate (grams/seconds) Maximum Hourly
NAPHTHALENE	128.17	1.83E-08	2.34E-06	3.41E-08	4.37E-14	6.38E-12
NITRIC ACID	63.01	1.32E-05	8.35E-04	1.22E-05	1.56E-11	2.28E-09
N-BUTANOL	74.12	5.68E-04	4.21E-02	6.14E-04	7.86E-10	1.15E-07
N-METHYL-2-PYRROLIDONE	99.13	1.26E-04	1.25E-02	1.82E-04	2.33E-10	3.40E-08
N-PROPYL ACETATE	102.13	1.04E-04	1.07E-02	1.56E-04	1.99E-10	2.91E-08
PARAFFIN OIL	72.15	3.78E-03	2.73E-01	3.98E-03	5.09E-09	7.43E-07
PERCHLOROETHYLENE	165.83	1.32E-03	2.19E-01	3.20E-03	4.10E-09	5.99E-07
PETROLEUM OIL PRODUCTS	282.00	4.03E-06	1.14E-03	1.66E-05	2.12E-11	3.10E-09
PHENOL	94.11	1.90E-07	1.78E-05	2.60E-07	3.33E-13	4.87E-11
POLYDIMETHYL SILOXANE	74.15	3.18E-07	2.36E-05	3.44E-07	4.41E-13	6.43E-11
PROPYLENE GLYCOL METHYL ETHER ACETATE	132.16	3.73E-04	4.93E-02	7.20E-04	9.22E-10	1.35E-07
PROPYLENE OXIDE	58.08	5.06E-04	2.94E-02	4.29E-04	5.49E-10	8.02E-08
PYRIDINE	79.10	2.90E-05	2.29E-03	3.35E-05	4.29E-11	6.26E-09
STODDARD SOLVENT	141.00	3.96E-04	5.58E-02	8.14E-04	1.04E-09	1.52E-07
STYRENE	104.15	6.45E-05	6.72E-03	9.80E-05	1.26E-10	1.83E-08
SULFOLANE	120.17	6.25E-05	7.51E-03	1.10E-04	1.40E-10	2.05E-08
SULFURIC ACID	36.46	4.04E-07	1.47E-05	2.15E-07	2.75E-13	4.01E-11
TETRAETHYL ORTHOSILICATE	208.33	1.72E-05	3.57E-03	5.21E-05	6.68E-11	9.75E-09
TETRAHYDROFURAN	72.11	4.12E-03	2.97E-01	4.33E-03	5.55E-09	8.10E-07
TOLUENE	92.14	1.21E-02	1.11E+00	1.62E-02	2.08E-08	3.04E-06
TRICHLOROETHENE	131.39	9.49E-03	1.25E+00	1.82E-02	2.33E-08	3.40E-06
TRIETHYLENETETRAMINE	146.24	4.90E-09	7.16E-07	1.04E-08	1.34E-14	1.95E-12
XYLENES	106.16	1.89E-03	2.00E-01	2.92E-03	3.74E-09	5.46E-07

**Note:**

<sup>a</sup> The partial pressure of each compound in the blended fuel wastestream was selected to represent the chemical in the emissions from this source. This is conservative because, in reality, some of the railcars sample contain wastewater which has far less concentration of each compound.



**Table 5.24**  
**Drum Sampling Emissions by Chemical**  
**Romic Facility - Chandler, Arizona**

**Volatile Organic Compound Emission Rates:** 2.26E-04 grams per second (annual average)  
2.26E-04 grams per second (maximum hourly)

