South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4182
(909) 396-2000 • www.aqmd.gov

**SUBJECT:** **NOTICE OF COMPLETION OF A DRAFT ENVIRONMENTAL IMPACT REPORT**

**PROJECT TITLE:** **PHILLIPS 66 LOS ANGELES REFINERY ULTRA LOW SULFUR DIESEL PROJECT**

In accordance with the California Environmental Quality Act (CEQA), the South Coast Air Quality Management District (SCAQMD) is the Lead Agency and has prepared a Draft Environmental Impact Report (EIR) for the project identified above. The Draft EIR includes a project description and analysis of potential adverse environmental impacts that could be generated from the proposed project. The purpose of this letter, the attached Notice of Completion (NOC) and Draft EIR is to allow public agencies and the public the opportunity to obtain, review and comment on the environmental analysis contained in the Draft EIR.

This letter, the attached NOC, and Draft EIR are not SCAQMD applications or forms requiring a response from you. Their purpose is simply to provide information to you on the above project. If the project has no bearing on you or your organization, no action on your part is necessary. The project's description, location, and potential adverse environmental impacts are summarized in the NOC.

Copies of the Draft EIR and other relevant documents may be obtained at the SCAQMD's Public Information Center located at SCAQMD Headquarters: 21865 Copley Drive, Diamond Bar, CA 91765. Copies of these documents can also be obtained by calling (909) 396-2039 or accessing the SCAQMD's CEQA website at http://www.aqmd.gov/home/library/documents-support-material/lead-agency-permit-projects/permit-project-documents---year-2014. Comments focusing on your area of expertise, your agency's area of jurisdiction, or issues relative to the environmental analysis should be addressed to Jeff Inabinet at the address shown above, or sent by FAX to (909) 396-3324 or by email to jinabinet@aqmd.gov. Comments must be received no later than 5:00 p.m. on November 13, 2014. In any written correspondence, please include the name, email address, and phone number of the contact person for your organization.

**Project Applicant:** Phillips 66

**Date:** September 26, 2014

**Signature:** Michael Krause

Michael Krause
Program Supervisor, CEQA Section
Planning, Rules, and Area Sources
(909) 396-2706

**SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT**
**21865 Copley Drive, Diamond Bar, CA 91765-4182**
# NOTICE OF COMPLETION OF DRAFT ENVIRONMENTAL IMPACT REPORT (EIR)

**Project Title:**
Phillips 66 Los Angeles Refinery Ultra Low Sulfur Diesel Project

**Project Location:**
Phillips 66 Wilmington Refinery is located at 1660 West Anaheim Street, Wilmington, California, 90744

**Description of Nature, Purpose, and Beneficiaries of Project:**
The project includes the following activities: 1) modifications to Hydrotreater Unit 90; 2) replacement of an existing charge heater with a functionally identical replacement heater; 3) installation of a Selective Catalytic Reduction Unit to control NOx emissions from the replacement heater, with aqueous ammonia supplied from an existing aqueous ammonia storage tank; 4) demolition of an existing cooling tower and replacement with a new cooling tower of the same capacity; 5) minor modifications to the mid barrel handling and shipping system; 6) minor modifications to the hydrogen distribution system including new hydrogen distribution piping; and 7) modifications to one storage tank to allow a change of service (i.e., contents). In response to the court's decision on the 2004 Final Negative Declaration and Addendum, an EIR is required for the ConocoPhillips ULSD Project to address the air quality setting and operational air quality impacts from the proposed project.

| **Lead Agency:** | **Division:** |
|---|---|
| South Coast Air Quality Management District | Planning, Rules, and Area Sources |

**Draft EIR and all supporting documentation are available at:**
SCAQMD Headquarters
21865 Copley Drive
Diamond Bar, CA 91765

**or by calling**
(909) 396-2039

**Draft EIR is available by accessing the SCAQMD's website at:**
http://www.aqmd.gov/home/library/documents-support-material/lead-agency-permit-projects/permit-project-documents---year-2014

