1.0 HEALTH RISK ASSESSMENT METHODOLOGY

1.1 Setting

As described in Chapter 1, the area surrounding the HGS and VGS is primarily commercial/industrial, and there are no residences or other sensitive receptors in the immediate vicinity. However, the SGS is bounded to the east by a residential neighborhood of single-family dwellings.

1.2 Impacts

1.2.1 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, 2000a).

1.2.2 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 2000b). 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 Modifications 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, 2000b, 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 three generation stations (HGS, SGS, and VGS) are presented below.

1.3 Harbor Generating Station

Emission Estimation of Toxic Air Contaminants

At the HGS site, the installation of the following equipment would result in the emissions of TACs:

- Five 47-MW CTs equipped with SCR systems.
- One black start diesel generator.

The TAC emissions were estimated for the following four operating scenarios for the HGS site:

1 & 2) Normal Startup and Normal Operating Scenario

During the normal startup scenario at the HGS site, all the five CTs would be started simultaneously and then put into normal operation. The emissions of all TACs (except ammonia) were estimated by using the California Air Resources Board approved emission factors (CARB, 2000a). The ammonia emissions were estimated using the SCAQMD's BACT permitting limit of 5 ppmv for ammonia slippage (during the normal operation of the CTs).

3). CTs Diesel Fuel Readiness Testing Scenario

The CTs at the HGS site will be tested for diesel fuel readiness, once per month for thirty minutes. The emissions of all TACs were estimated using the CARB-approved emission factors (CARB, 2000b).

4) Black Start Diesel Fuel Generator Readiness Testing Scenario

The black start generator will be tested every month for thirty minutes. The emissions of all TACs were estimated using the CARB-approved emission factors (CARB, 2000c).

The TACS that will be emitted from the HGS site and included in the SCAQMD Rule 1401 (Amended August 18, 2000) list of toxic air contaminants and requiring health risk assessment are presented in Table 3-1. The details of TAC emission calculations are provided in Appendix X of this Draft EIR. The locations of all the TAC emitting sources included in this risk assessment are shown in Figure 3-1.

In order to estimate the worst-case carcinogenic and noncarcinogenic risks from the HGS operation, the emissions from the four operating scenarios were combined as described below.

- For estimating the "worst-case" acute hazard index (HI) (noncarcinogenic health impact), it was assumed that all five CTs would be operating normally at full load (1-hr of operation for each CT), and the black start generator would be tested for readiness (30-minutes in duration).
- For estimating the "worst-case" chronic HI (noncarcinogenic health impact) and the carcinogenic health risk, it was assumed that all the five CTs would operate throughout the

year (8,760 hours for each CT), and the five CTs and the black start generator would also be tested throughout the year (12 months x 5 CTs/month x 30 minutes/month for the CTs and 12 months x 30 minutes/month for the generator readiness tests). It was also assumed that all the five CTs would operate at the full load.

A summary of maximum hourly and annual average TAC emission rates is presented in Table 3-2, Table 3-3, and Table 3-4.

Dispersion Modeling

Atmospheric dispersion modeling was conducted to determine the one-hour and annual average concentration of toxic air contaminants from the HGS site. The atmospheric dispersion modeling methodology used for the HGS site 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 3-1
List of Emitted Toxic Air Contaminants to be Included in the Health Risk Assessment and Associated Potential Health Effects

SCAQMD Rule 1401, Table 1 Substances		Rule 1401		
		Carcinogenic	Noncarcinogenic	
Air Toxic	CAS No.		Chronic	Acute
1,3-Butadiene	106990	x		
Acetaldehyde	75070	x	x	
Acrolein	107028			x
Ammonia	7664417		x	x
Arsenic	7440382	x		x
Benz(a)anthracene (PAH)	56553	x		
Benzene	71432	x	x	x
Benzo(a)pyrene (PAH)	50328	x		
Benzo(b)fluoranthene (PAH)	205992	x		
Benzo(k)fluoranthene (PAH)	207089	x		
Beryllium	7440417	x		
Cadmium	7440439	x		
Chrysene (PAH)	218019	x		
Chromium VI	18540299	x		
Chromium (Total)	7440473	x		
Copper	7440508			x
Dibenz(a,h)anthracene (PAH)	53703	x		

Tetra-p-dioxin	41903575	x	x	
Pentachlor-p-dioxin	36088229	x	x	
Hexachlor-p-dioxin	34465468	x	x	
Heptachlor-p-dioxin	37871004	x	x	
1,2,3,4,5,6,7,8-Octa	3268879	x	x	
Ethyl Benzene	100414		x	
Formaldehyde	50000	x	x	x
Tetrachlor-furan	55722275	x	x	
Pentachlor-furan	30402154	x	x	
Hexachlor-furan	55684941	x	x	
Heptachlor-furan	38998753	x	x	
1,2,3,4,5,6,7,8-Octf	39001020	x	x	
HCL	7647010		x	x
Hexane	110543		x	
Indeno(1,2,3-cd)pyrene (PAH)	193395	x		
Lead	7439921	x		
Manganese	7439965		x	
Mercury	7439976		x	x
Naphthalene (PAH)	91203		x	
Nickel	7440020	x	x	x
Propylene	115071		x	
Propylene Oxide	75569	x	x	x
Selenium	7782492			
Toluene	108883		x	x
Xylenes (Total)	1330207		x	x
Zinc	7440666			

Figure 3-1

Location of TAC Emitting Sources Included in the Health Risk Assessment, HGS Site

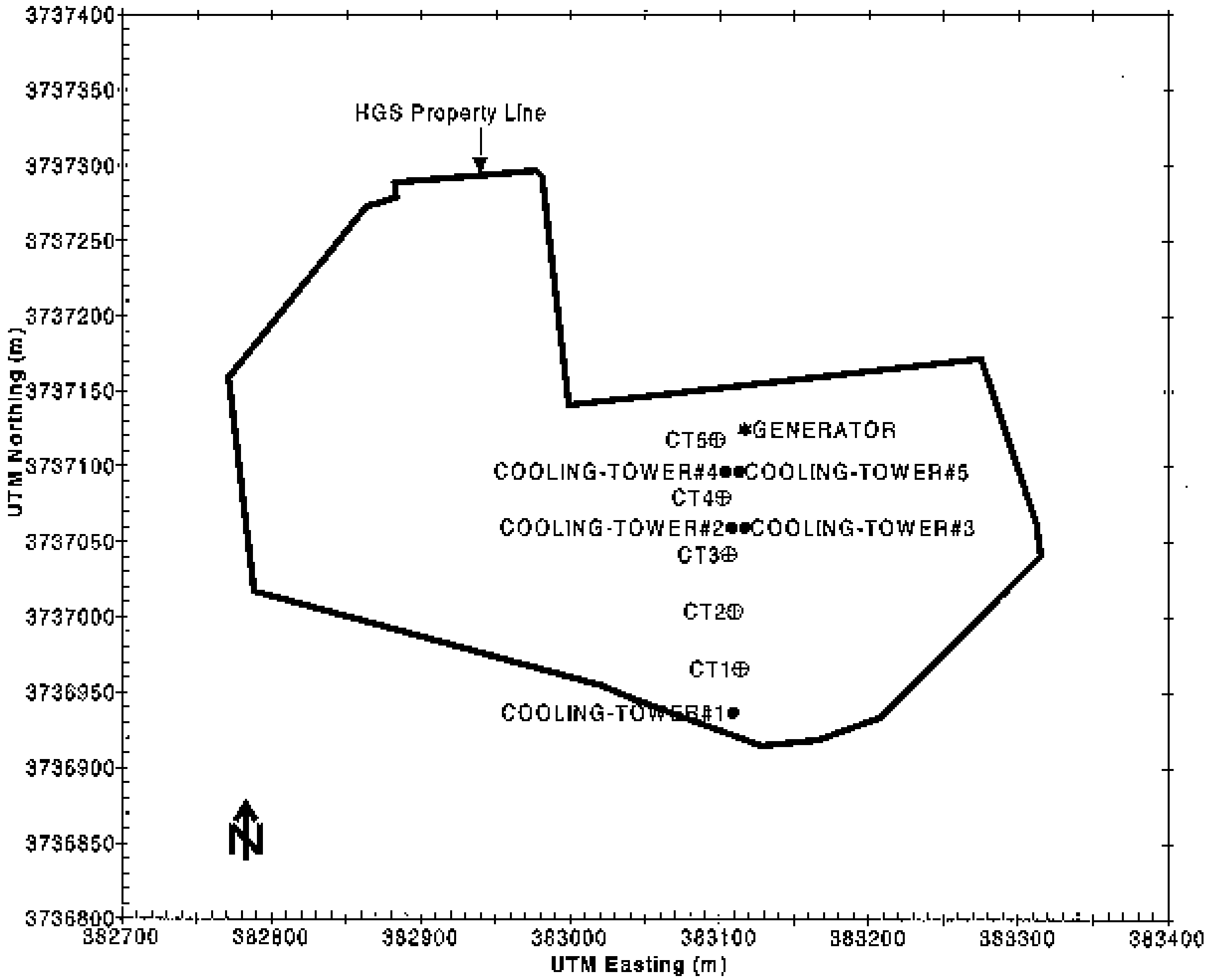


Table 3-2

Maximum Hourly TAC Emission Rates for the HGS and VGS Project Sites

TAC	HGS Emissions (lbs/hr)	VGS Emissions (lbs/hr)
Arsenic	0.00E+00	1.73E04
1,3-Butadiene	3.79E-04	1.19E-04
Acetaldehyde	2.80E-01	0.00E+00
Acrolein	3.89E-02	2.86E-04
Ammonia	1.48E+01	0.00E+00
Benz(a)anthracene	5.14E-05	7.81E-05
Benzene	2.99E-02	1.24E-02
Benzo(a)pyrene	2.88E-05	7.16E-05
Benzo(b)fluoranthene	2.50E-05	1.15E-04
Benzo(k)fluoranthene	2.32E-05	1.12E-04
Beryllium	0.00E+00	4.62E-05
Cadmium	0.00E+00	2.78E-04
Chromium (Hex)	0.00E+00	9.21E-06
Chrysene (PAH)	5.27E-05	8.93E-05
Copper	0.00E+00	8.49E-04
Dibenz(a,h)anthracene	4.93E-05	7.18E-05
Dioxin: 4D Total	0.00E+00	3.20E-09
Dioxin: 5D Total	0.00E+00	6.11E-09
Dioxin: 6D Total	0.00E+00	7.69E-09
Dioxin: 7D Total	0.00E+00	1.44E-08
Dioxin: 8D	0.00E+00	9.13E-08
Ethylbenzene	3.66E-02	0.00E+00
Formaldehyde	1.88E+00	6.28E-02
Furan: 4F Total	0.00E+00	2.86E-08
Furan: 5F Total	0.00E+00	3.99E-08
Furan: 6F Total	0.00E+00	2.06E-08
Furan: 7F Total	0.00E+00	1.43E-08
Furan: 8F	0.00E+00	7.73E-09
HCL	0.00E+00	6.91E-02
Hexane	5.30E-01	0.00E+00
Indeno(1,2,3-cd)pyrene	4.91E-05	7.17E-05
Lead	0.00E+00	5.20E-04
Manganese	0.00E+00	8.81E-03
Mercury	0.00E+00	2.32E-06
Naphthalene	4.59E-03	1.04E-02
Nickel	0.00E+00	4.18E-02

