F.0 HEALTH RISK ASSESSMENT METHODOLOGY

F.1 Setting

As described in Chapter 1, the area surrounding the VGS is primarily commercial/industrial, and there are no residences or other sensitive receptors in the immediate vicinity.

F.2 Significance Criteria

The SCAQMD's significance criteria for toxics are an increased cancer risk of 10 in one million or greater and for noncarcinogenic acute and chronic risks a hazard index greater than 1.0 for any endpoint. It should be noted that the established SCAQMD Rule 1401 permitting limits are 1.0 in one million cancer risk for sources without best available control technology for toxics (T-BACT) and 10 in one million for those with T-BACT (SCAQMD, 2001).

F.3 Risk Assessment Technique

SCAQMD has issued guidelines for preparing risk assessments to comply with Air Toxic Rules, and supplemental guidelines for preparing risk assessment to comply with the Air Toxics "Hot Spots" Information and Assessment Act (AB 2588) (SCAQMD, 1993 and 2000). The SCAQMD's supplemental guidelines supplement the primary guidelines published by CAPCOA for the preparation of risk assessments under the Air Toxics "Hot Spots" Program (CAPCOA, 1993). The health risk assessment for the LADWP's Repowering Project was conducted by using the detailed risk assessment technique suggested in the SCAQMD and CAPCOA guidelines with appropriate modifications, specific to the LADWP's Project (SCAQMD, 1993, 2000, and CAPCOA, 1993).

The risk assessment technique requires:

1. Estimation of one-hour and annual average concentration of toxic air contaminants by using USEPA-approved dispersion model.

2. Calculation of maximum individual cancer risk from carcinogenic toxic air contaminants and hazard indices for carcinogenic as well as noncarcinogenic TACs.

The details of the emission estimation, air dispersion modeling, and risk assessment for the Valley Repowering Project are presented below.

<u>Emission Estimation of Toxic Air Contaminants</u>

At the VGS site, the following equipment installation would result in TAC emissions:

- Two duel fuel (natural gas and distillate fuel) fired 171.7 megawatt (MW) combined-cycle combustion turbines (CGTs), two heat recovery steam generators (HRSGs) with associated SCRs, and a steam turbine generator. The CGTs will be provided with controls (e.g., water injection when firing diesel oil or a low NO_X combustor when firing natural gas) that will preliminarily reduce NO_X emissions prior to venting the exhaust to the SCR systems. The CGTs will be provided with SCR systems that will use ammonia and contain a CO catalyst to further reduce NO_X and CO emissions from the CGTs.

- One cooling tower, provided with ten cells with each cell having a 10,560 gallon per minute circulation rate.

The TAC emissions were estimated for the following three operating scenarios of the CGTs and the cooling tower for the Valley Repowering Project:

<u>Normal CGT Startup</u>

Normal startup will last for 4 hours (1/2 hour of normal operation with all controls). Gas turbine exhaust parameters for the minimum operating load point (50 percent) were used to characterize gas turbine exhaust during startup. The toxic air contaminant (except ammonia) emissions during the start-up mode were estimated using CARB-approved emission factors.

<u>Normal Operating Mode</u>

The normal operating mode is defined as the operation of the CGTs at full load with all add-on controls after the completion of the normal startup phase. The toxic air contaminant (except ammonia) emissions during this operating mode were estimated using CARB-approved emission factors.

<u>Distillate Fuel Readiness Testing</u>

The CGTs will be tested individually for distillate fuel readiness once per month for 60 minutes. Toxic air contaminant emission estimates for this operating mode were derived from CARB-approved emission factors.

<u>Cooling Tower Normal Operation</u>

TAC emissions for this operating mode were estimated using the methodology provided in U.S. EPA's AP-42 document.

The TACs that will be emitted from the proposed project and included in the SCAQMD Rule 1401 (Amended June 15, 2001) list of toxic air contaminants and requiring health risk assessment are presented in Table F-1. The details of TAC emission calculations are provided in Appendix C of this EIR. The locations of all the TAC emitting sources in this risk assessment are shown in Figure F-1.

In order to estimate the "worst-case" carcinogenic and noncarcinogenic risks from the operation of the equipment at the VGS, the emissions from the three operating modes (normal operation, normal startup, and diesel-readiness testing) discussed previously were analyzed as described below. The analysis led to the choice of the operating scenario that would result in the highest TAC emissions on an hourly basis, to evaluate acute health risks, and on an annual basis, to evaluate potential chronic health risks.

- For estimating the "worst-case" chronic hazard index (noncarcinogenic health impact) and the carcinogenic health risk, it was assumed that both CGTs would operate at full load throughout the year (8,760 hours for each CGT), and both CGTs would be tested for distillate fuel readiness during the year (12 tests/year , 1 test/month, and 1 hr/test for each CGT).

- For estimating the "worst-case" acute hazard index (noncarcinogenic health impact), it was assumed that both CGTs would be operating normally at full load.

A summary of maximum hourly and annual average TAC emission rates is presented in Table F-2.