**The Public Notice of Completion is provided through the following:**

☑ Los Angeles Times and The Daily Breeze (September 30, 2014) ☑ SCAQMD Website
☑ SCAQMD Public Information Center ☑ Interested Parties ☑ SCAQMD Mailing List

**Draft EIR 45-Day Review Period:**
September 30, 2014 through November 13, 2014

| **Send CEQA Comments to:** | **Phone:** | **Email:** | **Fax:** |
|---|---|---|---|
| Mr. Jeff Inabinet | (909) 396-2453 | jinabinet@aqmd.gov | (909) 396-3324 |

**September, 2014** **SCH No. 2004011095**

# PHILLIPS 66
# LOS ANGELES REFINERY

## ULTRA LOW SULFUR DIESEL PROJECT

## DRAFT
## ENVIRONMENTAL IMPACT REPORT

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**PHILLIPS 66 LOS ANGELES REFINERY**

**ULTRA LOW SULFUR DIESEL PROJECT**

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# CHAPTER 1

# INTRODUCTION AND EXECUTIVE SUMMARY

# 1.0 INTRODUCTION AND EXECUTIVE SUMMARY

## 1.1 INTRODUCTION

In 2004 the ConocoPhillips Los Angeles Refinery (Refinery) first proposed modifications to produce Ultra Low Sulfur Diesel (ULSD) to comply with the federal, state and SCAQMD regulations that limit the sulfur content of diesel fuels. Pursuant to the California Environmental Quality Act (CEQA), the South Coast Air Quality Management District (SCAQMD), as lead agency for the project, prepared a Final Negative Declaration and Addendum for the proposed ULSD modifications in 2004. However, a Draft Environmental Impact Report (EIR) is now being prepared for the Project because a decision of the California Supreme Court that found certain deficiencies in the previously prepared CEQA documents for the Phillips 66 ULSD Project and required the preparation of an EIR. However, the court did allow the project to proceed. Since the time of the ULSD Project approval, the ConocoPhillips owners changed the company's name to Phillips 66 and this is how the company will be referred to throughout the remainder of this document.

In Los Angeles, heavy-duty trucks and buses contributed more than a quarter of the nitrogen oxide (NOx) emissions and 14 percent of the particulate matter less than 2.5 microns in diameter (PM2.5) emissions from all mobile sources in 2004. The emission-control devices to reduce emissions from these heavy duty engines are sensitive to sulfur, thus regulatory requirements mandate that the amount of sulfur in the diesel fuel is reduced to increase performance of the control devices. Furthermore, reducing the sulfur content of diesel fuel leads to a reduction of sulfur oxides (SOx) and particulate sulfate emissions from mobile sources that use ULSD.

The United States Environmental Protection Agency (U.S. EPA) developed regulations that required refiners to sell highway diesel fuel that would meet a maximum sulfur standard of 15 parts per million by weight (ppmw) starting in 2006. In order to meet these deadlines, refineries needed to make equipment modifications and conuct performance testing in advance. Similarly, California's Air Resources Board (CARB) developed a Diesel Risk Reduction Plan to minimize exposure to cancer risks associated with diesel particulate matter and required a reduction in the sulfur content in fuel to reduce particulate emissions from vehicles that use the fuel starting in June 2006. Finally, the SCAQMD approved Rule 431.2 which required a reduction in sulfur content in diesel fuel used in stationary sources to a limit of 15 parts per million by weight (ppmw) starting in June 2006. The Phillips 66 ULSD Project was needed to comply with all of these federal, state, and local rules and requirements.

During litigation challenging the SCAQMD's approval and environmental analysis of the ULSD Project, the petitioners sought a preliminary injunction (or stay) to prevent Project construction during the pendency of the lawsuits; however, the Superior Court denied these requests. Based on denial of the preliminary injunction or stay, the Refinery modifications included as part of the ULSD Project were completed. As a result, Phillips 66 has been producing ULSD at its Los Angeles Refinery since 2006, as required by the applicable ULSD rules and regulations identified above.

