APPENDIX A – 3

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$\mu g/m^3$	Micrograms per cubic meter
AAQS	Ambient Air Quality Standards
AERMOD	American Meteorological Society/Environmental Protection Agency regulatory model
AFC	Application for certification
AQRV	Air Quality Related Values
BACT	Best available control technology
BPIP	Building profile input program
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
SDAPCD	San Diego County Air Pollution Control District
CEC	California Energy Commission
CO	Carbon monoxide
CTG	Combustion turbine generator
DLN	Dry low NOx
DOC	Determination of compliance
FLAG	Federal Land Managers Air Quality Related Values Workgroup
g/s	Gram per second
GE	General Electric
GEP	Good engineering practice
HARP	Hotspots analysis and reporting program
HRA	Health risk assessment
ISCST3	Industrial source complex short term model 3rd version
Km	Kilometers
LORS	Laws, ordinances, regulations, and standards
MEI	Maximally exposed individual
mm	millimeter
MW	Megawatt
NAAQS	National Ambient Air Quality Standards
NNSR	Nonattainment new source review
NO_x	Nitrogen oxides
NO_2	Nitrogen dioxide
NSR	New source review
O_3	Ozone
OEHHA	Office of Environmental Health Hazard Assessment
OLM	Ozone limiting method
Pb	Lead
$PM_{2.5}$	Particulate matter less than 2.5 microns in diameter
PM_{10}	Particulate matter less than 10 microns in diameter
ppm	Parts per million
PSD	Prevention of Significant Deterioration
ROC	Reactive organic compounds
SCR	Selective catalytic reduction
SIL	Significant impact level
SO_2	Sulfur dioxide

TAC	Toxic air contaminants
T-BACT	Best available control technology for toxics
TPY	Tons per year
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
UTM	Universal Transverse Mercator
ZOI	Zone of impact

A-3.1 BACKGROUND

Diamond Generating Corporation is proposing to develop and construct a new (third) combustion turbine generator (CTG) within the existing Larkspur power plant in the City of San Diego, California. The proposed addition of the third CTG will be referred to in this document as the Larkspur 3 Project or the Project. Specifically, this project will entail the addition of one General Electric (GE) LM 6000PC Sprint gas combustion turbine generator. In addition, a natural-gas fired reciprocating engine will be installed to provide black start capabilities. The new CTG will be an approximately 49 megawatt (MW) natural gas-fired simple-cycle unit located immediately east and adjacent to the existing Larkspur Units 1 and 2. Figures 1 and 2 show the location and general vicinity of the Larkspur site.

Although the proposed addition will increase the facility generating capacity by less than 50 MW, the project is subject to the site licensing requirements of the California Energy Commission (CEC), and is applying for an Amendment to a CEC Application for Certification (AFC). The CEC will coordinate its independent air quality evaluation of the Project with the San Diego County Air Pollution Control District (SDAPCD) through the Determination of Compliance (DOC) process.

It is expected that the annual emissions increase of all criteria pollutants due to the proposed third CTG will be below the significance thresholds specified by the USEPA's Prevention of Significant Deterioration (PSD) regulations. Specifically, the increases in emissions will be less than: 100 tons per year (tpy) of carbon monoxide (CO), reactive organic compounds (ROC), particulate matter less than 10 micrometers in diameter (PM10), sulfur oxides (SOx), and nitrogen oxides (NOx), less than 0.6 tons per year of lead (Pb) and less than 7 tons per year of sulfuric acid mist. San Diego County is currently designated unclassified for federal PM10 standards, non-attainment with respect to the California and federal ambient air quality standards for ozone, and non-attainment for California PM10 standards.

The air dispersion modeling for this project will be conducted in accordance with CEC and SDAPCD guidelines. Predicted maximum incremental pollutant concentrations will be compared with PSD significant impact limits (SILs), and these concentrations will be added to conservative background concentration from the most representative SDAPCD monitoring station to obtain total concentrations estimates for comparison with state and federal ambient air quality standards. Project emissions of non-attainment pollutants and their precursors will be offset to satisfy CEC requirements.

