Appendix K.1

Emissions Inventory Worksheets

Toxic Air Emission Estimates - Operational Turbines

Victorville 2 Hybrid Power Plant - Air Toxics Emissions Analysis

			Natural Gas Fuel Rate (each)			
			Hourly		Annual	
			1.70	MMscf/hour	14,913	MMscf/year
			0.54	MMscf/hour	4,769	MMscf/year
			2.25	MMscf/hour	19,682	MMscf/year

Assumptions:	H18U 18 F/60%RH	
	2 Turbines + Duct Burners	
Operating Schedule	8760	hours/year
Gas Heat Content	1020	MMBtu/MMscf
CTG Heat Input:	3,473	MMBtu/Hr (HHV Total)
DB Heat Input:	1,111	MMBtu/Hr (HHV Total)
Total Heat Input:	4,584	MMBtu/Hr (Total)

Substance	CAS Number	Emission Factor [1] (lbs/MMBtu)	Emission Factor (lbs/MMscf)	Gas Input (MMscf/hr)	Emissions (each)			Emissions (total)		
					(lbs/hr)	(lbs/yr)	(tons/yr)	(lbs/hr)	(lbs/yr)	(tons/yr)
Ammonia [2]	7664417	5.00E+00	5.00E+00	2.25	1.12E+01	9.84E+04	4.92E+01	2.25E+01	1.97E+05	9.84E+01
Acetaldehyde	75070	4.00E-05	4.08E-02	2.25	9.17E-02	8.03E+02	4.02E-01	1.83E-01	1.61E+03	8.03E-01
Acrolein	107028	6.40E-06	6.53E-03	2.25	1.47E-02	1.28E+02	6.42E-02	2.93E-02	2.57E+02	1.28E-01
Benzene	71432	1.20E-05	1.22E-02	2.25	2.75E-02	2.41E+02	1.20E-01	5.50E-02	4.82E+02	2.41E-01
1,3-Butadiene	106990	4.30E-07	4.39E-04	2.25	9.85E-04	8.63E+00	4.32E-03	1.97E-03	1.73E+01	8.63E-03
Ethylbenzene	100414	3.20E-05	3.26E-02	2.25	7.33E-02	6.42E+02	3.21E-01	1.47E-01	1.28E+03	6.42E-01
Formaldehyde [3]	50000	7.10E-05	7.24E-02	2.25	1.63E-01	1.43E+03	7.13E-01	3.25E-01	2.85E+03	1.43E+00
Naphthalene	91203	1.30E-06	1.33E-03	2.25	2.98E-03	2.61E+01	1.30E-02	5.96E-03	5.22E+01	2.61E-02
Benzo(a)anthracene [4]	56553		7.75E-05	2.25	1.74E-04	1.52E+00	7.62E-04	3.48E-04	3.05E+00	1.52E-03
Benzo(a)pyrene [4]	50328		4.76E-05	2.25	1.07E-04	9.38E-01	4.69E-04	2.14E-04	1.88E+00	9.38E-04
Benzo(b)fluoranthene [4]	205992		3.87E-05	2.25	8.70E-05	7.62E-01	3.81E-04	1.74E-04	1.52E+00	7.62E-04
Benzo(k)fluoranthene [4]	207089		3.77E-05	2.25	8.47E-05	7.42E-01	3.71E-04	1.69E-04	1.48E+00	7.42E-04
Chrysene [4]	218019		8.64E-05	2.25	1.94E-04	1.70E+00	8.50E-04	3.88E-04	3.40E+00	1.70E-03
Dibenz(a,h)anthracene [4]	53703		8.06E-05	2.25	1.81E-04	1.59E+00	7.93E-04	3.62E-04	3.17E+00	1.59E-03
Indeno(1,2,3-cd)pyrene [4]	193395		8.06E-05	2.25	1.81E-04	1.59E+00	7.93E-04	3.62E-04	3.17E+00	1.59E-03
Propylene Oxide	75569	2.90E-05	2.96E-02	2.25	6.65E-02	5.82E+02	2.91E-01	1.33E-01	1.16E+03	5.82E-01
Toluene	108883	1.30E-04	1.33E-01	2.25	2.98E-01	2.61E+03	1.30E+00	5.96E-01	5.22E+03	2.61E+00
Xylene (Total)	1330207	6.40E-05	6.53E-02	2.25	1.47E-01	1.28E+03	6.42E-01	2.93E-01	2.57E+03	1.28E+00

[1] Emission factors are from AP-42 Section, Table 3.1-3 Emission factors for HAP's from natural gas-fired stationary gas turbines.