TAC	HGS Emissions (lbs/hr)	VGS Emissions (lbs/hr)
Propylene	1.58E+00	7.88E-03
Propylene Oxide	9.77E-02	0.00E+00
Selenium	0.00E+00	7.18E-06
Toluene	1.46E-01	1.21E-03
Xylene(Total)	5.44E-02	7.91E-04
Zinc	0.00E+00	4.60E-02

Table 3-3

Maximum Annual TAC Emission Rates for the HGS and VGS Project Sites

TAC	HGS Emissions (lbs/yr)	VGS Emissions (lbs/yr)
Arsenic	1.04E-02	2.07E-03
1,3-Butadiene	2.28E+00	4.56E-01
Acetaldehyde	2.45E+03	4.91E+02
Acrolein	3.39E+02	6.77E+01
Ammonia	1.30E+05	2.60E+04
Benz(a)anthracene	4.09E-01	8.19E-02
Benzene	2.39E+02	4.78E+01
Benzo(a)pyrene	2.53E-01	5.07E-02
Benzo(b)fluoranthene	2.09E-01	4.19E-02
Benzo(k)fluoranthene	2.04E-01	4.08E-02
Beryllium	2.78E-03	5.56E-04
Cadmium	1.67E-02	3.33E-03
Chromium (Hex)	5.53E-04	1.11E-04
Chromium (total)	2.17E-02	4.35E-03
Chrysene (PAH)	4.57E-01	9.14E-02
Copper	5.11E-02	1.02E-02
Dibenz(a,h)anthracene	4.25E-01	8.51E-02
Dioxin: 4D Total	1.92E-07	3.83E-08
Dioxin: 5D Total	3.66E-07	7.33E-08
Dioxin: 6D Total	4.61E-07	9.22E-08
Dioxin: 7D Total	8.61E-07	1.72E-07
Dioxin: 8D	5.48E-06	1.10E-06
Ethylbenzene	3.21E+02	6.41E+01
Formaldehyde	1.64E+04	3.29E+03
Furan: 4F Total	1.71E-06	3.42E-07
Furan: 5F Total	2.39E-06	4.79E-07
Furan: 6F Total	1.23E-06	2.47E-07
Furan: 7F Total	8.56E-07	1.71E-07
Furan: 8F	4.41E-07	8.82E-08
HCL	4.15E+00	8.29E-01

TAC	HGS Emissions (lbs/yr)	VGS Emissions (lbs/yr)
Hexane	4.64E+03	9.28E+02
Indeno(1,2,3-cd)pyrene	4.25E-01	8.51E-02
Lead	3.12E-02	6.23E-03
Manganese	5.28E-01	1.06E-01
Mercury	1.39E-04	2.78E-05
Naphthalene	3.03E+01	6.07E+00
Nickel	2.50E+00	5.00E-01
Propylene	1.38E+04	2.76E+03
Propylene Oxide	8.56E+02	1.71E+02
Selenium	4.30E-04	8.60E-05
Toluene	1.27E+03	2.54E+02
Xylene(Total)	4.69E+02	9.39E+01
Zinc	2.76E+00	5.51E-01

Table 3-4

Maximum Hourly and Annual TAC Emission Rates for the SGS Project Site

TAC	Acute Assessment (lbs/hr)	Chronic Assessment (lbs/yr)
Ammonia	36.28	317,813

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. Only simple terrain areas exist in the HGS site vicinity.

Modeling Options

The options used in the ISCST3 dispersion modeling are summarized in Table 3-5. 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 3-5
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

Feature	Option Selected
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 HGS site the SCAQMD requires the use of its Long Beach 1981 meteorological data file. This data set was also used for the recent air quality and HRA modeling studies performed for the HGS site.

In the Long Beach data set, the surface wind speeds and directions were collected at the SCAQMD's Long Beach monitoring station (Station ID 53101), while the upper air sounding data used to estimate hourly mixing heights were gathered at Los Angeles International Airport. Temperatures and sky observation (used for stability classification) were taken from Long Beach 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 two parts: (1) receptors along the perimeter of the facility with a spacing of approximately 100 meters or less; and (2) receptors spaced 1,000 meters apart extending from the property line to approximately ten kilometers from the property line. No receptors were placed within the HGS 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 3 by 3 kilometer area with receptors at 100-meter spacing, and this was used for performing the refined risk assessment.

Figure 3-2 shows the boundary line and receptor locations used in performing the health risk assessment for the HGS 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.

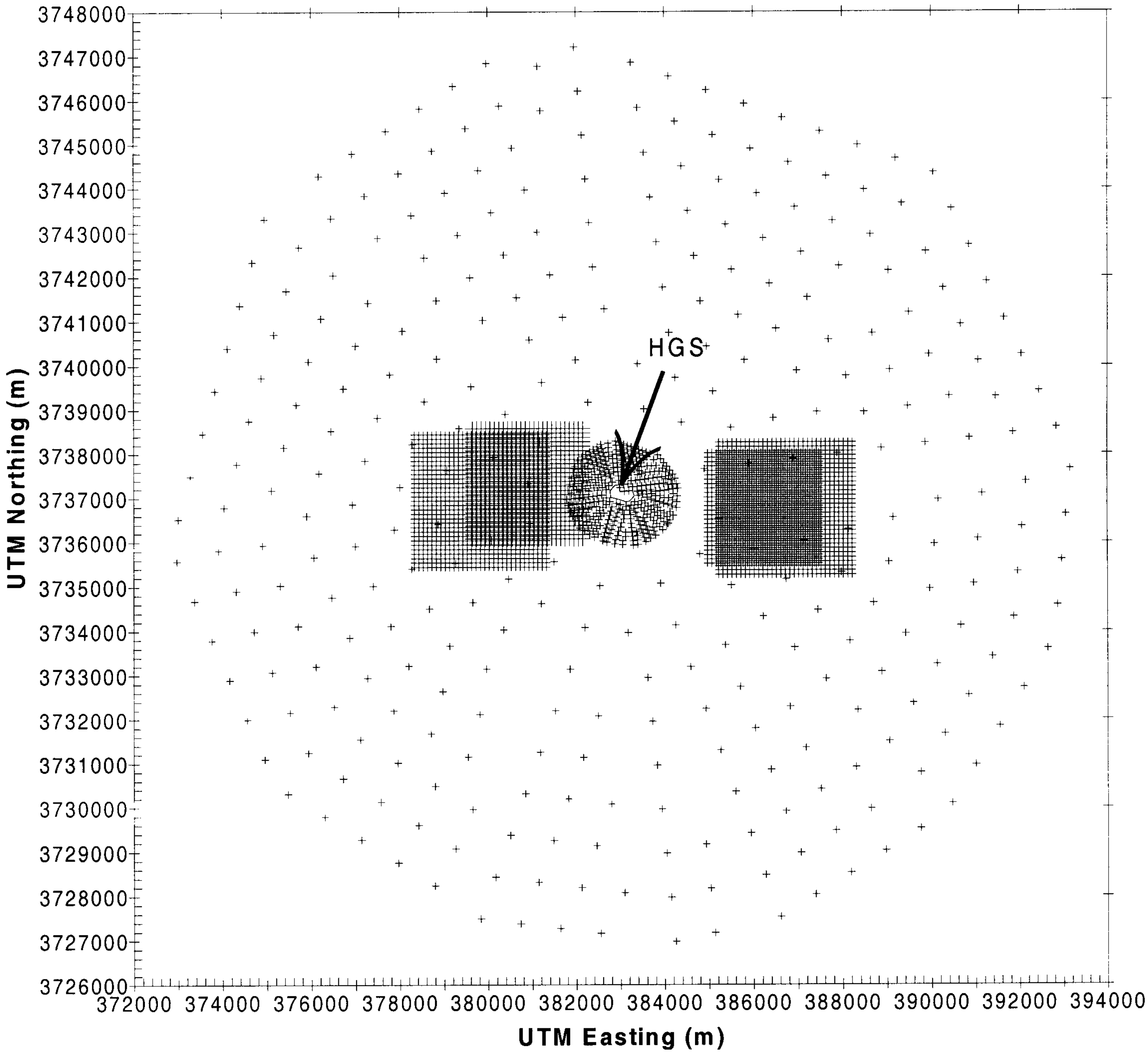
The USEPA's guidance was followed to address the potential influence on the ambient TAC concentrations due to structures located near point emission sources. The latest building downwash program (Version 3.15) developed by Lakes Environmental was used to identify the structures required to be included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

Source Parameters

All of the six 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 parameters are provided in the dispersion model input files ~~provided in Attachment 2B~~. Due to the voluminous nature of this file, the dispersion model input file is not included in this Final EIR.

Figure 3-2

Boundary Line and Receptor Locations Used in the Modeling for the HGS Site.



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 HGS site. 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, 2000b; 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, 2000b).

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 HGS. 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 ~~provided in Attachment 2B are~~ not included in this Final EIR due to the voluminous nature of these files. These files may be obtained by contacting the SCAQMD's CEQA Section (909) 396-3054.

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 (Amended August 18, 2000) with potency values or reference exposure levels were included in the HRA.

The TACs included in this HRA, along with their potential health effects are presented in Table 3-1. 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, 2000b, 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 HGS site, was performed following the CAPCOA and OEHHA and SCAQMD Guidelines (CAPCOA Tables III-5 through III-10, SCAQMD, 2000b, 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 HGS. The potency values of the TACs used for performing the health risk assessment are presented in Table 3-4. Noncancer reference exposure levels (acute and chronic RELs) for toxic air contaminants are also provided in Table 3-6. The toxicological end points for the noncancer toxic responses are provided in Table 3-7.

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.