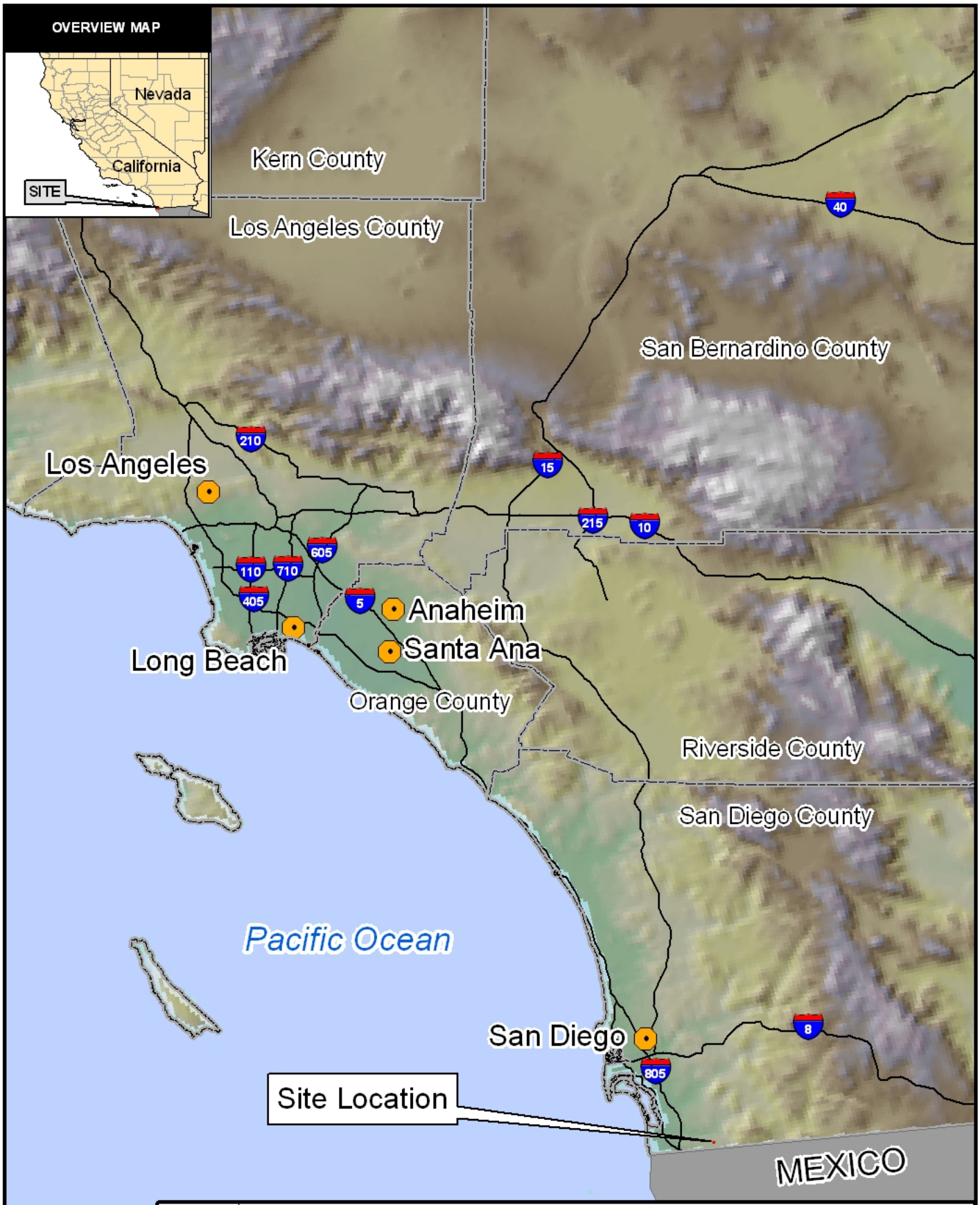
A-3.2 PURPOSE

The CEC, SDAPCD and EPA require the use of atmospheric dispersion modeling to demonstrate compliance with applicable air quality standards. SDAPCD confirmed verbally that this project does not need to conduct a Class I area impact analysis, because this Project is not a PSD source.

Both CEC and SDAPCD require modeling to determine the potential impacts on human health from emissions of toxic air contaminants. Finally, CEC siting regulations also require that the cumulative impacts of the proposed project and other new and reasonably foreseeable projects within 6 miles of the project site be assessed via modeling.

This document summarizes the procedures that will be used for the air dispersion modeling that will be conducted in support of project certification and permitting. Modeling of both construction and

operations emissions will be performed in accordance with CEC guidance (CEC, 1997). This protocol is being submitted to the CEC and SDAPCD for their review and comment prior to completion of the AFC Amendment application for the Larkspur 3 project. The proposed model selection and modeling approach is based on review of applicable regulations and agency guidance documents, as well as discussions with agency staff.



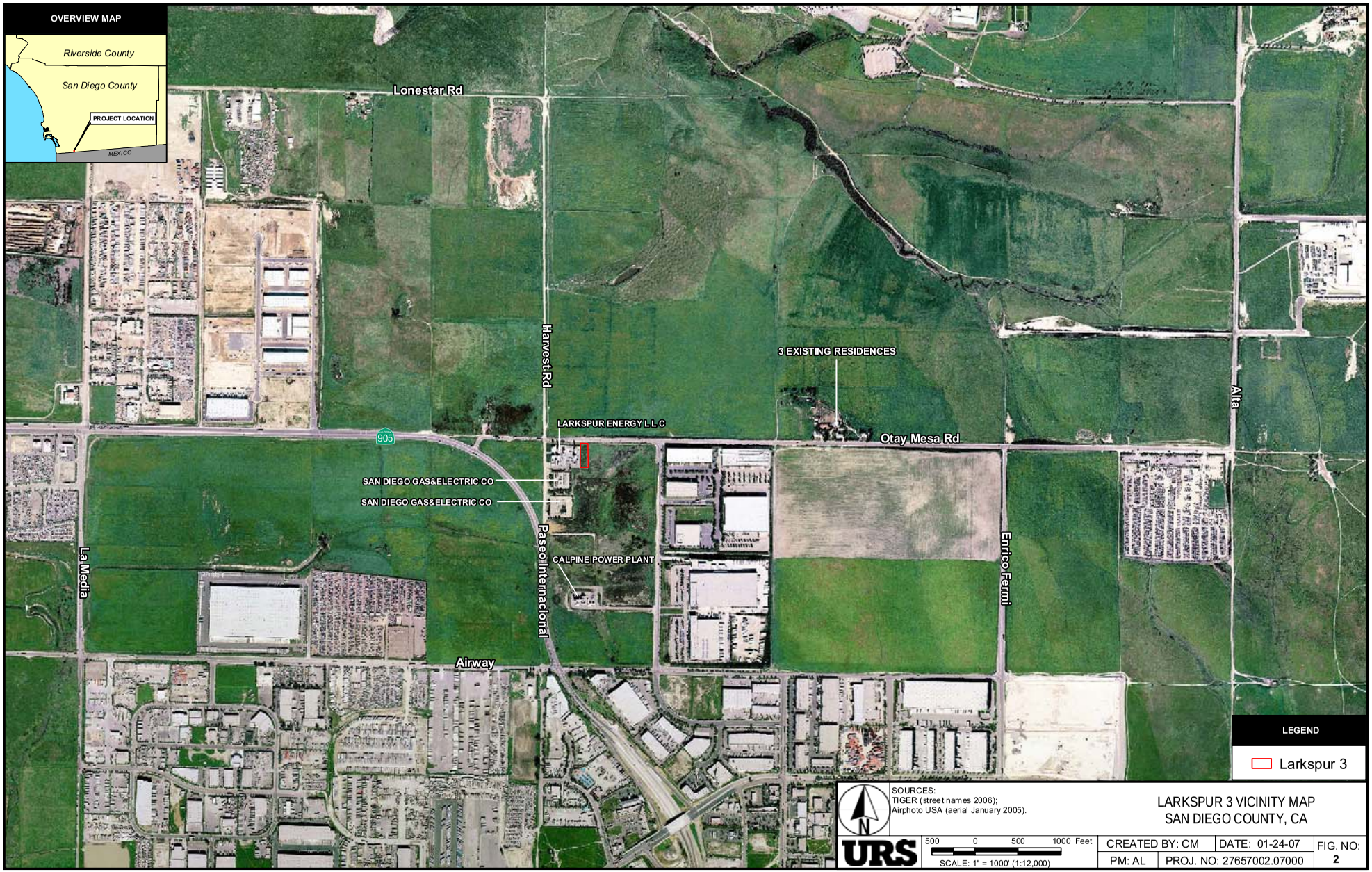
SOURCES:
USGS (Hillshade 1991);
ESRI (Roads, Cities, Counties and States 2005).