CHEMICAL	Maximum Partial Pressure (mmHg) <sup>a</sup>	Equilibrium Mole Fraction in Vapor	Mass of Individual Chemical in Vapor (grams/mole vapor)	Mass Fraction of Individual Chemical in Vapor	Emission Rate (grams/second) Annual Average	Emission Rate (grams/second) Maximum Hourly
1,1,1-TRICHLOROETHANE	1.24E+02	4.05E-03	5.41E-01	7.63E-03	1.72E-06	1.72E-06
1-METHOXY-2-PROPANOL	1.25E+01	4.09E-04	3.68E-02	5.20E-04	1.18E-07	1.18E-07
2-(2-BUTOXYETHOXY)ETHANOL	3.00E-01	2.14E-05	3.42E-03	4.83E-05	1.09E-08	1.09E-08
2-ETHOXYPROPANOL	3.98E+01	7.94E-03	8.28E-01	1.17E-02	2.64E-06	2.64E-06
2-HEPTANONE	3.90E+00	1.18E-04	1.35E-02	1.91E-04	4.31E-08	4.31E-08
2-PENTANONE	3.54E+01	4.07E-03	3.51E-01	4.95E-03	1.12E-06	1.12E-06
ACETONE	2.32E+02	5.21E-01	3.03E+01	4.28E-01	9.66E-05	9.66E-05
ACETONITRILE	8.88E+01	1.57E-03	6.43E-02	9.08E-04	2.05E-07	2.05E-07
BUTYL ACETATE	1.15E+01	9.28E-05	1.08E-02	1.52E-04	3.44E-08	3.44E-08
CHLOROFORM	1.59E+02	3.36E-04	4.01E-02	5.66E-04	1.28E-07	1.28E-07
CYCLOHEXANONE	4.33E+00	4.49E-04	5.03E-02	7.11E-04	1.61E-07	1.61E-07
DIBUTYL PHTHALATE	4.91E-05	4.24E-12	1.18E-09	1.67E-11	3.77E-15	3.77E-15
DICHLOROMETHANE	4.35E+02	1.41E-01	1.20E+01	1.70E-01	3.83E-05	3.83E-05
DIETHYLENE GLYCOL	5.70E-03	2.88E-05	3.06E-03	4.31E-05	9.75E-09	9.75E-09
DIMETHYLFORMAMIDE	3.87E+00	8.98E-05	6.56E-03	9.27E-05	2.09E-08	2.09E-08
ETHANOL	5.93E+01	3.58E-03	1.65E-01	2.33E-03	5.26E-07	5.26E-07
ETHYL ACETATE	9.32E+01	4.18E-03	3.68E-01	5.20E-03	1.17E-06	1.17E-06
ETHYL BENZENE	9.60E+00	4.18E-05	4.44E-03	6.27E-05	1.42E-08	1.42E-08
ETHYL LACTATE	3.75E+00	1.39E-02	1.64E+00	2.32E-02	5.24E-06	5.24E-06
ETHYL-3-ETHOXYPROPIONATE	1.00E+00	7.94E-05	1.16E-02	1.64E-04	3.70E-08	3.70E-08
ETHYLENE GLYCOL	9.20E-02	1.72E-05	1.07E-03	1.51E-05	3.41E-09	3.41E-09
ETHYLENE GLYCOL BUTYL ETHER	9.80E-01	1.38E-06	1.64E-04	2.31E-06	5.22E-10	5.22E-10
ETHYLENE GLYCOL BUTYL ETHER ACETATE	3.00E-01	1.05E-07	1.68E-05	2.37E-07	5.36E-11	5.36E-11
ETHYLENE GLYCOL ETHYL ETHER ACETATE	2.34E+00	4.41E-04	5.83E-02	8.23E-04	1.86E-07	1.86E-07
HEPTANE	4.60E+01	1.93E-04	1.93E-02	2.73E-04	6.16E-08	6.16E-08
HEXAMETHYLDISILAZANE	2.00E+01	1.49E-03	2.41E-01	3.40E-03	7.69E-07	7.69E-07
HEXANE	1.51E+02	1.25E-03	1.07E-01	1.52E-03	3.42E-07	3.42E-07
HYDROFLUORIC ACID (0.25%)	2.50E+01	---	---	0.00E+00	0.00E+00	0.00E+00
ISOPROPANOL	4.50E+01	1.29E-01	7.74E+00	1.09E-01	2.47E-05	2.47E-05
ISOPROPANOLAMINE	4.70E-01	6.80E-05	5.10E-03	7.21E-05	1.63E-08	1.63E-08
ISOPARAFFINIC HYDROCARBONS	3.55E+02	9.51E-04	6.86E-02	9.68E-04	2.19E-07	2.19E-07
ISOPROPYL ACETATE	4.30E+01	1.05E-05	1.08E-03	1.52E-05	3.43E-09	3.43E-09
METHANOL	1.27E+02	1.74E-02	5.59E-01	7.89E-03	1.78E-06	1.78E-06
METHYL ETHYL KETONE	9.06E+01	5.11E-02	3.69E+00	5.21E-02	1.18E-05	1.18E-05
METHYL ISOBUTYL KETONE	1.99E+01	2.72E-04	2.72E-02	3.84E-04	8.68E-08	8.68E-08
NAPHTHA	1.20E+01	2.38E-02	2.61E+00	3.69E-02	8.34E-06	8.34E-06
N-BUTANOL	6.70E+00	3.27E-04	2.42E-02	3.42E-04	7.73E-08	7.73E-08
N-METHYL-2-PYRROLIDONE	3.45E-01	1.26E-02	1.25E+00	1.76E-02	3.98E-06	3.98E-06
N-PROPYL ACETATE	3.59E+01	1.30E-03	1.32E-01	1.87E-03	4.22E-07	4.22E-07
PERCHLOROETHYLENE	1.85E+01	9.72E-03	1.61E+00	2.28E-02	5.14E-06	5.14E-06
PETROLEUM OIL PRODUCTS	1.00E-02	1.73E-06	4.89E-04	6.90E-06	1.56E-09	1.56E-09
PHENOL	3.50E-01	1.45E-07	1.36E-05	1.92E-07	4.34E-11	4.34E-11
PHOSPHORIC ACID	2.20E+00	2.20E-07	2.16E-05	3.05E-07	6.89E-11	6.89E-11
PROPYLENE GLYCOL METHYL ETHER ACETATE	3.92E+00	7.06E-04	9.34E-02	1.32E-03	2.98E-07	2.98E-07
STODDARD SOLVENT	2.00E+00	6.42E-03	9.05E-01	1.28E-02	2.89E-06	2.89E-06

**Table 5.24**  
**Drum Sampling Emissions by Chemical**  
**Romic Facility - Chandler, Arizona**

**Volatile Organic Compound Emission Rates:** 2.26E-04 grams per second (annual average)  
2.26E-04 grams per second (maximum hourly)

CHEMICAL	Maximum Partial Pressure (mmHg) <sup>a</sup>	Equilibrium Mole Fraction in Vapor	Mass of Individual Chemical in Vapor (grams/mole vapor)	Mass Fraction of Individual Chemical in Vapor	Emission Rate (grams/second) Annual Average	Emission Rate (grams/second) Maximum Hourly
SULFOLANE	6.20E-03	2.91E-06	3.49E-04	4.93E-06	1.11E-09	1.11E-09
TETRAETHYL ORTHOSILICATE	2.00E+00	3.08E-07	6.42E-05	9.06E-07	2.05E-10	2.05E-10
TETRAHYDROFURAN	1.62E+02	1.33E-03	9.56E-02	1.35E-03	3.05E-07	3.05E-07
TOLUENE	2.84E+01	5.70E-03	5.25E-01	7.41E-03	1.68E-06	1.68E-06
TRICHLOROETHYLENE	6.90E+01	1.31E-02	1.72E+00	2.43E-02	5.50E-06	5.50E-06
TRICHLOROTRIFLUOROETHANE	3.62E+02	1.08E-02	2.02E+00	2.85E-02	6.45E-06	6.45E-06
TRIETHYLENETETRAMINE	1.00E-02	1.65E-09	2.41E-07	3.40E-09	7.68E-13	7.68E-13
XYLENES	7.99E+00	8.29E-03	8.80E-01	1.24E-02	2.81E-06	2.81E-06

**Notes:**

mmHg = millimeter mercury

<sup>a</sup> The maximum partial pressure of each components from either the representative organic wastestream or blended fuel wastestream was selected to represent the chemical in the emissions from this source.

**Table 5.25**  
**Laboratory Exhaust Emissions – Input Parameters**  
**Romic Facility - Chandler, Arizona**

Parameter	Value	Units
Typical daily samples analyzes	42	facility estimate
Volume of a sample	20	milliliters
Fraction of samples handled under fume hoods	80%	facility estimate
Hours of operation	16	hours/day
	7	days/week
Emission factor <sup>a</sup>	2%	material loss via evaporation (assumption)
VOC Emission Rate	0.00023	grams/second (maximum hourly)
	0.00016	grams/second (annual average)

**Notes:**

% = percent

<sup>a</sup> Emission factor was assumed to be similar to the material loss fraction recommended for paint and varnish manufacturing (USEPA AP-42 Section 6.4).