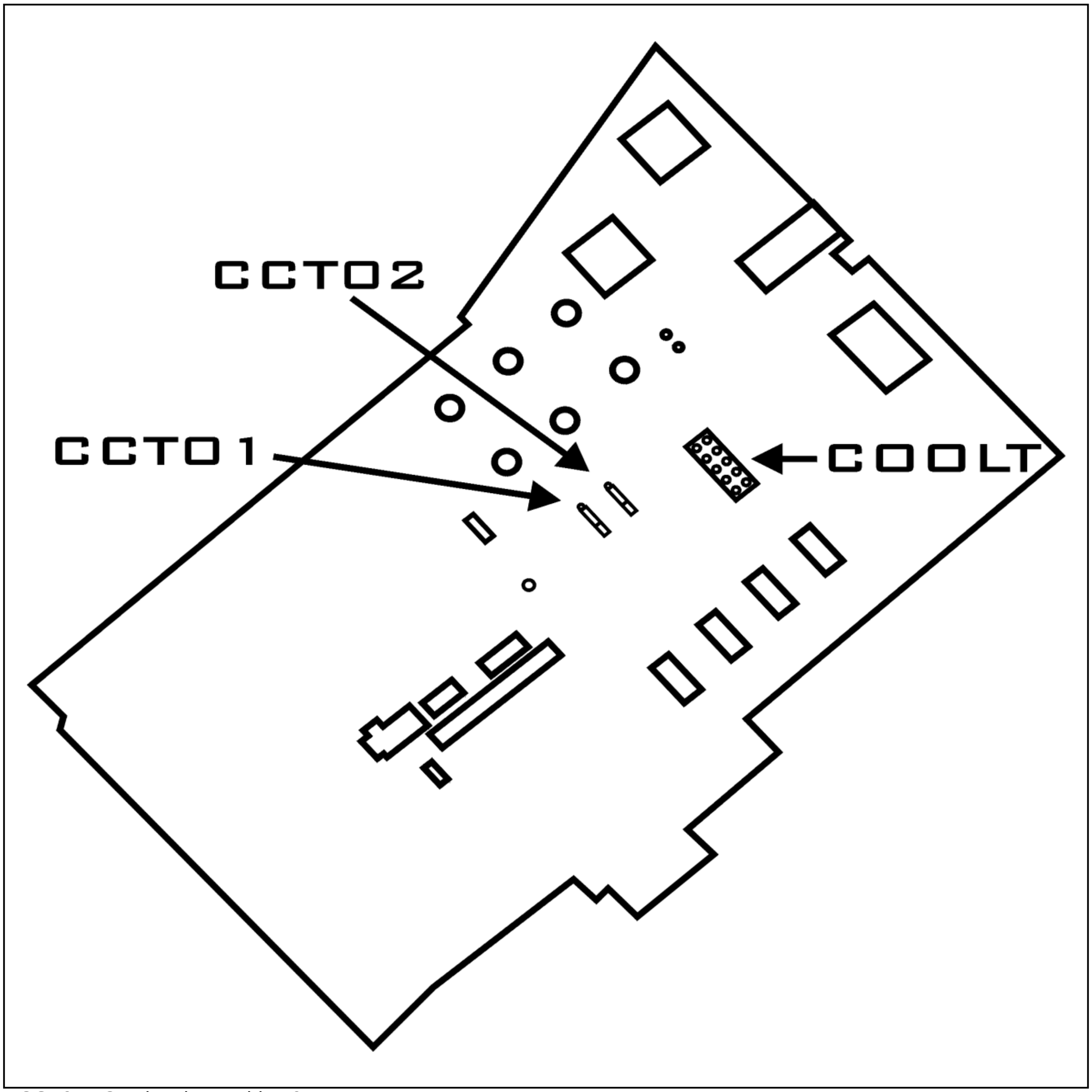
F.4 Dispersion Modeling

Atmospheric dispersion modeling was conducted to determine the one-hour and annual average concentration of toxic air contaminants from the proposed project. The atmospheric dispersion modeling methodology used is based on generally accepted modeling practices and modeling guidelines of both the USEPA and the SCAQMD. All dispersion modeling was performed using the Industrial Source Complex Short Term 3 (ISCST3) dispersion model (Version 00101) (USEPA 1999). The outputs of the ISCST3 dispersion model were used as inputs to conduct a risk assessment for TACs using the ACE2588 (Assessment of Chemical Exposure for AB2588) risk assessment model (Version 93288) (CAPCOA 1993).

Table F-1
List of Emitted Toxic Air Contaminants Included in the Health Risk Assessment and Associated Potential Health Effects

SCAQMD Rule 1401, Table 1 Substances		Rule 1401		
		Carcinogenic	Noncarcinogenic	
Toxic Air Contaminant	CAS No.		Chronic	Acute
Acetaldehyde	75070	X	X	
Acrolein	107028		X	X
Ammonia	7664417		X	X
Arsenic	7440382	X	X	X
Benzene	71432	X	X	X
Beryllium	7440417	X	X	
Butadiene-1,3	106990	X	X	
Cadmium	7440439	X	X	
Chloroform	67663	X	X	X
Chromium (hex.)	18540299	X	X	
Copper	7440508			X
Formaldehyde	50000	X	X	X
Hydrochloric acid	7647010		X	X
Lead	7439921	X	X	
Manganese	7439965		X	
Mercury	7439976		X	X
Naphthalene	91203		X	
Nickel	7440020	X	X	X
Propylene	115071		X	
Propylene oxide	75569	X	X	X
Selenium	7782492			
Toluene	108883		X	X
Xylene	1330207		X	X
Zinc	7440666			
Ethyl Benzene	100414		X	
Hexane	110543		X	
Benz[a]anthracene	56553	X		
Benzo[a]pyrene	50328	X		
Benzo[b]fluoranthren	205992	X		
Benzo[k]fluroanthren	207089	X		
Chrysene	218019	X		
Dibenz[a,h]anthracen	53703	X		
Indeno[1,2,3-cd]pyre	193395	X		
Tetra-p-dioxin	41903575	X	X	
1,2,3,4,6,7,8-Hepdio	37871004	X	X	
1,2,3,4,5,6,7,8-Octa	3268879	X	X	
1,2,3,4,5,6,7,8-Octf	39001020	X	X	
Pentachlor-p-dioxin	36088229	X	X	
Hexachlor-p-dioxin	34465468	X	X	
Tetrachlor-furan	55722275	X	X	
Pentachlor-furan	30402154	X	X	
Hexachlor-furan	55684941	X	X	
Heptachlor-furan	38998753	X	X	

Figure F-1
Location of TAC Emitting Sources Included in the Health Risk Assessment at the Valley Repowering Project Site



* CGT01 - Combustion Turbine 01
* CGT02 - Combustion Turbine 02
* COOLT - Cooling Tower

Table F-2
TAC Emission Rates for the Valley Repowering Project

Toxic Air Contaminant	Maximum Hourly Emission Rate (lb/hr)	Annual Emission Rate (lb/year)
Acetaldehyde	5.37E-01	4.70E+03
Acrolein	7.41E-02	6.49E+02
Ammonia	2.84E+01	2.49E+05
Arsenic	1.13E-04	9.85E-01
Benzene	5.25E-02	4.60E+02
Beryllium	2.06E-06	1.81E-02
Butadiene-1,3	4.98E-04	4.37E+00
Cadmium	1.24E-05	1.09E-01
Chloroform	2.44E-02	2.13E+02
Chromium (hex.)	4.11E-07	3.60E-03
Copper	3.79E-05	3.32E-01
Formaldehyde	3.59E+00	3.15E+04
Hydrochloric acid	3.08E-03	2.70E+01
Lead	2.30E-05	2.02E-01
Manganese	3.92E-04	3.43E+00
Mercury	1.03E-07	9.04E-04
Naphthalene	6.92E-03	6.06E+01
Nickel	1.86E-03	1.63E+01
Propylene	3.02E+00	2.64E+04
Propylene oxide	1.87E-01	1.64E+03
Selenium	3.19E-07	2.80E-03
Toluene	2.79E-01	2.44E+03
Xylene	1.02E-01	8.96E+02
Zinc	2.05E-03	1.79E+01
Ethyl Benzene	7.00E-02	6.13E+02
Hexane	1.01E+00	8.89E+03
Benz[a]anthracene	9.17E-05	8.03E-01
Benzo[a]pyrene	5.76E-05	5.05E-01
Benzo[b]fluoranthren	4.93E-05	4.32E-01
Benzo[k]fluroanthren	4.80E-05	4.20E-01
Chrysene	1.03E-04	8.99E-01
Dibenz[a,h]anthracen	9.52E-05	8.34E-01
Indeno[1,2,3-cd]pyre	9.52E-05	8.34E-01
Tetra-p-dioxin	1.43E-10	1.25E-06
1,2,3,4,6,7,8-Hepdio	6.40E-10	5.60E-06
1,2,3,4,5,6,7,8-Octa	4.06E-09	3.56E-05
1,2,3,4,5,6,7,8-Octf	3.29E-10	2.88E-06
Pentachlor-p-dioxin	2.71E-10	2.38E-06
Hexachlor-p-dioxin	3.43E-10	3.00E-06
Tetrachlor-furan	1.27E-09	1.11E-05
Pentachlor-furan	1.78E-09	1.56E-05
Hexachlor-furan	9.18E-10	8.04E-06
Heptachlor-furan	6.37E-10	5.58E-06

Model Selection

As mentioned above, the dispersion modeling methodology used follows both USEPA and SCAQMD guidelines. The ISCST3 model (Version 00101) is an USEPA model used for simulating the transport and dispersion of emission sources in areas of simple, complex, and intermediate terrain. Simple terrain, for air quality modeling purposes, is defined as a region where the heights of release of all emission sources are above the elevation of surrounding terrain. Complex terrain is defined as those areas where nearby terrain elevations exceed the release height of emissions from one or more sources. Intermediate terrain is that which falls between simple and complex terrain. Simple as well as complex terrain areas exist in the project site vicinity.

Modeling Options

The options used in the ISCST3 dispersion modeling are summarized in Table F-3. USEPA regulatory default modeling options were selected, except for the calm processing option. Since the meteorological data sets developed by the SCAQMD are based on hourly average wind measurements, rather than airport observations that represent averages of just a few minutes, the SCAQMD's modeling guidance requires that this modeling option not be used.