REGIONAL LOCATION MAP
Larkspur 3
San Diego County, California

URS

11 0 11 22 Miles
SCALE: 1" = 22 miles (1:1,393,920)

CREATED BY: CM	DATE: 01-25-07	FIG. NO: 1
PM: AL	PROJ. NO: 27657002.01000	



SOURCES:
TIGER (street names 2006);
Airphoto USA (aerial January 2005).

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URS

500 0 500 1000 Feet
SCALE: 1" = 1000' (1:12,000)

LARKSPUR 3 VICINITY MAP
SAN DIEGO COUNTY, CA

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PM: AL	PROJ. NO: 27657002.07000	2

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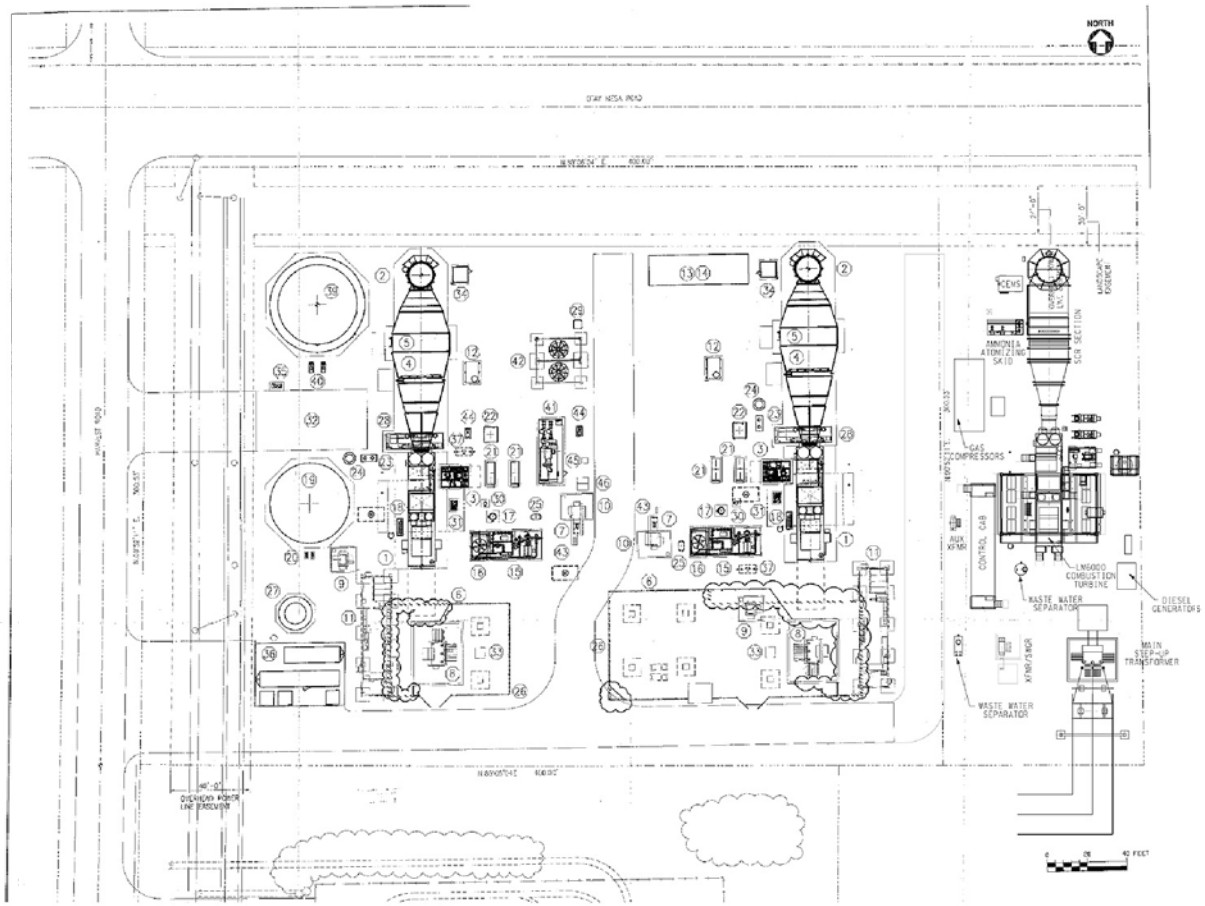
A-3.3 PROJECT LOCATION

The Larkspur 3 CTG will be installed immediately east and adjacent to the previously constructed Larkspur facility in the City of San Diego, California (see Figure 3). The Larkspur 3 site will be located approximately 15 miles southeast of downtown San Diego in the Otay Mesa area. The project site is located within approximately 0.4 miles of complex terrain (i.e., with elevation exceeding proposed stack heights), and the area immediately surrounding the project site is developed for industrial uses or in the process of becoming developed.