**Table 5.26**  
**Laboratory Exhaust Emissions by Chemical**  
**Romic Facility - Chandler, Arizona**

**Volatile Organic Compound Emission Rates:**

1.56E-04 grams per second (annual average)  
 2.33E-04 grams per second (maximum hourly)

CHEMICAL	Molecular Weight (grams/mole)	Maximum Partial Pressure (mmHg) <sup>a</sup>	Equilibrium Mole Fraction in Vapor	Mass of Individual Chemical in Vapor (grams/mole vapor)	Mass Fraction of Individual Chemical in Vapor	Emission Rate (grams/second) Annual Average	Emission Rate (grams/second) Maximum Hourly
1,1,1-TRICHLOROETHANE	133.41	3.14E+00	3.08E-03	4.11E-01	4.06E-03	6.32E-07	9.48E-07
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	187.38	1.70E-01	1.67E-04	3.13E-02	3.09E-04	4.81E-08	7.21E-08
1,1,2-TRICHLOROETHANE	133.40	6.39E-06	6.27E-09	8.36E-07	8.26E-09	1.28E-12	1.93E-12
1,2,4-TRIMETHYLBENZENE	120.19	3.73E+00	3.66E-03	4.40E-01	4.35E-03	6.76E-07	1.01E-06
1,2-DICHLOROBENZENE	147.00	1.19E-02	1.17E-05	1.72E-03	1.69E-05	2.63E-09	3.95E-09
1,3,5-TRIMETHYLBENZENE	120.19	1.99E-04	1.96E-07	2.35E-05	2.32E-07	3.61E-11	5.42E-11
1,4-DIOXANE	88.11	3.73E-03	3.66E-06	3.22E-04	3.18E-06	4.95E-10	7.43E-10
1-METHOXY-2-PROPANOL	90.12	2.49E-01	2.44E-04	2.20E-02	2.17E-04	3.38E-08	5.07E-08
2-BUTOXYETHANOL ACETATE	160.21	2.60E-06	2.55E-09	4.08E-07	4.03E-09	6.27E-13	9.40E-13
2-ETHOXYPROPANOL	104.17	1.25E-01	1.23E-04	1.28E-02	1.26E-04	1.97E-08	2.95E-08
2-HEPTANONE	114.19	2.45E-02	2.40E-05	2.74E-03	2.71E-05	4.21E-09	6.32E-09
2-METHYL-1-PROPANOL	74.12	1.00E-02	9.83E-06	7.29E-04	7.20E-06	1.12E-09	1.68E-09
2-PENTANONE	86.13	6.41E-01	6.29E-04	5.42E-02	5.35E-04	8.33E-08	1.25E-07
4-HYDROXY-4-METHYL-2-PENTANONE	116.16	2.00E-06	1.97E-09	2.28E-07	2.25E-09	3.51E-13	5.26E-13
ACETIC ACID	60.05	5.66E-03	5.56E-06	3.34E-04	3.30E-06	5.13E-10	7.69E-10
ACETONE	58.08	2.25E+01	2.21E-02	1.28E+00	1.27E-02	1.97E-06	2.96E-06
ACETONITRILE	130.19	1.98E-01	1.94E-04	2.53E-02	2.49E-04	3.88E-08	5.82E-08
ACROLEIN	56.06	1.82E-03	1.79E-06	1.00E-04	9.91E-07	1.54E-10	2.31E-10
ALCOHOLS	60.10	6.91E+00	6.79E-03	4.08E-01	4.03E-03	6.26E-07	9.40E-07
AMYL ACETATE	130.19	7.36E-03	7.22E-06	9.40E-04	9.28E-06	1.44E-09	2.17E-09
BENZENE	78.11	1.24E+01	1.21E-02	9.47E-01	9.35E-03	1.45E-06	2.18E-06
BROMINATED BISPHENOL	543.87	1.49E-14	1.46E-17	7.94E-15	7.84E-17	1.22E-20	1.83E-20
BUTYL CELLOSOLVE	118.18	1.53E-04	1.50E-07	1.77E-05	1.75E-07	2.72E-11	4.08E-11
BUTYL ACETATE	116.16	5.56E+01	5.46E-02	6.34E+00	6.26E-02	9.74E-06	1.46E-05
CARBON TETRACHLORIDE	153.82	7.45E-05	7.31E-08	1.12E-05	1.11E-07	1.73E-11	2.59E-11
CHLOROBENZENE	112.56	2.58E-02	2.53E-05	2.85E-03	2.82E-05	4.38E-09	6.57E-09
CHLOROFORM	119.38	4.96E-01	4.87E-04	5.81E-02	5.74E-04	8.92E-08	1.34E-07
CRESOL	324.42	3.78E-06	3.71E-09	1.20E-06	1.19E-08	1.85E-12	2.78E-12
CYCLOHEXANE	84.16	2.68E+00	2.63E-03	2.21E-01	2.19E-03	3.40E-07	5.10E-07
CYCLOHEXANONE	112.17	7.23E-03	7.09E-06	7.96E-04	7.86E-06	1.22E-09	1.83E-09
DIBUTYL PHTHALATE	278.35	9.67E-11	9.49E-14	2.64E-11	2.61E-13	4.06E-17	6.09E-17
DICHLOROMETHANE	84.93	4.58E+01	4.49E-02	3.81E+00	3.77E-02	5.86E-06	8.79E-06
DIESEL	185.00	1.98E-01	1.94E-04	3.59E-02	3.54E-04	5.51E-08	8.27E-08
DIETHYLENE GLYCOL	106.12	4.54E-04	4.46E-07	4.73E-05	4.67E-07	7.26E-11	1.09E-10
DIETHYLENE GLYCOL BUTYL ETHER	162.23	3.56E-04	3.49E-07	5.66E-05	5.59E-07	8.70E-11	1.30E-10
DIETHYLENE TRIAMINE	103.17	7.60E-06	7.46E-09	7.70E-07	7.60E-09	1.18E-12	1.77E-12
DIMETHYLFORMAMIDE	73.09	2.16E-02	2.12E-05	1.55E-03	1.53E-05	2.38E-09	3.58E-09
ETHANOL	46.07	2.44E+00	2.39E-03	1.10E-01	1.09E-03	1.69E-07	2.54E-07
ETHYL ACETATE	88.11	5.85E-01	5.74E-04	5.06E-02	5.00E-04	7.77E-08	1.17E-07
ETHYL BENZENE	106.17	8.72E+00	8.56E-03	9.08E-01	8.97E-03	1.40E-06	2.09E-06
ETHYL LACTATE	118.13	2.19E-01	2.15E-04	2.54E-02	2.51E-04	3.91E-08	5.86E-08
ETHYL-3-ETHOXYPROPIONATE	146.19	1.25E-03	1.23E-06	1.80E-04	1.77E-06	2.76E-10	4.14E-10
ETHYLENE GLYCOL	62.07	4.57E-04	4.49E-07	2.78E-05	2.75E-07	4.28E-11	6.42E-11
ETHYLENE GLYCOL ETHYL ETHER ACETATE	132.16	7.43E-03	7.29E-06	9.64E-04	9.52E-06	1.48E-09	2.22E-09
FERRIC CHLORIDE	162.20	2.43E-03	2.39E-06	3.87E-04	3.82E-06	5.95E-10	8.92E-10
FORMIC ACID	46.03	1.19E-05	1.17E-08	5.37E-07	5.30E-09	8.25E-13	1.24E-12
GASOLINE	108.00	1.19E+02	1.17E-01	1.26E+01	1.24E-01	1.94E-05	2.90E-05
GLYCERIN	92.09	2.65E-05	2.60E-08	2.39E-06	2.36E-08	3.68E-12	5.51E-12
HEPTANE	100.20	4.37E-02	4.29E-05	4.30E-03	4.24E-05	6.60E-09	9.90E-09
HEXAMETHYLDISILAZANE	161.39	2.36E-02	2.31E-05	3.73E-03	3.68E-05	5.73E-09	8.60E-09
HEXANE	86.18	4.66E+02	4.58E-01	3.95E+01	3.90E-01	6.06E-05	9.09E-05
HYDROCHLORIC ACID	36.46	2.36E-06	2.32E-09	8.45E-08	8.35E-10	1.30E-13	1.95E-13
ISOBUTYL ACETATE	116.16	4.60E-03	4.51E-06	5.24E-04	5.18E-06	8.05E-10	1.21E-09
ISOBUTYL ISOBUTYRATE	144.21	3.67E-06	3.60E-09	5.19E-07	5.13E-09	7.98E-13	1.20E-12
ISOPARAFFINIC HYDROCARBONS	72.15	2.58E+01	2.53E-02	1.83E+00	1.81E-02	2.81E-06	4.21E-06
ISOPROPANOLAMINE	75.11	1.07E-03	1.05E-06	7.90E-05	7.80E-07	1.21E-10	1.82E-10
ISOPROPYL ACETATE	102.13	9.95E-02	9.76E-05	9.97E-03	9.85E-05	1.53E-08	2.30E-08
JET FUEL/KEROSENE	165.00	6.93E-01	6.80E-04	1.12E-01	1.11E-03	1.72E-07	2.58E-07
METHANOL	32.04	1.01E+01	9.87E-03	3.16E-01	3.12E-03	4.86E-07	7.29E-07
METHYL ETHYL KETONE	72.11	3.72E+00	3.65E-03	2.63E-01	2.60E-03	4.04E-07	6.07E-07
METHYL ISOBUTYL KETONE	100.16	1.57E-01	1.55E-04	1.55E-02	1.53E-04	2.38E-08	3.57E-08
NAPHTHA	110.00	5.89E-01	5.78E-04	6.36E-02	6.28E-04	9.77E-08	1.47E-07
NAPHTHALENE	128.17	5.61E-02	5.50E-05	7.05E-03	6.96E-05	1.08E-08	1.62E-08
N-BUTANOL	74.12	5.37E-02	5.27E-05	3.91E-03	3.86E-05	6.00E-09	9.01E-09
N-METHYL-2-PYRROLIDONE	99.13	1.98E-01	1.95E-04	1.93E-02	1.90E-04	2.96E-08	4.44E-08
N-PROPYL ACETATE	102.13	1.06E-01	1.04E-04	1.07E-02	1.05E-04	1.64E-08	2.46E-08