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 long-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 HGS site and prior HRAs, the following four primary exposure pathways were considered for assessing the health risks from the increased TAC emissions at the HGS 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 HGS 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 HGS vicinity.

The exposure parameters for exposure assessments were selected based on the guidance provided in the CAPCOA Risk Assessment Guidelines (CAPCOA, 1993). Table 3-8 presents the key input parameter values, which were used for exposure assessments.

Table 3-6

Potency Values of the Air Toxics to be Included in the Health Risk Assessment

Toxic Air Contaminant	Symbol	Number	CAS No.	Unit Risk (ug/m3)-1	Potency (mg/kg-d)	Acute REL -1 (ug/m3)	Chronic REL (ug/m3)	Oral Dose (mg/kg-d)
Arsenic	As	10	7440382	3.30E-03	1.50E+00	1.90E-01	9.99E+12	1.00E-03
Butadiene-1,3	BUTAD	20	106990	1.70E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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	9.99E+12	0.00E+00
Ammonia	NH3	9	7664417	0.00E+00	0.00E+00	3.20E+03	2.00E+02	0.00E+00
Benz[a]anthracene	BENZA	163	56553	1.10E-04	1.20E+00	0.00E+00	0.00E+00	0.00E+00
Benzene	BENZE	13	71432	2.90E-05	0.00E+00	1.30E+03	6.00E+01	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
Beryllium	Be	17	7440417	2.40E-03	0.00E+00	0.00E+00	9.99E+12	5.00E-03
Cadmium	Cd	22	7440439	4.20E-03	0.00E+00	0.00E+00	9.99E+12	1.00E-03
Chromium (hex.)	Cr	36	18540299	1.50E-01	4.20E-01	0.00E+00	9.99E+12	5.00E-03
Chrysene	CHRYS	167	218019	1.10E-05	1.20E-01	0.00E+00	0.00E+00	0.00E+00
Copper	Cu	38	7440508	0.00E+00	0.00E+00	1.00E+02	9.99E+12	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
Tetra-p-dioxin	4DPD	174	41903575	3.80E+01	0.00E+00	0.00E+00	4.00E-05	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
Heptachlor-p-dioxin	7DPDT	232	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
Ethyl Benzene	EBENZ	159	100414	0.00E+00	0.00E+00	0.00E+00	2.00E+03	0.00E+00
Formaldehyde	HCHO	70	50000	6.00E-06	0.00E+00	9.40E+01	3.00E+00	0.00E+00

Table 3-6 (continued)

Potency Values of the Air Toxics to be Included in the Health Risk Assessment

Toxic Air Contaminant	Symbol	Number	CAS No.	Unit Risk	Potency	Acute REL	Chronic REL	Oral Dose
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
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
Hydrochloric acid	HCl	78	7647010	0.00E+00	0.00E+00	2.10E+03	9.00E+00	0.00E+00
Hexane	HEXAN	160	110543	0.00E+00	0.00E+00	0.00E+00	7.00E+03	0.00E+00
Indeno[1,2,3-cd]pyre	INDEN	169	193395	1.10E-04	1.20E+00	0.00E+00	0.00E+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 3-7

Toxicological Endpoints of the Toxic Air Contaminants to be 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
Arsenic	As	10	7440382	1	1	0	0	0	0	1	1	0	1	0	0	0	0	0	1	0	0	0
Butadiene-1,3	BUTAD	20	106990	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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	0	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
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
Benzene	BENZE	13	71432	1	1	0	0	0	1	0	0	0	0	1	0	1	0	0	1	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
Beryllium	Be	17	7440417	0	0	0	0	0	0	1	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
Chromium (hex.)	Cr	36	18540299	0	0	0	1	1	0	1	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
Copper	Cu	38	7440508	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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
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
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
Heptachlor-p-dioxin	7DPDT	232	37871004	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-Octa	8DPD	180	3268879	1	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0

Table 3-7 (continued)

Toxicological Endpoints of the Air Toxics to be 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
Ethyl Benzene	EBENZ	159	100414	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	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
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
1,2,3,4,5,6,7,8-Octf	8DBF	190	39001020	1	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0
Hydrochloric acid	HCl	78	7647010	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0
Hexane	HEXAN	160	110543	0	1	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
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	0	1	1	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
Zinc	Zn	152	7440666	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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 HGS 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.

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.

Table 3-8

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

Table 3-8

Key Input Parameters Used For Exposure Assessment

Parameter	Input Value
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

Results of the Health Risk Assessment

Excess Carcinogenic Risk. The results of the ACE2588 model analysis indicate a MEI cancer risk of 0.19 in one million at a distance of about 2.5 kilometers east of the HGS site. The location of the MEI is shown in Figure 3-3. Tables 3-9 and 3-10 show the cancer risk from inhalation and noninhalation pathways by source and by TAC, respectively for the MEI location.

For the MEI location, 96 percent of the maximum risk was contributed by combustion turbines. Formaldehyde was the major contributor to the total carcinogenic risk (about 76 percent of the total carcinogenic risk). As expected, the results of the risk analysis in Table 3-10 show that the carcinogenic risk at the MEI location from the inhalation pathway would be the maximum (approximately 93 percent).

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 3-6 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 0.08 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 kilometers west of the HGS site. Figure 3-3 shows the location of the maximum acute hazard index. Table 3-11 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. The maximum contribution to the total acute hazard index was from the CT Stack #3.

Table 3-12 shows the chronic hazard indices for different toxicological endpoints for the peak receptor by pollutant. The total chronic hazard index was estimated to be 0.01 for the respiratory endpoint. This value of the hazard index is also lower than the threshold value of 1.0. The peak receptor, where the maximum chronic hazard index occurred, was identified in the general area of the MEI location. Approximately 82 percent of the total chronic hazard index was from the emissions of formaldehyde. Figure 3-3 shows the location of maximum chronic hazard index.

1.4 Scattergood Generating Station

Emission Estimation of Toxic Air Contaminants

At the SGS site, the installation of the SCRs would result in the emissions of ammonia, which is a TAC. The emissions of ammonia were estimated using the SCAQMD's BACT permitting limit of 10 ppm for ammonia slippage for the SGS. The maximum hourly and annual emission rates of ammonia were estimated at 36.3 lbs/hr and 317,813 lbs/yr, respectively. The details of the TAC emission calculations are provided in Appendix X of this Draft EIR. The location of the ammonia emitting sources at the SGS site are shown in Figure 3-4.

Dispersion Modeling

The details of the dispersion modeling are provided above under HGS site modeling.

<u>Meteorological Data</u>

For the vicinitiy of SGS site, the SCAQMD requires the use of its Lennox 1981 meteorological data file. This data set was also used for the recent air quality and HRA modeling studies performed for the SGS site.

In the Lennox data set, the surface wind speeds and directions were collected at the SCAQMD's LAX monitoring station (Surface Station No. 52118), while the upper air sounding data used to estimate

Figure 3-3

Location of Maximally Exposed Individual, Maximum Acute Hazard Index, and Maximum Chronic Hazard Index for HGS

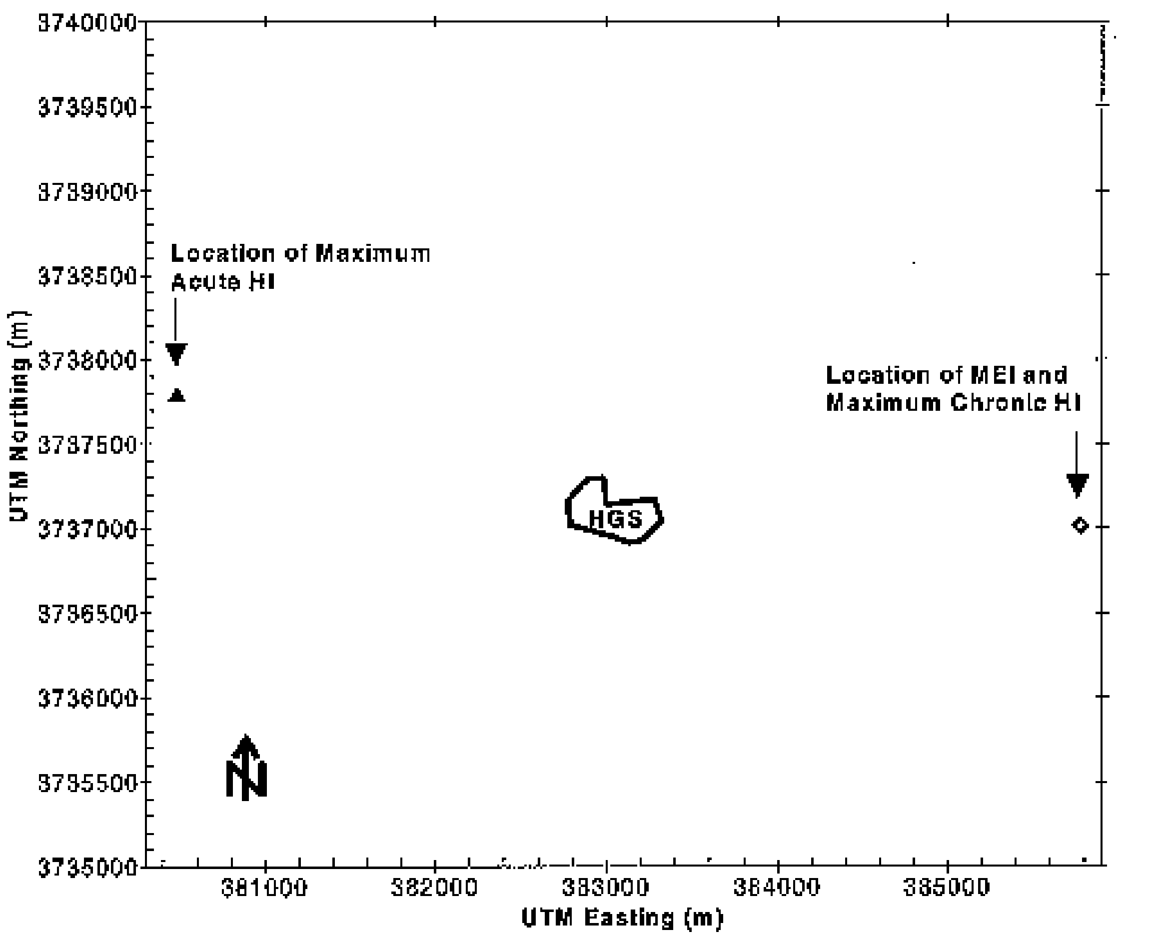


Table 3-9

Multipathway Cancer Risk By Source For MEI (HGS Site)