Table F-3
Dispersion Modeling Options for ISCST3

Feature	Option Selected
Terrain processing selected	Yes
Meteorological data input method	Card Image
Rural-urban option	Urban
Wind profile exponents values	Defaults
Vertical potential temperature gradient values	Defaults
Program calculates final plume rise only	Yes
Program adjusts all stack heights for downwash	Yes
Concentrations during calm period set = 0	No
Aboveground (flagpole) receptors used	No
Buoyancy-induced dispersion used	Yes
Year of surface data	1981
Year of upper air data	1981

Meteorological Data

The SCAQMD has established a standard set of meteorological data files for use in air quality modeling in the Basin. For the vicinity of VGS site the SCAQMD requires the use of its Burbank 1981 meteorological data file. This data set was also used for the recent air quality and HRA modeling studies performed for the LADWP's Electrical Generating Stations Modification Project.

In this dataset, the surface wind speeds and directions were collected at the SCAQMD's Burbank monitoring station (Surface Station No. 51100), while the upper air sounding data used to estimate hourly mixing heights were gathered at Ontario International Airport (Upper Air Station No. 99999). Temperatures and sky observation (used for stability classification) were taken from Burbank and Ontario Airport data.

Receptors

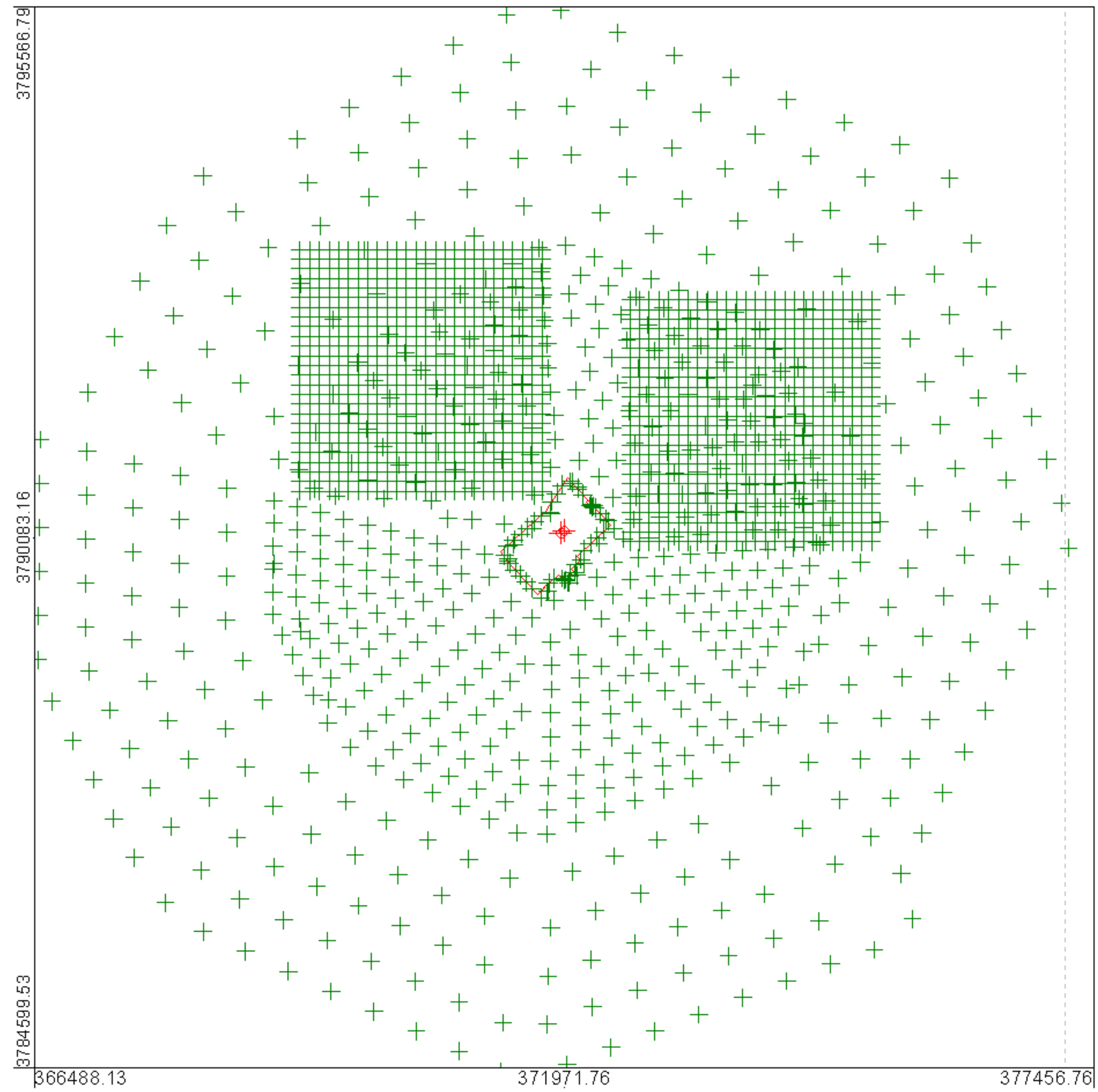
Appropriate model receptors must be selected to determine the worst-case modeling impacts. For this modeling, two sets of receptor grids were used for determining the peak impacts for the HRA. A “coarse” grid was used to determine the general area of peak concentration. The coarse grid consisted of three parts: (1) receptors along the perimeter of the facility with a spacing of approximately 100 meters or less; (2) receptors spaced 250 meters apart extending from the property line to approximately 2.5 kilometers from the property line; and (3) receptors spaced 500 meters apart extending from the prior grids to another 2.5 kilometers. No receptors were placed within the Valley Repowering Project site property line.

Once the location of peak concentration was identified from the coarse grid simulation, a fine grid of receptors was created that was centered on the coarse grid peak location. The fine receptor grid covered a 2.5 by 2.5 kilometer area with receptors at 100-meter spacing, and this was used for performing the refined risk assessment.

Figure F-2 shows the boundary line and receptor locations used in performing the health risk assessment for the VGS site.

Terrain heights for all receptors were determined from commercially available digital terrain elevations developed by the U.S. Geological Survey by using its Digital Elevation Model (DEM). The DEM data provides terrain elevations with 1-meter vertical resolution and 30-meters horizontal resolution based on a Universal Transverse Mercator (UTM) coordinate system. For each receptor location, the terrain elevation was set to the elevation for the closest DEM grid point.

Figure F-2
Boundary Line and Receptor Locations Used in the Modeling for the Valley Repowering Project



The USEPA's guidance was followed to address the potential influence on the ambient TAC concentrations due to structures located near point emission sources. The latest building downwash program (Version 3.15) developed by Lakes Environmental was used to identify the structures required to be included in the ISCST3 model to address building downwash effects.

This building downwash program was also used to estimate the direction-specific building dimensions, which are required as inputs by the ISCST3 dispersion model, to address the influence of nearby structures on the ambient TAC concentrations.

<u>Source Parameters</u>

All TAC emitting sources were modeled as point sources. The source release parameters for the point sources included exit velocity, exit temperature, stack height, and stack diameter. The source parameter inputs used for this health risk assessment are presented in Table **F-**4.

