4.3 Public Health Risk

Operations at the Inglewood Oil Field create combustion products and fugitive hydrocarbon emissions, and possibly expose the general public and workers to these pollutants as well as the toxic chemicals associated with other aspects of facility operations. The major sources of toxic emissions from the Inglewood Oil Field are airborne from the sources discussed above. The purpose of this public health analysis is to determine whether a significant health risk would result from public continued exposure to these fugitive emissions and combustion by-products as routinely emitted during project operations.

The exposure of primary concern in this section is to pollutants for which no air quality standards have been established. These are known as non-criteria pollutants, toxic air pollutants, or air toxics. Those for which ambient air quality standards have been established are known as criteria pollutants, which have been addressed in the Air Quality Section (Section 4.2). This section of the EIR provides information on the baseline air toxic emissions from the Inglewood Oil Field and addresses the potential for increased air toxic emissions associated with the potential future development. Based upon the analysis of the potential future development, recommendations are made to enhance the proposed CSD.

4.3.1 Environmental Setting

The potential development is within the jurisdiction of the South Coast Air Quality Management District (SCAQMD), which encompasses an area of 10,473 square miles (referred to hereafter as the district), consisting of the four county South Coast Air Basin (Basin) and the Riverside County portions of the Salton Sea Air Basin and the Mojave Desert Air Basin. The Basin, which is a subarea of the SCAQMD's jurisdiction, is bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The 6,745 square-mile Basin includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. The Riverside County portion of the Salton Sea Air Basin and Mojave Desert Air basin is bounded by the San Jacinto Mountains in the west and spans eastward up to the Palo Verde Valley. Information on regional meteorological conditions is provided in Section 4.2.1.

4.3.1.1 Regional Health Risks from Toxic Air Contaminants

The Multiple Air Toxics Exposure Study III (MATES III) is a monitoring and evaluation study conducted in the South Coast Air Basin by the SCAQMD (2008). The MATES III Study consists of several elements. These include a monitoring program, an updated emissions inventory of toxic air contaminants, and a modeling effort to characterize risk across the South Coast Air Basin. The study focuses on the carcinogenic risk from exposure to air toxics. Excerpts from the MATES III study are included below to provide an overview of regional health risk assessment issues.

A network of 10 fixed sites was used to monitor toxic air contaminants once every three days for two years. The location of the sites was the same as in the previous MATES II Study to provide comparisons over time.

The initial scope of the monitoring was for a one-year period from April, 2004 through March, 2005. Due to the heavy rains in the South Coast Air Basin in the fall and winter of this period, there was concern that the measurements may not be reflective of typical meteorology. The study was thus extended for a second year from April, 2005 through March, 2006.

In addition to the fixed sites, five additional locations were monitored for periods of several months using moveable monitoring platforms. These microscale sites were chosen to determine if there were gradients between communities that would not be picked up by the fixed locations.

The study also included an update of the toxics emissions inventories for the South Coast Air Basin and computer modeling to estimate toxics levels throughout the basin. This allows estimates of air toxics risks in all areas of the South Coast Air Basin, as it is not feasible to conduct monitoring in all areas.

The monitored and modeled concentrations of air toxics were then used to estimate the carcinogenic risks from exposure. Annual average concentrations were used to estimate a lifetime risk from exposure to these levels, consistent with guidelines established by the Office of Environmental Health Hazard Assessment (OEHHA) of the California Environmental Protection Agency (EPA). The cancer risk is referred to as the excess cancer risk, or the risk associated with exposure to toxic air contaminants, and are generally a small fraction of the overall cancer risk from all contributing factors combined such as dietary exposure or hereditary factors.

The carcinogenic risk from air toxics in the South Coast Air Basin based on the average concentrations at the fixed monitoring sites is about 1,200 excess cancer cases per million. This risk refers to the expected number of additional cancers in a population of one million individuals that is exposed over a 70 year lifetime. The risk at the fixed sites ranged from 870 to 1,400 per million. For comparison purposes, the SCAQMD considers the risk of a project to be significant if the carcinogenic risk exceeds 10 excess cancer cases per million. Thus, the baseline carcinogenic risk resulting from routine exposure to air toxics in the South Coast Air Basin is substantial.

Compared to previous studies of air toxics in the South Coast Air Basin, this study found a decreasing risk for air toxics exposure, with the population weighted risk down by 17% from the analysis in MATES II. While there has been improvement in air quality regarding air toxics, the risks are still unacceptable and are higher near sources of emissions such as ports and transportation corridors.

Diesel particulate continues to dominate the risk from air toxics, and the portion of air toxic risk attributable to diesel exhaust is increased compared to the MATES II Study. The highest risks are found near the port area, an area near central Los Angeles, and near transportation corridors. The results from this study underscore that a continued focus on reduction of toxic emissions, particularly from diesel engines, is needed to reduce air toxics exposure.

The MATES III health risk assessment results are provided in Figure 4.3-1. The location of the Inglewood Oil Field is also shown as a point of reference. This figure indicated that the modeled baseline health risk in the vicinity of the Inglewood Oil Field is in the 600-800 excess cancer cases per million individuals exposed, which is considerably higher than levels that are considered acceptable, which are approximately 10 excess cancer cases per million individuals exposed. The relative risk from the Inglewood Oil Field, or what might be considered the contribution from this facility to the greater regional health risk, are summarized in Section 4.3.1.3.

4.3.1.2 Regional Toxic Air Contaminant Concentrations

A toxic air contaminant is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. Toxic air contaminants are usually present in minute quantities in the ambient air. However, their high toxicity or health risk may pose a threat to public health even at very low concentrations. In general, for those toxic air contaminants that may cause cancer, there is no concentration that does not present some risk. This contrasts with the criteria pollutants for which acceptable levels of exposure can be determined and for which the state and federal governments have set ambient air quality standards.

In 1987, the California legislature adopted the Air Toxics “Hot Spots” Information and Assessment Act (or AB 2588). AB 2588 requires facilities to submit an air-toxics-inventory report from which priority scores are calculated. Facilities with a priority score exceeding specific thresholds must provide health risk analysis. If the risk reported in the health risk analysis exceeds specific thresholds, then the facility is required to provide public notice to the affected community. In 1992, the California legislature added a risk reduction component, the Facility Air Toxic Contaminant Risk Audit and Reduction Plan (or SB 1731), which required the District to specify a significant risk level, above which risk reduction would be required. The District began to implement the AB 2588 program beginning in 1988.

Monitoring for toxic air contaminants is limited compared to monitoring for criteria pollutants because toxic pollutant impacts are typically more localized than criteria pollutant impacts. California Air Resources Board (CARB) conducts air monitoring for a number of toxic air contaminants various locations throughout California. The closest CARB toxic air contaminant monitoring location is the North Long Beach site. Table 4.3.1 presents the Annual Toxics Summary for North Long Beach, the maximum concentration data for volatile organic compounds, polycyclic aromatic hydrocarbons and inorganic compounds. The data for volatile organic compounds are for the year 2005; for polycyclic aromatic hydrocarbons the year is 2004; and for all inorganic compounds the data are for the year 2003 except for hexavalent chromium, which is from 2005, the most recent data available from CARB on toxic air contaminants.