Source	Inhale	Dermal	Soil	Water	Plants	Animal	Mother Milk	Sum
CT1_OPER	3.40E-08	1.58E-10	2.50E-10	0.00E+00	1.81E-09	0.00E+00	0.00E+00	3.62E-08
CT2_OPER	3.42E-08	1.59E-10	2.51E-10	0.00E+00	1.83E-09	0.00E+00	0.00E+00	3.64E-08
CT3_OPER	3.43E-08	1.60E-10	2.52E-10	0.00E+00	1.83E-09	0.00E+00	0.00E+00	3.66E-08
CT4_OPER	3.44E-08	1.60E-10	2.53E-10	0.00E+00	1.84E-09	0.00E+00	0.00E+00	3.66E-08
CT5_OPER	3.43E-08	1.60E-10	2.52E-10	0.00E+00	1.83E-09	0.00E+00	0.00E+00	3.66E-08
CT1_READ	1.20E-09	1.16E-11	6.80E-11	0.00E+00	1.40E-10	0.00E+00	0.00E+00	1.42E-09
CT2_READ	1.21E-09	1.16E-11	6.83E-11	0.00E+00	1.41E-10	0.00E+00	0.00E+00	1.43E-09
CT3_READ	1.21E-09	1.17E-11	6.85E-11	0.00E+00	1.41E-10	0.00E+00	0.00E+00	1.43E-09
CT4_READ	1.21E-09	1.17E-11	6.85E-11	0.00E+00	1.41E-10	0.00E+00	0.00E+00	1.43E-09
CT5_READ	1.21E-09	1.16E-11	6.83E-11	0.00E+00	1.41E-10	0.00E+00	0.00E+00	1.43E-09
BS1	1.07E-11	1.63E-13	2.57E-13	0.00E+00	1.87E-12	0.00E+00	0.00E+00	1.29E-11
SUM	1.77E-07	8.57E-10	1.60E-09	0.00E+00	9.85E-09	0.00E+00	0.00E+00	1.90E-07

Table 3-10
Multipathway Cancer Risk By Pollutant for MEIR (HGS Site)

Pollutant*	Inhale	Dermal	Soil	Water	Plants	Animal	Mother Milk	Sum
As	2.13E-10	5.33E-12	2.52E-10	0.00E+00	1.05E-10	0.00E+00	0.00E+00	5.75E-10
BUTAD	5.70E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.70E-10
ACETA	9.74E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.74E-09
BENZA	6.87E-11	6.53E-11	1.03E-10	0.00E+00	7.48E-10	0.00E+00	0.00E+00	9.85E-10
BENZE	1.03E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.03E-08
BENZO	4.32E-10	4.10E-10	6.46E-10	0.00E+00	4.70E-09	0.00E+00	0.00E+00	6.19E-09
BENZF	3.74E-11	3.55E-11	5.60E-11	0.00E+00	4.07E-10	0.00E+00	0.00E+00	5.36E-10
BENZK	3.64E-11	3.46E-11	5.45E-11	0.00E+00	3.96E-10	0.00E+00	0.00E+00	5.22E-10
Be	4.15E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.15E-11
Cd	4.35E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.35E-10
Cr	5.16E-10	7.96E-13	3.76E-12	0.00E+00	1.51E-12	0.00E+00	0.00E+00	5.22E-10
CHRYS	7.66E-12	7.28E-12	1.15E-11	0.00E+00	8.34E-11	0.00E+00	0.00E+00	1.10E-10
DIBEN	7.72E-10	2.30E-10	3.62E-10	0.00E+00	2.63E-09	0.00E+00	0.00E+00	4.00E-09
4DPD	4.53E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.53E-11
5DPDT	4.32E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.32E-11
6DPDT	1.09E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.09E-11
7DPDT	2.04E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.04E-12
8DPD	1.30E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.30E-12
HCHO	1.45E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.45E-07
4DBFT	4.05E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.05E-11
5DBFT	2.83E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.83E-10
6DBFT	2.92E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.92E-11
7DBFT	2.02E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.02E-12
8DBF	1.04E-13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.04E-13
INDEN	7.08E-11	6.73E-11	1.06E-10	0.00E+00	7.71E-10	0.00E+00	0.00E+00	1.02E-09
Pb	2.33E-12	9.08E-14	4.29E-12	0.00E+00	1.80E-12	0.00E+00	0.00E+00	8.51E-12
Ni	4.05E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.05E-09
PROX	4.66E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.66E-09
SUM	1.77E-07	8.57E-10	1.60E-09	0.00E+00	9.85E-09	0.00E+00	0.00E+00	1.90E-07

*See Table 3-6 for key to complete names of pollutants

Table 3-11

Acute Hazard Index for Peak Receptor (HGS Site)

POLLU-TANT*	CONC (ug/m3)	BACKGR (ug/m3)	AEL (ug/m3)	CV/BS	CNS/PNS	IMMUN	KIDN	GI/LI	REPR	RESP	EYE	SKIN
ACROL	1.36E-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	7.17E-02	7.17E-02	0.00E+00
NH3	5.10E+00	0.00E+00	3.20E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.59E-03	1.59E-03	0.00E+00
BENZE	1.26E-02	0.00E+00	1.30E+03	9.73E-06	0.00E+00	9.73E-06	0.00E+00	0.00E+00	9.73E-06	0.00E+00	0.00E+00	0.00E+00
HCHO	6.48E-01	0.00E+00	9.40E+01	0.00E+00	0.00E+00	6.89E-03	0.00E+00	0.00E+00	0.00E+00	6.89E-03	6.89E-03	0.00E+00
PROX	3.37E-02	0.00E+00	3.10E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.09E-05	1.09E-05	1.09E-05	0.00E+00
TOL	5.13E-02	0.00E+00	3.70E+04	0.00E+00	1.39E-06	0.00E+00	0.00E+00	0.00E+00	1.39E-06	1.39E-06	1.39E-06	0.00E+00
XYLEN	1.93E-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	8.79E-07	8.79E-07	0.00E+00
			SUM =	9.73E-06	1.39E-06	6.90E-03	0.00E+00	0.00E+00	2.20E-05	8.02E-02	8.02E-02	0.00E+00

*See Table 3-6 for key to complete names of pollutants

Table 3-12

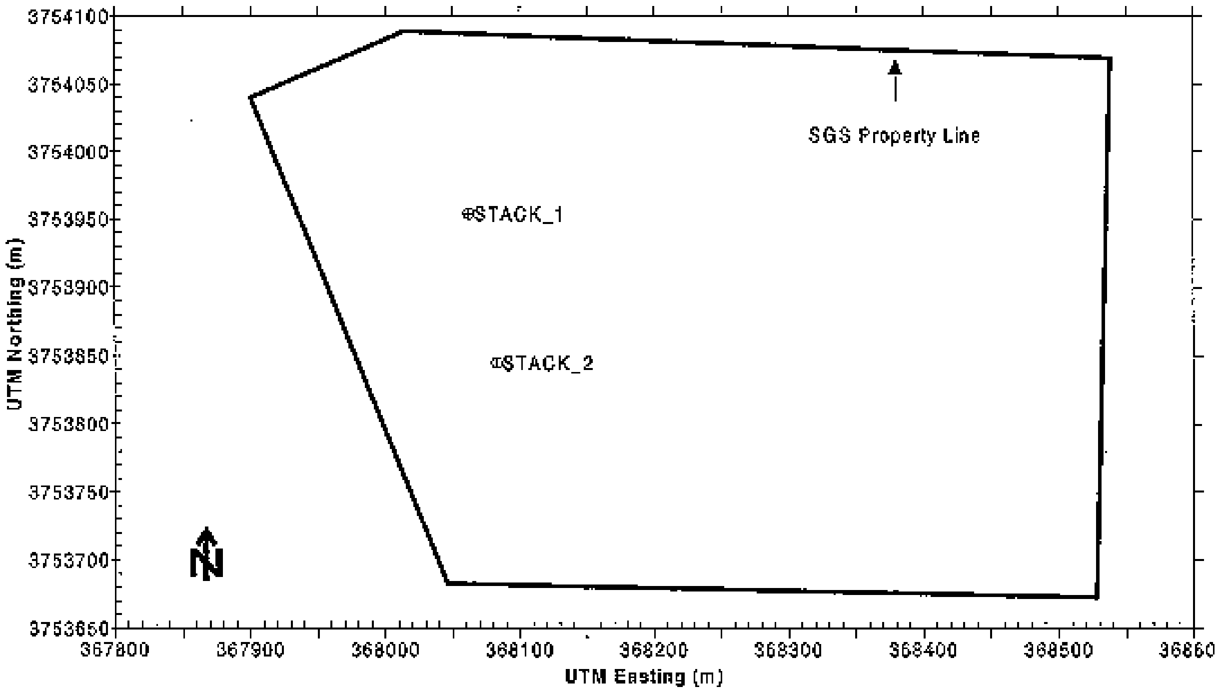
Chronic Hazard Index for Peak Receptor (HGS Site)