F.5 Health Risk Assessment Model

The ACE2588 Risk Assessment Model (Version 93288) was used to evaluate the potential health risks from TACs potentially emitted from the Valley Repowering Project. The ACE2588 model, which is accepted by the California Air Pollution Control Officers Association (CAPCOA), has been widely used for required health risk assessments under the CARB AB2588 Program. The model provides conservative algorithms to predict relative health risks from exposure to carcinogenic, chronic noncarcinogenic, and acute noncarcinogenic pollutants. It is a multi-source, multipollutant, multipathway risk assessment model. The model can evaluate the following routes of exposure: inhalation, soil ingestion, dermal absorption, water ingestion, food ingestion, and mother's milk. The model computes the individual cancer risk for the carcinogens at each receptor. For noncarcinogenic TACs, hazard indices are evaluated for both acute and chronic exposures. Data specific to TACs are built into the model, such as unit risk factors and acceptable (reference) exposure levels.

The toxicity data in the 93288 version of ACE2588 were revised to include the current data as recommended by the SCAQMD and OEHHA (SCAQMD, 2000; OEHHA, 1999, 2000a, and 2000b). The results obtained based on the CAPCOA HRA guidance are considered to be consistent with those which would be obtained following SCAQMD's Risk Assessment Procedures for Rule 1401 (SCAQMD, 2001).

The ISCST3 model was run with unit emission rates (i.e. 1 g/sec). The output binary file was input to the ACE2588 model along with the actual emission rates of various toxic air contaminants emitted from various sources at the Valley Repowering Project. The ACE2588 model provided health risks and hazard indices at various receptors. Input files used for the ISCST3 and ACE2588 models for performing the health risk assessment and the printouts of ACE2588 results are available for public inspection by contacting the SCAQMD's CEQA Section.

Table F-4
Source Parameters Used in Health Risk Assessment

Source ID	Easting (m)	Northing (m)	Elevation (m)	Release Height (m)	Temp (K)	Stack Vel (m/s)	Stack Diam (m)
CGT01 (Combustion Turbine 1, Fuel - Natural Gas)	371935	3790125	282	41.15	358	18.85	6.1
CGT02	371965	3790150	282	41.15	358	18.85	6.1
CGT01DT (Combustion Turbine 1, Fuel - Diesel)	371935	3790125	282	41.15	415	20.00	6.1
CGT02DT	371965	3790150	282	41.15	415	20.00	6.1
COOLT	372095	3790180	282	16.76	311	7.80	11.0

Hazard Identification

The hazard identification involves a determination of potential health effects, which may be associated with emitted TACs from the facility. The purpose of hazard identification is to identify qualitatively whether the TAC is a potential human carcinogen and/or is associated with other types of adverse health effects. Only TACs identified in the SCAQMD Rule 1401 (SCAQMD, 2001) with potency values or reference exposure levels were included in the HRA.

The potential health effects associated with each of the toxic air contaminant was identified by using the information provided in Tables III-5, 6, 8 and 9 of the CAPCOA Risk Assessment Guidelines, SCAQMD Guidelines Document, and OEHHA Guidelines (CAPCOA, 1993, SCAQMD, 2000, and OEHHA, 1999, 2000a, and 2000b).

Dose Response Assessment

A dose-response assessment is the process of characterizing the relationship between the exposure to a TAC and the incidence of an adverse health effect in the exposed population. A dose-response assessment for various TACs, which would be emitted from the Valley Repowering Project site, was performed following the CAPCOA and OEHHA and SCAQMD Guidelines (CAPCOA Tables III-5 through III-10, SCAQMD, 2000, and OEHHA, 1999, 2000a, 2000b). The dose-response relationship expressed in terms of a potency slope, were used to quantitatively assess the carcinogenic risk. Noncancer reference (acceptable) exposure levels (RELs) for both acute and chronic exposures have also been developed and provided in the guidelines. These were used to assess the noncarcinogenic health impacts from the Valley Repowering Project. The potency values of the TACs used for performing the health risk assessment are presented in Table F-5. Noncancer reference exposure levels (acute and chronic RELs) for toxic air contaminants are also provided in Table F-5. The toxicological end points for the noncancer toxic responses are provided in Table F-6.

OEHHA has revised the averaging times for acute RELs for arsenic and benzene from one hour to four and six hours, respectively. Since the current ISCST3 and ACE2588 models are not designed to estimate four-hour and six-hour concentrations, the one-hour average concentrations were estimated and compared with acute RELs for arsenic and benzene. This methodology is expected to provide a conservative (higher) estimate of acute hazards from exposure to arsenic and benzene, since the four-hour and six-hour average concentrations would be significantly lower than the predicted maximum one-hour average concentrations.

Table F-5
Potency Values of the Air Toxics Included in the Health Risk Assessment

Toxic Air Contaminant	Symbol	Number	CAS No.	Unit Risk	Potency	Acute REL	Chronic REL	Oral Dose
Acetaldehyde	ACETA	1	75070	2.70E-06	0.00E+00	0.00E+00	9.00E+00	0.00E+00
Acrolein	ACROL	3	107028	0.00E+00	0.00E+00	1.90E-01	6.00E-02	0.00E+00
Ammonia	NH3	9	7664417	0.00E+00	0.00E+00	3.20E+03	2.00E+02	0.00E+00
Arsenic	As	10	7440382	3.30E-03	1.50E+00	1.90E-01	3.00E-02	1.00E-03
Benzene	BENZE	13	71432	2.90E-05	0.00E+00	1.30E+03	6.00E+01	0.00E+00
Beryllium	Be	17	7440417	2.40E-03	0.00E+00	0.00E+00	9.99E+12	5.00E-03
Butadiene-1,3	BUTAD	20	106990	1.70E-04	0.00E+00	0.00E+00	2.00E+01	0.00E+00
Cadmium	Cd	22	7440439	4.20E-03	0.00E+00	0.00E+00	2.00E-02	1.00E-03
Chloroform	CHCl3	30	67663	5.30E-06	0.00E+00	1.50E+02	3.00E+02	0.00E+00
Chromium (hex.)	Cr	36	18540299	1.50E-01	4.20E-01	0.00E+00	2.00E-01	5.00E-03
Copper	Cu	38	7440508	0.00E+00	0.00E+00	1.00E+02	0.00E+00	0.00E+00
Formaldehyde	HCHO	70	50000	6.00E-06	0.00E+00	9.40E+01	3.00E+00	0.00E+00
Hydrochloric acid	HCl	78	7647010	0.00E+00	0.00E+00	2.10E+03	9.00E+00	0.00E+00
Lead	Pb	83	7439921	1.20E-05	8.50E-03	0.00E+00	9.99E+12	4.30E-04
Manganese	Mn	85	7439965	0.00E+00	0.00E+00	0.00E+00	2.00E-01	0.00E+00
Mercury	Hg	87	7439976	0.00E+00	0.00E+00	1.80E+00	9.00E-02	3.00E-04
Naphthalene	NAPTH	110	91203	0.00E+00	0.00E+00	0.00E+00	9.00E+00	4.00E-03
Nickel	Ni	111	7440020	2.60E-04	0.00E+00	6.00E+00	5.00E-02	0.00E+00
Propylene	PROPL	134	115071	0.00E+00	0.00E+00	0.00E+00	3.00E+03	0.00E+00
Propylene oxide	PROX	135	75569	3.70E-06	0.00E+00	3.10E+03	3.00E+01	0.00E+00
Selenium	Se	137	7782492	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Toluene	TOL	145	108883	0.00E+00	0.00E+00	3.70E+04	3.00E+02	0.00E+00
Xylene	XYLEN	151	1330207	0.00E+00	0.00E+00	2.20E+04	7.00E+02	0.00E+00
Zinc	Zn	152	7440666	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table F-5 (Concluded)
Potency Values of the Air Toxics Included in the Health Risk Assessment