**Table 5.26**  
**Laboratory Exhaust Emissions by Chemical**  
**Romic Facility - Chandler, Arizona**

**Volatile Organic Compound Emission Rates:**

1.56E-04 grams per second (annual average)  
2.33E-04 grams per second (maximum hourly)

CHEMICAL	Molecular Weight (grams/mole)	Maximum Partial Pressure (mmHg) <sup>a</sup>	Equilibrium Mole Fraction in Vapor	Mass of Individual Chemical in Vapor (grams/mole vapor)	Mass Fraction of Individual Chemical in Vapor	Emission Rate (grams/second) Annual Average	Emission Rate (grams/second) Maximum Hourly
NITRIC ACID	63.01	1.25E-03	1.23E-06	7.76E-05	7.66E-07	1.19E-10	1.79E-10
PARAFFIN OIL	72.15	3.58E-01	3.51E-04	2.53E-02	2.50E-04	3.89E-08	5.83E-08
PERCHLOROETHYLENE	165.83	1.39E+02	1.37E-01	2.27E+01	2.24E-01	3.48E-05	5.22E-05
PETROLEUM OIL PRODUCTS	282.00	2.69E-03	2.65E-06	7.46E-04	7.37E-06	1.15E-09	1.72E-09
PHENOL	94.11	1.14E-03	1.11E-06	1.05E-04	1.04E-06	1.61E-10	2.42E-10
PHENYLMERCURIC ACETATE	336.74	1.86E-11	1.83E-14	6.15E-12	6.07E-14	9.45E-18	1.42E-17
PHOSPHORIC ACID	98.00	1.25E-11	1.23E-14	1.21E-12	1.19E-14	1.85E-18	2.78E-18
POLYDIMETHYL SILOXANE	74.15	8.66E-01	8.50E-04	6.31E-02	6.23E-04	9.69E-08	1.45E-07
PROPYLENE GLYCOL METHYL ETHER ACETATE	132.16	3.53E-02	3.47E-05	4.59E-03	4.53E-05	7.04E-09	1.06E-08
PYRIDINE	79.10	2.75E-03	2.70E-06	2.13E-04	2.11E-06	3.28E-10	4.91E-10
STODDARD SOLVENT	141.00	1.01E-01	9.93E-05	1.40E-02	1.38E-04	2.15E-08	3.23E-08
STYRENE	104.15	4.03E+00	3.96E-03	4.12E-01	4.07E-03	6.33E-07	9.50E-07
SULFOLANE	120.17	5.93E-03	5.83E-06	7.00E-04	6.91E-06	1.08E-09	1.61E-09
SULFURIC ACID	36.46	4.04E-07	3.96E-10	1.44E-08	1.43E-10	2.22E-14	3.33E-14
TETRAETHYL ORTHOSILICATE	208.33	1.62E-03	1.59E-06	3.32E-04	3.28E-06	5.10E-10	7.65E-10
TETRAHYDROFURAN	72.11	3.90E-01	3.83E-04	2.76E-02	2.73E-04	4.24E-08	6.36E-08
TOLUENE	92.14	2.61E+01	2.57E-02	2.36E+00	2.33E-02	3.63E-06	5.45E-06
TRICHLOROETHENE	131.39	6.51E+00	6.39E-03	8.40E-01	8.29E-03	1.29E-06	1.94E-06
TRIETHYLENETETRAMINE	146.24	4.63E-07	4.55E-10	6.65E-08	6.57E-10	1.02E-13	1.53E-13
XYLENES	106.16	4.72E+01	4.63E-02	4.92E+00	4.85E-02	7.55E-06	1.13E-05

**Notes:**

mmHg = millimeter mercury

<sup>a</sup> The maximum partial pressure for each compound was found to be the maximum of the partial pressure in the equilibrium vapor above the blended fuel or the representative organic wastestream or the representative wastewater stream.