[2] Ammonia based on stack gas concentration limit of 5 ppmv, worst-case considtions during ammonia "slip". Note: Ammonia is not a HAP and is not included in the HAP Total.

[3] Formaldehyde AP-42 emission factor adjusts for 90% emissions control usinig carbon monoxide catalyst.

[4] Unspeciated PAH (polycyclic aromatic hydrocarbon) emissions based on AP-42 composite emission factor of 2.20E-06 lbs/MMBtu. PAH speciation profile derived from California Air Toxics Emission Factors (CATEF) database for natural gas-fired turbine engines, applied to composite (unspeciated) PAH emission in AP-42. Shown are PAH species for which there is a unit risk factor in OEHHA Consolidated Risk Table (OEHHA, October 2006)

Toxic Air Emission Estimates - Cooling Towers

Victorville 2 Hybrid Power Plant - Air Toxics Emissions Analysis

Cooling Tower Recirculation Rate:	130,000	gpm
Drift Eliminator Efficiency:	0.0005	%
Drift:	325.5	lbs/hr (E lb/hr = Water Circulation Rate gpm * 60 min/hr * Drift % / 100 * 8.3453 lb/gal)
Cooling Tower Cylces of Concentration:	5	

Emission Rate for Non-Volatile Compounds: ER (lb/hr) = Recirculation rate (gal/min) * 60 min/hr * 3.785 liters/gal * HAP conc (ug/liter) * 1lb / 453.6 g * 1g / 10^6 ug * Drift Fraction * 4000/973 (5 conc cycles)

Emission Rate for Volatile Compounds: ER (lb/hr) = Makeup rate (gal/min) * 60 min/hr * 3.785 liters/gal * HAP conc (ug/liter) * 1lb / 453.6 g * 1g / 10^6 ug * Volatilization Fraction

Pollutant	CAS Number	Reported Discharge [1]		Emissions (per unit) [2]		Emissions (total)	
		Average Dischange (ug/l)	Maximum Discharge (ug/l)	Max Hourly (lbs/hr/unit)	Annual (lbs/yr/unit)	Max Hourly (lbs/hr)	Annual (lbs/yr)
Emission Rate for Non-Volatile Compounds:							
arsenic	7440382	6.98E-03	2.20E-02	9.332E-08	8.18E-04	9.33E-07	8.175E-03
barium	7440393	7.98E-02	1.40E-01	1.068E-06	9.35E-03	1.07E-05	9.352E-02
beryllium	7440417	8.03E-03	8.03E-03	1.075E-07	9.41E-04	1.07E-06	9.415E-03
copper	7440508	2.45E-02	4.90E-02	3.281E-07	2.87E-03	3.28E-06	2.874E-02
cyanide compounds	1073	4.00E-05	6.00E-05	5.351E-10	4.69E-06	5.35E-09	4.688E-05
selenium	7782492	1.16E-02	2.20E-02	1.558E-07	1.36E-03	1.56E-06	1.365E-02
zinc	7440666	8.54E-03	2.50E-02	1.142E-07	1.00E-03	1.14E-06	1.001E-02
Vanadium (fume or dust)	7440622	2.21E-02	4.20E-02	2.962E-07	2.60E-03	2.96E-06	2.595E-02
Emission Rate for Volatile Compounds:							
p-Dichlorobenzene	106467	8.34E-04	2.50E-03	1.116E-08	9.78E-05	1.12E-07	9.780E-04
Chloroform	67663	2.04E-03	1.40E-02	2.723E-08	2.39E-04	2.72E-07	2.386E-03
Perchloroethylene {tetrachloroethene}	127184	1.10E-05	1.10E-05	1.472E-10	1.29E-06	1.47E-09	1.289E-05
Trichloroethylene	79016	5.00E-07	5.00E-07	6.689E-12	5.86E-08	6.69E-11	5.860E-07
toluene	108883	7.78E-04	7.78E-04	1.041E-08	9.12E-05	1.04E-07	9.118E-04
xylenes (mixed xylenes)	1330207	7.60E-04	7.60E-04	1.017E-08	8.91E-05	1.02E-07	8.907E-04
Diethyl phthalate	84662	2.60E-05	2.60E-05	3.478E-10	3.05E-06	3.48E-09	3.047E-05
Phenol	108952	4.00E-05	4.00E-05	5.351E-10	4.69E-06	5.35E-09	4.688E-05

[1] Based on water quality data obtained from the Victor Valley Water Reclamation Authority for 2004 and 2005.