## 1.2 PREVIOUS CEQA DOCUMENTS

The activities associated with the ULSD Project were evaluated in the CEQA documents described below.

Notice of Intent to Adopt a Negative Declaration, ConocoPhillips Los Angeles Refinery, Ultra Low Sulfur Diesel Project (January 2004)

The Notice of Intent (NOI) to Adopt a Negative Declaration was released for a 30-day public review and comment period on January 22, 2004. The Negative Declaration evaluated the potential adverse impacts on the following environmental topics: aesthetics, agriculture resources, air quality, biological resources, cultural resources, energy, geology and soils, hazards and hazardous materials, hydrology and water quality, land use and planning, mineral resources, noise, population and housing, public services, recreation, solid and hazardous waste, and transportation/circulation. No significant adverse impacts were identified for any of these environmental resources, therefore, no mitigation measures or alternatives were incorporated into the 2004 Draft Negative Declaration.

2004 Final Negative Declaration for the ConocoPhillips Los Angeles Refinery Ultra Low Sulfur Diesel Project, June 2004

The 2004 Final Negative Declaration included applicable changes to the text of the Draft Negative Declaration and the responses to comments received during the public review and comment period.

The SCAQMD received two comment letters on the Draft Negative Declaration during the public comment period and one letter was received after the close of the public comment period. Comments from all three comment letters were responded to and, along with the comment letters, were presented in Appendix C of the 2004 Final Negative Declaration. The 2004 Final Negative Declaration was certified on June 18, 2004 (SCH 2004011095). No significant impacts on the environment were identified, therefore, no mitigation measures or alternatives were incorporated into the 2004 Final Negative Declaration (SCAQMD, 2004).

Addendum to the Final Negative Declaration for the ConocoPhillips Los Angeles Refinery Ultra Low Sulfur Diesel Project, September 2004

After the certification of the Final Negative Declaration, Phillips 66 proceeded with detailed engineering design for the ULSD Project. In the course of the detailed engineering work, the company updated the fugitive component counts (e.g., valves, flanges, pumps, etc.) for the Project. To account for the changes resulting from the revised number of fugitive components, an Addendum to the 2004 Final Negative Declaration was prepared. An addendum was the appropriate document because there were no Project changes or changes to the 2004 Final Negative Declaration that warrant the preparation of a subsequent CEQA document pursuant to CEQA Guidelines §15162. On September 21, 2004, the Addendum was certified and the 2004 Final Negative Declaration was re-certified.

The Notice of Intent to Adopt Draft Subsequent Negative Declaration for the ConocoPhillips Los Angeles Refinery Ultra Low Sulfur Diesel Project, June 2005

Subsequent to certification of the 2004 Addendum, SCAQMD staff concluded that best available control technology (BACT) for replacement charge heater B-401 was selective catalytic reduction (SCR) which was not evaluated in earlier CEQA documents for the project. Based on this modification to the Phillips 66 USLD Project, it was determined that a subsequent CEQA document pursuant to CEQA Guidelines §15162 should be prepared. A NOI to Adopt a Draft Subsequent Negative Declaration was released for a 30-day public review and comment period beginning on June 21, 2005 and ending on July 20, 2005. The Draft Subsequent Negative Declaration evaluated changes to the ULSD Project that included the installation of a SCR unit for NOx control on replacement charge heater B-401. The NOI evaluated the potential adverse impacts on the following environmental topics: aesthetics, agriculture resources, air quality, biological resources, cultural resources, energy, geology and soils, hazards and hazardous materials, hydrology and water quality, land use and planning, mineral resources, noise, population and housing, public services, recreation, solid and hazardous waste, and transportation/circulation. No significant adverse impacts were identified for any of these environmental resources, therefore, no mitigation measures or alternatives were required in the 2005 Draft Subsequent Negative Declaration.