Figure 4.3-1 SCAQMD MATES III Modeled Health Risk Assessment

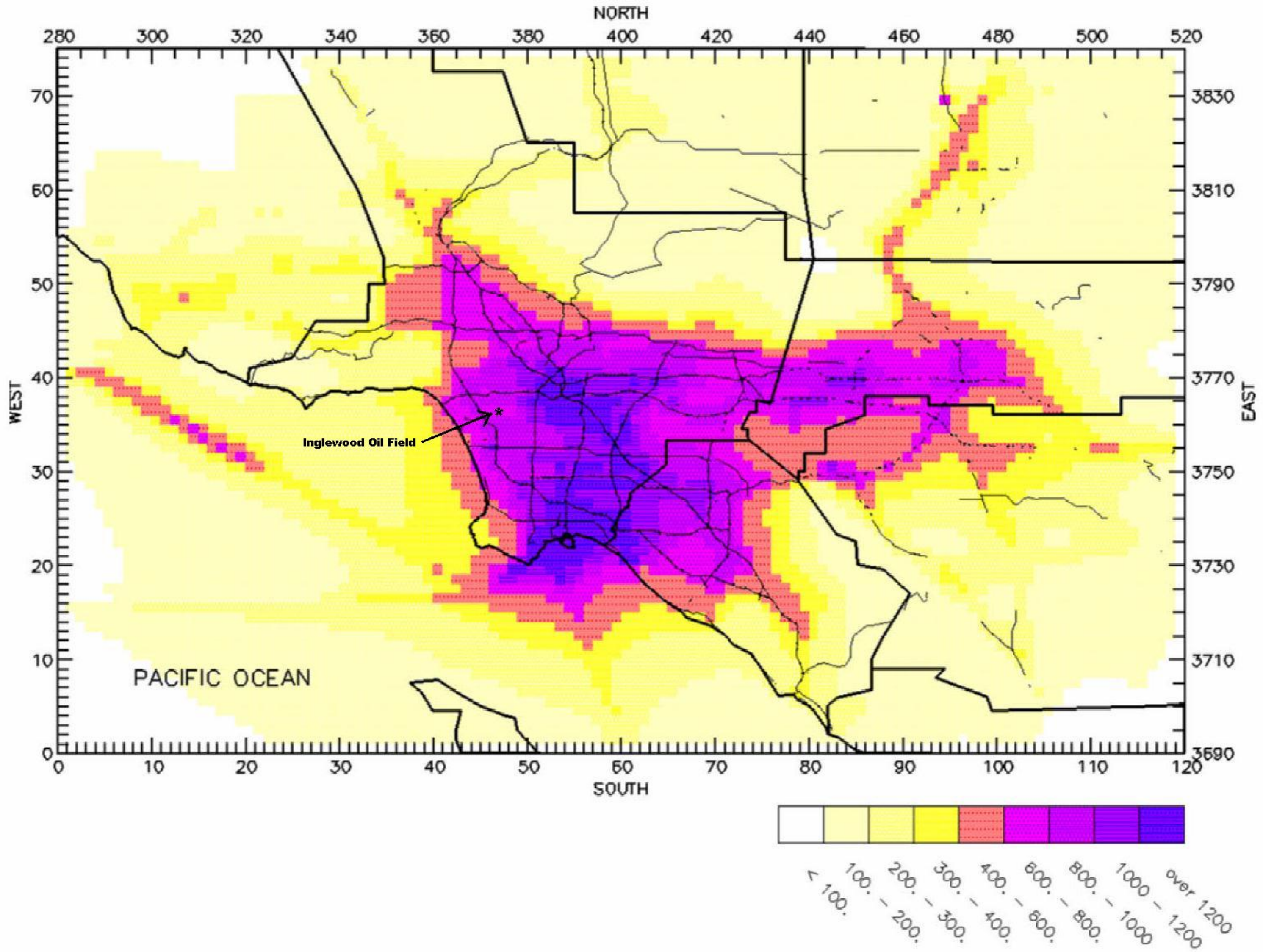


Table 4.3.1 Annual Toxics Summary for North Long Beach

Pollutant	Maximum Concentration	Pollutant	Maximum Concentration
Volatile Organic Compounds [1] (parts per billion by volume)			
Acetaldehyde	2.6	Ethyl Benzene	0.6
Acetone	20	Formaldehyde	6.1
Acetonitrile	2.3	Methyl Bromide	0.12
Acrolein	0.9	Methyl Chloroform	0.05
Acrylonitrile	0.9	Methyl Ethyl Ketone	0.2
Benzene	1.6	Methyl tertiary - Butyl Ether	*
1,3 – Butadiene	0.56	Methylene Chloride	2.4
Carbon Disulfide	1.1	Perchloroethylene	0.18
Carbon Tetrachloride	*	Styrene	0.7
Chloroform	0.06	Toluene	4.7
o – Dichlorobenzene	0.15	Trichloroethylene	0.18
p – Dichlorobenzene	0.15	meta/para – Xylene	2.4
cis – 1,3 – Dichloropropene	0.05	Ortho – Xylene	0.8
trans – 1,3 – Dichloropropene	0.05		
Polycyclic Aromatic Hydrocarbons (2) (nanograms per cubic meter)			
Benzo(a)pyrene	0.61	Benzo(k)fluoranthene	0.19
Benzo(b)fluoranthene	0.51	Dibenz(a,h)anthracene	0.18
Benzo(g,h,i)perylene	1.7	Indeno(1,2,3-cd)pyrene	0.64
Inorganic compounds (3) (nanograms per cubic meter)			
Aluminum	1700	Nickel	9
Antimony	3	Phosphorous	35
Barium	56	Potassium	890
Bromine	9	Rubidium	4
Calcium	2,300	Selenium	1
Chlorine	2,000	Silicon	5,600
Chromium	6	Strontium	24
Cobalt	7.5	Sulfur	1,300
Copper	36	Tin	2.5
Hexavalent Chromium [4]	0.12	Titanium	140
Iron	1,600	Uranium	1.5
Lead	12	Vanadium	23
Manganese	33	Yttrium	2
Mercury	1.5	Zinc	110
Molybdenum	1	Zirconium	7

Source: CARB website: http://www.arb.ca.gov/adam/toxics/sitesubstance.html
[1] Data for VOCs are for the year 2005.
[2] Data for PAHs are for the year 2004.
[3] Data for inorganic compounds are for the year 2003, except for hexavalent chromium.
[4] Data for hexavalent chromium are for the year 2005.
(*) Means there was insufficient or no data available to determine the value.

4.3.1.3 Inglewood Oil Field Toxic Emissions

Operational Emissions

Table 4.3.2 shows the toxic air contaminant emissions from the Inglewood Oil Field as reflected in the Annual Emissions Report (AER) documents submitted to the SCAQMD.

Toxic emissions of benzene are primarily associated with fugitive emissions from the tanks and components. Toxic emissions of the remaining pollutants are associated with combustion (the flare and the internal combustion engines).

The use of drilling and workover diesel engines also contributes to the facility toxic emissions. These emissions are a function of the number of wells drilled per year and the number of well workovers per year. Information of well drilling, pad grading and well workovers from the year 2007 were used in the analysis. Emissions associated with well drilling, pad grading and well workovers are shown in Table 4.3.2 also. The well drilling, grading and well workovers utilize diesel engines which contribute the majority of the toxic air contaminant metal emissions, polycyclic aromatic hydrocarbons, acetaldehydes and the diesel particulate to the field-wide toxic air contaminant emissions.

Soil Vapor Emissions

Between September 24 and October 26, 2007, GeoScience Analytical, Inc. personnel advanced ninety-four (94) soil probes to depths of 4.0’ at various locations throughout the Inglewood Oil Field. Figure E-1 in Appendix E shows the location of the 94 sampling locations. The majority of these sampling locations were in the vicinity of idled or abandoned wells.

Soil gases were extracted from each of the soil probes and transported to the laboratory for analyses of C1-C7 hydrocarbons and hydrogen sulfide. The analytical data for each of the sampling locations is provided in Appendix E, Table E.1.

Methane concentrations ranged from 1.0 ppmv (parts per million volume) to a high of 981,400 ppmv in the case of location #7, which was located near well LAI 1-130, which was an idled well. Given the high value for this location, additional soil gas vapor testing was done at 12 sites located around well LA-1-130. Figure E-2 shows the location of these additional sampling points (location #s 94-105). The results of this additional sampling indicated that the source of the gas was most likely well LA-1-130. After the testing program Plains Exploration & Production tested the well and determined that the casing was leaking gas. The well has since been abandoned to the current Division of Oil, Gas and Geothermal Resources (DOGGR) standards.

Heavier homologes of methane were generally present at low concentrations. The maximum ethane concentration was 1,253 ppmv in the case of location #7, which was the leaking abandoned well. The maximum propane reading was at location #61 with a concentration of 33.7 ppmv. This sample was taken in an area of known historical soil contamination. Hydrogen sulfide concentrations were below detection limits for all locations.

Table 4.3.2 Current Oil Field Operations Toxic Pollutant Emissions (lbs/year)

Pollutant Description	2005 – 2006 Operations	Drilling[1]	Total	Inventory Threshold for Reporting[2]
1,1,2,2-Tetrachloroethane	0.03	0	0.03	1
1,1,2-Trichloroethane {Vinyl trichloride}	0.02	0	0.02	50
1,2,4-Trimethylbenzene	14.0	15.0	29.0	5
1,2-Dichloropropane {Propylene dichloride}	0.02	0	0.02	20
1,3-Dichloropropene	0.02	0	0.02	10
Acetaldehyde	7.8	208.1	215.9	20
Acrolein	4.4	10.31	14.7	0.05
Ammonia	244.3	0	244.3	200
Arsenic and Compounds (inorganic)	0.0007	0.60	0.60	0.01
Benzene	284.3	56.6	341.0	2
Butadiene [1,3]	0.44	5.4	5.8	0.1
Cadmium	0.0007	4.8	4.8	0.01
Carbon tetrachloride	0.03	0	0.025379	1
Chloroform	0.02	0	0.01968	10
Chlorine	0	41.6	41.6	None
Chromium, hexavalent (and compounds)	0.00004	0	0.000044	0.0001
Copper	0.0018	3.02	3.02	0.1
Diesel exhaust particulates	15.2	1311.6	1326.9	10
Ethyl benzene	179.9	8.6	188.6	200
Ethylene dibromide {1,2-Dibromoethane}	0.03	0	0.03	0.5
Ethylene dichloride {1,2-Dichloroethane}	0.02	0	0.02	2
Formaldehyde	131.4	416.5	548.0	5
Hexane	242.9	4.4	247.4	200
Hydrochloric acid	0.08	0	0.08	20
Hydrogen selenide	0.0010	1.2	1.2	0.5
Hydrogen sulfide	0.27	0	0.27	5
Lead compounds (inorganic)	0.0037	5.1	5.1	0.5
Manganese	0.0014	4.8	4.8	0.1
Mercury	0.0009	3.6	3.6	1
Methyl ethyl ketone {2-Butanone}	0	41.8	41.8	None
Methanol	1.04	0.85	1.9	200
Methyl tert-butyl ether	65.7	0	65.7	200
Methylene chloride {Dichloromethane}	0.06	0	0.06	50
Nickel	0	15.3	15.3	0.1
Phosphorus	0.0017	2.30	2.3	None
Polycyclic Aromatic Hydrocarbons	3.5	13.4	16.9	0.2
Styrene	0.02	1.6	1.7	100
Toluene	196.1	41.7	237.8	200
Vinyl chloride	0.01	0	0.01	0.5
Xylene	106.1	29.5	135.5	200

Source: 2005-2006 Operations from SCAQMD AER (based on fiscal year),

1. Drilling emissions are calculated from 2005/2006 drilling activities and includes well drilling, workovers and well pad grading.
2. Thresholds from the SCAQMD Protocol for the development of toxic emission inventories, 2004. Each facility emitting a toxic air contaminant greater than or equal to the annual thresholds listed in this table is assessed an annual emissions fee as specified in SCAQMD Rule 301.

Various governmental agencies have mitigation threshold standards for methane in soil. The City of Los Angeles requires mitigation for all occupied structures within oil fields. Typically, methane concentrations in excess of 12,500 ppmv are considered significantly high requiring mitigation. All but two of the sample values were below this threshold.