Toxic Air Contaminant	Symbol	Number	CAS No.	Unit Risk	Potency	Acute REL	Chronic REL	Oral Dose
Ethyl Benzene	EBENZ	159	100414	0.00E+00	0.00E+00	0.00E+00	2.00E+03	0.00E+00
Hexane	HEXAN	160	110543	0.00E+00	0.00E+00	0.00E+00	7.00E+03	0.00E+00
Benz[a]anthracene	BENZA	163	56553	1.10E-04	1.20E+00	0.00E+00	0.00E+00	0.00E+00
Benzo[a]pyrene	BENZO	164	50328	1.10E-03	1.20E+01	0.00E+00	0.00E+00	0.00E+00
Benzo[b]fluoranthren	BENZF	165	205992	1.10E-04	1.20E+00	0.00E+00	0.00E+00	0.00E+00
Benzo[k]fluroanthren	BENZK	166	207089	1.10E-04	1.20E+00	0.00E+00	0.00E+00	0.00E+00
Chrysene	CHRYS	167	218019	1.10E-05	1.20E-01	0.00E+00	0.00E+00	0.00E+00
Dibenz[a,h]anthracen	DIBEN	168	53703	1.20E-03	4.10E+00	0.00E+00	0.00E+00	0.00E+00
Indeno[1,2,3-cd]pyre	INDEN	169	193395	4.00E-04	1.20E+00	0.00E+00	0.00E+00	0.00E+00
Tetra-p-dioxin	4DPD	174	41903575	3.80E+01	0.00E+00	0.00E+00	4.00E-05	1.00E-09
1,2,3,4,6,7,8-Hepdio	7DPD	179	37871004	3.80E-01	0.00E+00	0.00E+00	4.00E-03	1.00E-09
1,2,3,4,5,6,7,8-Octa	8DPD	180	3268879	3.80E-02	0.00E+00	0.00E+00	4.00E-02	1.00E-09
1,2,3,4,5,6,7,8-Octf	8DBF	190	39001020	3.80E-02	0.00E+00	0.00E+00	4.00E-02	1.00E-09
Pentachlor-p-dioxin	5DPDT	230	36088229	1.90E+01	0.00E+00	0.00E+00	8.00E-05	1.00E-09
Hexachlor-p-dioxin	6DPDT	231	34465468	3.80E+00	0.00E+00	0.00E+00	4.00E-04	1.00E-09
Tetrachlor-furan	4DBFT	233	55722275	3.80E+00	0.00E+00	0.00E+00	4.00E-04	1.00E-09
Pentachlor-furan	5DBFT	234	30402154	1.90E+01	0.00E+00	0.00E+00	8.00E-05	1.00E-09
Hexachlor-furan	6DBFT	235	55684941	3.80E+00	0.00E+00	0.00E+00	4.00E-04	1.00E-09
Heptachlor-furan	7DBFT	236	38998753	3.80E-01	0.00E+00	0.00E+00	4.00E-03	1.00E-09

Table F-6
Toxicological Endpoints of the Toxic Air Contaminants Included in the Health Risk Assessment

Toxic Air Contaminant	Symbol	Num.	CAS No.	Chronic Toxic Endpoints										Acute Toxic Endpoints								
				CV/ BL	CN/ PN	IM	KI	GI/ LI	RP	RS	SK	EN	EY	CV/ BS	CN/ PN	IM	KI	GI/ LI	RP	RS	EY	SK
Acetaldehyde	ACETA	1	75070	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Acrolein	ACROL	3	107028	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0
Ammonia	NH3	9	7664417	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0
Arsenic	As	10	7440382	1	1	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0
Benzene	BENZE	13	71432	1	1	0	0	0	1	0	0	0	0	1	0	1	0	0	1	0	0	0
Beryllium	Be	17	7440417	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Butadiene-1,3	BUTAD	20	106990	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Cadmium	Cd	22	7440439	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Chloroform	CHCl3	30	67663	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Chromium (hex.)	Cr	36	18540299	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Copper	Cu	38	7440508	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Formaldehyde	HCHO	70	50000	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	1	1	0
Hydrochloric acid	HCl	78	7647010	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0
Lead	Pb	83	7439921	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Manganese	Mn	85	7439965	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mercury	Hg	87	7439976	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Naphthalene	NAPTH	110	91203	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Nickel	Ni	111	7440020	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0
Propylene	PROPL	134	115071	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Propylene oxide	PROX	135	75569	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	0
Selenium	Se	137	7782492	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Toluene	TOL	145	108883	0	1	0	0	1	1	0	0	0	0	0	1	0	0	0	1	1	1	0
Xylene	XYLEN	151	1330207	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0

Table F-6 (Concluded)

Toxicological Endpoints of the Toxic Air Contaminants Included in the Health Risk Assessment

Toxic Air Contaminant	Symbol	Num.	CAS No.	Chronic Toxic Endpoints										Acute Toxic Endpoints								
				CV/ BL	CN/ PN	IM	KI	GI/ LI	RP	RS	SK	EN	EY	CV/ BS	CN/ PN	IM	KI	GI/ LI	RP	RS	EY	SK
Zinc	Zn	152	7440666	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ethyl Benzene	EBENZ	159	100414	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Hexane	HEXAN	160	110543	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Benz[a]anthracene	BENZA	163	56553	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Benzo[a]pyrene	BENZO	164	50328	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Benzo[b]fluoranthren	BENZF	165	205992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Benzo[k]fluroanthren	BENZK	166	207089	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chrysene	CHRYS	167	218019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dibenz[a,h]anthracen	DIBEN	168	53703	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Indeno[1,2,3-cd]pyre	INDEN	169	193395	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tetra-p-dioxin	4DPD	174	41903575	1	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0
1,2,3,4,6,7,8-Hepdio	7DPD	179	37871004	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
1,2,3,4,5,6,7,8-Octa	8DPD	180	3268879	1	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0
1,2,3,4,5,6,7,8-Octf	8DBF	190	39001020	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Pentachlor-p-dioxin	5DPDT	230	36088229	1	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0
Hexachlor-p-dioxin	6DPDT	231	34465468	1	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0
Tetrachlor-furan	4DBFT	233	55722275	1	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0
Pentachlor-furan	5DBFT	234	30402154	1	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0
Hexachlor-furan	6DBFT	235	55684941	1	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0
Heptachlor-furan	7DBFT	236	38998753	1	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0

Exposure Assessment

The objective of the exposure assessment was to estimate the extent of public exposure to each TAC for which cancer risk is to be quantified or noncancer effects are to be evaluated. This involved emission quantification, air dispersion modeling, evaluation of environmental fate, identification of exposure routes, identification of exposed populations, and estimation of short-term and lonF-term exposure levels. The details of the air toxics emission sources, air dispersion modeling, and receptors to be selected for the air dispersion modeling were described earlier in this section. The details of the exposure routes selected for this HRA are presented below.

Exposure Pathways

From a review of the land use surrounding the Valley Repowering Project site and prior HRAs, the following four primary exposure pathways were considered for assessing the health risks from the increased TAC emissions at the project site:

- Dermal exposure
- Inhalation
- Mother's milk
- Soil ingestion

A secondary exposure pathway through the ingestion of crops (except home grown vegetable gardens) was not considered, because there are no commercial agricultural operations in the project vicinity. In addition, exposure through ingestion of fish, meat, eggs, and dairy products were not considered, because there are no known facilities producing meat, fish, dairy, poultry, or egg products in the project vicinity.

The exposure parameters for exposure assessments were selected based on the guidance provided in the CAPCOA Risk Assessment Guidelines (CAPCOA, 1993). Table F-7 presents the key input parameter values, which were used for exposure assessments.