The project area is currently designated as: unclassified for federal PM_{10} standards; non-attainment with respect to the California and federal ambient air quality standards for ozone; and non-attainment for California PM_{10} standards

A-3.4 DESCRIPTION OF THE PROPOSED SOURCES

The new emission sources associated with the Larkspur 3 Project will include one simple-cycle gas turbine generator and a black start reciprocating engine fired with natural gas. The turbine will be fired exclusively on natural gas, and will be equipped with water injection and selective catalytic reduction (SCR) for the control of nitrogen oxides (NOx) emissions and an oxidation catalyst for control of carbon monoxide (CO) emissions. The CTG will be nominally rated at 49 MW and the natural gas-fired reciprocating engine will be included to enable black start capabilities required for plant startups during losses of grid power. Otherwise, this engine will only be operated for short periods to test its operability in the event of an emergency. The new CTG will operate in simple cycle mode and will have an exhaust stack with a height of 60 feet. Ammonia reagent for the Larkspur facility SCR systems will be provided by an existing aqueous ammonia storage tank. A plot plan of the facility including the proposed Larkspur 3 project is provided in Figure 3.



LEGEND

1 GAS TURBINE GENERATOR
2 EXHAUST STACK
3 AUXILIARY SKID
4 SCR ENCLOSURE
5 CO CATALYST BED
6 HIGH VOLTAGE SUBSTATION
7 MEDIUM VOLTAGE SWITCHGEAR
8 STEP UP TRANSFORMER
9 AUX TRANSFORMER
10 COMPRESSOR TRANSFORMER
11 MODULAR CONTROL ROOM
12 AIR COMPRESSOR SKID
13 FUEL GAS METER
14 FUEL GAS BLOCK VALVE
15 FUEL GAS COMPRESSOR SKID
16 FUEL GAS AIR COOLER
17 FUEL GAS DISCHARGE ACCUMULATOR
18 CO2 BOTTLE CABINET
19 DEMINERALIZED WATER STORAGE TANK
20 DEMINERALIZED WATER FORWARDING PUMPS
21 D.W. INJECTION BOOSTER PUMP SKID
22 LIQUID FUEL BOOSTER PUMP SKID
23 OILY WATER SEPARATOR
24 WASTE WATER SUMP
25 FUEL GAS DRAINS TANK
26 SAFETY FENCE
27 AQUEOUS AMMONIA STORAGE TANK
28 AMMONIA INJECTION SKID
29 CHEMICAL TREATMENT SKID
30 FUEL GAS FILTER
31 SPRINKLER SKID
32 AQUEOUS AMMONIA UNLOADING AREA
33 BREAKER
34 CEMS
35 FUEL OIL UNLOADING AREA
36 DEMINERALIZED WATER TREATMENT FACILIT
37 WATER WASH DRAINS FACILITY
38 NOT USED
39 FUEL OIL TANK
40 FUEL OIL TRANSFER PUMPS
41 OITLEM PACKAGE
42 COOLING TOWER
43 GAS COMPRESSOR CONTROL PANEL
44 LUBE OIL COOLING WATER PUMP
45 480V TRANSFER SWITCH
46 5KV TRANSFER SWITCH

LARKSPUR 3 FACILITY
PLOT PLAN

URS	NO SCALE	CREATED BY: CM	DATE: 01-25-07	FIG. NO: 3
		PM: AL	PROJ. NO: 27657002.01000	

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A-3.5 CALIFORNIA ENERGY COMMISSION REQUIREMENTS

While typically CEC requirements apply exclusively to projects with electrical power generation capacity of 50 MW or more, circumstances surrounding the energy crisis of California in 2001 created a situation in which peaking facilities that were permitted through the emergency 21-day expedited process must obtain approval from CEC for any subsequent facility addition or modifications. Since the Larkspur facility was permitted under the expedited 21-day permitting process, any modification (regardless of size) is required to undergo the CEC process. This process requires that applicants obtain emission offset credits for each affected pollutant, and that applicants prepare a comprehensive Application for Certification (AFC) document, or in this case, an Amendment to an AFC, addressing the proposed project's environmental and engineering features. Offset credits are proposed for nitrogen oxides (NO_x), carbon monoxide (CO), particulate matter greater than 10 microns in diameter, volatile organic compounds (VOC) and sulfur oxides (SO_x). The Amendment to an AFC has the same requirements as any other AFC application and must include the following air quality information (CEC, 1997):

- A description of the project, including project emissions, fuel type(s) and specifications, control technologies and stack characteristics;
- The basis for all emission estimates and/or calculations;
- An analysis of Best Available Control Technology (BACT) according to local air district Rules;
- Existing baseline air quality data for all regulated pollutants;
- A description of the regional climate, using existing meteorological data, including temperature, wind speed and direction;
- A listing of applicable laws, ordinances, regulations and standards (LORS) and a determination of compliance with all applicable LORS;
- An emissions offsets strategy;
- An air quality impact analysis (i.e., National and State ambient air quality standards [AAQS] and PSD review, if applicable), and a protocol for the assessment of cumulative impacts of the proposed project, along with permitted and under construction projects within a 6-mile radius; and
- An analysis of human exposure to air toxics (i.e., health risk assessment [HRA]).

The proposed modeling approaches for evaluating the Larkspur 3 project's incremental and cumulative air quality impacts and the health risk assessment for the project's emissions of toxic air contaminants will comply with the requirements for an AFC air quality assessment.

A-3.6 SAN DIEGO COUNTY AIR POLLUTION CONTROL DISTRICT REQUIREMENTS

The SDAPCD has promulgated NSR requirements under Rules 20.1 through 20.3. Based on a preliminary evaluation of the potential to emit for the existing facility and proposed new CTG, it is expected that the Larkspur 3 project may require permitting as a major source, as this term is defined in SDAPCD rules. It

would then be subject to the modeling requirements of Rule 20.3. In general, all equipment with the potential to emit air pollutants is subject to SDAPCD NSR requirements. However, as the Larkspur facility is currently designated a minor source, it is not subject to district offset requirements. NSR has three other major requirements that potentially apply to new sources:

- Installation of BACT;
- Ambient air quality impact modeling to demonstrate compliance with NAAQS and CAAQS; and
- Certification of statewide compliance with air quality requirements.