The Inglewood Oil Field site was found to be relatively void of appreciable light hydrocarbons in the surficial soils, except for high hydrocarbon concentrations at two locations as discussed above. However, in order to conservatively evaluate potential offsite exposure to fugitive toxic air contaminant emissions from subsurface well casings, worst-case emissions were estimated for all abandoned wells. These emissions were based on the average emission factor for active wells, even though monitoring studies of abandoned wells and subsurface vapors indicated no emissions from almost all wells.

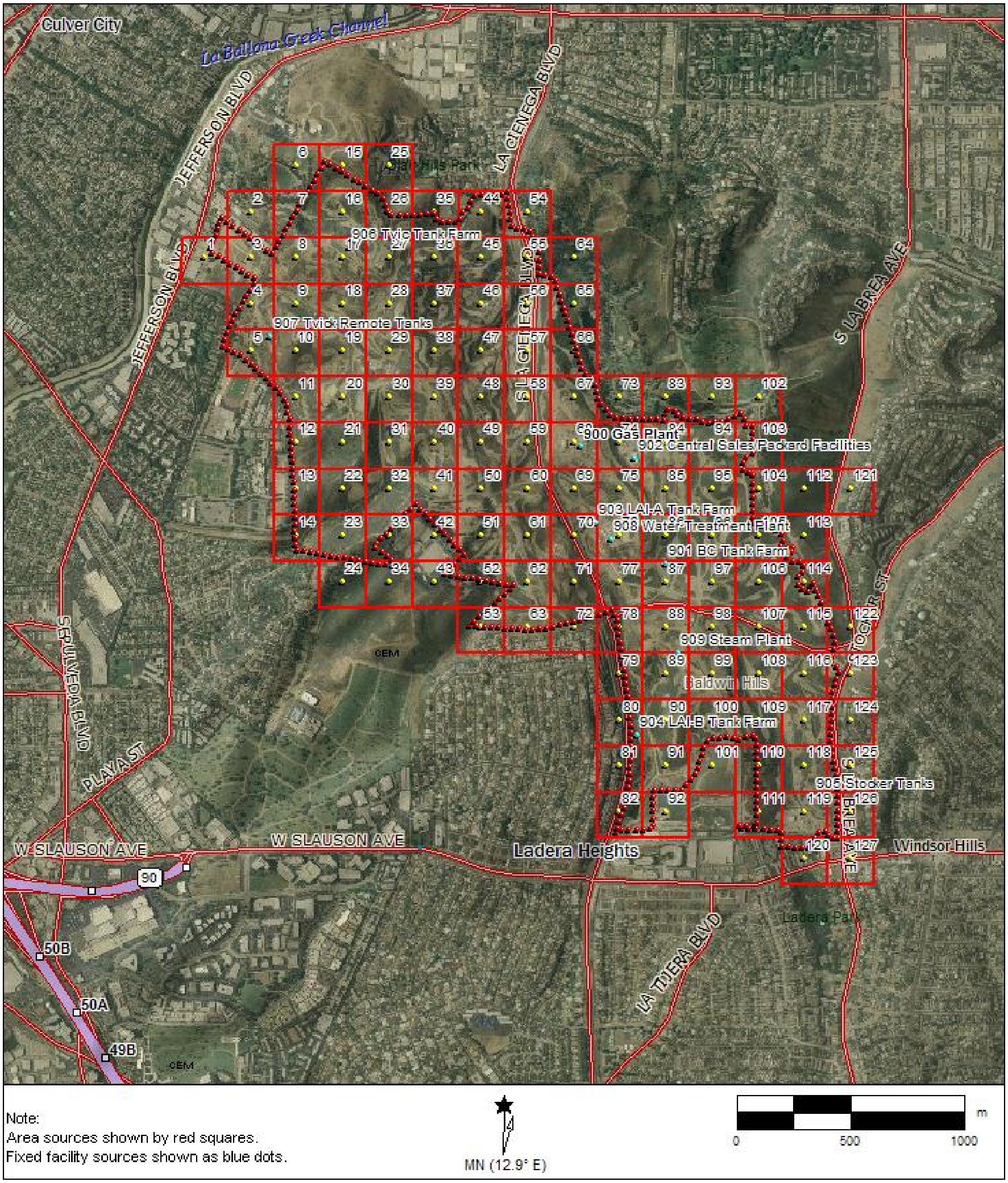
4.3.1.4 Inglewood Oil Field Baseline Health Risk Assessment

As per AB2588, health risk assessments are required for facilities that emit toxic pollutants above a threshold criteria level. Based on the annual emission reporting requirements of the SCAQMD, existing operations at the Inglewood Oil Field exceed the inventory reporting thresholds for a number of air toxic compounds (See Table 4.3.2).

As part of this analysis, a health risk assessment was conducted using the CARB Hotspots Analysis and Reporting Program (HARP) model. HARP is a computer software package that combines the tools of emission inventory database, facility prioritization, air dispersion modeling, and risk assessment analysis. All of these tools are tied to a single database allowing information to be shared and utilized. The HARP model provides the best available modeling methodologies to assess public health impacts associated with emissions of toxic air contaminants. The risk assessment methods and procedures outlined in the Office of Environmental Health Hazard Assessment's document Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments (OEHHA, 2003).The inputs associated with the model are discussed below.

The sources of pollutants at the Inglewood Oil Field were addressed primarily as area sources. The field was divided up into approximately 100 grid cells of 10 acres each. The number of emission sources within each cell, including production wells, injection wells, abandoned wells (for fugitive emissions), fugitive emissions from tanks and components, were generated based on Geographic Information System maps and aerial photographs and component counts produced as part of the field-wide SCAQMD Rule 1173 requirements (The SCAQMD requirements for control of fugitive emissions from valves, flanges and other components). Toxic emissions generated from well workovers diesel engines were assessed based on an assumed well workover frequency of once per year per well. Source locations are shown in Figure 4.3-2.

Figure 4.3-2 Health Risk Assessment Source Locations



Receptor locations were established based on the field boundary, a regional receptor grid and the closest residences. The main receptor grid covered a 4km by 4km grid at 100 meter spacing. Receptors along the property boundary were spaces approximately 20 meters apart. Receptors are points within the modeling domain where concentrations of pollutants and potential health risks are estimated.

People may or may not necessarily reside at the receptor points; however, all receptors could represent at least transient public exposure. For the purposes of the analysis, it is assumed that an individual could reside at the receptor for a continuous 70-year exposure period. The receptor grid that was employed in the health risk assessment is shown in Figure 4.3-3. Sensitive receptors, such as hospitals, care facilities and schools, are shown in Figure 4.3-4.

The health risk assessment utilized two meteorological datasets. SCAQMD meteorological data from the West Los Angeles station for 1981, in conjunction with the HARP model five year (1985-1989) dataset from Los Angeles International Airport, were used in order to obtain worst-case health risk estimates. These meteorological datasets were utilized since they represent the most recent approved data for use in regulatory dispersion modeling. The SCAQMD West Los Angeles station is located at Wilshire and Sawtelle Boulevards, which is approximately six miles northwest of the Inglewood Oil Field. Los Angeles International Airport is located approximately four miles southwest of the Inglewood Oil Field.

Pursuant to SCAQMD Guidelines, terrain elevation heights were included in the modeling analysis. Digital Elevation Mapping data contained in the HARP modeling software were used to input elevation for all sources and receptors. Digital Elevation Mapping data from four US Geological Survey (USGS) quadrangles were required, which included Inglewood, Beverly Hills, Hollywood and Venice.

Since the Inglewood Oil Field has been in operations for over 80 years, it was assumed that all offsite individuals would experience a lifetime exposure (i.e., 70 years under the SCAQMD and OEHHA risk assessment guidelines).

The results of the HARP modeling are shown below in Table 4.3.3 and Figure 4.3-5. Overall, worst-case health risk associated with baseline operations are well below all applicable health risk criteria. The estimated baseline health risk also represents a relatively small fraction of the overall air toxic health risk in the region as identified in the MATES III study. The Inglewood Oil Field baseline cancer risk of 8.18 cancer cases per million represents 1.1 percent of the excess cancer risk of 730 in the vicinity of the project site, 0.58 percent of the excess cancer risk of 1,400 at the Central Los Angeles monitoring site, 0.68 percent of the excess cancer risk of 1,200 at the Compton monitoring site and 1.1 percent of the excess cancer risk of 750 at the North Long Beach monitoring site.