2005 Final Subsequent Negative Declaration for the ConocoPhillips Los Angeles Refinery Ultra Low Sulfur Diesel Project, October 2005

The 2005 Final Subsequent Negative Declaration included applicable changes to the text of the Draft Negative Declaration and the responses to comments received during the public review and comment period.

The SCAQMD received two comment letters on the Draft Subsequent Negative Declaration during the public comment period and one letter was received after the close of the public comment period. Additional comments were received as part of a request for a public hearing under SCAQMD Regulation XII filed after the close of the public comment period. Responses to all four comment letters were prepared, and the comment letters and responses were presented in

Appendix C of the 2005 Final Subsequent Negative Declaration. The 2005 Final Subsequent Negative Declaration was certified on October 3, 2005 (SCH 2004011095).

Following the close of the public comment period on the Draft Subsequent Negative Declaration, the Governing Board of the SCAQMD received two petitions requesting hearings pursuant to SCAQMD Regulation XII, which were ultimately denied by the Governing Board. SCAQMD was under no legal requirement to respond to the assertions made in the petitions or the materials submitted as exhibits to the petitions for the Regulation XII hearing. Nonetheless, the SCAQMD elected to include clarifications and updates to issues raised in the Regulation XII petitions and supporting materials in the Final Subsequent Negative Declaration. The Project changes associated with the SCR and the clarifications and updates of issues raised in the Regulation XII petitions did not identify any new significant adverse impacts or show that previously identified impacts would be substantially worse. Conclusions made in the 2004 Negative Declaration also did not change (SCAQMD, 2005a).

<u>Notice of Preparation of Draft Environmental Impact Report, ConocoPhillips Los Angeles Refinery Ultra Low Sulfur Diesel Project, March 2012</u>

A Notice of Preparation (NOP) of a Draft EIR was prepared and circulated to the public on March 28, 2012 through April 26, 2012. No comments were received on the NOP. A copy of the NOP is included in Appendix A of this EIR.

Following completion of the CEQA documents, the SCAQMD issued permits to construct/operate to Phillips 66 for the construction of the ULSD Project components.

## 1.3 LEGAL HISTORY OF THE ULSD PROJECT

On July 16, 2004, two lawsuits were filed challenging the SCAQMD's certification of the 2004 Final Negative Declaration and approval of an SCAQMD permit for the ULSD Project (California Superior Court, Los Angeles County, Case Nos. BS091275 and BS091276). These lawsuits asserted that, among other things, an EIR should have been prepared to review the impacts associated with the Phillips 66 ULSD Project. The petitioners sought a preliminary injunction or stay to prevent Project construction during the pendency of the lawsuits; however, the court denied these requests. The lawsuits were amended following certification of the 2005 Subsequent Negative Declaration to add claims associated with that CEQA document and associated air permits issued by the SCAQMD. The trial occurred in two phases. Phase I challenged the SCAQMD's decision to prepare the 2004 Negative Declaration and 2004 Addendum. The Phase 2 trial was held a year later and challenged the Subsequent Negative Declaration, as well as SCAQMD's decision not to apply its Regulation XVII permitting program. Following each trial, the Los Angeles Superior Court concluded that the SCAQMD was correct on all counts. More specifically, the court concluded that the 2004 Final Negative

Declaration, the 2004 Addendum, and the 2005 Final Subsequent Negative Declaration all complied with CEQA and that the permitting decisions complied with law. On June 29, 2006, the Superior Court entered Judgment. The plaintiffs filed notices of appeal in August 2006.

On appeal, plaintiffs argued substantial evidence supported a fair argument that the Project would have a significant environmental impact on air quality, requiring the SCAQMD to prepare an EIR. On January 16, 2008, the Court of Appeal upheld the decision of the Superior Court on all claims but one. In the Court's opinion, an improper baseline was used to evaluate air quality impacts during project operations. It concluded that the potential increased use of existing equipment should have been evaluated as part of the ULSD Project, not as part of the baseline, and, that if the proper baseline had been used, there would be substantial evidence supporting a fair argument of significant NOx emissions from the ULSD Project, requiring the preparation of an EIR. The SCAQMD filed a Petition for Review to the California Supreme Court on February 25, 2008, in which Phillips 66 joined. The Petition sought review only of the portion of the Appellate Court's decision concerning baseline for evaluation of operational air quality impacts from the ULSD Project, and no other portion of the opinion was challenged by any party. On April 16, 2008, the Supreme Court granted review of the case.