Assembly Bill 2588, California Air Toxics Hot Spots Program, allows a predicted incremental cancer risk from toxic air contaminants (TAC) at any receptor up to ten in one million, prior to public notification, if best available control technology for toxics (T-BACT) is implemented. A TAC analysis should include TAC emission estimates and a modeling analysis to identify the Zone of Impact (ZOI) and the Maximally Exposed Individual (MEI). The ZOI encompasses the area within which the incremental carcinogenic risk (due to the inhalation pathway only) equals or exceeds one in one million.

A-3.7 U.S. ENVIRONMENTAL PROTECTION AGENCY REQUIREMENTS

USEPA has promulgated PSD regulations applicable to criteria pollutant emissions from major sources in San Diego County. The Larkspur 3 project will not be a major source under the PSD rules, because even after the addition of the third CTG, facility-wide emissions for all criteria pollutants will remain below the PSD threshold applicable to simple cycle gas turbines (250 tons per year). Therefore an evaluation of project impacts versus PSD Significant Impact Levels (SILs) and PSD Increments is not required for this project.

This section describes the dispersion models and modeling techniques that will be used in performing the air quality analysis for the Larkspur 3 facility. The objectives of the modeling are to demonstrate that air emissions from the Larkspur 3 project will not cause or contribute to an exceedance of an ambient air quality standard, and will not cause a significant health risk.

In November 2005, the USEPA officially recognized the American Meteorological Society/ Environmental Protection Agency Regulatory Model (AERMOD) as the preferred dispersion model for regulatory applications, replacing the Industrial Source Complex Short Term 3 (ISCST3) model. USEPA allowed a one-year "grace period" commencing November 9, 2005 during which the use of either model was acceptable, depending on the preference of the local air quality jurisdiction. For this analysis, we have selected AERMOD, since this is consistent with the most recent USEPA policy and the data needed to support its application are available for San Diego County.

A-3.8 SCREENING MODELING

An initial screening analysis will be conducted to identify which operating mode for the new CTG results in worst-case ambient air impacts. This exercise will use the most recent version of the USEPA AERMOD model along with vendor emissions guarantees and stack parameters corresponding to each of nine operating modes across the expected CTG load range and different ambient temperatures covering the expected range of conditions that will be encountered at the site. A unit emission rate of 1.0 gram per second (g/s) will be modeled using stack parameters corresponding to the different combinations of turbine load and ambient temperature. Building downwash effects will be addressed, as described in Section 4.4. Concentrations for each pollutant, expressed in units of micrograms per cubic meter ($\mu g/m^3$), will be determined by multiplying the unit concentrations obtained from the AERMOD screening results (expressed in $\mu g/m^3$ per g/s) by the emission rate calculated for each pollutant (expressed in g/s) for each operating mode. This is a streamlined process, because it allows AERMOD to be executed only once for all pollutants for each operating mode, instead of having to execute the model iteratively for each pollutant.

The operating mode that yields the highest concentrations for each averaging time pertaining to the National and California AAQS will be considered the worst-case Larkspur 3 gas turbine operating mode for that averaging time. Stack parameters corresponding to this worst-case operating mode will be used in all subsequent AERMOD modeling analyses. Refined modeling (discussed in the following section) will be used to determine the worst case annual and short-term impacts of the turbine unit in combination with other project sources. Screening modeling will not be used to eliminate pollutants from the refined modeling analysis.

A-3.9 REFINED MODELING

A-3.9.1 Criteria Pollutants

The purpose of the refined modeling analysis is to demonstrate that air pollutant emissions from the Larkspur 3 project will not cause or contribute to an AAQS violation and will not cause a significant

health risk impact. The most recent version (04300) of the AERMOD model will be used for the refined modeling. The regulatory default settings will be selected. AERMOD will be used for modeling concentrations of pollutants having short-term (e.g., one to 24 hour) ambient standards with the appropriate averaging time selected. Modeling for pollutants having annual standards (i.e., $PM_{10,}$ SO_2 and NO_2), will be conducted using AERMOD with the ANNUAL option to predict impacts for comparison with the annual standards. Specific modeling techniques for conducting the AAQS and HRA analyses are discussed below.

According to the AERMOD Implementation Guide (USEPA 2005), to apply AERMOD in an urban setting without selecting its urban option, meteorological data must be sufficient to fully define the profiles of wind, temperature, and turbulence, as well as including estimates of urban nighttime mixing height. Based on consultation with the SDAPCD, it was determined that the Chula Vista meteorological data set was sufficient to define wind, temperature, and turbulence profiles and urban nighttime mixing height, and therefore the recommendation of the SDAPCD was to apply AERMOD without selecting its urban option.

Dispersion modeling will be performed for both the construction and operations phases of the Project. The purpose of the refined analysis is to determine whether the combined emission sources of the Larkspur 3 project will cause or contribute to a federal or state Ambient Air Quality Standards (AAQS) violation (see Table A-3-1). The project will not be considered to cause or contribute to an AAQS violation unless impacts from the project itself combined with the background concentration exceed the AAQS, or the project has a significant impact at the same location and time as a predicted AAQS violation. The following approach is proposed for performing the AAQS analysis:

1. The receptor grid deployment spacing described in Section 4.5 will be used for the AAQS analysis.
2. Short-term and annual AAQS modeling will be performed using AERMOD. Annual AAQS modeling will be performed using AERMOD with the PERIOD option. Both short-term and annual analyses will be run using sequential hourly meteorological data for the monitoring station recommended by SDAPCD. Maximum impact equals highest predicted modeled impact plus background.
3. For NO_2 modeling, the modeling will initially assume full conversion of NO_x to NO_2. Should it be required, NO_2 estimates will be reduced using the USEPA ozone limiting method (OLM) or the Plume Volume Molar Ratio Method (PVMRM) (for either hourly and/or annual impacts). If 1-hour and annual concentrations do not exceed the applicable AAQS without these refinements, then compliance is demonstrated and no further modeling is necessary for NO_2.

Comparison of model-predicted impacts with ambient air quality standards will require assumptions regarding background pollutant concentrations, i.e., the contributions of sources other than those of the sources being modeled. For purposes of the Larkspur 3 modeling analyses, background values for each pollutant and averaging time will be represented using the highest measured levels at the nearest air quality monitoring station in San Diego County over the last three years. Section 4.6.2 discusses the representativeness of the air quality monitoring data that are available for this purpose.