In accordance with Table III-5 of the CAPCOA AB2588 Risk Assessment Guidelines and OEHHA's current guidelines (OEHHA, 1999), the following twenty-four air toxics emitted from the Valley Repowering Project site were considered for multipathway evaluation: Arsenic, Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthrene, Benzo[k]fluroanthrene, Beryllium, Cadmium, Chromium (hex.), Chrysene, Dibenz[a,h]anthracene, Tetrachlorodibenzo-p-dioxin, Pentachlorodibenzo-p-dioxin, Hexachlorodibenzo-p-dioxin, Heptachlorodibenzo-p-dioxin, 1,2,3,4,5,6,7,8-Octachlorodibenzo-p-dioxin, Tetrachlorodibenzofuran, Pentachlorodibenzofuran, Hexachlorodibenzofuran, Heptachlorodibenzofuran, 1,2,3,4,5,6,7,8-Octachlorodibenzofuran, Indeno[1,2,3-cd]pyre, Lead, Mercury, Naphthalene.

Table F-7
Key Input Parameters Used For Exposure Assessment

Parameter	Input Value
1. Inhalation/General	
Emission rate variable	Yes
Respiration rate (m^3/day)	20
Percent chemical absorption	100
Average body weight (kg)	70
Total exposure time (hr/day; day/yr; yr)	24;365;70 (residential) 8;240;46 (commercial/industrial)
2. Soil Ingestion	
Deposition rate constant	Yes
Deposition rate (m/sec)	0.02
Ingestion rate (mg/day)	110
Soil half-life (day)	Chemical-specific
Total exposure time	See 1. above
Total exposure time (year), mother's-milk pathway	See 3. below (mother's milk)
Soil mixing depth (m)	0.01/0.15
Soil bulk density (kg/m^3)	1333
3. Mother's Milk (for PAH)	
Fraction of Contaminant that partitions to mother's fat	0.9
Percent fat of mother's milk	0.04
Percent of mother's weight that is fat	0.33
Half-life of contaminant in mother (days)	1460
Frequency of exposure (days/year)	365
Breast feeding period (years)	1
Average infant body weight (kg)	6.5
Exposure Period (days)	25550
Daily breast-milk ingestion rate (kg/day)	0.9
Total exposure time (years)	
Residential MEI	25 years (mother), 1 year (child)
Commercial/Industrial MEI	0 (i.e., not considered)
4. Dermal	
Surface area of exposed skin (cm^2)	4656
Soil loading on skin (mg/cm^2/day)	0.5
Fraction absorbed across skin	Chemical specific
5. Vegetation	
Direct deposition considered	Yes
Root translocation/uptake considered	Yes
Uptake factors (inorganic compounds)	Chemical specific
Uptake factors (organic compounds)	Not available
Consumption of plants (kg/day)	Root, 0.05; Leafy 0.01; Vine, 0.25
Site specific fraction of produce locally grown	Root, Leafy, and Vine, 0.15
Gastrointestinal absorption factors	1
Bioavailability factors	1

Health Risk Characterization

The SCAQMD's significance criteria for toxics are an increased cancer risk of 10 in one million or greater and for noncarcinogenic acute and chronic risks a hazard index greater than 1.0 for any endpoint. It should be noted that the established SCAQMD Rule 1401 permitting limits are 1.0 in one million cancer risk for sources without best available control technology for toxics (T-BACT) and 10 in one million for those with T-BACT.

F.6 Results of the Health Risk Assessment

F.6.1 Excess Carcinogenic Risk

The results of the ACE2588 model analysis indicate a MEI cancer risk of 0.69 in one million at a distance of about 2.5 kilometers northwest of the VGS site. The location of the MEI is shown in Figure F-3. Tables F-8 and F-9 show the cancer risk from inhalation and noninhalation pathways by source and by TAC, respectively for the MEI location.

Formaldehyde was the major contributor to the total carcinogenic risk (about 72 percent of the total carcinogenic risk). As expected, the results of the risk analysis in Table F-8 show that the carcinogenic risk at the MEI location from the inhalation pathway would be the maximum (approximately 90 percent).

F.6.2 Noncarcinogenic Health Effects

The noncarcinogenic health effects of the TACs were assessed by calculating the hazard indices. The hazard index is the sum of the ratios of dispersion model estimated TAC concentrations to the acceptable exposure levels (see Table F-4 for the acute and chronic acceptable exposure levels).

Based on the results of the acute noncarcinogenic effects analyses, the maximum total acute hazard index for any one toxicological endpoint was estimated to be 0.23 for the respiratory and eye endpoints. This is lower than the threshold value of 1.0. Acute hazard indices for all other endpoints were considerably lower than the threshold of 1.0. The peak receptor location where the maximum acute hazard index occurred was identified 2.3 kilometers north-northwest of the Valley Repowering Project site (see Figure F-3). Table F-10 shows the acute hazard index for different toxicological endpoints for the peak receptor by pollutant (TAC). Approximately 89 percent of the total acute hazard index resulted from acrolein emissions.

Table F-11 shows the chronic hazard indices for different toxicological endpoints for the peak receptor by pollutant. The total chronic hazard index was estimated to be 0.06 for the respiratory endpoint located at the same location as the MEI (see Figure F-3). This value of the hazard index is also lower than the threshold value of 1.0. The two pollutants contributing most to the chronic hazard index for the MEI were acrolein (46 percent) and ammonia (45 percent).

Figure F-3
Locations of Maximally exposed Individual, Maximum Acute Hazard Index, and Maximum Chronic Hazard Index for the Valley Repowering Project