POLLU-	ORAL DOSE	BACKGR	AEL	CV/BL	CNS/PNS	IMMUN	KIDN	GI/LI	REPR	RESP	SKIN	ENDO	EYE
As	1.00E-03	0.00E+00	9.99E+12	2.41E-07	2.41E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.45E-21	2.41E-07	0.00E+00	2.41E-07
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	4.01E-04	0.00E+00	0.00E+00	0.00E+00
ACROL	0.00E+00	0.00E+00	9.99E+12	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
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	9.54E-04	0.00E+00	0.00E+00	0.00E+00
BENZE	0.00E+00	0.00E+00	6.00E+01	5.90E-06	5.90E-06	0.00E+00	0.00E+00	0.00E+00	5.90E-06	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	1.73E-21	0.00E+00	0.00E+00	0.00E+00
Cd	1.00E-03	0.00E+00	9.99E+12	0.00E+00	0.00E+00	0.00E+00	5.71E-07	0.00E+00	0.00E+00	1.04E-20	0.00E+00	0.00E+00	0.00E+00
Cr	5.00E-03	0.00E+00	9.99E+12	0.00E+00	0.00E+00	0.00E+00	2.89E-09	2.89E-09	0.00E+00	3.44E-22	0.00E+00	0.00E+00	0.00E+00
Cu	0.00E+00	0.00E+00	9.99E+12	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
4DPD	1.00E-09	0.00E+00	4.00E-05	2.87E-06	0.00E+00	0.00E+00	0.00E+00	2.87E-06	2.87E-06	2.98E-08	0.00E+00	2.87E-06	0.00E+00
5DPDT	1.00E-09	0.00E+00	8.00E-05	5.45E-06	0.00E+00	0.00E+00	0.00E+00	5.45E-06	5.45E-06	2.84E-08	0.00E+00	5.45E-06	0.00E+00
6DPDT	1.00E-09	0.00E+00	4.00E-04	6.87E-06	0.00E+00	0.00E+00	0.00E+00	6.87E-06	6.87E-06	7.19E-09	0.00E+00	6.87E-06	0.00E+00
7DPDT	1.00E-09	0.00E+00	4.00E-03	1.28E-05	0.00E+00	0.00E+00	0.00E+00	1.28E-05	1.28E-05	1.34E-09	0.00E+00	1.28E-05	0.00E+00
8DPD	1.00E-09	0.00E+00	4.00E-02	8.15E-05	0.00E+00	0.00E+00	0.00E+00	8.15E-05	8.15E-05	8.55E-10	0.00E+00	8.15E-05	0.00E+00
EBENZ	0.00E+00	0.00E+00	2.00E+03	0.00E+00	0.00E+00	0.00E+00	2.35E-07	2.35E-07	2.35E-07	0.00E+00	0.00E+00	2.35E-07	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	8.05E-03	0.00E+00	0.00E+00	8.05E-03
4DBFT	1.00E-09	0.00E+00	4.00E-04	2.54E-05	0.00E+00	0.00E+00	0.00E+00	2.54E-05	2.54E-05	2.66E-08	0.00E+00	2.66E-08	0.00E+00
5DBFT	1.00E-09	0.00E+00	8.00E-05	3.57E-05	0.00E+00	0.00E+00	0.00E+00	3.57E-05	3.57E-05	1.86E-07	0.00E+00	1.86E-07	0.00E+00
6DBFT	1.00E-09	0.00E+00	4.00E-04	1.83E-05	0.00E+00	0.00E+00	0.00E+00	1.83E-05	1.83E-05	1.92E-08	0.00E+00	1.92E-08	0.00E+00
7DBFT	1.00E-09	0.00E+00	4.00E-03	1.27E-05	0.00E+00	0.00E+00	0.00E+00	1.27E-05	1.27E-05	1.33E-09	0.00E+00	1.33E-09	0.00E+00
8DBF	1.00E-09	0.00E+00	4.00E-02	6.55E-06	0.00E+00	0.00E+00	0.00E+00	6.55E-06	6.55E-06	6.87E-11	0.00E+00	6.87E-11	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	2.86E-06	0.00E+00	0.00E+00	0.00E+00
HEXAN	0.00E+00	0.00E+00	7.00E+03	0.00E+00	9.76E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pb	4.30E-04	0.00E+00	9.99E+12	1.69E-06	1.69E-06	1.69E-06	1.69E-06	0.00E+00	1.69E-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	1.64E-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	2.79E-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	5.25E-06	0.00E+00	0.00E+00	0.00E+00
Ni	0.00E+00	0.00E+00	5.00E-02	3.11E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.11E-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	6.77E-06	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	4.20E-05	0.00E+00	0.00E+00	0.00E+00
TOL	0.00E+00	0.00E+00	3.00E+02	0.00E+00	6.22E-06	0.00E+00	0.00E+00	0.00E+00	6.22E-06	6.22E-06	0.00E+00	0.00E+00	0.00E+00
XYLEN	0.00E+00	0.00E+00	7.00E+02	0.00E+00	9.84E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.84E-07	0.00E+00	0.00E+00	0.00E+00
			SUM =	5.27E-04	3.25E-05	1.69E-06	2.50E-06	2.09E-04	2.22E-04	9.78E-03	2.41E-07	1.10E-04	8.05E-03

*See Table 3-6 for key to complete names of pollutants

Figure 3-4.

Location of Sources Emitting Toxic Air Pollutants for SGS



hourly mixing heights were gathered at Los Angeles International Airport (Upper Air Station No. 91919). Temperatures and sky observation (used for stability classification) were taken from Lennox and LAX 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 two parts: (1) receptors along the perimeter of the facility with a spacing of approximately 100 meters or less and (2) receptors spaced 1,000 meters apart extending from the property line to approximately ten kilometers from the property line. No receptors were placed within the SGS property line.

Once the approximate location of peak concentration was identified from the coarse grid simulation, a fine grid of receptors was created that centered on the coarse grid peak location. The fine receptor grid covered a 3 by 3 kilometer area with receptors at 100-meter spacing, and this was used for performing the refined health risk assessment.

Figure 3-5 shows the boundary line and receptor locations used in performing the health risk assessment for the SGS site.

Source Parameters

Ammonia will be emitted from two stacks; these were modeled as point sources. The source parameters used for dispersion modeling are provided in the dispersion model input file ~~provided in Attachment 2B~~. Due to the voluminous nature of this file, the dispersion model input file is not included in this Final EIR.

Health Risk Assessment Model

The details of the health risk assessment model are provided above in the HGS health risk assessment model subsection.

Hazard Identification

The potential health effects of ammonia are presented in Table 3-1

Dose Response Assessment

The reference exposure levels of ammonia that was used for performing the risk assessment are presented in Table 3-6. The toxicological endpoints for the noncarcinogenic toxic responses are provided in Table 3-7.

Exposure Assessment

In accordance with Table III-5 of the CAPCOA AB2588 Risk Assessment Guidelines and OEHHA's current guidelines (OEHHA, 1999), ammonia is not required to be considered for multipathway evaluation. Thus, only inhalation exposure pathways were considered for assessing the health risks from the increased ammonia emissions at the SGS site. Table 3-8 presents the key input parameter values used for inhalation exposure assessments.

Health Risk Characterization

The details of the health risk characterization are provided above in the HGS health risk characterization subsection.

Results of the Risk Assessment

Noncarcinogenic Health Effects. The noncarcinogenic health effects of ammonia were assessed by calculating the hazard indices.

The maximum total acute hazard index for the respiratory endpoint was estimated to be 0.002. This is lower than the threshold value of 1.0. The peak receptor location, where the maximum acute hazard index occurred, was identified 5 kilometers southeast of the SGS site. Figure 3-6 shows the location of maximum acute hazard index.

Figure 3-5

Boundary Line and Receptor Locations Used in the Modeling for the SGS.

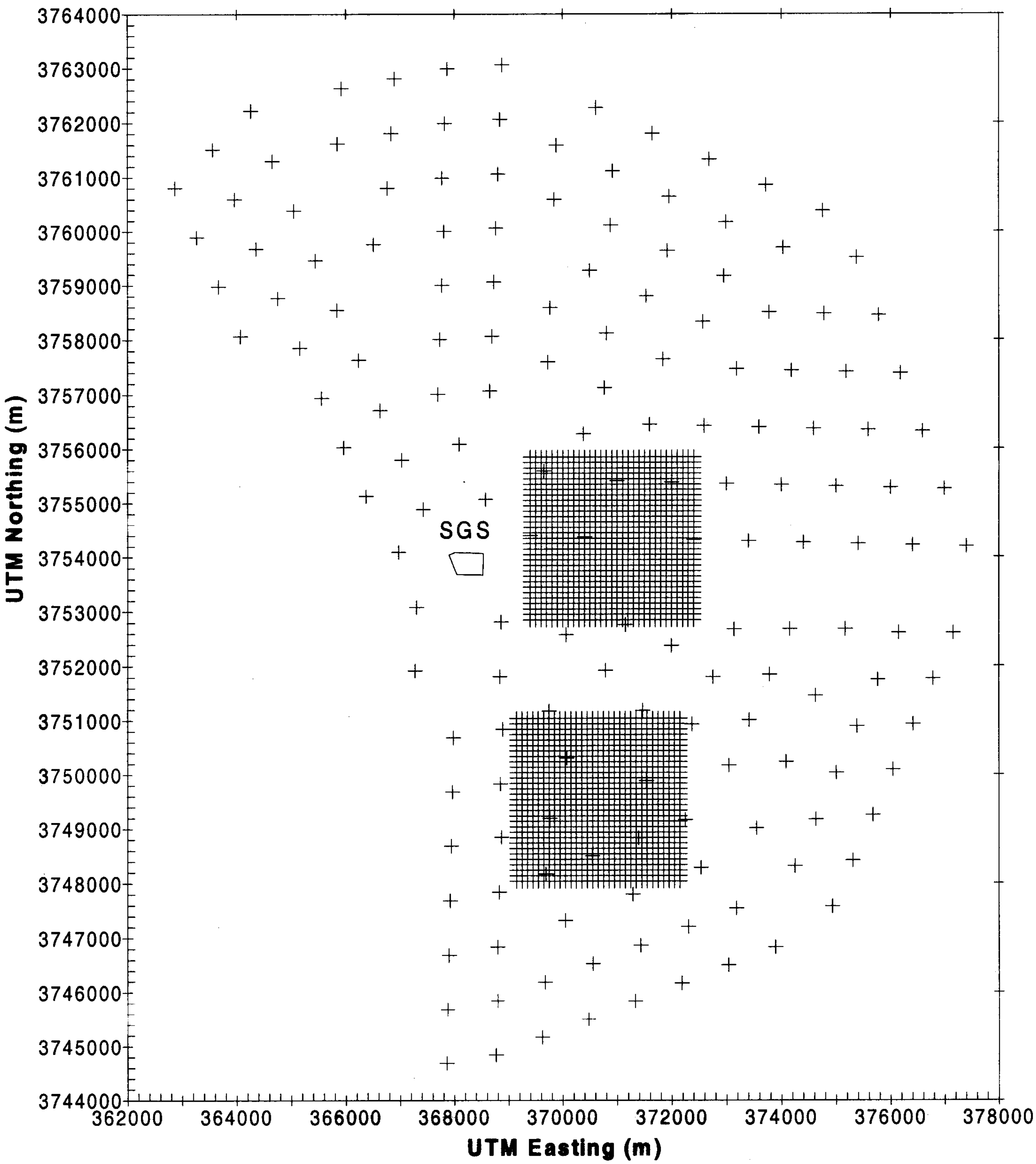
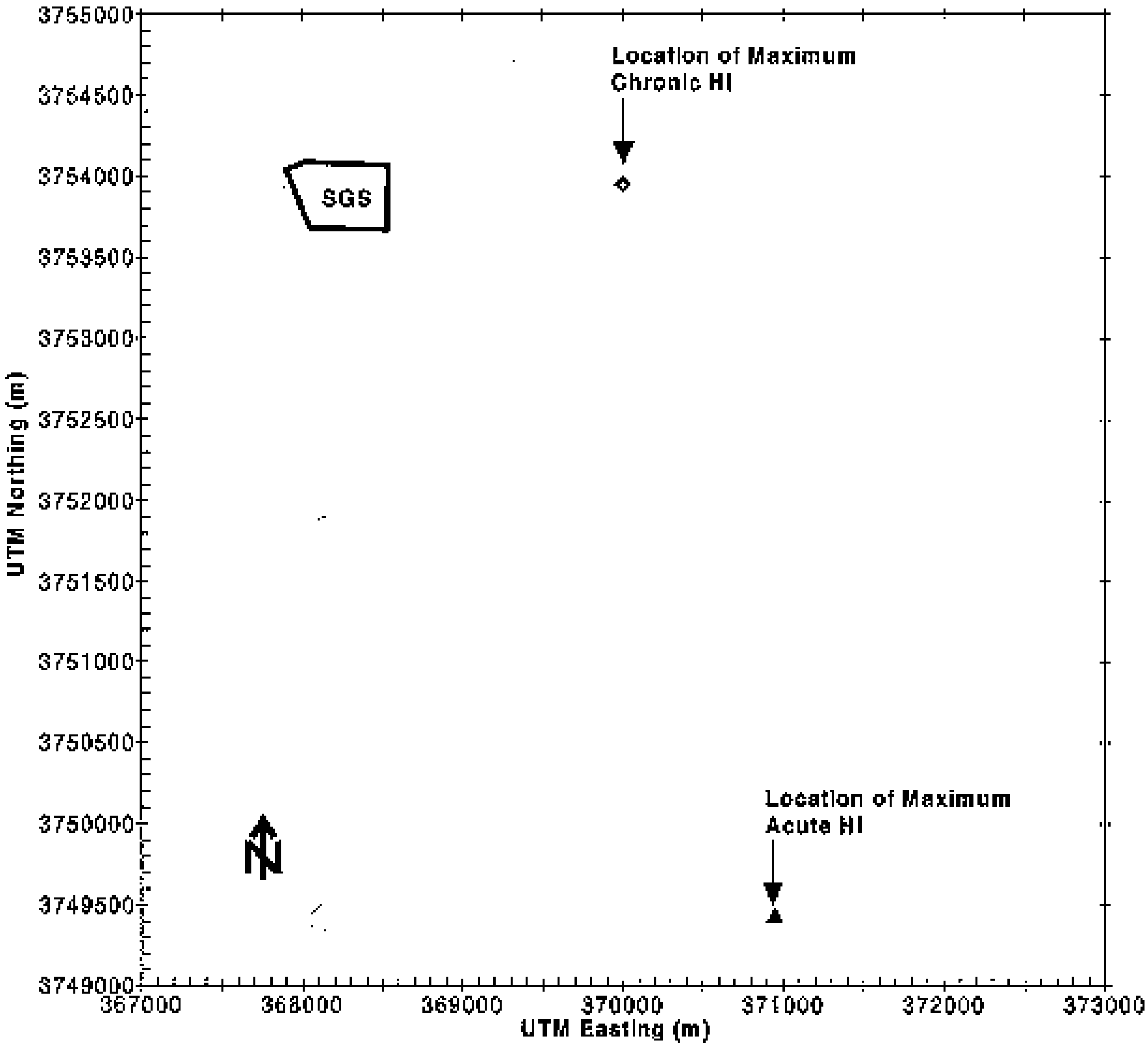