Table A-3-1
Relevant Ambient Air Quality Standards and Significance Levels

Pollutant	Averaging Time	CAAQS (a,c)	NAAQS (b,c)	Ambient PSD Significance Impact Levels ($\mu g/m^3$)	PSD/NNSR Significant Emissions Increase Thresholds (TPY)	PSD Increments ($\mu g/m^3$)	
						Class I	Class II
CO	8-hour	9.0 ppm (10,000 $\mu g/m^3$)	9.0 ppm (10,000 $\mu g/m^3$)	500	100		
	1-hour	20 ppm (23,000 $\mu g/m^3$)	35 ppm (40,000 $\mu g/m^3$)	2,000			
NO_2[d]	Annual	0.030 ppm (56 $\mu g/m^3$)	0.053 ppm (100 $\mu g/m^3$)	1	100	2.5	25
	1-hour	0.18 ppm (338 $\mu g/m^3$)					
SO_2	Annual		0.03 ppm (80 $\mu g/m^3$)	1	100	2	20
	24-hour	0.04 ppm[e] (105 $\mu g/m^3$)	0.14 ppm (365 $\mu g/m^3$)	5		5	91
	3-hour		0.5 ppm (1,300 $\mu g/m^3$)	25		25	512
	1-hour	0.25 ppm (655 $\mu g/m^3$)					
PM_{10}	Annual	20 $\mu g/m^3$	50 $\mu g/m^3$	1	100	4	17
	24-hour	50 $\mu g/m^3$	150 $\mu g/m^3$	5		8	30
$PM_{2.5}$	Annual	12 $\mu g/m^3$	15 $\mu g/m^3$				
	24-hour		35 $\mu g/m^3$				
O_3	8-hour	0.07 ppm (137 $\mu g/m^3$)	0.08 ppm (157 $\mu g/m^3$)	See footnote[f]	100 (of VOCs)		
	1-hour	0.09 ppm (180 $\mu g/m^3$)	See footnote[g]				

a. California standards for ozone (as volatile organic compounds, carbon monoxide, sulfur dioxide (1-hour), nitrogen dioxide, and PM_{10}, are values that are not to be exceeded. The visibility standard is not to be equaled or exceeded.
b. National standards, other than those for ozone and based on annual averages, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.
c. Concentrations are expressed first in units in which they were promulgated. Equivalent units are given in parentheses and based on a reference temperature of 25° C and a reference pressure of 760 mm of mercury. All measurements of air quality area to be corrected to a reference temperature of 25° C and a reference pressure of 760 mm of mercury (1,013.2 millibar).
d. Nitrogen dioxide (NO_2) is the compound regulated as a criteria pollutant; however, emissions are usually based on the sum of all oxides of nitrogen (NO_x).
e. At locations where the state standards for ozone and/or PM_{10} are violated. National standards apply elsewhere.
f. Modeling is required for any net increase of 100 tons per year or more of VOCs subject to PSD.
g. New federal 8-hour ozone and fine particulate matter ($PM_{2.5}$) standards were promulgated by USEPA on July 18, 1997. The federal 1-hour ozone standard was revoked by USEPA on June 15, 2005.

Blanks = Not applicable
CAAQS = California Ambient Air Quality Standard
mm = millimeters
NAAQS = National Ambient Air Quality Standard
ppm = parts per million by volume, or micromoles of pollutant per mole of gas
TPY = ton per year
$\mu g/m^3$ = micrograms per cubic meter

Cumulative modeling for the operational Project will be performed in the same manner, except that sources outside the Project site that are currently in the permitting process or under construction will be included, as will the existing sources of the Larkspur plant.

As described previously, the Larkspur 3 project will not produce emission quantities high enough to trigger a PSD review. Accordingly, modeling analysis of PSD increment consumption is not proposed.

A-3.9.2 Health Risk Assessment Analysis

The CEC and SDAPCD require a health risk assessment (HRA) of TAC emissions from the operation of the project. Contaminants potentially emitted by the Larkspur 3 project with potential carcinogenic, chronic or acute non-carcinogenic health effects will be considered. This health risk assessment will be performed following the San Diego Air Pollution Control District (SDAPCD) Supplemental Guidelines for Submission of Air Toxics "Hot Spots" Program Health Risk Assessments (HRAs) (SDAPCD 2006) and the Office of Environmental Health Hazard Assessment (OEHHA), Air Toxics Hot Spots Program Risk Assessment Guidelines (OEHHA, 2003). As recommended by both the SDAPCD and OEHHA guidelines, the California Air Resources Board (CARB) Hotspots Analysis and Reporting Program (HARP) (CARB, 2005) will be used to perform a refined health risk assessment for the project. HARP includes two modules: a dispersion module and a risk module. The HARP dispersion module incorporates the USEPA ISCST3 air dispersion model, and the HARP risk module implements the latest Risk Assessment Guidelines developed by OEHHA.

First, ground-level impacts from the Larkspur 3 sources alone will be estimated using the ISCST3 atmospheric dispersion modeling. The HARP modeling analysis will be consistent with, and use similar appropriate parameters as the modeling approach discussed above for the AAQS analyses using AERMOD. Based on the impacts modeled using ISCST3 (the dispersion model incorporated by HARP), the HARP model will be used to estimate health risk. Both surface and upper air meteorological data for the years 1992-1995 from Miramar will be used in the HRA, per SDAPCD Risk Assessment Guidelines (SDAPCD 2006) for mesa locations. Model receptors will be placed at 25 meter spacing around the Larkspur 3 facility fence line and at 100 meter spacing out to 10 km. All receptors that HARP creates that are inside the Larkspur facility fenceline will be excluded. HARP will also include census receptors out to 10 km. Receptors will also be placed at all sensitive locations (e.g., child care facilities, schools, hospitals, libraries or churches) out to 3-miles, if any are identified. A fine receptor grid with a 50 meter spacing will be used in areas encompassing the maximum cancer and non-cancer risks. All receptors will be in UTM NAD83 zone 11 coordinates, since this is the only coordinate system that ISCST3 within HARP accepts.