Figure 4.3-3 Health Risk Assessment Receptor Grid

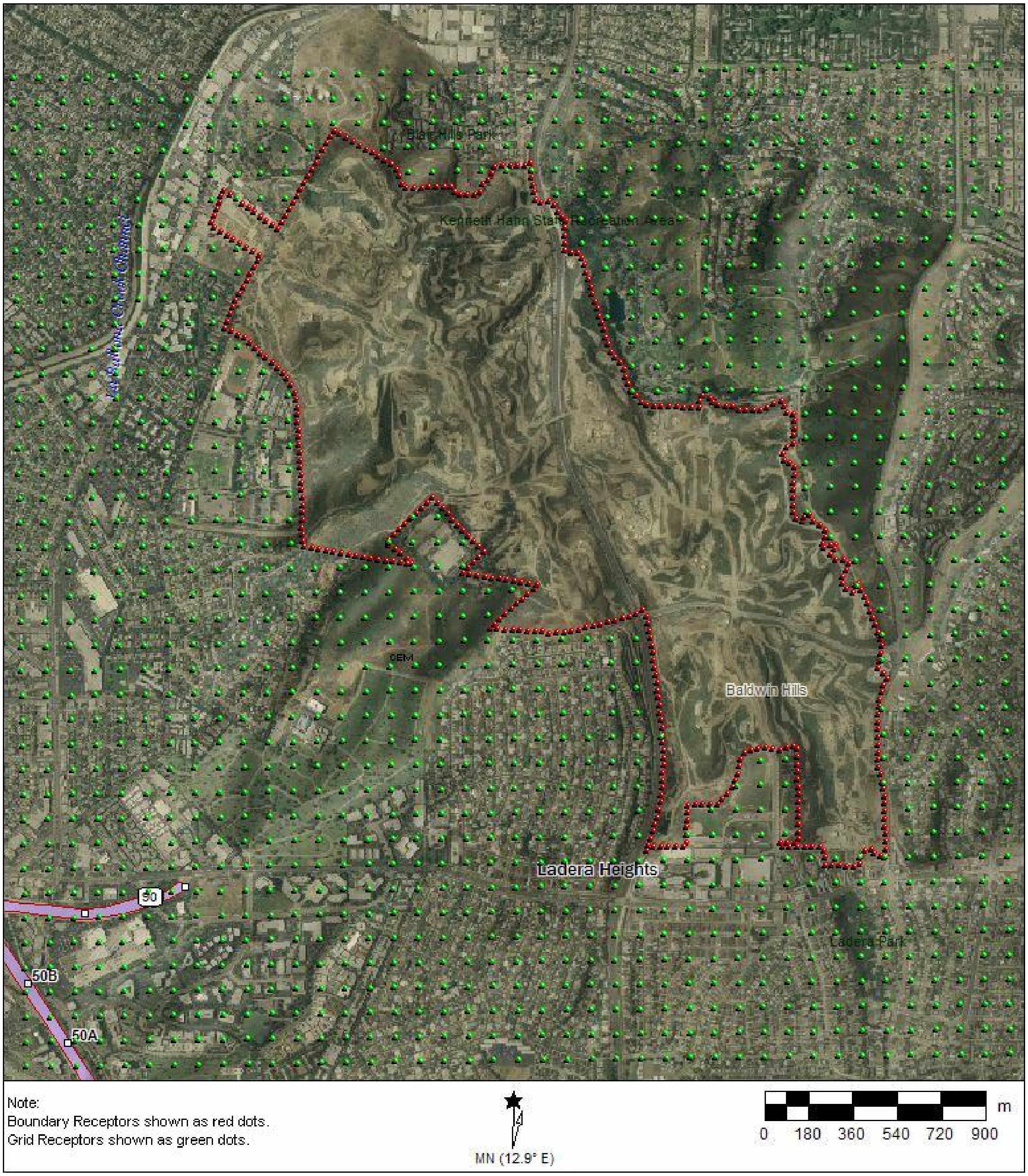


Figure 4.3-4 Sensitive Receptors

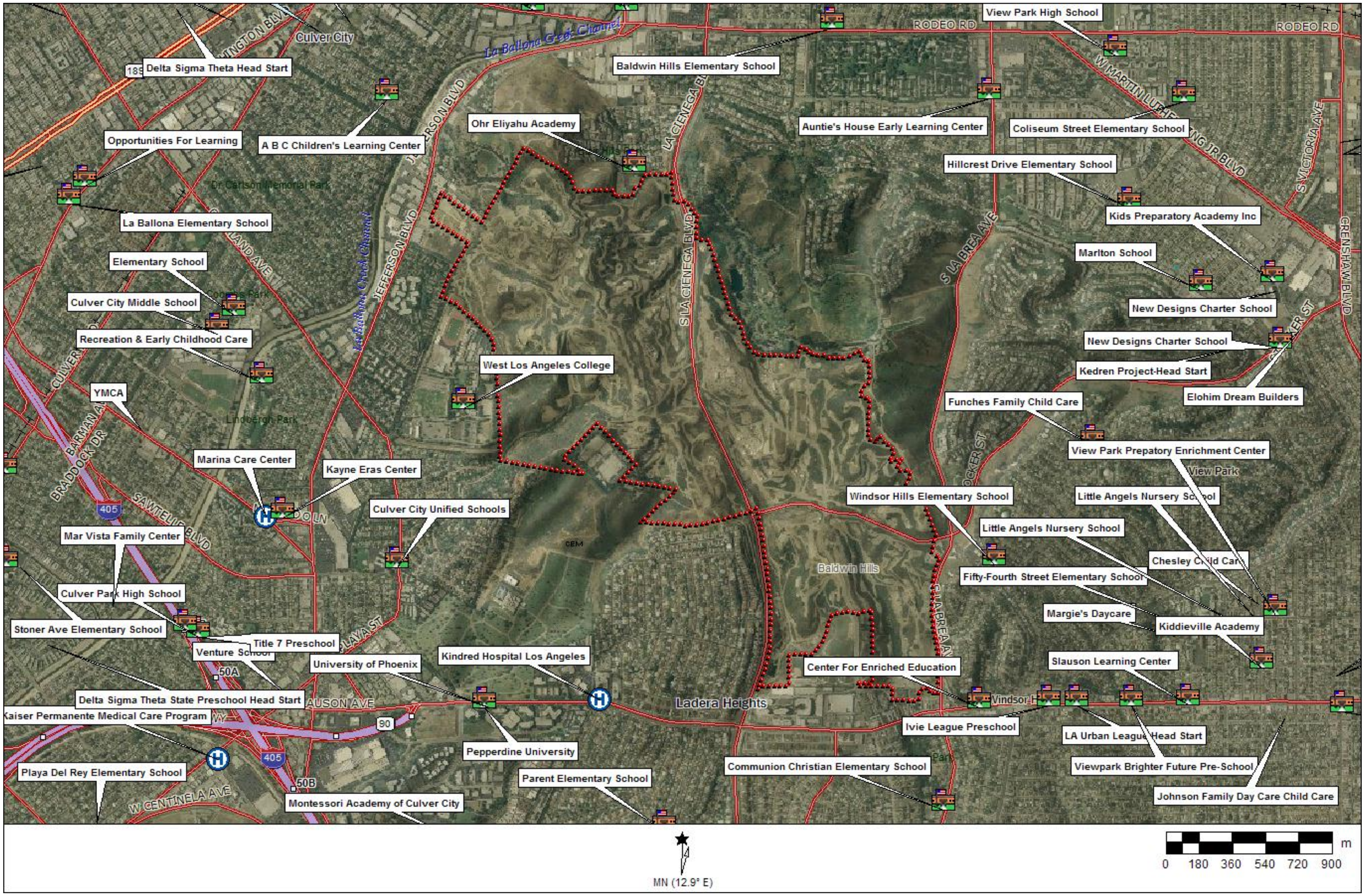


Figure 4.3-5 Inglewood Oil Field Baseline Excess Cancer Risk

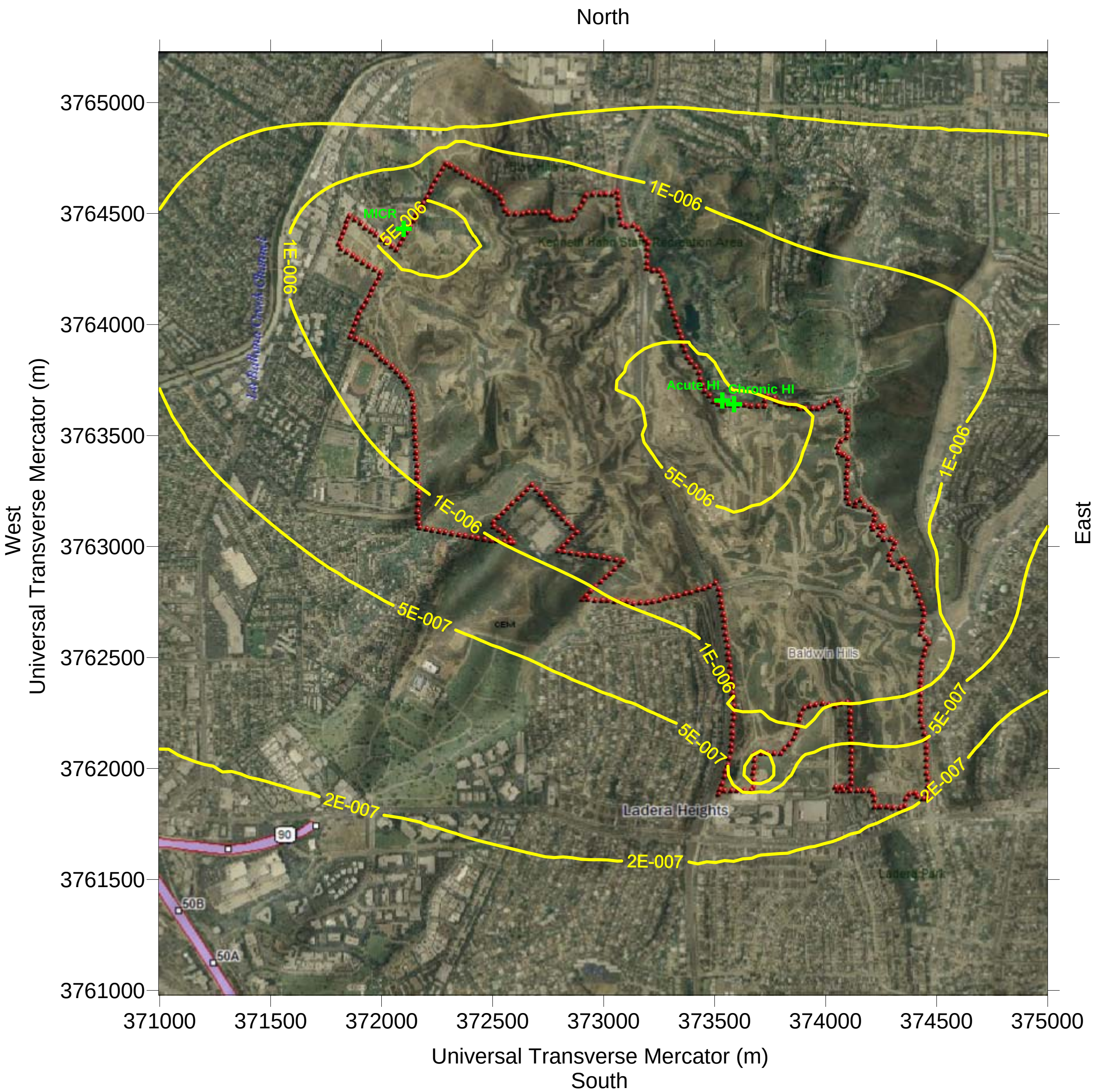


Table 4.3.3 Inglewood Oil Field Baseline Health Risk Assessment Results

Criteria Description	Health Risk Assessment Result	Threshold Value
Cancer risk, per million	8.18	10
Cancer Burden	0.005	0.5
Chronic risk, health index	0.021	1
Acute risk, health index (refined)	0.96	1

4.3.2 Regulatory Setting

Regulatory requirements covering the proposed oil field development project are summarized in Table 4.3.4 and discussed in the following sections.