[2] Ten cooling tower stacks (units) modeled.

Toxic Air Emission Estimates - Natural Gas Fired Auxiliary Boiler

Input:	35.00	MMBtu/Hr
Maximum Annual Hours of Operation:	500	hours/year
Heat Value:	1020	Btu/scf

Pollutant	CAS Number	Emission Factor [1] (lbs/MMscf)	Max Hourly Emissions		Annual Emissions	
			(lb/hr)	(g/s)	(ton/yr)	(lb/yr)
Benzene	71432	0.0058	1.99E-04	0.0000251	0.00005	9.95E-02
Formaldehyde	50000	0.0123	4.22E-04	0.0000532	0.00011	2.11E-01
PAH's (excluding naphthalene) [(2)]	50328	0.0004	1.37E-05	0.0000017	0.00000	6.86E-03
Naphthalene	91203	0.0003	1.03E-05	0.0000013	0.00000	5.15E-03
Acetaldehyde	75070	0.0031	1.06E-04	0.0000134	0.00003	5.32E-02
Acrolein	107028	0.0027	9.26E-05	0.0000117	0.00002	4.63E-02
Propylene	115071	0.53	1.82E-02	0.0022915	0.00455	9.09E+00
Toluene	108883	0.0265	9.09E-04	0.0001146	0.00023	4.55E-01
Xylenes	1330207	0.0197	6.76E-04	0.0000852	0.00017	3.38E-01
Ethyl benzene	100414	0.0069	2.37E-04	0.0000298	0.00006	1.18E-01
Hexane	110543	0.0046	1.58E-04	0.0000199	0.00004	7.89E-02

[(1)] Emission factors based on Ventura County Air Pollution Control District, AB2588 Combustion Emission Factors for Natural Gas Fired External Combustion Equipment 10-100 MMBtu/Hr, May 2001

[(2)] Unspeciated PAH (polycyclic aromatic hydrocarbon) emissions based on composite emission factor. Benzo(a)pyrene or B(a)P was modeled as the surrogate carcinogen for all PAH emissions, as indicated by the CAS number shown. Since the (B(a)P) surrogate for total PAH emissions is the most or nearly-the-most potent carcinogens in the class, use of this cancer potency factor with total emissions will overestimate the risk.

Toxic Air Emission Estimates - Fire Water Pump

Given:

Diesel engine fuel consumption is 9.43 gallons/hr at full load with fan.

Scheduled usage if 1/2 hour per week for testing and is the expeccted hourly engine use.

Diesel engine output:	182	hp	
Fuel Consumption:	9.43	gal/hr	100% load with fan
Maximum Annual Hours of Operation:	300	hours/year	

Fuel Consumption:	4.72	gal/hr	0.0047	1000-gal/hr
	113.16	gal/day	0.1132	1000-gal/day
	2,828	gal/yr	2.8277	1000-gal/yr

Pollutant	CAS Number	Emission Factor [1] (lb/1000 gal)	Emissions		
			(lb/hr)	lb/day	(lb/yr)
Diesel Particulate Matter	9901	0.0104	1.04E-02	2.50E-01	3.13E+00

[1] Emissions of particulate matter from diesel-fired combustion engines calculated as total PM10 mass based on Tier 3 standard for internal combustion engines. Testing of the emergency generator and fire-water pump will be limited to no more than 50 hours per year to comply with California emission standards for new compression ignited engines. Health risk modeling based on 300 hours therefore provides the analysis a margin of safety to allow for non-emergency engine use

Toxic Air Emission Estimates - Emergency Diesel Generator

Diesel engine output:	2,682	hp	2.0 MW generation
Fuel Consumption:	138.90	gal/hr	100% load with fan
Maximum Annual Hours of Operation:	300	hours/year	