**Table 5.27**  
**Distillation Processes Throughput and Recovery Rates**  
**Romic Facility - Chandler, Arizona**

<b>Product</b>	<b>Annual Throughput (2004) (gallons)</b>	<b>Runtimes (hours/1000 gallons)</b>	<b>Recovery Fractions</b>
<b><i>Vacuum Pot</i></b>			
Acetone	6142	5	90%
Lacquer Thinner	6183	5	94%
Isopropanol	1000	5	85%
Methylene Chloride	3295	13	89%
<b><i>Distillation Column</i></b>			
Methylene Chloride	1400	13	93%
Perchloroethylene	7200	11	94%
Wastewater	54147	4	14%
<b><i>Thin Film Evaporator</i></b>			
Acetone	2419	5	67%
Lacquer Thinner	15132	5	55%
Perchloroethylene	2500	4	80%
Xylene	5432	2	100%

**Note:**

% = percent

**Table 5.28**  
**Distillation Processes – Petroleum Products Equilibrium Partial Pressures**  
**Romic Facility - Chandler, Arizona**

Chemical/Mixture	Molecular Weight (grams/mole)	Vapor Pressure (mmHg)	Molar Fraction in Liquid	Normalized Molar Fraction in Liquid	Equilibrium Partial Pressure in Vapor (atm)
cyclohexane	84.16	96.90	1.21E-02	2.77E-02	3.53E-03
diesel	185.00	1.60	5.42E-02	1.24E-01	2.60E-04
gasoline	108.00	362.15	1.44E-01	3.28E-01	1.56E-01
isoparaffinic hydrocarbons	72.15	355.00	1.68E-02	3.84E-02	1.79E-02
jet fuel	165.00	5.00	5.35E-02	1.22E-01	8.03E-04
heptane	100.20	46.00	3.21E-04	7.31E-04	4.43E-05
kerosene	165.00	5.00	7.21E-03	1.64E-02	1.08E-04
naptha	110.00	12.00	2.15E-02	4.91E-02	7.75E-04
stoddard solvent	141.00	2.00	1.07E-02	2.43E-02	6.40E-05
petroleum oil products	282.00	0.01	1.18E-01	2.69E-01	3.55E-06
tetrahydrothiophene	88.17	19.71	2.58E-08	5.89E-08	1.53E-09

**Notes:**

mmHg = millimeter mercury

atm = atmosphere

**Table 5.29**  
**Distillation Processes Emission Factors Per Unit Operation**  
**Romic Facility - Chandler, AZ**

CHEMICAL	Molecular Weight (g/gmol)	Vapor Pressure (mmHg)	Mol Fraction in Liquid	Molar Concentration in Liquid (mol/m <sup>3</sup> )	Henry's Law Constant (atm·m <sup>3</sup> /mol)	Partial Pressure (atmospheres)	Distillation Column - Mass per Gallon of Throughput (g/gal)
<b>Wastewater</b>							
1,1,1-TRICHLOROETHANE	133.4	124.00	1.43E-04	2.36E-01	1.72E-02	4.07E-03	8.26E-02
1,2,4 - TRIMETHYL BENZENE	120.2	1.70	4.76E-04	7.84E-01	6.16E-03	4.83E-03	8.83E-02
1,2 - DICHLOROBENZENE	147.0	1.20	3.54E-06	5.83E-03	2.64E-03	1.54E-05	3.44E-04
1-METHOXY-2-PROPANOL	90.1	12.50	1.90E-04	3.13E-01	9.20E-07	2.88E-07	3.95E-06
2-METHOXYETHANOL	76.1	9.50	2.97E-05	4.90E-02	8.10E-08	3.97E-09	4.60E-08
2-PYRROLIDONE	85.1	0.01	1.52E-02	2.51E+01	NA	---	---
ACETIC ACID	60.1	11.00	3.29E-03	5.43E+00	1.00E-07	5.43E-07	4.96E-06
ACETONE	58.1	232.00	2.84E-02	4.68E+01	4.76E-05	2.23E-03	1.97E-02
ACETONITRILE	41.1	88.80	5.30E-03	8.73E+00	2.93E-05	2.56E-04	1.60E-03
ALCOHOLS	60.1	45.00	3.99E-02	6.58E+01	6.85E-06	4.51E-04	4.12E-03
BENZENE	78.1	95.30	1.40E-03	2.30E+00	6.95E-03	1.60E-02	1.90E-01
BIOCIDE (AS ACROLEIN)	56.1	488.09	1.17E-05	1.94E-02	1.22E-04	2.36E-06	2.01E-05
BUTYL ACETATE	116.2	11.50	2.29E-03	3.77E+00	1.91E-02	7.20E-02	1.27E+00
BUTOXYETHANOL (BUTYL CELLOSOLVE)	118.2	0.98	2.47E-05	4.08E-02	1.30E-08	5.30E-10	9.53E-09
CHLOROBENZENE	112.6	8.80	6.52E-06	1.07E-02	3.11E-03	3.34E-05	5.72E-04
CHLOROFORM	119.4	159.00	1.34E-04	2.21E-01	2.90E-03	6.42E-04	1.17E-02
CRESOL	324.4	0.10	4.80E-06	7.91E-03	6.19E-07	4.90E-09	2.42E-07
CYCLOHEXANE	84.2	96.90	1.21E-02	2.00E+01	NA	3.53E-03	4.52E-02
CYCLOHEXANONE	112.2	4.33	1.47E-03	2.42E+00	9.00E-06	2.18E-05	3.72E-04
DIESEL FUEL	185.0	1.60	5.42E-02	8.93E+01	NA	2.60E-04	7.32E-03
DIETHYLENE GLYCOL	106.1	0.01	3.50E-03	5.78E+00	4.41E-13	2.55E-12	4.11E-11
DIETHYLENE GLYCOL BUTYL ETHER	162.2	0.02	1.14E-03	1.87E+00	1.30E-08	2.43E-08	6.01E-07
DIETHYLENETRIAMINE	103.2	0.40	1.90E-05	3.12E-02	3.15E-07	9.84E-09	1.54E-07
DIMETHYLFORMAMIDE	73.1	3.87	2.01E-04	3.31E-01	7.39E-08	2.44E-08	2.72E-07
ETHANOL	78.1	59.30	9.87E-03	1.63E+01	5.00E-06	8.14E-05	9.68E-04
ETHYL ACETATE	88.1	93.20	1.90E-03	3.14E+00	1.38E-04	4.33E-04	5.81E-03
ETHYL BENZENE	106.2	9.60	6.58E-04	1.08E+00	1.04E-02	1.13E-02	1.82E-01
ETHYL LACTATE	118.1	3.75	1.39E-03	2.30E+00	5.83E-07	1.34E-06	2.41E-05
ETHYLENE GLYCOL	62.1	0.09	1.14E-01	1.88E+02	2.25E-10	4.22E-08	3.99E-07
FERRIC CHLORIDE	162.2	40.00	3.34E-05	5.50E-02	5.72E-05	3.15E-06	7.77E-05
GASOLINE	108.0	362.15	1.44E-01	2.37E+02	NA	1.56E-01	2.57E+00
GLYCERIN	92.1	0.00	1.20E-03	1.98E+00	1.73E-08	3.43E-08	4.80E-07
HEPTANE	100.2	46.00	3.21E-04	5.29E-01	NA	4.43E-05	6.75E-04
HEXANE	86.2	151.00	2.03E-04	3.35E-01	1.80E+00	6.04E-01	7.92E+00
HYDROCHLORIC ACID (0.5-4.0%)	36.5	0.01	7.56E-03	1.25E+01	NA	0.00E+00	0.00E+00
HYDROFLUORIC ACID (0.25-2.5%)	20.0	25.00	2.37E-03	3.90E+00	NA	0.00E+00	0.00E+00
ISOBUTANOL	74.1	9.00	8.04E-04	1.33E+00	9.78E-06	1.30E-05	1.46E-04
ISOPARAFFINIC HYDROCARBON	72.2	355.00	1.68E-02	2.77E+01	NA	1.79E-02	1.97E-01
ISOPROPYL ACETATE	102.1	43.00	2.78E-04	4.58E-01	2.81E-04	1.29E-04	2.00E-03