Figure 3-6

Location of the Maximum Acute Hazard Index and Maximum Chronic Hazard Index for SGS



The chronic hazard index was estimated to be 0.0017 for the respiratory endpoint. Thus the chronic hazard index is also lower than the threshold value of 1.0. The peak receptor where the maximum chronic hazard index occurred was identified approximately 1.5 kilometers east of the SGS site. Figure 3-6 shows the location of maximum chronic hazard index.

1.5 Valley Generating Station

Emission Estimation of Toxic Air Contaminants

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

- One 47-MW CT equipped with a SCR system.
- One black start diesel generator.

The TAC emissions were estimated for the following four operating scenarios for the VGS site:

1 & 2) Normal Startup/Normal Operating Scenario

During the normal startup/normal operating scenario at the VGS site, the CT would be started at significantly lower load and then put into normal operation at the desired load conditions. The emissions of all TACs (except ammonia) were estimated by using the CARB approved emission factors (CARB, 2000a). The ammonia emissions were estimated by using the SCAQMDs BACT permitting emission limit of 5 ppm for ammonia slippage the VGS (during the normal operation of the CT).

3) CT Diesel Fuel Readiness Testing Scenario

The CT at the VGS will be tested for diesel fuel readiness, once per month for thirty minutes. All the toxic air contaminants were estimated by using the CARB approved emission factors (CARB, 2000b).

4) Black Start Diesel Fuel Generator Readiness Testing Scenario

The black start generator will be tested every month for thirty minutes. The emissions of all TAC were estimated using the CARB approved emission factors (CARB, 2000c).

The TAC that will be emitted from the VGS site and included in the SCAQMD Rule 1401 (amended August 2000) list of TACs and requiring a HRA are presented in Table 3-1. The details of TAC emission calculations are provided in Appendix X of this Draft EIR. The location of all TAC emitting sources included in the risk assessment are shown in Figure 3-7

In order to estimate the worst-case carcinogenic and noncarcinogenic risks from the VGS operation, the emissions from the four operating scenarios were combined as described below.

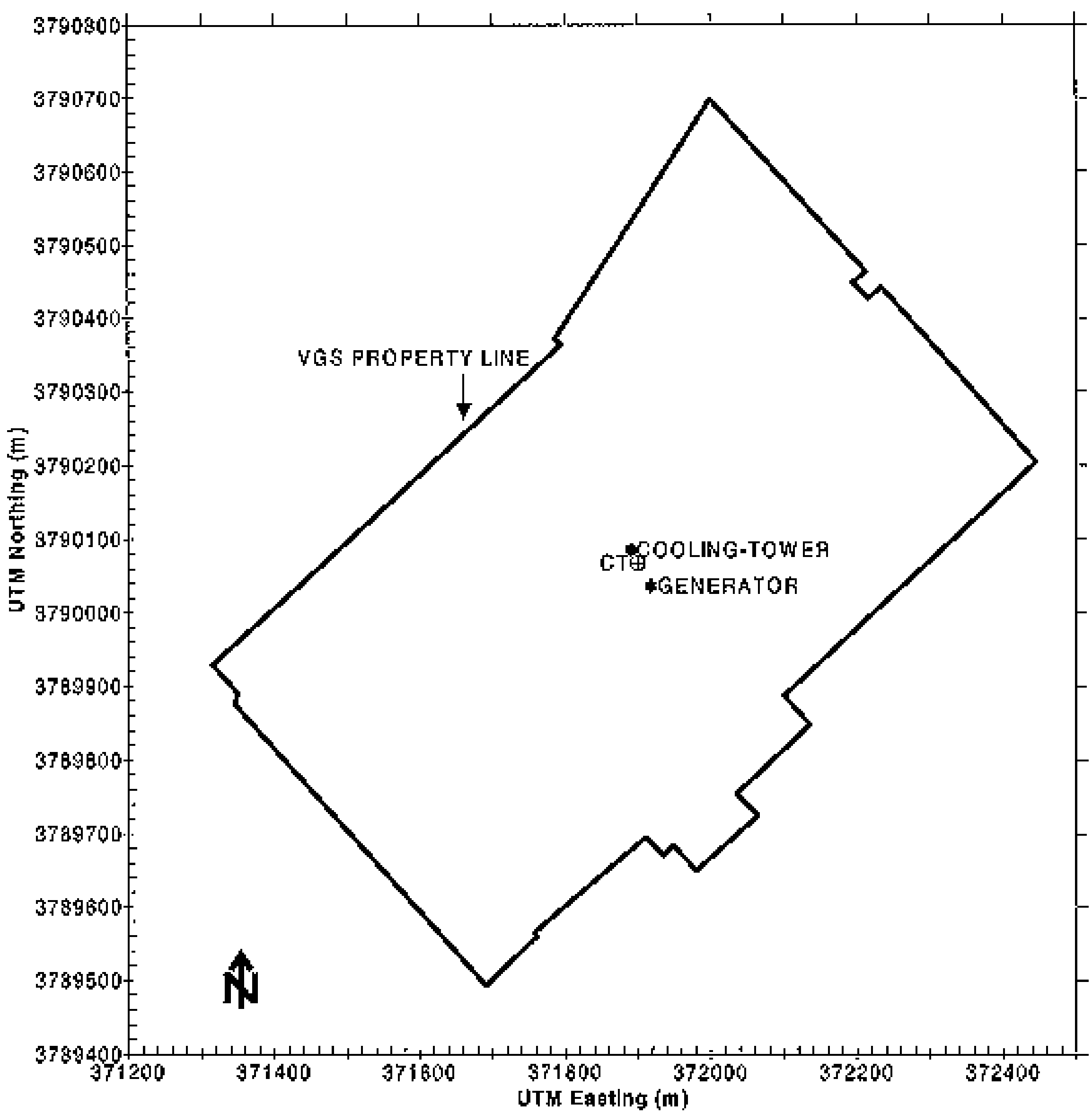
- For estimating the "worst-case" acute hazard index (noncarcinogenic health impact), it was assumed that CT and the black start generator would be tested would be tested for readiness.
- For estimating the worst-case chronic hazard index (noncarcinogenic health impact) and the carcinogenic health risk, it was assumed that the CT would operate throughout the

year (8,760 hours), and the CT and the black start generator would also be tested throughout the year (12 months, 30-minutes per month for the CT and black start generator readiness tests).

A summary of maximum hourly and annual average TAC emission rates is presented in Table 3-2, Table 3-3, and Table 3-4.

Figure 3-7

Location of Sources Emitting Toxic Air Pollutants for VGS



Dispersion Modeling

The details of the dispersion modeling are provided above under the HGS site modeling.

Meteorological Data

For the vicinity of VGS, 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 VGS site.

In the Burbank data set, 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 that used to estimate hourly mixing heights were gathered at Ontario Airport (Upper Air Station No. 99999). Temperatures and sky observation (used for stability classification) were taken from Burbank and Ontario Airport data.

Receptors

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 two parts: (1) receptors along the perimeter of the facility with a spacing of approximately 100 meters; and (2) receptors spaced 1,000 meters apart extending from the property line to approximately five kilometers from the property line. No receptors were placed within the VGS property line.

Once the approximate location of peak concentration was identified from the coarse grid simulation, a fine grid of receptors was created and 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 grid was used for performing the refined risk assessment.

Figure 3-8 shows the boundary line and receptor locations used in the modeling for the VGS.