The HRA will follow the following steps:

1. Define the Point of Maximum Impact (PMI) and the location of the Maximally Exposed Individual (MEI) (i.e., the location where an individual may experience the highest carcinogenic risk);

2. Define the Point of Maximum Impact (PMI) of the maximum chronic non-carcinogenic adverse health effects and the maximum acute adverse health effects; and

3. Calculate concentrations and adverse health effects at locations of maximum impact for each pollutant.

4. Calculate cancer burden if the cancer risk is predicted to be greater than one in a million.

The HARP model will be executed for the inhalation pathway for all applicable uptake pathways for other TACs that will be emitted by Project sources. A discussion of the surrounding land use, sensitive receptors and local meteorology will be provided in the AFC application.

Due to the short-term nature of the construction activities, a HRA will not be conducted for this Project phase.

A-3.10 EMISSIONS SOURCES REPRESENTED IN MODELING ANALYSES

A-3.10.1 Project Sources

The proposed Larkspur 3 project will involve the addition of a single General Electric LM 6000PC Sprint natural gas turbine and a natural gas fired reciprocating engine for blackstart capabilities. Table A-3-2 presents preliminary annual emission estimates for the Larkspur 3 project. Conceptual plant design includes water injection and SCR for NO_x control and oxidation catalyst for CO control that will match recent BACT determinations in California for similar projects. Emissions of SO_2 and PM_{10} will be low, owing to the exclusive use of interstate pipeline quality natural gas as fuel for the gas turbine and combustion engine.

Worst-case emissions scenarios will be determined and modeled for each pollutant and averaging time using realistic combinations of normal operations, turbine startups/shutdowns. Initial commissioning activities will be evaluated separately, as this will be a relatively short-lived, one-time activity. The modeling to address all of these operating conditions is discussed below.

Normal operating CTG emissions will vary with ambient temperature and turbine load. The screening modeling analysis described in Section 4.1 will be used to determine the turbine operating mode and ambient conditions that will produce the highest incremental air quality impacts for each averaging time addressed by the ambient standards, and the corresponding emission parameters will be used to represent the turbine contributions for all subsequent refined modeling of normal operations.

Table A-3-2
Preliminary Estimated Emissions for Larkspur 3 Facility Combustion Turbine-Generator and Natural Gas-Fired Black Start Engine (tons per year)

NO_x	CO	SO_2	VOC	PM_{10}	Pb
9.73	13.60	1.83	2.65	8.15	<0.6

Startup and shutdown conditions will be incorporated in the modeling analysis for the operational project as follows: The emissions from these events and their durations will be quantified conservatively, using data provided by the turbine vendors and a reasonable maximum number of startups/shutdowns will be assumed in developing the worst-case emissions scenarios for each relevant averaging time.

Emissions resulting from turbine commissioning immediately following equipment installation will also be represented, based on the sequence of commissioning activities recommended by the equipment manufacturers and the expected durations and pollutant emissions profiles for each step in the commissioning process. Care will be taken to ensure that conservative assumptions are used for all parameters in order to avoid underestimating these one-time emissions or their impacts on local air quality levels.

Equipment emissions and stack parameters for all of the operating modes described above will be examined and modeled to determine which activity will produce the highest ground-level concentrations for all pollutants and averaging times, and the maximum impacts will be reported in the application as evidence of the project's ability to comply with applicable air quality standards.

Toxic air contaminants (TACs) will also be emitted from the operational Larkspur 3 project due to turbine and blackstart engine combustion of natural gas. These emissions have not been estimated as of the time of this protocol's publication. However, because only natural gas will be used as fuel for the CTG and the blackstart engine, only small quantities of TAC may potentially be emitted. Emissions estimates for TAC will be based on SDAPCD published emission factors (which are based on AP-42 emission factors).

Temporary construction emissions will result from equipment exhaust (primarily NOx and diesel particulate emissions) and fugitive dust (PM10) from earthmoving activities and vehicle and equipment traffic on unpaved surfaces. A construction schedule and equipment list provided by the project engineering design firm will be consulted to determine the scenarios that will produce the highest emissions for the different averaging times addressed in the ambient air quality standards. For the Larkspur 3 facility, the fugitive PM10 emissions from construction will be estimated using approximate information on the land area to be disturbed and the extent of equipment operations, and will take into account the effects of implementing feasible mitigation measures to control fugitive dust and minimize equipment exhaust emissions during construction. The air quality impacts of the heavy equipment exhaust and fugitive dust emissions will then be modeled using AERMOD. The construction site, parking area, and lay-down area will be modeled as volume sources. Low sulfur diesel fuel (15 ppm by weight) will be utilized in any emission calculations for construction equipment used at the Larkspur 3 site.

A-3.10.2 Cumulative Impact Analysis Including Sources Outside Larkspur 3 Facility

A cumulative impact analysis will evaluate the combined air quality impacts of all routinely operating sources within the Larkspur 3 site together with the emission from other projects within 6 miles from the Larkspur Energy Site that are currently either under construction, currently in an air quality permitting or CEQA review process, or reasonably expected to enter these processes in the near future. A request will be made to SDAPCD asking for a list of all newly permitted sources or other sources that are reasonably anticipated to be permitted within six miles of the Larkspur 3. This list, when compiled will be forwarded

on to CEC for review. Based on this information, additional sources may be included in the cumulative source modeling analysis.

A-3.11 BUILDING WAKE EFFECTS

The effect of building wakes (i.e., downwash) upon the stack plumes of emission sources at the Larkspur 3 plant will be evaluated in accordance with USEPA guidance (USEPA, 1985). Direction-specific building data will be generated for stacks below good engineering practice (GEP) stack height, using the most recent version of USEPA Building Parameter Input Program – Prime (BPIP-Prime). Appropriate information will be provided in the application that describes the input assumptions and output results from the BPIP-Prime model.