**Table 5.29**  
**Distillation Processes Emission Factors Per Unit Operation**  
**Romic Facility - Chandler, AZ**

CHEMICAL	Molecular Weight (g/gmol)	Vapor Pressure (mmHg)	Mol Fraction in Liquid	Molar Concentration in Liquid (mol/m <sup>3</sup> )	Henry's Law Constant (atm·m <sup>3</sup> /mol)	Partial Pressure (atmospheres)	Distillation Column - Mass per Gallon of Throughput (g/gal)
JET FUEL	165.0	5.00	5.35E-02	8.82E+01	NA	8.03E-04	2.02E-02
KEROSENE	165.0	5.00	7.21E-03	1.19E+01	NA	1.08E-04	2.72E-03
METHANOL	32.0	127.00	1.15E-02	1.89E+01	4.55E-06	8.60E-05	4.19E-04
METHYL AMYL KETONE (2-HEPTANONE)	114.2	3.94	1.14E-04	1.87E-01	1.69E-04	3.17E-05	5.50E-04
METHYL ETHYL KETONE	72.1	90.60	3.39E-03	5.59E+00	5.69E-05	3.18E-04	3.49E-03
METHYL ISOBUTYL KETONE	100.2	19.90	3.42E-04	5.64E-01	1.38E-04	7.79E-05	1.19E-03
METHYLENE CHLORIDE	84.9	435.00	1.36E-02	2.23E+01	2.65E-03	5.92E-02	7.65E-01
NAPHTHA	110.0	12.00	2.15E-02	3.55E+01	NA	7.75E-04	1.30E-02
NAPHTHALENE	128.2	0.05	6.34E-05	1.05E-01	6.94E-04	7.25E-05	1.41E-03
N-BUTYL ALCOHOL	74.1	6.70	2.75E-04	4.53E-01	1.24E-05	5.62E-06	6.34E-05
N-METHYL-2-PYRROLIDONE	99.1	0.35	1.20E-02	1.99E+01	1.56E-08	3.10E-07	4.67E-06
N-PROPYL ACETATE	102.1	35.90	3.83E-04	6.31E-01	2.18E-04	1.38E-04	2.14E-03
NITRIC ACID (0.5-5.0%)	63.0	7.10	8.72E-04	1.44E+00	NA	0.00E+00	0.00E+00
PERCHLOROETHYLENE	165.8	18.50	4.55E-03	7.51E+00	2.40E-02	1.80E-01	4.55E+00
PETROLEUM OIL PRODUCTS	282.0	0.01	1.18E-01	1.95E+02	NA	3.55E-06	1.52E-04
PHENOL	94.1	0.35	1.54E-03	2.55E+00	5.77E-07	1.47E-06	2.10E-05
PHENYLMERCURIC ACETATE	336.7	0.00	2.58E-08	4.26E-05	5.66E-10	2.41E-14	1.23E-12
PHOSPHORIC ACID	98.0	2.20	1.30E-03	2.14E+00	7.60E-15	1.62E-14	2.42E-13
POLYDIMETHYL SILOXANE	74.2	0.01	6.80E-05	1.12E-01	1.00E-02	1.12E-03	1.27E-02
PROPYLENE GLYCOL METHYL ETHER ACETATE	132.2	3.92	1.29E-03	2.12E+00	3.44E-06	7.30E-06	1.47E-04
PYRIDINE	79.1	16.00	5.90E-05	9.73E-02	1.10E-05	1.07E-06	1.29E-05
STODDARD SOLVENT	141.0	2.00	1.07E-02	1.76E+01	NA	6.40E-05	1.37E-03
STYRENE	104.2	6.40	1.15E-03	1.90E+00	2.75E-03	5.22E-03	8.27E-02
SULFOLANE	120.2	0.01	2.06E-03	3.39E+00	8.90E-10	3.02E-09	5.52E-08
SULFURIC ACID	98.1	0.30	4.22E-04	6.95E-01	NA	0.00E+00	0.00E+00
TETRAETHYL ORTHOSILICATE	208.3	2.00	3.95E-04	6.52E-01	9.44E-09	6.15E-09	1.95E-07
TETRAHYDROFURAN	72.1	162.20	1.13E-05	1.86E-02	7.05E-05	1.31E-06	1.44E-05
TETRAHYDROTHIOPHENE	88.2	19.71	2.21E-04	3.64E-01	NA	1.53E-09	2.05E-08
TOLUENE	92.1	28.40	2.41E-03	3.97E+00	8.53E-03	3.38E-02	4.74E-01
TRICHLOROETHENE	131.4	69.00	3.93E-04	6.49E-01	1.30E-02	8.43E-03	1.69E-01
XYLENES	106.2	7.99	3.63E-03	5.99E+00	1.02E-02	6.11E-02	9.86E-01
<b>Lacquer Thinner</b>							
METHYL ETHYL KETONE	72.11	90.60	1.00E-01	---	---	---	1.31E-01
TOLUENE	92.14	28.40	2.50E-01	---	---	---	1.31E-01
ISOPROPANOL	60.10	45.00	1.00E-01	---	---	---	5.41E-02
BUTYL ACETATE	116.16	11.50	5.00E-02	---	---	---	1.34E-02
ACETONE	58.08	232.00	2.00E-01	---	---	---	5.40E-01
XYLENES	106.16	7.99	1.00E-01	---	---	---	1.70E-02
BUTANOL	74.12	6.70	3.00E-02	---	---	---	2.98E-03