On March 15, 2010, the Supreme Court concluded that the potential environmental impacts of a proposed Project must be compared to the environmental conditions that exist at the time the CEQA analysis was commenced, not the level of development or activity that would be allowed under existing permits or approvals. Because the ULSD Project may require increased utilization of existing permitted boilers and other steam generating equipment, the court concluded it was inconsistent with CEQA to use the maximum permitted operating capacity of this utility equipment as the baseline against which to compare NOx emissions from the proposed Project, rather than an estimate of the actual NOx emissions from the equipment under current operating conditions. The court determined that an inappropriate baseline was used and required SCAQMD to prepare an EIR for the Phillips 66 ULSD Project to respond to the findings the Supreme Court.

The Supreme Court left to the discretion of the SCAQMD the methodology for estimating the "actual existing levels of emissions" from the utility equipment. The Court explained:

> "The District and Phillips 66 emphasized that refinery operations are highly complex and that these operations, including the steam generation system, vary greatly with the season, crude oil supplies, market conditions, and other factors. . .
>
> "We do not attempt here to answer any technical questions as to how existing refinery operations should be measured for baseline purposes in this case or how similar baseline conditions should be measured in future cases. CEQA Guidelines section 15125 (Cal. Code Regs., tit. 14, § 15125, subd. (a) directs that the lead agency 'normally' use a measure of physical conditions 'at the time the notice of

> preparation [of an EIR] is published, or if no notice of preparation is published, at the time environmental analysis is commenced.' But, as one appellate court observed, 'the date for establishing baseline cannot be a rigid one. Environmental conditions may vary from year to year and in some cases it is necessary to consider conditions over a range of time periods.' . . . In some circumstances, peak impacts or recurring periods of resource scarcity may be as important environmentally as average conditions. Where environmental conditions are expected to change quickly during the period of environmental review for reasons other than the proposed project, project effects might reasonably be compared to predicted conditions at the expected date of approval, rather than to conditions at the time analysis is begun. . . A temporary lull or spike in operations that happens to occur at the time environmental review for a new project begins should not depress or elevate the baseline; overreliance on short term activity averages might encourage companies to temporarily increase operations artificially, simply in order to establish a higher baseline.
>
> "Neither CEQA nor the CEQA Guidelines mandates a uniform, inflexible rule for determination of the existing conditions baseline. Rather, the agency enjoys the discretion to decide, in the first instance, exactly how the existing physical conditions without the project can most realistically be measured, subject to review, as with all CEQA factual determinations, for support by substantial evidence."

The Court observed that the SCAQMD had previously calculated NOx emissions from the ULSD Project. However, it also stated that the SCAQMD is not required to use the same measurement method in the EIR that was used in the Negative Declaration. "Whatever method the District uses, however, the comparison must be between existing physical conditions without the Diesel Project and the conditions expected to be produced by the project." Because the project has already been constructed and currently operating, the analysis in the EIR has the advantage of actual data.

Finally, it should be noted that neither the Court of Appeal decision nor the Supreme Court decision invalidated any aspect of the prior CEQA documents except for the baseline used in the analysis of air quality impacts from Project operation. Other aspects of the prior CEQA documents that were challenged in the litigation, were rejected by the trial court, and the trial court's rulings were upheld on appeal. Thus, this EIR will focus only in the Air Quality analysis with regard to potential NOx emissions from the operation of the ULSD Project.