4.3.2.1 Federal

The Clean Air Act of 1970 (42 U.S.C., § 7401 et seq.) required establishment of ambient air quality standards to protect the public from the effects of air pollutants. These standards have been established by the United States EPA for the major air pollutants: nitrogen dioxide, ozone, sulfur dioxide, carbon monoxide, sulfates, particulate matter with a diameter of 10 and 2.5 micron or less (PM10 and PM2.5) and lead. The National Emission Standards for Hazardous Air Pollutants (NESHAPs) is a set of national emission standards for listed hazardous pollutants emitted from specific classes or categories of new and existing sources. These standards were implemented in the CAA Amendments of 1977.

4.3.2.2 State

California Health and Safety Code § 39606 requires the California Air Resources Board (ARB) to establish California's ambient air quality standards to reflect the California-specific conditions that influence its air quality. Such standards have been established by the ARB for ozone, carbon monoxide, sulfur dioxide, PM10, lead, hydrogen sulfide, vinyl chloride and nitrogen dioxide. The same biological mechanisms underlie some of the health effects of most of these criteria pollutants as well as the non-criteria pollutants. The California standards are listed together with the corresponding federal standards in the Air Quality section.

Table 4.3.4 Summary of Regulatory Requirements

Authority	Administering Agency	Requirement
Clean Air Act (CAA)	USEPA CARB SCAQMD	Protect public from unhealthful exposure from air pollutants.
California Clean Air Act, TAC Program, H&SC § 39650, et seq.	SCAQMD	Requires quantification of toxic air contaminant emissions, use of best available control technology, and preparation of a health risk assessment
H&SC, Part 6, § 44300 et seq. (Air Toxics "Hot Spots Act" or AB2588)	SCAQMD with CARB/OEHHA oversight	Regulates public exposure to air toxics. Requires inventory of toxic air contaminants and health risk assessments.
H&SC § 41700	SCAQMD with CARB oversight	Prohibits emissions in quantities that adversely affect public health, other businesses or property.
SCAQMD Rule 1401	SCAQMD	Toxic Air Contaminants - New Source Review
SCAQMD Rule 1402	SCAQMD	Toxic Air Contaminant Public Health Risks - Public Notification and Risk Reduction

Notes:
OES = Office of Emergency Services

California Health and Safety Code § 44300 et seq. requires facilities, which emit large quantities of criteria pollutants and any amount of non-criteria pollutants to provide the local air district an inventory of toxic emissions. Such facilities may also be required to prepare a quantitative health risk assessment to address the potential health risks involved. The California Air Resources Board and the South Coast Air Quality Management District (SCAQMD) will ensure implementation of these requirements for the oil field through their various permitting, rules and regulations.

California Health and Safety Code § 41700 states that "No person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause or have a natural tendency to cause injury or damage business or property."

The California Health and Safety Code §§ 39650 et seq. mandates that the California Environmental Protection Agency (Cal-EPA) establish safe exposure limits for toxic, non-criteria air pollutants and identify the best available methods for their control. These laws also require that the new source review rules for each air district include regulations establishing procedures to control the emission of these pollutants. The toxic emissions from oil field operations are listed in ARB's California Toxic Emissions Factors (CATEF) database. Cal-EPA has developed specific cancer potency estimates for assessing their related cancer risks at specific exposure levels. For noncancer-causing toxic air pollutants, Cal-EPA established specific no-effects levels (known as reference exposure levels) for assessing the likelihood of producing health effects at specific exposure levels. Such health effects would be considered significant only when exposure exceeds these reference levels.

4.3.2.3 Regional

The South Coast Air Quality Management District has no specific rules implementing Health and Safety Code § 44300. It does, however, require the results of a health risk assessment as part of air permit the application process.

SCAQMD Rule 1401 - New Source Review of Toxic Air Contaminants
This rule specifies limits for maximum individual cancer risk, cancer burden, and noncancer acute and chronic hazard index from new permit units, relocations, or modifications to existing permit units which emit toxic air contaminants. Under Rule 1401, the Executive Officer shall deny the permit to construct a new, relocated or modified permit unit if emissions of any listed toxic air contaminant may occur, unless the applicant has substantiated to the satisfaction of the Executive Officer all of the following:

1) Maximum Individual Cancer Risk and Cancer Burden
   The cumulative increase in maximum individual cancer risk which is the sum of the calculated maximum individual cancer risk values for all toxic air contaminants emitted from the new, relocated or modified permit unit will not result in any of the following:
   a) An increased maximum individual cancer risk greater than one in one million (1.0×10^{-6}) at any receptor location, if the permit unit is constructed without TBACT (TBACT is the best available control technology for toxic emissions);
   b) An increased maximum individual cancer risk greater than ten in one million (1.0×10^{-5}) at any receptor location, if the permit unit is constructed with TBACT;
   c) A cancer burden greater than 0.5.
2) Chronic Hazard Index
   The cumulative increase in total chronic hazard index for any target organ system due to total emissions from the new, relocated or modified permit unit owned or operated by the applicant for which applications were deemed complete on or after the date when the risk value for the compound is finalized by OEHHA, unless paragraph (e)(3) applies, will not exceed 1.0 at any receptor location.
3) Acute Hazard Index
   The cumulative increase in total acute hazard index for any target organ system due to total emissions from the new, relocated or modified permit unit owned or operated by the applicant for which applications were deemed complete on or after the date when the risk value for the compound is finalized by OEHHA, unless paragraph (e)(3) applies, will not exceed 1.0 at any receptor location.
4) Risk Per Year
   The risk per year shall not exceed 1/70 of the maximum allowable risk specified in (d)(1)(A) or (d)(1)(B) at any receptor locations in residential areas.

For the purpose of determining maximum individual cancer risk, cancer burden, chronic and acute hazard indexes due to a new or relocated permit unit pursuant to this rule, the total Toxic Air Contaminant emissions from the new or relocated permit unit shall be calculated on an annual basis from permit conditions which directly limit the emissions or, when no such conditions are imposed, from:

- The maximum rated capacity;
- The maximum possible annual hours of operation;
- The maximum annual emissions; and
- The physical characteristics of the materials processed.

SCAQMD Rule 1402 - Control of Toxic Air Contaminants from Existing Sources
The purpose of this rule is to reduce the health risk associated with emissions of toxic air contaminants from existing sources by specifying limits for maximum individual cancer risk, cancer burden, and noncancer acute and chronic hazard index applicable to total facility emissions and by requiring facilities to implement risk reduction plans to achieve specified risk limits, as required by the Hot Spots Act and this rule. The rule also specifies public notification and inventory requirements.

4.3.3 Significance Criteria

The significance of potential project-related health risks will be determined based on compliance with the thresholds in SCAQMD Rule 1401, which are consistent with health risk threshold throughout California. Therefore, regardless of the current baseline, any estimated health risk indices that exceed the SCAQMD Rule 1401 thresholds will be considered significant as follows:

- Maximum individual cancer risk of:
  - greater than one in one million (1.0×10^{-6}) at any offsite receptor location, if the facility is constructed and/or operated without TBACT;
  - greater than ten in one million (1.0×10^{-5}) at any offsite receptor location, if the facility is constructed and/or operated with TBACT
- A cancer burden greater than 0.5.
- The cumulative increase in total chronic hazard index for any target organ system due to total emissions from the facility is greater than 1.0 at any offsite receptor location.
- The cumulative increase in total acute hazard index for any target organ system due to total emissions from the facility is greater than 1.0 at any offsite receptor location.
- The risk per year shall not exceed 1/70 of the maximum allowable risk specified above at any receptor locations in residential areas.

4.3.4 Analysis of Potential Future Oil Field Development

Emissions associated with potential development operations would increase due to the following activities:

- An increase in crude oil throughputs, which would increase crude tank fugitive emissions and heater emissions;
- Construction activities related to drilling of new wells;
- Construction activities related to grading of new or existing well pads for new wells;
- Construction activities related to construction of new facilities, including well slot manifolds and automatic well tests, the new oil cleaning plant, new water treatment facility, new water injection wells, new vapor recovery skid, new pipelines and connections and new ancillary facilities;
- Increased number of workover rigs and activities;
- Construction of the steam drive facility including a new steam injection wells and oil plant, new gas treatment plant, new water softening plant, new water treatment plant and the new steam plant;
- Operation of the steam drive facility, including a new crude oil heater, fugitive emissions from the new equipment at the oil plant, the gas treatment plant, the water treatment plant, and operation of the steam generators.