Fuel Consumption:	69.45	gal/hr	0.0695	1000-gal/hr
	1,667	gal/day	1.6668	1000-gal/day
	9,000	gal/yr	9.0000	1000-gal/yr

Pollutant	CAS Number	Emission Factor [1] (lb/1000 gal)	Emissions		
			(lb/hr)	lbs/day	(lb/yr)
Diesel Particulate Matter	9901	0.1537	1.54E-01	3.69E+00	4.61E+01

[1] Emissions of particulate matter from diesel-fired combustion engines calculated as total PM10 mass based on EPA Tier 2 standard for internal combustion engines. Testing of the emergency generator and fire-water pump will be limited to no more than 50 hours per year to comply with California emission standards for new compression ignited engines. Health risk modeling based on 300 hours therefore provides the analysis a margin of safety to allow for non-emergency engine use.

Toxic Air Emission Estimates - Natural Gas Fired HTF Heater

Input:	40.00	MMBtu/Hr
Maximum Annual Hours of Operation:	1,000	hours/year
Heat Value:	1020	Btu/scf

Pollutant	CAS Number	Emission Factor [1] (lbs/MMscf)	Max Hourly Emissions (lb/hr)	Annual Emissions	
				(lb/yr)	(ton/yr)
Benzene	71432	0.0058	2.27E-04	2.27E-01	1.14E-04
Formaldehyde	50000	0.0123	4.82E-04	4.82E-01	2.41E-04
PAH's (excluding naphthalene) [(2)]	50328	0.0004	1.57E-05	1.57E-02	7.84E-06
Naphthalene	91203	0.0003	1.18E-05	1.18E-02	5.88E-06
Acetaldehyde	75070	0.0031	1.22E-04	1.22E-01	6.08E-05
Acrolein	107028	0.0027	1.06E-04	1.06E-01	5.29E-05
Propylene	115071	0.53	2.08E-02	2.08E+01	1.04E-02
Toluene	108883	0.0265	1.04E-03	1.04E+00	5.20E-04
Xylenes	1330207	0.0197	7.73E-04	7.73E-01	3.86E-04
Ethyl benzene	100414	0.0069	2.71E-04	2.71E-01	1.35E-04
Hexane	110543	0.0046	1.80E-04	1.80E-01	9.02E-05

[(1)] Emission factors based on Ventura County Air Pollution Control District, AB2588 Combustion Emission Factors for Natural Gas Fired External Combustion Equipment 10-100 MMBtu/Hr, May 2001

[(2)] Unspeciated PAH (polycyclic aromatic hydrocarbon) emissions based on composite emission factor. Benzo(a)pyrene or B(a)P was modeled as the surrogate carcinogen for all PAH emissions, as indicated by the CAS number shown. Since the (B(a)P) surrogate for total PAH emissions is the most or nearly-the-most potent carcinogens in the class, use of this cancer potency factor with total emissions will overestimate the risk.

Appendix K.2

Residential and Worker Receptors

Residential and Worker Receptors

Beside the gridded receptors, receptors within a 3-mile radius from the VV2 project were included at specific locations for the Health Risk Assessment (HRA) to assess potential exposures at these sites. These receptor locations included existing residences, work places, and sensitive receptors and were identified based on orthographic aerial photographs, Yahoo Yellow Pages, and community elements contained in geographic information software packages.

Twelve (12) residential receptors were identified and modeled to determine the maximum exposed individual – residential (MEIR). Residences evaluated were primarily located north of the VV2 site on and around Colusa Road, and east of the project in and around the community of Oro Grande and along Route 66.