**Table 5.29**  
**Distillation Processes Emission Factors Per Unit Operation**  
**Romic Facility - Chandler, AZ**

CHEMICAL	Molecular Weight (g/mol)	Vapor Pressure (mmHg)	Mol Fraction in Liquid	Molar Concentration in Liquid (mol/m <sup>3</sup> )	Henry's Law Constant (atm-m <sup>3</sup> /mol)	Partial Pressure (atmospheres)	Distillation Column - Mass per Gallon of Throughput (g/gal)
BUTOXYETHANOL	118.18	0.98	3.00E-02	---	---	---	6.96E-04
METHANOL	32.04	127.00	3.00E-02	---	---	---	2.44E-02
NAPTHA	110.00	12.00	1.00E-01	---	---	---	2.64E-02
<b><i>Vacuum Pot</i></b>							
METHYL ETHYL KETONE	72.11	90.60	1.00E-01	---	---	---	1.31E-01
TOLUENE	92.14	28.40	2.50E-01	---	---	---	1.31E-01
ISOPROPANOL	60.10	45.00	1.00E-01	---	---	---	5.41E-02
BUTYL ACETATE	116.16	11.50	5.00E-02	---	---	---	1.34E-02
ACETONE	58.08	232.00	2.00E-01	---	---	---	5.40E-01
XYLENES	106.16	7.99	1.00E-01	---	---	---	1.70E-02
BUTANOL	74.12	6.70	3.00E-02	---	---	---	2.98E-03
BUTOXYETHANOL	118.18	0.98	3.00E-02	---	---	---	6.96E-04
METHANOL	32.04	127.00	3.00E-02	---	---	---	2.44E-02
NAPTHA	110.00	12.00	1.00E-01	---	---	---	2.64E-02
<b><i>Methylene Chloride</i></b>							
Methylene Chloride	84.93	435.00	1.00E+00	---	---	---	7.40E+00
<b><i>Perchloroethylene</i></b>							
Perchloroethylene	165.83	18.50	1.00E+00	---	---	---	6.14E-01
<b><i>Acetone</i></b>							
Acetone	58.08	232.00	1.00E+00	---	---	---	2.70E+00
<b><i>Xylenes</i></b>							
Xylenes	106.16	7.99	1.00E+00	---	---	---	1.70E-01
<b><i>Isopropanol</i></b>							
Isopropanol	60.10	45.00	1.00E+00	---	---	---	5.41E-01

**Notes:**

NA = Not Available  
g/mol = gram per gram mole  
m<sup>3</sup> = cubic meter  
g/gal = grams/gallon

--- = Not Calculated  
mmHg = millimeter Mercury  
mol = mole

**Table 5.30**  
**Modeled Source Emission Rates**  
**Romic Facility - Chandler, Arizona**

Chemical	CAS_No	Controlled Emission Rates (grams/second) Annual Average <sup>a</sup>	Controlled Emission Rates (grams/second) Maximum Hourly <sup>a</sup>
1,1,1-TRICHLOROETHANE	71556	1.02E-07	7.14E-06
1,2,4-Trimethylbenzene	95636	1.06E-08	4.30E-07
1,2-dichlorobenzene	95501	4.26E-11	1.76E-09
1,3,5-trimethylbenzene	108678	1.69E-10	1.23E-08
1-methoxy-2-propanol	107982	6.73E-07	4.91E-05
2-butoxyethanol acetate	112072	6.28E-13	4.58E-11
2-ethoxyethyl acetate	111159	2.69E-10	1.97E-08
2-heptanone	110430	2.50E-10	1.61E-08
2-methoxyethanol	109864	4.50E-09	3.28E-07
2-pentanone	107879	2.83E-07	2.06E-05
4-hydroxy-4-methyl-2-pentanone	123422	1.99E-12	1.46E-10
Acetic acid	64197	2.50E-09	1.82E-07
Acetone	67641	6.79E-06	5.94E-04
Acetonitrile	75058	6.14E-07	4.48E-05
ALCOHOLS	67630	1.58E-06	1.28E-04
amyl acetate	628637	3.98E-09	2.90E-07
Benzene	71432	1.56E-07	1.07E-05
BIOCIDE (AS ACROLEIN)	107028	2.42E-12	9.79E-11
brominated bisphenol	79947	3.36E-20	2.45E-18
BUTANOL	71363	2.12E-08	1.56E-06
butoxy ethanol	111762	1.66E-10	1.60E-08
butyl acetate	123864	1.78E-07	8.10E-06
Carbon tetrachloride	56235	7.18E-11	5.24E-09
Chlorobenzene	108907	1.26E-10	6.93E-09
Chloroform	67663	4.78E-08	3.44E-06
CRESOL	1319773	1.42E-12	1.03E-10
Cyclohexane	110827	3.65E-08	2.49E-06
Cyclohexanone	108941	4.72E-09	3.43E-07
dibutyl phthalate	84742	8.47E-18	6.18E-16
DIESEL FUEL	68476346	5.43E-09	3.68E-07
diethylene glycol	111466	7.53E-14	5.50E-12
diethylene glycol butyl ether	112345	8.59E-13	6.03E-11
DIETHYLENETRIAMINE	111400	1.86E-14	7.51E-13
Dimethyl formamide	68122	8.86E-09	6.47E-07
Dioxane (1,4)	123911	2.31E-09	1.69E-07
Ethyl acetate	141786	2.64E-07	1.93E-05
Ethyl alcohol	64175	5.92E-07	4.32E-05
ethyl lactate	687478	7.08E-08	5.17E-06
ethyl-3-ethoxypropionate	763699	9.57E-11	6.99E-09
Ethylbenzene	100414	2.70E-08	1.26E-06
ethylene glycol	107211	2.31E-10	1.69E-08
ferric chloride	7705080	1.90E-10	1.36E-08
Formic acid	64186	5.15E-12	3.76E-10
Gasoline	8006619	2.67E-06	1.85E-04
glycerin	56815	5.77E-14	2.34E-12
Heptane (-n)	142825	2.52E-08	1.83E-06
hexamethyldisilazane	999973	3.81E-10	2.78E-08
Hexane (-n)	110543	1.09E-06	4.88E-05