4.3.4.1 Future Construction Emissions

Emissions associated with potential development construction would increase over the current emissions due to an increase in the drilling activities, construction of new facilities, which would include grading and equipment construction activities, and additional grading for wells pads.

Each of these activities would be separate, but could occur simultaneously depending on construction schedules and development priorities.

Emissions associated with drilling would primarily be associated with diesel engines used to power the drawworks, mudworks, generators, and support equipment, including cranes, loaders, welding machines, etc. Drawworks, mudworks and generators associated with the drilling rig were assumed to be certified engines as per the rigs used in 2006 and 2007. Construction emissions for grading and well drilling are based on the actual emissions estimated from fuel use for 2007 on a per well basis.

In addition, grading would be conducted to prepare areas for new wells. Grading activities and associated emissions were assumed to be the same as the 2007 grading emissions on a per well basis.

Emissions associated with construction of the new facilities would be generated by the construction equipment diesel engines, including graders, loaders, tampers, welding machines, manlifts, trucks, etc. Emission factors from the SCAQMD were used to calculate the emissions.

Offsite construction emissions are based on the estimated number of contractors and the truck trips described in the Potential Oil and Gas Development Scenario, Section 3.0.

4.3.4.2 Future Operational Emissions

Emissions associated with potential development operations would increase over the current emissions due to an increase in the crude oil throughout, fugitive emissions associated with new equipment and an increase in the use of combustion equipment associated with additional crude heaters and the steam generators.

Increased crude oil throughput would increase fugitive emissions from tanks due to working losses. Emissions associated with potential development tank working losses were estimated based on the 2006 SCAQMD AER and each tanks associated throughput increase. Standing losses were assumed to remain the same as 2006 as they are not a function of product throughout. Crude throughout was assumed to be the maximum throughput identified in Section 3.0.

Fugitive emissions from existing valves, connections, compressors, PSVs, etc would be the same as the baseline. However, additional equipment would be added associated with the steam drive plant and the water treatment/crude cleaning plants. The new equipment fugitive emissions were estimated based on the fugitive emissions from existing, similar equipment.

As new wells would be added to the field, these additional wells would also produce fugitive emissions. Well counts would peak at an estimated 880 producing wells, based on the drilling and abandonment schedules shown in Section 3.0.

Emissions from the new heaters and the steam generators was estimated based on the equipment heat rating and the application of best available control technology, including low-NOx burners and selective catalytic reduction (utilizing urea for an ammonia source).

Workovers would continue to be conducted at the field, but at a greater frequency with more workover rigs. This would increase the emissions from workover activities at the field.

Offsite emissions during operations would increase marginally due to an increase in propane trucks and an increase in contractors associated with the increase in well workovers.

4.3.4.3 Toxic Air Contaminant Emissions from Future Construction/Operations

Toxic emissions associated with future construction and operations would increase over the current emissions due to an increase in the crude oil throughout, fugitive emissions associated with new equipment and an increase in combustion associated with existing heaters and new heaters and the new steam generators. In addition, more construction would be taking place at the field, including grading, additional drilling activities and new equipment construction. All of these construction activities utilize diesel engine power construction equipment, which emit toxic pollutants.

Future drilling activities were assessed based on the number of wells projected to be drilled in each area and the corresponding number of grid cells within each area. Workovers were assigned a conservative value of one workover per well each year. Grading was assumed to continue at the average acreage per well drilled that occurred in 2006. The future emissions of toxic pollutants (i.e., potential future oil field development) are listed in Table 4.3.5.

Impact #	Impact Description	Phase	Residual Impact
PH.1	Potential emissions of toxic air contaminants associated with future operations would produce a potential health risk that exceeds SCAQMD significance thresholds.	Construction/ Operation	II

As per AB2588, health risk assessments are required for facilities that emit toxic pollutants above a threshold criteria level. Based on the annual emission reporting requirements of the SCAQMD, future operations at the Inglewood Oil Field exceed the thresholds for benzene, butadiene, formaldehyde, ammonia and PAHs for equipment that is covered by the SCAQMD Rule 301 reporting requirements. Mobile sources and temporary equipment, such as drill rigs and construction equipment are not covered by the SCAQMD Rule 301 reporting requirement, but have been included to provide the public with a comparison of these emissions to the reporting thresholds.

As part of this analysis, a health risk assessment was conducted using the California Air Resources Board Hotspots Analysis and Reporting Program (HARP) model. HARP is a computer software package that combines the tools of emission inventory database, facility prioritization, air dispersion modeling, and risk assessment analysis. All of these tools are tied to a single database allowing information to be shared and utilized.

The risk assessment methods and procedures are outlined in the Office of Environmental Health Hazard Assessment's document Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments (OEHHA, 2003).The inputs associated with the model are discussed below.

The sources of pollutants at the Inglewood Oil Field were addressed primarily as area sources. The field was divided up into approximately 100 grid cells of 10 acres each. The number of emission sources within each cell, including production wells, injection wells, abandoned wells (for fugitive emissions), fugitive emissions from tanks and components, were generated based on GIS maps and aerial photographs and component counts produced as part of the field-wide SCAQMD Rule 1173 requirements. Toxic emissions generated from well workovers diesel engines were assessed based on an assumed well workover frequency of once per year per well. Source locations were presented in Figure 4.3-2 (see Section 4.3.1.4).

Receptor locations were established based on the field boundary, a regional receptor grid and the closest residences. The main receptor grid covered a 4km by 4km grid at 100 meter spacing. Receptors along the property boundary were spaced approximately 20 meters apart. The receptor grid that was employed in the HRA was presented in Figure 4.3-3 (see Section 4.3.1.4).

Table 4.3.5 Future Inglewood Oil Field Operations Toxic Pollutant Emissions (lbs/year)

Pollutant Description	Future Operations Existing Equipment	Future Operations New Equipment	Future Operations Total	Future Drilling, Workovers, Pad Grading	Inventory Threshold for Reporting [1]
1,1,2,2-Tetrachloroethane	0.03	0	0.03	0	1
1,1,2-Trichloroethane {Vinyl trichloride}	0.02	0	0.02	0	50
1,2,4-Trimethylbenzene	15.24	2.04	17.27	19.83	5
1,2-Dichloropropane {Propylene dichloride}	0.02	0	0.02	0	20
1,3-Dichloropropene	0.02	0	0.02	0	10
Acetaldehyde	7.84	4.43	12.27	275.10	20
Acrolein	4.47	3.58	8.05	13.62	0.05
Ammonia	336.30	4127.76	4464.06	0	200
Arsenic and Compounds (inorganic)	0.00	0	0.0007	0.81	0.01
Benzene	372.98	158.33	531.32	74.86	2
Butadiene [1,3]	0.44	0	0.44	7.11	0.1
Cadmium	0.0007	0	0.0007	6.48	0.01
Carbon tetrachloride	0.03	0	0.03	0	1
Chlorine	0	0	0	55.73	10
Chloroform	0.02	0	0.02	0	None
Chromium, hexavalent (and compounds)	4.4E-05	0	4.4E-05	0	0.0001
Copper	0.0018	0	0.0018	4.05	0.1
Diesel exhaust particulates	15.24	0	15.24	1754.80	10
Ethyl benzene	189.24	39.25	228.48	11.41	200
Ethylene dibromide {1,2-Dibromoethane}	0.03	0	0.03	0	0.5
Ethylene dichloride {1,2-Dichloroethane}	0.02	0	0.02	0	2
Formaldehyde	131.80	27.56	159.36	550.51	5
Hexane	325.23	153.98	479.22	5.87	200
Hydrochloric acid	0.08	0	0.08	0	20
Hydrogen selenide	0.0010	0	0.0010	1.62	0.5
Hydrogen sulfide	0.31	0.07	0.39	0	5
Lead compounds (inorganic)	0.0037	0	0.0037	6.80	0.5
Manganese	0.0014	0	0.0014	6.48	0.1
Mercury	0.0009	0	0.0009	4.86	1
Methyl ethyl ketone {2-Butanone}	0	0	0	55.26	None
Methanol	1.04	0	1.04	1.12	200
Methyl tert-butyl ether	65.71	0	65.71	0	200
Methylene chloride {Dichloromethane}	0.06	0	0.06	0	50
Xylene	126.38	60.16	186.55	38.95	200
Nickel	0.0017	0	0.0017	3.08	None
Phosphorus	0	0	0	20.57	0.1
Polycyclic Aromatic Hydrocarbons	3.55	0.73	4.28	17.73	0.2
Styrene	0.02	0	0.02	2.17	100
Toluene	244.13	118.16	362.29	55.11	200
Vinyl chloride	0.01	0	0.01	0	0.5

1. Thresholds from the SCAQMD Protocol for development of toxic emission inventories, 2004. Facilities emitting a toxic air contaminant greater than or equal to the annual thresholds listed in this table are assessed an annual emissions fee as specified in SCAQMD Rule 301.

The health risk assessment utilized two meteorological datasets. SCAQMD meteorological data from the West Los Angeles station for 1981, in conjunction with the HARP model five year (1985-1989) dataset from Los Angeles International Airport, were used in order to obtain worst-case health risk estimates. The SCAQMD West Los Angeles station is located at Wilshire and Sawtelle Boulevards, which is approximately six miles northwest of the Inglewood Oil Field. Los Angeles International Airport is located approximately four miles southwest of the Inglewood Oil Field.

Pursuant to SCAQMD Guidelines, terrain elevation heights were included in the modeling analysis. Digital Elevation Mapping data contained in the HARP modeling software were used to input elevation for all sources and receptors. Digital Elevation Mapping data from four USGS quadrangles were required, which included Inglewood, Beverly Hills, Hollywood and Venice.