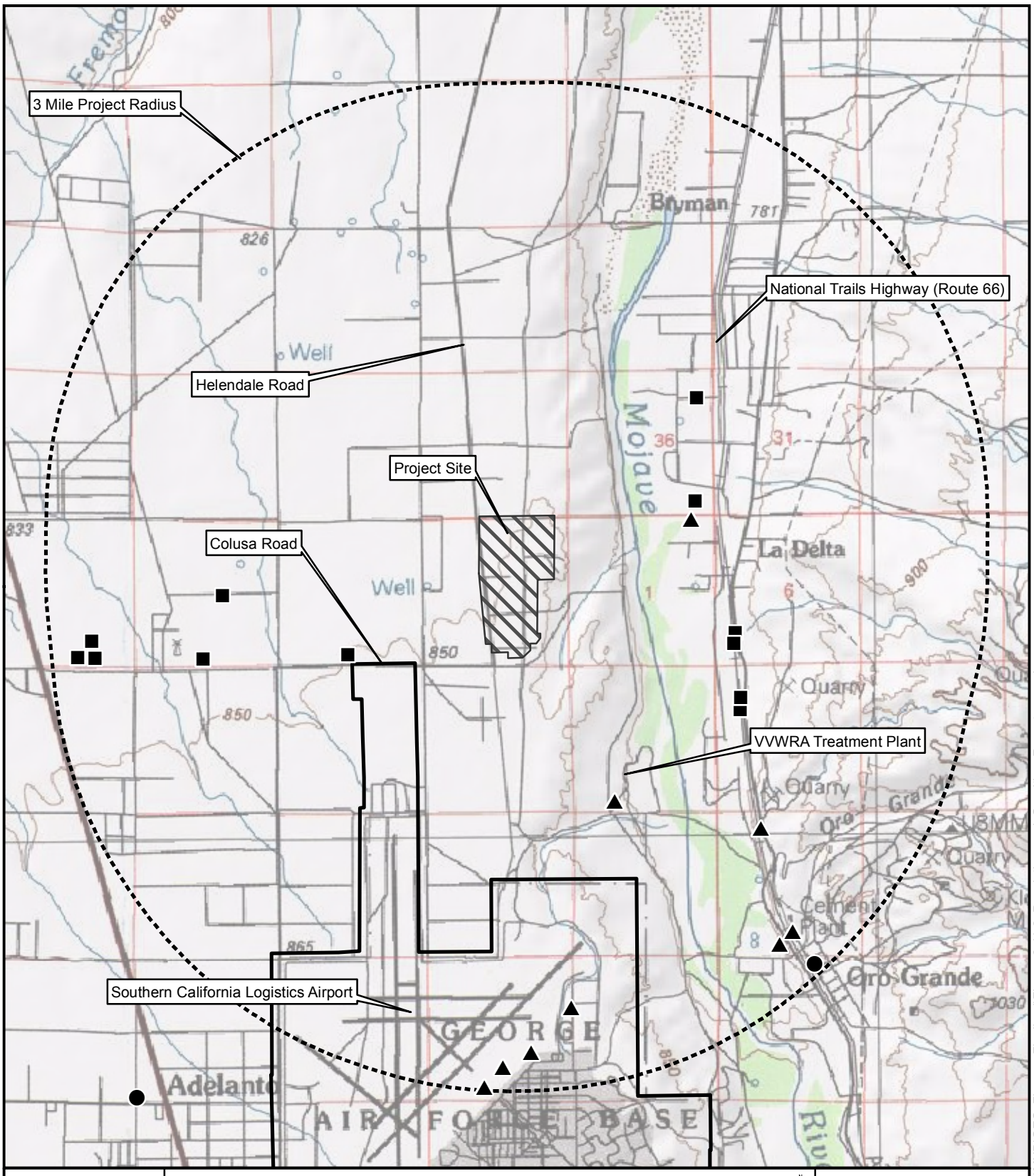
Nine (9) work place receptors were identified and modeled to determine the maximum exposed individual – worker (MEIW). Work places evaluated were primarily located to the south and east of the VV2 Project. For the Southern California Logistics Airport (SCLA), a total of three receptors were placed to represent different locations of potential exposure. Similarly, two receptors were used to evaluate health impacts associated with potential exposures to workers at the Oro Grande Cement Plant.

In accordance with the CEC Guidelines, a sensitive receptor is considered to be infants and children, the elderly, and the chronically ill, and any other member of the general population who is more susceptible to the effects of the exposure than the population at large. One (1) school was identified as a sensitive receptor located within 3 miles of the Project site. The school receptor was evaluated for health risk impacts based on both student and occupational exposure scenarios.

The locations of the receptors used for the MEIR, MEIW, and sensitive receptor analyses are listed in the table and plotted in the figure provided below.