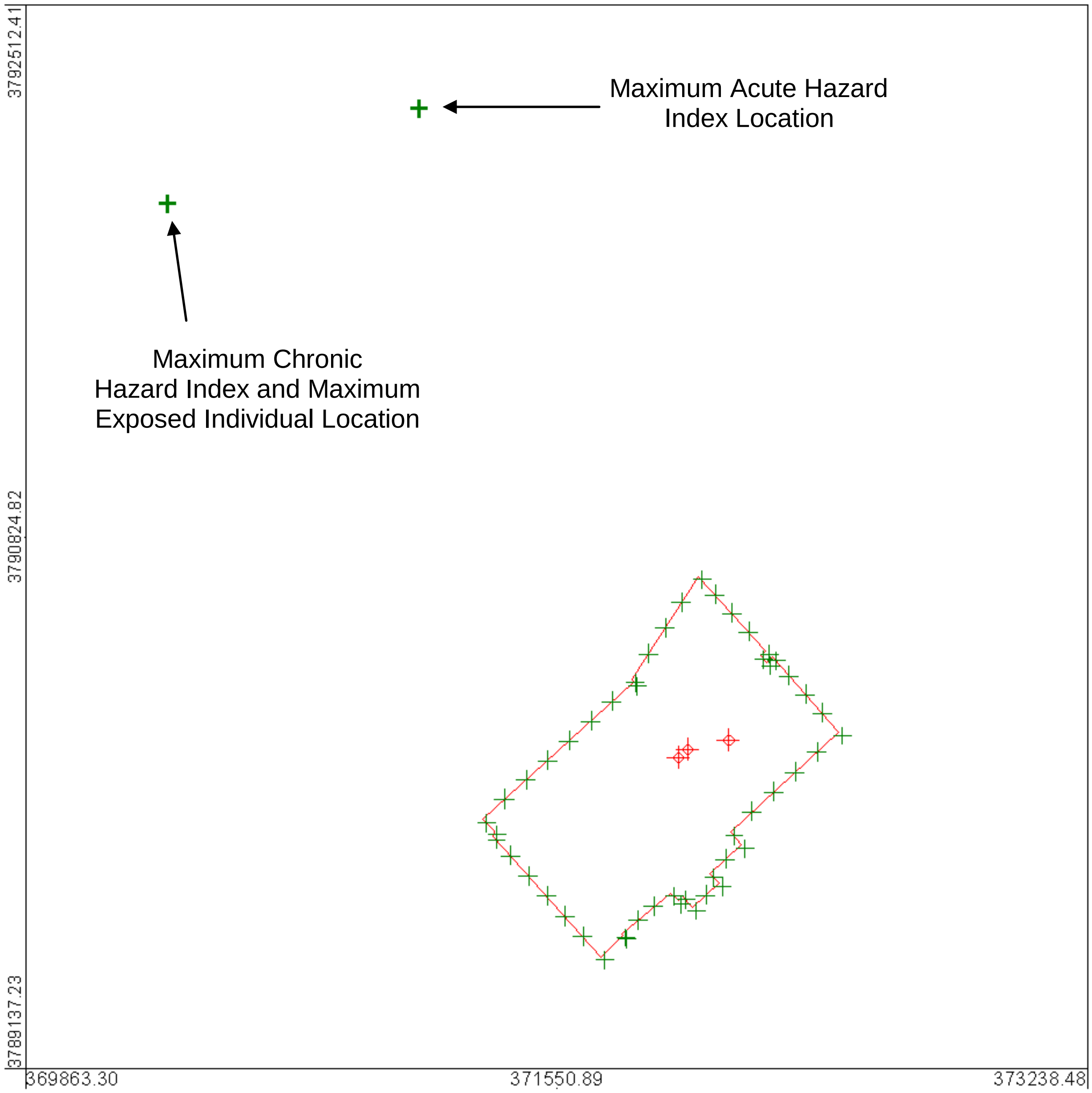


Table F-8
Multipathway Cancer Risk by Source for MEI

SOURCE	INHALE	DERMAL	SOIL	WATER	PLANTS	ANIMAL	MOTHER MILK	SUM
CGT01	2.88E-07	1.34E-09	2.12E-09	0.00E+00	1.54E-08	0.00E+00	0.00E+00	3.07E-07
CGT02	2.97E-07	1.39E-09	2.18E-09	0.00E+00	1.59E-08	0.00E+00	0.00E+00	3.17E-07
CGT01DT	5.84E-09	5.62E-11	3.31E-10	0.00E+00	6.80E-10	0.00E+00	0.00E+00	6.91E-09
CGT02DT	6.05E-09	5.82E-11	3.42E-10	0.00E+00	7.04E-10	0.00E+00	0.00E+00	7.15E-09
COOLT	2.14E-08	3.90E-10	1.84E-08	0.00E+00	7.67E-09	0.00E+00	0.00E+00	4.78E-08
SUM	**6.18E-07**	**3.23E-09**	**2.34E-08**	**0.00E+00**	**4.03E-08**	**0.00E+00**	**0.00E+00**	**6.85E-07**

Table F-9
Multipathway Cancer Risk by Pollutant for MEI

POLLUTANT*	INHALE	DERMAL	SOIL	WATER	PLANTS	SUM
ACETA	3.33E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.33E-08
As	1.60E-08	4.00E-10	1.89E-08	0.00E+00	7.88E-09	4.32E-08
BENZE	3.49E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.49E-08
Be	8.17E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.17E-11
BUTAD	1.95E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.95E-09
Cd	8.58E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.58E-10
CHCl3	5.81E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.81E-09
Cr	1.02E-09	1.57E-12	7.41E-12	0.00E+00	2.98E-12	1.03E-09
HCHO	4.94E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.94E-07
Pb	4.56E-12	1.78E-13	8.40E-12	0.00E+00	3.53E-12	1.67E-11
Ni	7.97E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.97E-09
PROX	1.59E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.59E-08
BENZA	2.29E-10	2.18E-10	3.43E-10	0.00E+00	2.50E-09	3.29E-09
BENZO	1.43E-09	1.36E-09	2.15E-09	0.00E+00	1.56E-08	2.05E-08
BENZF	1.21E-10	1.15E-10	1.81E-10	0.00E+00	1.32E-09	1.73E-09
BENZK	1.18E-10	1.12E-10	1.76E-10	0.00E+00	1.28E-09	1.69E-09
CHRYS	2.56E-11	2.44E-11	3.84E-11	0.00E+00	2.79E-10	3.68E-10
DIBEN	2.60E-09	7.74E-10	1.22E-09	0.00E+00	8.86E-09	1.35E-08
INDEN	8.66E-10	2.27E-10	3.57E-10	0.00E+00	2.59E-09	4.04E-09
4DPD	8.94E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.94E-11
7DPD	4.01E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.01E-12
8DPD	2.55E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.55E-12
8DBF	2.06E-13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.06E-13
5DPDT	8.51E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.51E-11
6DPDT	2.15E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.15E-11
4DBFT	7.97E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.97E-11
5DBFT	5.57E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.57E-10
6DBFT	5.75E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.75E-11
7DBFT	3.99E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.99E-12
SUM	**6.18E-07**	**3.23E-09**	**2.34E-08**	**0.00E+00**	**4.03E-08**	**6.85E-07**

***See Table F-6 for key to complete names of pollutants**

Table F-10
Acute Hazard index for Peak Receptor

POLLU-TANT*	CONC (ug/m3)	BACKGR (ug/m3)	AEL (ug/m3)	CV/BS	CNS/PNS	IMMUN	KIDN	GI/LI	REPR	RESP	EYE	SKIN
ACROL	3.97E-02	0.00E+00	1.90E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.09E-01	2.09E-01	0.00E+00
NH3	1.52E+01	0.00E+00	3.20E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.75E-03	4.75E-03	0.00E+00
As	1.35E-04	0.00E+00	1.90E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.12E-04	0.00E+00	0.00E+00	0.00E+00
BENZE	2.80E-02	0.00E+00	1.30E+03	2.15E-05	0.00E+00	2.15E-05	0.00E+00	0.00E+00	2.15E-05	0.00E+00	0.00E+00	0.00E+00
CHCl3	3.09E-02	0.00E+00	1.50E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.06E-04	0.00E+00	0.00E+00	0.00E+00
Cu	1.23E-05	0.00E+00	1.00E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.23E-07	0.00E+00	0.00E+00
HCHO	1.92E+00	0.00E+00	9.40E+01	0.00E+00	0.00E+00	2.04E-02	0.00E+00	0.00E+00	0.00E+00	2.04E-02	2.04E-02	0.00E+00
HCl	9.95E-04	0.00E+00	2.10E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.74E-07	4.74E-07	0.00E+00
Hg	3.33E-08	0.00E+00	1.80E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E-08	0.00E+00	0.00E+00	0.00E+00
Ni	6.00E-04	0.00E+00	6.00E+00	0.00E+00	0.00E+00	1.00E-04	0.00E+00	0.00E+00	0.00E+00	1.00E-04	0.00E+00	0.00E+00
PROX	1.00E-01	0.00E+00	3.10E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.23E-05	3.23E-05	3.23E-05	0.00E+00
TOL	1.50E-01	0.00E+00	3.70E+04	0.00E+00	4.05E-06	0.00E+00	0.00E+00	0.00E+00	4.05E-06	4.05E-06	4.05E-06	0.00E+00
XYLEN	5.47E-02	0.00E+00	2.20E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.49E-06	2.49E-06	0.00E+00
			SUM =	**2.15E-05**	**4.05E-06**	**2.06E-02**	**0.00E+00**	**0.00E+00**	**9.75E-04**	**2.34E-01**	**2.34E-01**	**0.00E+00**