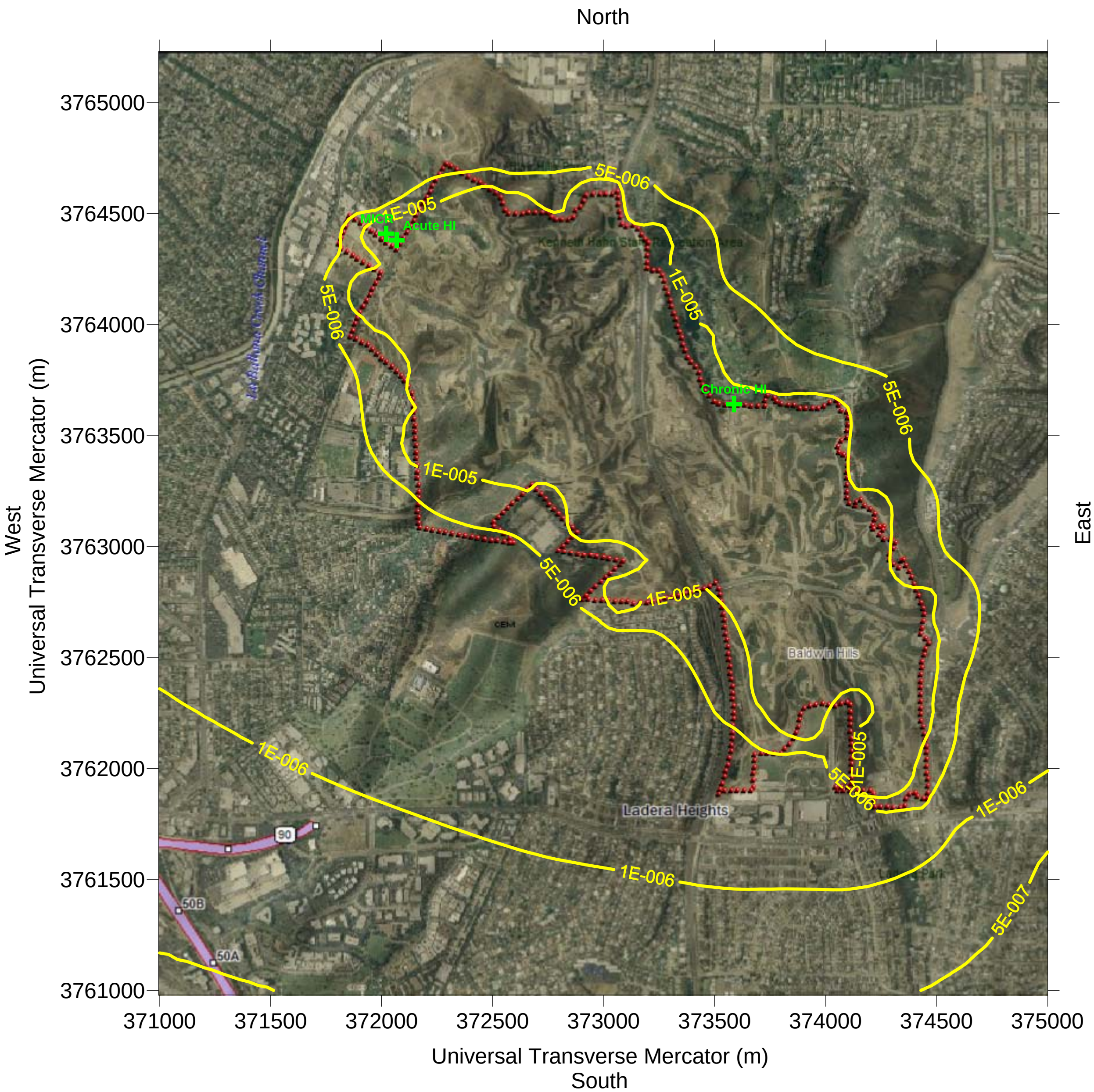
Since the Inglewood Oil Field has been in operations for over 80 years, it was assumed that all offsite individuals would experience a lifetime exposure (i.e., 70 years under the SCAQMD and OEHHA risk assessment guidelines). While the proposed CSD only covers operations for the next 10 to 20 years, it can be reasonably assumed that oil field operations could continue indefinitely.

The results of the HARP modeling are shown below in Table 4.3.6 and Figure 4.3-6. Overall, worst-case health risk associated with future operations exceeded applicable health risk criteria for individual cancer risk and acute noncancer risk.

Table 4.3.6 Inglewood Oil Field Potential Future Oil Field Development Health Risk Assessment Results

Criteria Description	HRA Result	Threshold Value
Cancer risk, per million	**30.2**	10
Cancer Burden	0.14	0.5
Chronic risk, health index	0.025	1
Acute risk, health index (refined)	**10.46**	1

Figure 4.3-6 Inglewood Oil Field Project Excess Cancer Risk



Based on the health risk assessment modeling results, potential health risks would be considered potentially significant. Sources that contributed the greatest to the high health risk levels mainly included diesel engines, especially those associated with the drilling of new wells.

Mitigation Measure

Several mitigation measures have been identified as part of the Air Quality Analysis. These mitigation measures, including AQ.1-1, AQ.1-2, AQ.2-1 and AQ.3-1 through AQ.3-5 would also reduce emissions of Toxic Air contaminants. However, the following mitigation measure would also be required to reach acceptable levels of public health risk:

PH.1-1 Install second generation heavy duty diesel catalysts, or equivalent technology, on all drill rig engines. The technology shall be capable of achieving 90 percent reductions for hydrocarbons, and particulate matter less than 10 microns (PM_{10}). An example would include the Johnson Matthey CCRT® filter, which has achieved hydrocarbon and particulate emission controls in excess of 90 percent.

PH.1-2 Install CARB-Verified Level 3 diesel catalysts on all diesel-powered construction equipment. The current list of CARB-Verified Level 3 diesel catalysts is located at http://www.arb.ca.gov/diesel/verdev/vt/cvt.htm. Catalysts shall be capable of achieving 85% reduction for diesel particulate matter.

PH.1-3 After five years of operation of the meteorological station at the oil field, the meteorological data shall be reviewed to determine if it could result in significant changes to the health risk assessment in this EIR. If there is the potential for significant changes, then the health risk assessment shall be updated, to determine if additional mitigation measures are required to keep the level of risk less than significant.

Residual Impacts

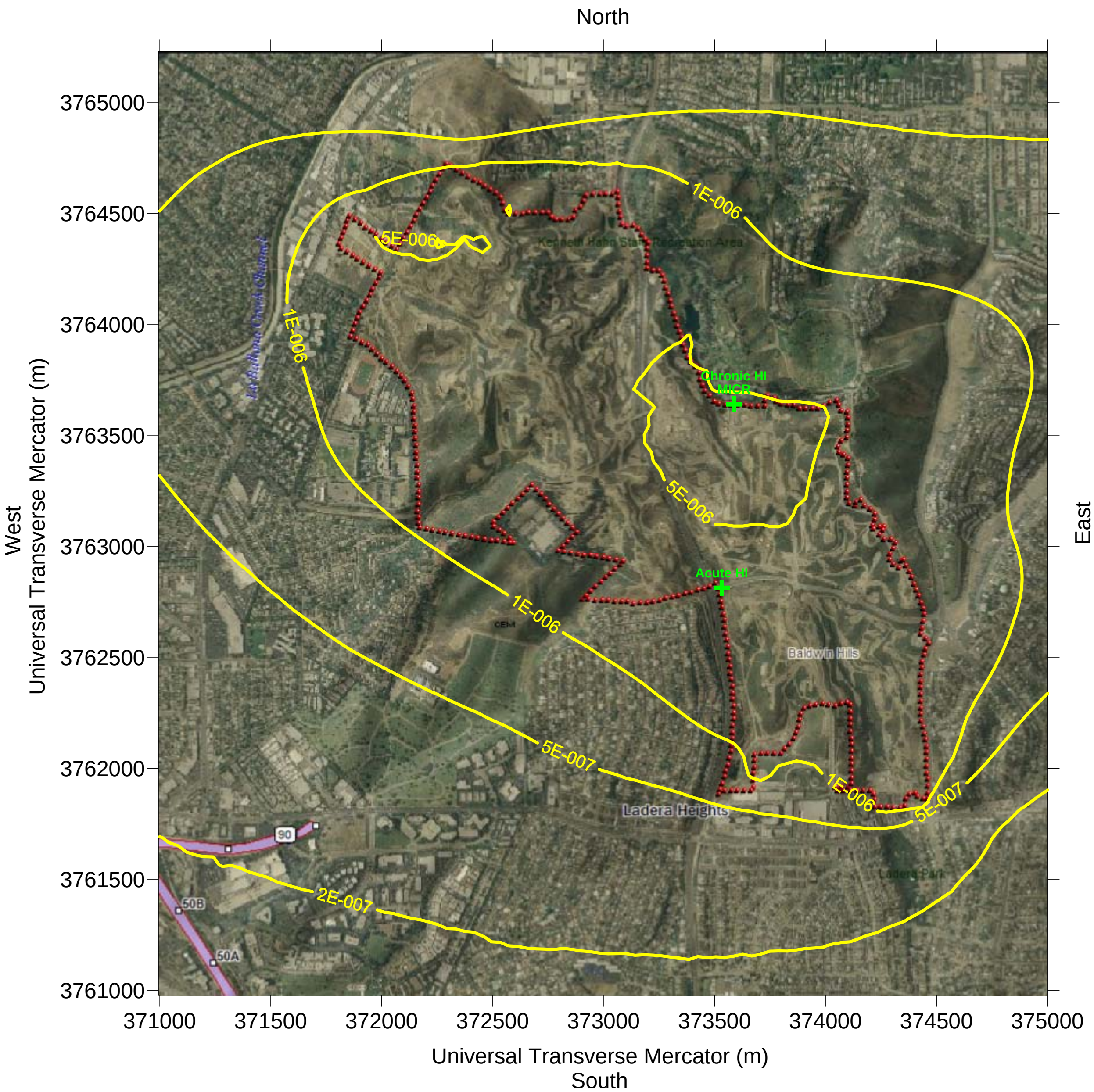
To evaluate the effectiveness of the proposed mitigation measures (i.e., AQ.1-1, AQ.1-2, AQ.2-1, AQ.3-1 through AQ.3-5, PH.1-1 and PH.1-2), the HARP model was rerun using the same approach as was used to evaluate the potential future oil field development. Revised health risk assessment modeling results are presented in Table 4.3.7 and Figure 4.3-7. Overall, worst-case health risk associated with mitigated project operations are well below all applicable health risk criteria.