Individual Receptors Within 3-miles (5-kilometers) of the VV2 Project

Receptor Type	Easting (meters)	Northing (meters)	Distance from Site (km)	Direction from Site
Residential Receptors				
House Colusa at Mesa Linda	464138	3832199	1.9	West
House Near Oval Track	468024	3833875	2.6	Northeast
House Sonoma at Pearmain	462751	3832869	3.4	Northwest
House Colusa and Jonathan	462521	3832162	3.5	West
House Route 66	468503	3831541	2.5	Southeast
House Route 66	468509	3831678	2.5	Southeast
House Route 66	468458	3832396	2.4	East
House Route 66	468443	3832282	2.4	East
Farmhouse near Roy Rogers	468053	3835023	3.5	Northeast
House Colusa	461124	3832189	4.9	West
House Colusa	461320	3832187	4.7	West
House Off Colusa	461286	3832374	4.8	West
Work Place Receptors				
VVWRA	467094	3830537	1.9	Southeast
SCLA Control Tower	465608	3827362	4.8	South
SCLA Aircraft Hangar 1	465817	3827586	4.6	South
SCLA Aircraft Hangar 2	466134	3827743	4.4	South
High Desert Power Plant	466585	3828235	3.9	South
Oro Grande Credit Union	468915	3828920	4.3	Southeast
Oro Grande Cement Plant South	469063	3829065	4.3	Southeast
Oro Grande Cement Plant North	468721	3830215	3.3	Southeast
Oval Track Near Route 66	467976	3833671	2.5	Northeast
Sensitive Receptors				
Oro Grande Elementary	469303	3828705	4.7	Southeast
Source: All receptors modeled using UTM Zone 11 North NAD 83 Coordinates (meters)				



Locus Map

Residential, Worker, and Sensitive Receptors within 3 miles of Project Site
Victorville 2 Hybrid Power Project

Legend

▲ Occupational Receptors ■ Residential Receptors ● Sensitive Receptors

Scale: 1:60,000

0 0.5 1 2 3 4 Miles

Inland Energy, Inc.

ENSR | AECOM

Appendix: K.2

Date: February 2007

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Appendix K.3

HARP Modeling Files

HARP Modeling File Index

PMI 500-meter Course Grid
PMI_Rep_Can_70yr_DerAdj_AllRec_AllSrc_AllCh_ByRec_Site_500M_4.txt
PMI_Rep_Acu_AllRec_AllSrc_AllCh_ByRec_Site_500M_4.txt
PMI_Rep_Chr_Res_DerOEH_AllRec_AllSrc_AllCh_ByRec_Site_500M_4.txt

PMI 100-meter Fine Grid
PMI_Rep_Can_70yr_DerOEH_AllRec_AllSrc_AllCh_ByRec_Site_100M_4.txt
PMI_Rep_Acu_AllRec_AllSrc_AllCh_ByRec_Site_100M_4.txt
PMI_Rep_Chr_Res_DerOEH_AllRec_AllSrc_AllCh_ByRec_Site_100M_4.txt

Cancer Risk Culpability Analysis at the PMI
PMI_Rep_Can_70yr_DerAdj_Rec1002_AllSrc_AllCh_ByRec_ByChem_Site.txt
PMI_Rep_Can_70yr_DerAdj_Rec1002_AllSrc_AllCh_BySrc_Site.txt

MEIR / MEIW
SEN_Rep_Can_70yr_DerAdj_AllRec_AllSrc_AllCh_ByRec_Site_SEN_4.txt
SEN_Rep_Acu_AllRec_AllSrc_AllCh_ByRec_Site_SEN_4.txt
SEN_Rep_Chr_Res_DerOEH_AllRec_AllSrc_AllCh_ByRec_Site_SEN_4.txt
MEIW_Rep_Can_WRK_Avg_Rec17_AllSrc_AllCh_BySrc_Site.txt

Sensitive Receptors
SEN_Rep_Can_9yrC_DerOEH_Rec22_AllSrc_AllCh_BySrc_Site.txt
SEN_Rep_Can_WRK_Avg_Rec22_AllSrc_AllCh_BySrc_Site.txt

Meteorological Data Files
VICTOR04.MET
VICTOR02.MET
VICTOR03.MET

HARP Transaction File
VV2_HRA.tra

HARP Receptor File
VV2_HRA.rec

HEALTH RISK ASSESSMENT MODELING FILES
PROVIDED UPON REQUEST