***See Table F-6 for key to complete names of pollutants**

Table F-11
Chronic Hazard Index for Peak Receptor

POLLU-	ORAL	BACKGR	AEL	CV/BL	CNS/PNS	IMMUN	KIDN	GI/LI	REPR	RESP	SKIN	ENDO	EYE
ACETA	0.00E+00	0.00E+00	9.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.37E-03	0.00E+00	0.00E+00	0.00E+00
ACROL	0.00E+00	0.00E+00	6.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.84E-02	0.00E+00	0.00E+00	0.00E+00
NH3	0.00E+00	0.00E+00	2.00E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.26E-03	0.00E+00	0.00E+00	0.00E+00
As	1.00E-03	0.00E+00	3.00E-02	1.80E-04	1.80E-04	0.00E+00	0.00E+00	0.00E+00	1.80E-04	0.00E+00	0.00E+00	0.00E+00	1.80E-04
BENZE	0.00E+00	0.00E+00	6.00E+01	2.00E-05	2.00E-05	0.00E+00	0.00E+00	0.00E+00	2.00E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Be	5.00E-03	0.00E+00	9.99E+12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.41E-21	0.00E+00	0.00E+00	0.00E+00
BUTAD	0.00E+00	0.00E+00	2.00E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.72E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cd	1.00E-03	0.00E+00	2.00E-02	0.00E+00	0.00E+00	0.00E+00	1.13E-05	0.00E+00	0.00E+00	1.02E-05	0.00E+00	0.00E+00	0.00E+00
CHCl3	0.00E+00	0.00E+00	3.00E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.66E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cr	5.00E-03	0.00E+00	2.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.39E-08	0.00E+00	0.00E+00	0.00E+00
HCHO	0.00E+00	0.00E+00	3.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.75E-02	0.00E+00	2.75E-02	0.00E+00
HCl	0.00E+00	0.00E+00	9.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.65E-06	0.00E+00	5.65E-06	0.00E+00
Pb	4.30E-04	0.00E+00	9.99E+12	3.31E-06	3.31E-06	3.31E-06	3.31E-06	0.00E+00	3.31E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mn	0.00E+00	0.00E+00	2.00E-01	0.00E+00	3.23E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Hg	3.00E-04	0.00E+00	9.00E-02	0.00E+00	5.51E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NAPTH	4.00E-03	0.00E+00	9.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.74E-05	0.00E+00	0.00E+00	0.00E+00
Ni	0.00E+00	0.00E+00	5.00E-02	6.13E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.13E-04	0.00E+00	0.00E+00	0.00E+00
PROPL	0.00E+00	0.00E+00	3.00E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.31E-05	0.00E+00	0.00E+00	0.00E+00
PROX	0.00E+00	0.00E+00	3.00E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E-04	0.00E+00	0.00E+00	0.00E+00
TOL	0.00E+00	0.00E+00	3.00E+02	0.00E+00	2.14E-05	0.00E+00	0.00E+00	2.14E-05	2.14E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
XYLEN	0.00E+00	0.00E+00	7.00E+02	0.00E+00	3.35E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.35E-06	0.00E+00	0.00E+00	0.00E+00
EBENZ	0.00E+00	0.00E+00	2.00E+03	0.00E+00	0.00E+00	0.00E+00	8.04E-07	8.04E-07	8.04E-07	0.00E+00	0.00E+00	0.00E+00	8.04E-07
HEXAN	0.00E+00	0.00E+00	7.00E+03	0.00E+00	3.33E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4DPD	1.00E-09	0.00E+00	4.00E-05	5.67E-06	0.00E+00	0.00E+00	0.00E+00	5.67E-06	5.67E-06	5.88E-08	0.00E+00	5.67E-06	0.00E+00
7DPD	1.00E-09	0.00E+00	4.00E-03	2.52E-05	0.00E+00	0.00E+00	0.00E+00	2.52E-05	2.52E-05	2.64E-09	0.00E+00	0.00E+00	0.00E+00
8DPD	1.00E-09	0.00E+00	4.00E-02	1.60E-04	0.00E+00	0.00E+00	0.00E+00	1.60E-04	1.60E-04	1.68E-09	0.00E+00	1.60E-04	0.00E+00
8DBF	1.00E-09	0.00E+00	4.00E-02	1.29E-05	0.00E+00	0.00E+00	0.00E+00	1.29E-05	1.29E-05	1.36E-10	0.00E+00	0.00E+00	0.00E+00
5DPDT	1.00E-09	0.00E+00	8.00E-05	1.07E-05	0.00E+00	0.00E+00	0.00E+00	1.07E-05	1.07E-05	5.60E-08	0.00E+00	1.07E-05	0.00E+00
6DPDT	1.00E-09	0.00E+00	4.00E-04	1.35E-05	0.00E+00	0.00E+00	0.00E+00	1.35E-05	1.35E-05	1.41E-08	0.00E+00	1.35E-05	0.00E+00
4DBFT	1.00E-09	0.00E+00	4.00E-04	5.01E-05	0.00E+00	0.00E+00	0.00E+00	5.01E-05	5.01E-05	5.25E-08	0.00E+00	5.01E-05	0.00E+00
5DBFT	1.00E-09	0.00E+00	8.00E-05	7.03E-05	0.00E+00	0.00E+00	0.00E+00	7.03E-05	7.03E-05	3.67E-07	0.00E+00	7.03E-05	0.00E+00
6DBFT	1.00E-09	0.00E+00	4.00E-04	3.62E-05	0.00E+00	0.00E+00	0.00E+00	3.62E-05	3.62E-05	3.78E-08	0.00E+00	3.62E-05	0.00E+00
7DBFT	1.00E-09	0.00E+00	4.00E-03	2.51E-05	0.00E+00	0.00E+00	0.00E+00	2.51E-05	2.51E-05	2.63E-09	0.00E+00	2.51E-05	0.00E+00
			SUM =	**1.23E-03**	**2.63E-04**	**3.31E-06**	**1.55E-05**	**4.35E-04**	**6.35E-04**	**6.13E-02**	**0.00E+00**	**2.79E-02**	**1.81E-04**
***See Table F-6 for key to complete names of pollutants**													

F.7 CONCLUSIONS

The maximum individual excess carcinogenic risks for the maximally exposed individual, and the hazard indices (acute and chronic) for the VGS site are estimated to be below the significance criteria of ten in one million and 1.0, respectively. Therefore, the TAC emissions impacts to public health would be insignificant during the proposed project's operation. The maximum individual excess cancer risk of 0.69, maximum acute hazard index of 0.23, and a maximum chronic hazard index of 0.06 were estimated for the VGS.

F.8 REFERENCES

California Air Pollution Control Officers Association (CAPCOA), 1993. Air Toxics "Hot Spots" Program, Revised 1992 Risk Assessment Guidelines, 1993.

California Office of Environmental Health and Hazard Assessment (OEHHA), 1999. Hot Spots Unit Risk and Cancer Potency Values, June 1999.

California Office of Environmental Health and Hazard Assessment (OEHHA), 2000a. Acute Reference Exposure Levels (RELs), Averaging Times and Toxicological Endpoints, May 2000.

California Office of Environmental Health and Hazard Assessment (OEHHA), 2000b. Chronic Reference Exposure Levels (RELs), May 2000.

South Coast Air Quality Management District (SCAQMD), 2001. Rule 1401 New Source Review of Toxic Air Contaminants, June 2001.

South Coast Air Quality Management District (SCAQMD), 2001. Risk Assessment Procedures for Rules 1401 and 212, 2001.

U.S. Environmental Protection Agency (USEPA), 1999. User's Guide for the Industrial Source Complex Dispersion Models, 1999.