With implementation of the above listed mitigation measures, impacts would be reduced to *less than significant with mitigation (Class II).*

Table 4.3.7 Inglewood Oil Field Mitigated Health Risk Assessment Results

Criteria Description	HRA Result	Threshold Value
Cancer risk, per million	7.5	10
Cancer Burden	0.01	0.5
Chronic risk, health index	0.02	1
Acute risk, health index (refined)	0.70	1

Figure 4.3-7 Inglewood Oil Field Mitigated Project Excess Cancer Risk



Impact #	Impact Description	Phase	Residual Impact
PH.2	Potential short-term health risk associated with exposure to emissions from drilling new wells could exceed acceptable health hazard indices.	Drilling	II

In evaluating the potential oil field development, emissions associated with drilling of new wells were allocated to each respective 10-acre area source (see Figure 4.3-2) since it is not known at this time exactly where each well will be drilled within the 10-acre area. Therefore, additional health risk assessment modeling was conducted to evaluate potential health risks in the immediate vicinity of well drilling activities. Drilling activities were addressed separately by conducting HARP modeling runs for cancer, acute and chronic risks that could occur at locations near drilling activity. This modeling was conducted to establish a recommended offset distance between the property boundary and drilling activity to avoid health risk impacts above threshold values. Since well drilling emissions at any given point are temporary in nature, potential property line offset distances were determined based on acute exposure to toxic air contaminants. All modeling also included the applicable mitigation measures proposed in the Air Quality section and PH.1-1 above.

Health risk assessment modeling results indicate that the acute hazard index of 1.0 would be exceeded at distances within 100 meters of well drilling activities. The Maximum hazard index associated with new well drilling was as high as 1.3 in the immediate vicinity of the drill rig, dropping to below 1.0 at approximately 400 feet from the drill rig.

Mitigation Measure

Several mitigation measures have been identified as part of the Air Quality Analysis and Impact PH.1. These mitigation measures, including AQ.1-1, AQ.1-2, AQ.2-1, AQ.3-1 through AQ.3-5 and PH.1-1 would also reduce emissions of Toxic Air contaminants. However, the following mitigation measure would also be required to reach acceptable levels of public health risk:

PH.2-1 *When drilling new wells, maintain a distance of at least 400 feet from all areas where public exposure could occur. This would generally equate to maintaining a buffer of 400 feet from the Active Surface Field boundaries, except for areas where there would be no public exposure (i.e., areas inaccessible to the public either due to legal access limitations of rough terrain).*

Alternatively, drilling can occur to within 300 feet of areas where public exposure could occur as long as the drill rig generator is placed at least 500 feet from the drill rig and no closer than 300 feet from areas of public exposure. If it can be demonstrated through an updated health risk assessment addressing drilling rig emissions that a buffer distance can be reduced, then that buffer zone can be adjusted based on the results of the health risk assessment.

Residual Impacts

To evaluate the effectiveness of the proposed mitigation measures (i.e., AQ.1-1, AQ.1-2, AQ.2-1, AQ.3-1 through AQ.3-5, PH.1-1 and PH.2-1), the HARP model was rerun using the same approach as was used to evaluate the proposed project. Revised health risk assessment modeling results indicate that the acute noncancer hazard index would drop to below 1.0 when a 400 foot offset distance is employed. An offset of 300 feet is also acceptable if the drill rig generator, which accounts for approximate 35 percent of traditional drill rig emissions, remains at least 500 feet from the drill rig and 300 feet from areas of public exposure.

With implementation of the above listed mitigation measures, impacts would be reduced to *less than significant with mitigation (Class II).*

4.3.5 Analysis of Proposed CSD

While the Applicant proposed CSD does not contain any conditions related to public health (the Applicant proposed CSD is provided in Section 2.4.), it does provide some conditions that cover setbacks for the drill rigs. Mitigation measures developed as part of the public health analysis of the potential oil field development are associated with health impacts that could occur during drilling, construction and operation activities as delineated in the potential future development scenario described in Chapter 3. Table 4.3.8 provides a comparison of the Applicant proposed CSD and the public health mitigation measures identified in the analysis of Potential Oil Field Development, above. Where there are differences between the Applicant proposed CSD and the mitigation measures, Table 4.3.8 provides recommended modifications to the proposed CSD.

Table 4.3.8 CSD Conditions and EIR Mitigation Measure Comparison

Mitigation Measure	Summary of Mitigation Measure	CSD Condition #	Recommended Modifications to the Proposed CSD Based on the Analysis
PH.1-1	Install second generation heavy duty diesel catalysts or equivalent technology, on all drill rig engines.	None	The proposed CSD should require the use of second generation heavy duty diesel catalysts on all drill rig engines for reducing hydrocarbon and PM_{10} emissions by 90 percent.
PH.1-2	Install CARB-Verified Level 3 diesel catalysts on all diesel-powered construction equipment.	None	The proposed CSD should require the use of CARB-Verified Level 3 diesel catalysts on all diesel-powered construction equipment that are capable of reducing particulate matter by 85 percent.
PH.1-3	Evaluate the need for an updated health risk assessment after five years of meteorological data from the site and update as needed.	None	The proposed CSD should require that after five years of meteorological data has been collected at the oil field, that a determination be made if the site specific meteorological data would significantly change the result of the health risk assessment in this EIR. If so, then an updated health risk assessment should be conducted using the site specific meteorological data.

Table 4.3.8 CSD Conditions and EIR Mitigation Measure Comparison

Mitigation Measure	Summary of Mitigation Measure	CSD Condition #	Recommended Modifications to the Proposed CSD Based on the Analysis
PH.2-1	When drilling new wells, maintain a distance of at least 400 feet from all areas where public exposure could occur unless the drill rig generator can be at least 500 feet from the drill rig and 300 feet from areas of public exposure. In that case, an offset of 300 feet is acceptable. Or a new health risk assessment can demonstrate that a change in the buffer zone is merited.	D.a.4	The CSD should contain a requirement that the drill rig not be placed within 400 feet of any area of public exposure unless the drill rig generator can be placed 500 feet from the drill rig. In which case 300 feet from areas of public exposure is adequate. The CSD should also provide a provision that allows the Oil Field Operator to update the health risk assessment to account for new technology that would reduce the acute health risk index to one or less.

4.3.6 Cumulative Analysis

Of the cumulative projects listed in Chapter 2 (Table 2.9), it is likely that they would all be constructed before the construction of the potential future steam drive, water treatment, and oil cleaning plants. These facilities are projected for construction five to ten years out. As such, they would not combine with the potential future construction air toxic impacts. Therefore, potential cumulative impacts of project construction would be less than significant.

None of the cumulative projects would be major sources of air toxic contaminants since they are mainly commercial and residential development. In addition, none of the cumulative projects are close enough to the Inglewood Oil Field where the combined air toxic emissions would have a cumulative effect on the same receptors. Therefore, with the implementation of the mitigation measures listed above, the cumulative impacts on public health risk for air toxic emission would be considered less that significant with mitigation.

In addition, the results of the HARP modeling are shown in Table 4.3.3 and Figure 4.3-4. Overall, worst-case health risk associated with potential future oil field operations are well below all applicable health risk criteria. The estimated health risk associated with potential future operations also represents a relatively small fraction of the overall air toxic health risk in the region identified in the MATES III study. The Inglewood Oil Field cancer risk of 5.5 cancer cases per million represents 0.6 percent of the excess cancer risk of 730 in the vicinity of the project site, 0.75 percent of the excess cancer risk of 1,400 at the Central Los Angeles monitoring site, 0.37 percent of the excess cancer risk of 1,200 at the Compton monitoring site and 0.73 percent of the excess cancer risk of 750 at the North Long Beach monitoring site.

4.3.7 Mitigation Monitoring Plan

Mitigation Measure	Requirements	Compliance Verification		
		Method	Timing	Responsible Party
PH.1-1	Use of second generation heavy duty diesel catalysts or equivalent technology, on all drill rig engines.	Visual Inspection Review of Certifications	Prior to use at the oil field	Los Angeles County Department of Regional Planning
PH.1-2	Use of CARB-Verified Level 3 diesel catalysts on all diesel-powered construction equipment.	Review of CARB engine certifications	Prior to use at the oil field	Los Angeles County Department of Regional Planning
PH.1-3	Evaluate the need for an updated health risk assessment after five years of meteorological data from the site and update if needed.	Review of meteorological data and re-run health risk assessment	Every five years	Los Angeles County Department of Regional Planning
PH.2-1	When drilling new wells, maintain a distance of at least 400 feet from all areas where public exposure could occur unless the drill rig generator can be at least 500 feet from the drill rig and 300 feet from areas of public exposure. In that case, an offset of 300 feet is acceptable.	Site Plan Review, visual inspection	Prior to drilling	Los Angeles County Department of Regional Planning

4.3.8 References

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