Source Parameters

The two stack sources that would emit TACs were modeled as point sources. The source parameters are provided in the dispersion model input files ~~provided in Attachment 2B~~. Due to the voluminous nature of this file, the dispersion model input file is not included in this Final EIR.

Health Risk Assessment Model

The details of the health risk model above in the HGS health risk assessment model discussion.

Hazard Identification

The TACs included in this HRA, along with their potential health effects are presented in Table 3-1

Dose Response Assessment

The potency values of the TACs used for performing the health risk assessment are presented in Table 3-6. The toxicological endpoints for the noncancer toxic responses are provided in Table 3-7.

EXPOSURE ASSESSMENT

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

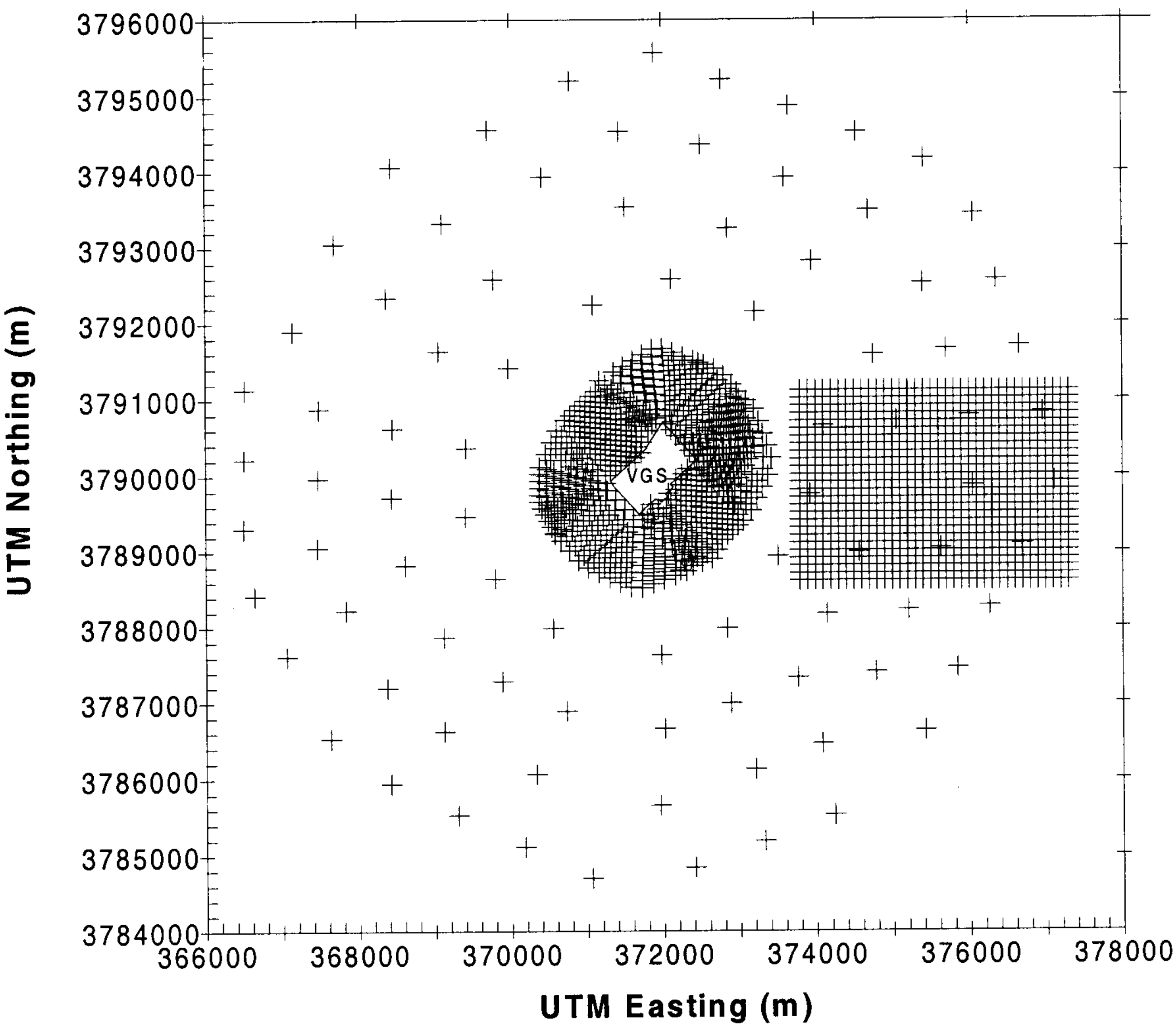
- Dermal exposure
- Inhalation
- Mother's milk
- Soil ingestion

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 VGS 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 VGS vicinity.

Table 3-8 presents the key input exposure parameter values which were used for exposure assessments.

Figure 3-8

Boundary Line and Receptor Locations Used in the Modeling for the VGS



In accordance with Table III-5 of the CAPCOA AB2588 Risk Assessment Guidelines and OEHHA's current guidelines (OEHHA, 1999), 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

Health Risk Characterization

The details of the health risk characterizations are provided above in the HGS health risk characterization site section.

Results of the Risk Assessment

Excess Carcinogenic Risk. The results of the ACE2588 model analysis indicate a MEI of 0.05 in one million at a distance of about 3 kilometers east of the VGS. The location of the MEI is shown in Figure 3-9. Tables 3-13 and 3-14 show the cancer risk from inhalation and noninhalation pathways by source and by TAC, respectively for the MEI location.

For the MEI location, the maximum risk (about 99 percent of the total carcinogenic risk) was contributed by the combustion turbine during normal operations. Formaldehyde was the major contributor to the total carcinogenic risk (about 79 percent of the total carcinogenic risk). As expected, the results of the risk analysis in Table 3-13 show that the contribution to the carcinogenic risk at the MEI location from the inhalation pathway would be the maximum (approximately 94 percent).

Noncarcinogenic Health Effects. 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 0.05 for the respiratory endpoint. 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 on the property line. Figure 3-9 shows the location of maximum acute hazard index. Table 3-15 shows the acute hazard index for different toxicological endpoints for the peak receptor by TAC. Approximately 82 percent of the total acute hazard index resulted from Nickel emissions. The maximum contribution to the total acute hazard index was from the CT stack.

Table 3-16 shows the chronic hazard indices for different toxicological endpoints for the peak receptor by pollutant. The total chronic hazard index was estimated to be 0.003 for the respiratory endpoint. This hazard index value was also lower than the threshold value of 1.0. The peak receptor where the maximum chronic hazard index occurred was identified to be in the general area of the MEI location. Approximately 84 percent of the total chronic hazard index was from the emissions of formaldehyde. Figure 3-9 shows the location of maximum chronic hazard index.

1.6 CONCLUSIONS

The maximum individual excess carcinogenic risks for the maximally exposed individual, and the hazard indices (acute and chronic) for all the three generation stations (HGS, SGS, and VGS) 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 LADWP Modification Project's operation. The maximum individual excess cancer risk of 0.19, maximum acute hazard index of 0.08, and a maximum chronic hazard index of 0.01 were estimated for modifications at the HGS site.

Figure 3-9

Location of Maximally Exposed Individual, Maximum Acute Hazard Index, and Maximum Chronic Hazard Index for VGS

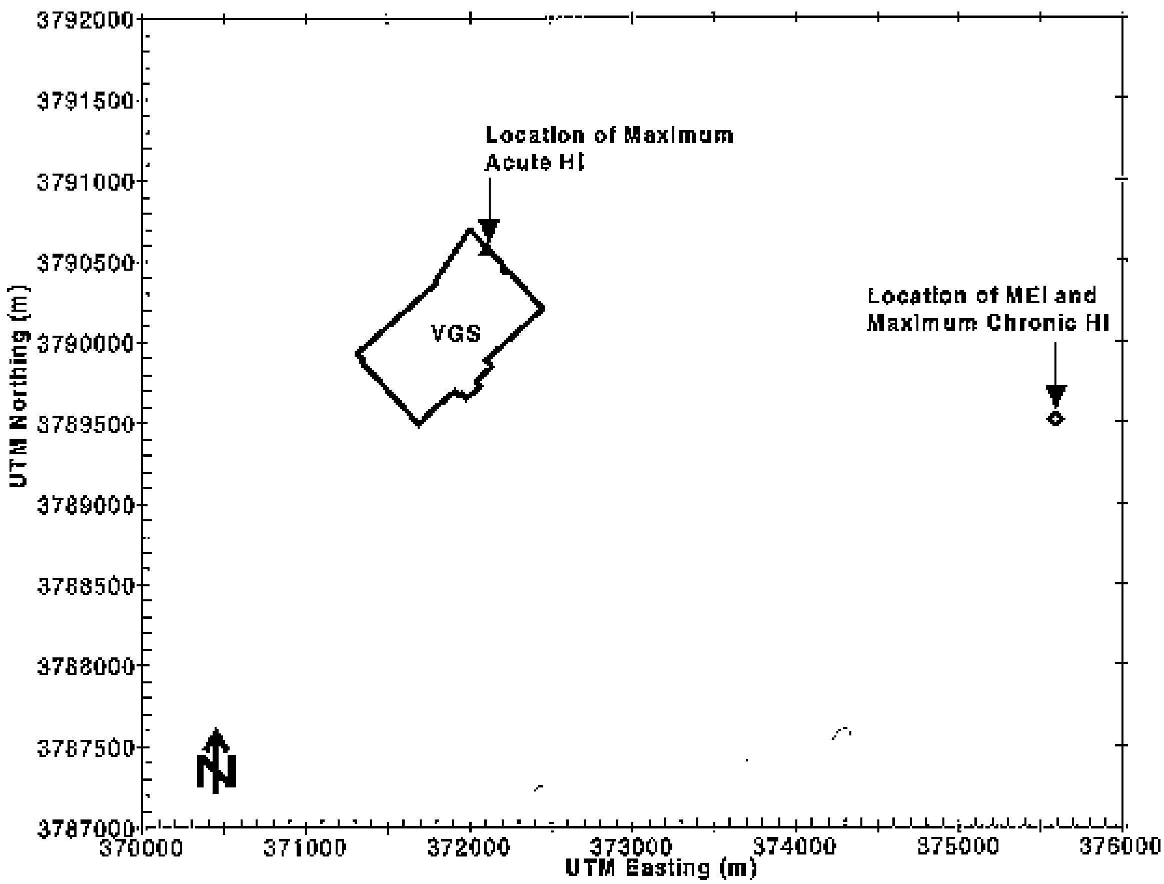


Table 3-13

Multipathway Cancer Risk by Source for MEI (VGS Site)