A-3.12 RECEPTOR GRID

The receptor grids that will be used in the AERMOD modeling analyses described in this protocol for operational sources will be as follows:

- 25-meter spacing along the fenceline and extending from the fenceline out to 100 meters beyond the property line;
- 100-meter spacing from 100 m to 1 km beyond the property line;
- 500-meter spacing within 1 to 5 km of project sources; and
- 1,000-meter spacing within 5 to 10 km of project sources.

During the refined modeling analysis for operational Project emissions, if a maximum predicted concentration for a particular pollutant and averaging time is located within the portion of the receptor grid with spacing greater than 25 meters, a supplemental dense receptor grid will be placed around the original maximum concentration point and the model will be rerun. The dense grid will use 25-meter spacing and will extend to the next grid point in all directions from the original point of maximum concentration.

Due to the large computation time required to run AERMOD this receptor grid, with the additional dense nested grid points, was determined to best balance the need to predict maximum pollutant concentrations and allow the all operational modeling runs to be completed in less than one week.

Because construction emission sources release pollutants to the atmosphere from small stacks or from soil disturbances at ground level, maximum predicted construction impacts for all pollutants and averaging times will occur within the first kilometer from the Larkspur site boundary. Accordingly, only the portion of the above grid out to a distance of 1 km will be used for the construction modeling.

For the HRA modeling, receptors will be placed around the fenceline with 25-meter spacing, and 100-meter spacing will be used outside of the fenceline out to 10 km. All receptors that HARP creates that are inside the fence will be excluded. HARP will also include the census receptors out to 10 km. These census receptors will include the populated areas near the proposed EPP facility location. Discrete receptors will also be placed at all sensitive locations (e.g., schools, hospitals, etc.) out to 3 miles. A fine

receptor grid with a 50 meter spacing will be used in areas encompassing the maximum cancer and non-cancer risks. All receptors will be in UTM NAD83 zone 11 coordinates, since this is the only coordinate system that ISCST3 within HARP accepts.

A detailed project map and a 7 ½- minute U.S Geological Survey (USGS) map will be provided in the AFC. Actual Universal Transverse Mercator (UTM) coordinates will be used. The CAAQS and NAAQS apply to all locations outside of the applicant's facility, i.e. where public access is not under the control of the applicant, and the south part of the property, to which the public begins to have access. Therefore, the fenceline will be placed inside of the facility's property boundary, and the receptors will be placed on and outside of the fenceline.

A-3.13 METEOROLOGICAL AND AIR QUALITY DATA

A-3.13.1 Meteorological Data

Meteorological data suitable for input to AERMOD were obtained from San Diego Air Pollution Control District based on the surface monitoring record for the agency's Chula Vista meteorological station, which is located approximately 8 miles northwest of the Larkspur project site and upper air data from the Miramar station. The meteorological record selected for this modeling analysis includes hourly data for the years 2000 through 2002. Missing data were replaced by following the USEPA approved techniques for filling in missing data.

The meteorological data recorded at Chula Vista, the closest long-term meteorological monitoring station, are considered to be representative of conditions at the Larkspur 3 facility. This conclusion is based on proximity to the Project site and similarity in terrain characteristics.

The ISCST3 dispersion model is incorporated in the HARP modeling system that will be used for the air toxics health risk assessment. Per SDAPCD Risk Assessment Guidelines (SDAPCD 2006) for mesa locations, sequential hourly data for 1992 through 1995 from the Miramar meteorological monitoring station formatted for ISCST3 input will be used to support the HRA.

A-3.13.2 Background Air Pollutant Monitoring Data

Available air quality monitoring data will be used to represent background air pollutant concentrations. The ambient air quality in San Diego County is currently monitored at various permanent air pollutant stations. The closest monitoring station to the facility is located in Otay Mesa at the Otay Mesa-Paseo International, 1.2 miles south of the Larkspur facility. Data from the Chula Vista monitoring station eight miles northwest of the Project site will be used as necessary to provide background concentrations for the criteria pollutants that are not recorded at the Otay Mesa-Paseo International station.

For both the construction and operational phase modeling, the highest reported concentration that has occurred within the last 3 years at the most representative monitoring station will be used as the background value for each pollutant and averaging time. These background values will be added to the maximum modeled contributions of project sources to obtain total pollutant concentrations suitable for comparison with the ambient air quality standards. This highly conservative approach assumes that the

highest recorded value and the modeled maximum impact both occur at the same time and at the same location.

A-3.14 NAAQS AND CAAQS ANALYSIS

The modeling analysis results for the new Larkspur 3 sources alone and the cumulative analysis will be presented in summary tables. A figure indicating the locations of the maximum pollutant concentrations will be provided. For CO, NO_2, and SO_2, the maximum incremental short-term and annual concentrations predicted for the entire meteorological input data record will be reported. For PM_{10}, the maximum 24-hour and annual concentrations will be presented. Background concentrations will be added to yield the total concentration, which will be compared with the NAAQS and CAAQS.

A-3.15 PSD INCREMENT ANALYSIS

The Larkspur 3 Project is not subject to requirements of the PSD increment analyses.

A-3.16 HEALTH RISK ASSESSMENT ANALYSIS

Maps will depict the following data:

- Elevated terrain within a 10-km radius of the project;
- Distribution of sensitive receptors, including schools, pre-schools, etc., within a 3-mile radius of the project;
- Current residential land uses;
- Isopleths of any areas where predicted exposures to air toxics result in estimated chronic non-cancer impacts and acute impacts equal to or exceeding a hazard index of 1.0; and
- Isopleths of any areas where exposures to air toxics lead to an estimated carcinogenic risk equal to or exceeding one in one million.

Health risk assessment modeling results will be summarized in tabular form to include maximum annual (chronic, both carcinogenic and non-carcinogenic) and hourly (acute) adverse health effects from toxic air contaminant emissions. Cancer burden will also be presented if the maximum predicted cancer risk is greater than one in one million. Health risk values will be calculated and presented in the summary table for the points of maximum impact and the sensitive receptors with the maximum risk values.

A-3.17 DATA SUBMITTAL

Electronic copies of all modeling input and output files will be provided to SDAPCD and CEC.

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