**Table 5.30  
Modeled Source Emission Rates  
Romic Facility - Chandler, Arizona**

Chemical	CAS_No	Controlled Emission Rates (grams/second) Annual Average <sup>a</sup>	Controlled Emission Rates (grams/second) Maximum Hourly <sup>a</sup>
hydrochloric acid	7647010	3.58E-13	2.61E-11
hydrofluoric acid	7664393	2.16E-10	1.58E-08
isobutyl acetate	110190	1.30E-09	9.51E-08
Iso-butyl alcohol	78831	2.01E-11	8.94E-10
isobutyl isobutyrate	97858	1.18E-12	8.58E-11
Isoparaffinic Hydrocarbons	64771728	8.93E-08	5.75E-06
isopropyl acetate	108214	6.35E-10	3.85E-08
Jet kerosene	8008206	8.24E-09	5.12E-07
Methyl alcohol	67561	1.63E-06	1.19E-04
Methyl ethyl ketone	78933	1.36E-06	1.00E-04
Methyl isobutyl ketone	108101	8.01E-08	5.84E-06
Methylene chloride	75092	3.26E-06	3.42E-04
NAPHTHA	8030306	1.52E-06	1.11E-04
Naphthalene	91203	1.77E-10	7.36E-09
nitric acid (0.5-5.0%)	7697372	4.16E-12	3.04E-10
n-methyl-2-pyrrolidone	872504	1.62E-08	1.19E-06
n-propyl acetate	109604	5.15E-09	3.67E-07
paraffin oil	8012951	1.07E-07	7.82E-06
PETROLEUM OIL PRODUCTS	8002059	4.65E-10	3.33E-08
phenol	108952	1.26E-11	8.37E-10
PHENYLMERCURIC ACETATE	62384	1.48E-19	6.00E-18
PHOSPHORIC ACID	7664382	2.91E-20	1.18E-18
polydimethylsiloxane	63148629	1.53E-09	6.22E-08
propylene glycol methyl ether acetate	108656	1.94E-08	1.42E-06
Propylene oxide	75569	1.62E-08	1.18E-06
Pyridine	110861	1.46E-09	1.06E-07
STODDARD SOLVENT	8052413	8.05E-07	5.88E-05
Styrene	100425	1.34E-08	6.54E-07
sulfolane	126330	2.17E-09	1.58E-07
sulfuric acid	7664939	6.04E-15	4.41E-13
Tetrachloroethylene	127184	7.38E-07	5.42E-05
tetraethyl orthosilicate	78104	1.75E-09	1.28E-07
Tetrahydrofuran	109999	1.39E-07	1.01E-05
Toluene	108883	6.13E-07	4.36E-05
Trichloro(1,1,2)trifluoroethane	76131	1.03E-08	7.49E-07
Trichloroethane (1,1,2)	79005	5.13E-12	3.74E-10
Trichloroethylene	79016	6.18E-07	4.45E-05
triethylenetetramine	112243	2.81E-13	2.05E-11
XYLENES	1330207	2.39E-07	2.44E-05

**Note:**

<sup>a</sup> The emissions from wastewater, Lacquer Thinner, Vacuum Pot, Methylene Chloride stream, Perchloroethylene stream, Acetone stream, Xylenes stream, Isopropanol stream, aerosol can crushing, waste paint consolidation, railcar loading and tanker truck transferring are all vented through the distillation process vent. The controlled emissions are the total emissions after the off-gases go through the VOC abatement/carbon bed control system installed at the distillation processes.

**Table 5.31**  
**Boiler Specifications**  
**Romic Facility - Chandler, Arizona**

Parameter	Value	Units
Horsepower	400	horsepower
Average annual natural gas usage	123,649	therms (2004 consumption)
	12.4	million cubic feet of gas
	2.9	MMBTU/hour
Approximate exhaust temperature <sup>a</sup>	300.0	°F
	423	Kelvin
F-factor for actual conditions <sup>b</sup>	10610	actual cubic feet exhaust per MMBTU natural gas (at 68°F)
Estimated exhaust flowrate	35945	actual cubic feet exhaust per hour (at 68°F)
	0.28	cubic meters/second
Correct estimated exhaust flowrate	51872	actual cubic feet exhaust per hour (at 300°F)
	0.41	cubic meters/second
Typical usage	12	hours/day
	7	days/week

**Notes:**

<sup>a</sup> Actual temperature is not available, however this is a typical exhaust temperature for natural gas fired boilers.

<sup>b</sup> Estimation of exhasut flowrate is based on USEPA Method 19 calculation methodology.

**Table 5.32**  
**Boiler Emissions by Chemical**  
**Romic Facility - Chandler, Arizona**

Chemical	Emission Factor (pounds per million standard cubic feet natural gas)	Emission Rate (grams/second) Annual Average	Emission Rate (grams/second) Maximum Hourly
Benzene	2.10E-03	3.74E-07	7.50E-07
Hexane	1.80E+00	3.20E-04	6.43E-04
Naphthalene	6.10E-04	1.09E-07	2.18E-07
Toluene	3.40E-03	6.05E-07	1.21E-06

**Source:**

United States Environmental Protection Agency (USEPA). 2005. Compilation of Air Pollutant Emission Factors AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources. Section 1.4 Natural Gas Combustion. November.