SOURCE	INHALE	DERMAL	SOIL	WATER	PLANTS	ANIMAL	MOTHER MILK	SUM
CT_OPER	4.93E-08	2.30E-10	3.62E-10	0.00E+00	2.63E-09	0.00E+00	0.00E+00	5.26E-08
CT_READ	4.61E-10	4.45E-12	2.61E-11	0.00E+00	5.38E-11	0.00E+00	0.00E+00	5.46E-10
BS	3.11E-12	4.77E-14	7.52E-14	0.00E+00	5.47E-13	0.00E+00	0.00E+00	3.78E-12
SUM	4.98E-08	2.35E-10	3.89E-10	0.00E+00	2.69E-09	0.00E+00	0.00E+00	5.31E-08

Table 3-14

Multipathway Cancer Risk by Pollutant for MEI (VGS Site)

POLLUTANT*	INHALE	DERMAL	SOIL	WATER	PLANTS	SUM
As	1.63E-11	4.08E-13	1.93E-11	0.00E+00	8.03E-12	4.40E-11
BUTAD	1.64E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.64E-10
ACETA	2.81E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.81E-09
BENZA	1.92E-11	1.82E-11	2.87E-11	0.00E+00	2.09E-10	2.75E-10
BENZE	2.93E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.93E-09
BENZO	1.18E-10	1.12E-10	1.77E-10	0.00E+00	1.29E-09	1.69E-09
BENZF	9.79E-12	9.31E-12	1.47E-11	0.00E+00	1.07E-10	1.40E-10
BENZK	9.52E-12	9.05E-12	1.43E-11	0.00E+00	1.04E-10	1.37E-10
Be	3.18E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.18E-12
Cd	3.33E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.33E-11
Cr	3.95E-11	6.09E-14	2.88E-13	0.00E+00	1.16E-13	4.00E-11
CHRYS	2.13E-12	2.03E-12	3.19E-12	0.00E+00	2.32E-11	3.05E-11
DIBEN	2.16E-10	6.43E-11	1.01E-10	0.00E+00	7.36E-10	1.12E-09
4DPD	3.47E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.47E-12
5DPDT	3.30E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.30E-12
6DPDT	8.37E-13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.37E-13
7DPDT	1.56E-13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.56E-13
8DPD	9.94E-14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.94E-14
HCHO	4.17E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.17E-08
4DBFT	3.10E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.10E-12
5DBFT	2.17E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.17E-11
6DBFT	2.23E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.23E-12
7DBFT	1.55E-13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.55E-13
8DBF	7.99E-15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.99E-15
INDEN	1.98E-11	1.88E-11	2.96E-11	0.00E+00	2.16E-10	2.84E-10
Pb	1.78E-13	6.95E-15	3.28E-13	0.00E+00	1.38E-13	6.51E-13
Ni	3.10E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.10E-10
PROX	1.34E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.34E-09
SUM	4.98E-08	2.35E-10	3.89E-10	0.00E+00	2.69E-09	5.31E-08

*See Table 3-6 for key to complete names of pollutants

Table 3-15

Acute Hazard index for Peak Receptor (VGS Site)

POLLU-TANT*	CONC (ug/m3)	BACKGR (ug/m3)	AEL (ug/m3)	CV/BS	CNS/PNS	IMMUN	KIDN	GI/LI	REPR	RESP	EYE	SKIN
As	1.10E-03	0.00E+00	1.90E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.80E-03	0.00E+00	0.00E+00	0.00E+00
ACROL	1.01E-03	0.00E+00	1.90E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.30E-03	5.30E-03	0.00E+00
BENZE	7.02E-02	0.00E+00	1.30E+03	5.40E-05	0.00E+00	5.40E-05	0.00E+00	0.00E+00	5.40E-05	0.00E+00	0.00E+00	0.00E+00
Cu	5.41E-03	0.00E+00	1.00E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.41E-05	0.00E+00	0.00E+00
HCHO	3.92E-01	0.00E+00	9.40E+01	0.00E+00	0.00E+00	4.17E-03	0.00E+00	0.00E+00	0.00E+00	4.17E-03	4.17E-03	0.00E+00
HCl	4.41E-01	0.00E+00	2.10E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.10E-04	2.10E-04	0.00E+00
Hg	1.48E-05	0.00E+00	1.80E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.21E-06	0.00E+00	0.00E+00	0.00E+00
Ni	2.66E-01	0.00E+00	6.00E+00	0.00E+00	0.00E+00	4.44E-02	0.00E+00	0.00E+00	0.00E+00	4.44E-02	0.00E+00	0.00E+00
TOL	4.27E-03	0.00E+00	3.70E+04	0.00E+00	1.15E-07	0.00E+00	0.00E+00	0.00E+00	1.15E-07	1.15E-07	1.15E-07	0.00E+00
XYLEN	2.78E-03	0.00E+00	2.20E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.26E-07	1.26E-07	0.00E+00
			SUM =	5.40E-05	1.15E-07	4.86E-02	0.00E+00	0.00E+00	5.87E-03	5.41E-02	9.68E-03	0.00E+00

*See Table 3-6 for key to complete names of pollutants

Table 3-16

Chronic Hazard Index for Peak Receptor (VGS Site)

POLLU-	ORAL DOSE	BACKGR	AEL	CV/BL	CNS/PNS	IMMUN	KIDN	GI/LI	REPR	RESP	SKIN	ENDO	EYE
As	1.00E-03	0.00E+00	9.99E+12	1.85E-08	1.85E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.94E-22	1.85E-08	0.00E+00	1.85E-08
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	1.16E-04	0.00E+00	0.00E+00	0.00E+00
ACROL	0.00E+00	0.00E+00	9.99E+12	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
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	2.75E-04	0.00E+00	0.00E+00	0.00E+00
BENZE	0.00E+00	0.00E+00	6.00E+01	1.69E-06	1.69E-06	0.00E+00	0.00E+00	0.00E+00	1.69E-06	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	1.33E-22	0.00E+00	0.00E+00	0.00E+00
Cd	1.00E-03	0.00E+00	9.99E+12	0.00E+00	0.00E+00	0.00E+00	4.37E-08	0.00E+00	0.00E+00	7.94E-22	0.00E+00	0.00E+00	0.00E+00
Cr	5.00E-03	0.00E+00	9.99E+12	0.00E+00	0.00E+00	0.00E+00	2.21E-10	2.21E-10	0.00E+00	2.64E-23	0.00E+00	0.00E+00	0.00E+00
Cu	0.00E+00	0.00E+00	9.99E+12	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
4DPD	1.00E-09	0.00E+00	4.00E-05	2.20E-07	0.00E+00	0.00E+00	0.00E+00	2.20E-07	2.20E-07	2.28E-09	0.00E+00	2.20E-07	0.00E+00
5DPDT	1.00E-09	0.00E+00	8.00E-05	4.17E-07	0.00E+00	0.00E+00	0.00E+00	4.17E-07	4.17E-07	2.17E-09	0.00E+00	4.17E-07	0.00E+00
6DPDT	1.00E-09	0.00E+00	4.00E-04	5.26E-07	0.00E+00	0.00E+00	0.00E+00	5.26E-07	5.26E-07	5.51E-10	0.00E+00	5.26E-07	0.00E+00
7DPDT	1.00E-09	0.00E+00	4.00E-03	9.80E-07	0.00E+00	0.00E+00	0.00E+00	9.80E-07	9.80E-07	1.03E-10	0.00E+00	9.80E-07	0.00E+00
8DPD	1.00E-09	0.00E+00	4.00E-02	6.24E-06	0.00E+00	0.00E+00	0.00E+00	6.24E-06	6.24E-06	6.54E-11	0.00E+00	6.24E-06	0.00E+00
EBENZ	0.00E+00	0.00E+00	2.00E+03	0.00E+00	0.00E+00	0.00E+00	6.78E-08	6.78E-08	6.78E-08	0.00E+00	0.00E+00	6.78E-08	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	2.32E-03	0.00E+00	0.00E+00	2.32E-03
4DBFT	1.00E-09	0.00E+00	4.00E-04	1.95E-06	0.00E+00	0.00E+00	0.00E+00	1.95E-06	1.95E-06	2.04E-09	0.00E+00	1.95E-06	0.00E+00
5DBFT	1.00E-09	0.00E+00	8.00E-05	2.73E-06	0.00E+00	0.00E+00	0.00E+00	2.73E-06	2.73E-06	1.42E-08	0.00E+00	2.73E-06	0.00E+00
6DBFT	1.00E-09	0.00E+00	4.00E-04	1.40E-06	0.00E+00	0.00E+00	0.00E+00	1.40E-06	1.40E-06	1.47E-09	0.00E+00	1.40E-06	0.00E+00
7DBFT	1.00E-09	0.00E+00	4.00E-03	9.72E-07	0.00E+00	0.00E+00	0.00E+00	9.72E-07	9.72E-07	1.02E-10	0.00E+00	9.72E-07	0.00E+00
8DBF	1.00E-09	0.00E+00	4.00E-02	5.02E-07	0.00E+00	0.00E+00	0.00E+00	5.02E-07	5.02E-07	5.26E-12	0.00E+00	5.02E-07	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	2.19E-07	0.00E+00	0.00E+00	0.00E+00
HEXAN	0.00E+00	0.00E+00	7.00E+03	0.00E+00	2.81E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pb	4.30E-04	0.00E+00	9.99E+12	1.29E-07	1.29E-07	1.29E-07	1.29E-07	0.00E+00	1.29E-07	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	1.26E-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
Hg	3.00E-04	0.00E+00	9.00E-02	0.00E+00	2.14E-09	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	1.43E-06	0.00E+00	0.00E+00	0.00E+00
Ni	0.00E+00	0.00E+00	5.00E-02	2.38E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.38E-05	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	1.95E-06	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	1.21E-05	0.00E+00	0.00E+00	0.00E+00
TOL	0.00E+00	0.00E+00	3.00E+02	0.00E+00	1.79E-06	0.00E+00	0.00E+00	0.00E+00	1.79E-06	1.79E-06	0.00E+00	0.00E+00	0.00E+00
XYLEN	0.00E+00	0.00E+00	7.00E+02	0.00E+00	2.84E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.84E-07	0.00E+00	0.00E+00	0.00E+00
			SUM =	4.16E-05	5.45E-06	1.29E-07	2.41E-07	1.60E-05	1.96E-05	2.75E-03	1.85E-08	1.60E-05	2.32E-03

*See Table 3-6 for key to complete names of pollutants