## 1.4 SCOPE AND CONTENT

Based on the court's decision on the previous CEQA documents for the Phillips 66 ULSD, the SCAQMD as the lead agency is required to prepare an EIR for the Phillips 66 ULSD Project. As a result, a Notice of Preparation of a Draft EIR for the ULSD Project was circulated for a 30-day review period on March 23, 2012. See Appendix A of the NOP.

No court decision invalidated any aspect of the prior CEQA documents except for the baseline used in the air quality impacts analysis for Project operations. With respect to analysis of air quality impacts from ULSD Project construction in particular, the litigation challenged the emissions estimates and the emissions factors applied to various construction activities and equipment, but the trial court found that the analysis in the prior CEQA documents was sound, and this aspect of the trial court decisions was not appealed. Similarly, other aspects of the prior CEQA documents that were challenged in the litigation were rejected by the trial court, and the trial court's rulings were upheld on appeal. Therefore, the Draft EIR for the Phillips 66 ULSD Project focuses on the issues directed by the court and is therefore limited to air quality setting and impacts from Project operations.

Because the SCAQMD is required to prepare an EIR, this document includes all relevant components required for preparation of an EIR (CEQA Guidelines §15120 through §15131) including, but not limited to, an executive summary, project description, existing setting, impacts, cumulative impacts, and an alternatives analysis.

## 1.5 LEAD AGENCY AND RESPONSIBLE AGENCIES

CEQA requires the evaluation of environmental impacts for proposed "projects" and requires the identification and implementation of feasible methods to reduce, avoid, or eliminate significant adverse impacts from these projects. The Phillips 66 ULSD Project constitutes a "project" as defined by CEQA. To fulfill the purpose and intent of CEQA, the SCAQMD is the "lead agency" for the Phillips 66 ULSD Project.

The lead agency is the public agency that has the principal responsibility for carrying out or approving a project that may have a significant effect upon the environment (Public Resources Code §21067). Because the SCAQMD has the greatest responsibility for supervising or approving the ULSD Project as a whole and because the SCAQMD has acted as the lead agency for previous CEQA documents for the ULSD Project, it was determined that the SCAQMD continues to be the most appropriate public agency to act as lead agency for the Phillips 66 ULSD Project (CEQA Guidelines § 15051(b)).

CEQA Guidelines §15381 defines a "responsible agency" as: "a public agency which proposes to carry out or approve a project, for which a Lead Agency is preparing or has prepared an EIR, SEIR, or Negative Declaration. For purposes of CEQA, responsible agencies include all public agencies other than the lead agency that have discretionary approval authority over the project."

The agency that had discretionary authority over the ULSD Project was the SCAQMD. The other public agency that had ministerial permitting authority, and was a responsible agency for certain actions associated with the ULSD Project at the Phillips 66 Los Angeles Refinery's Wilmington Plant was the City of Los Angeles.

No trustee agencies as defined by CEQA Guidelines §15386 have been identified with respect to the ULSD Project. However, notice of the ULSD Project has been sent to the Office of Planning and Research pursuant to Public Resources Code §21080.4 for distribution in the event trustee or other responsible agencies are identified.

## 1.6 INTENDED USES OF THE EIR

The Draft EIR is intended to be a decision-making tool that provides full disclosure of the environmental consequences associated with implementing the ULSD Project. Additionally, CEQA Guidelines §15124(d)(1) requires a public agency to identify the following specific types of intended uses:

- A list of the agencies that are expected to use the Draft EIR in their decision-making;
- A list of permits and other approvals required to implement the project; and,
- A list of related environmental review and consultation requirements required by federal, state, or local laws, regulations, or policies.

To the extent that local public agencies, such as cities, are responsible for making land use and planning decisions related to the ULSD Project, they relied on CEQA documents prepared by the SCAQMD during their decision-making process. It should be noted that the permits required for the ULSD Project have already been issued, including SCAQMD and City of Los Angeles permits, and the ULSD Project modifications have already been implemented. The court decisions did not rescind the permits associated with the ULSD Project. Therefore, the purpose of this EIR is to respond to the findings of the Supreme Court that requires a revised baseline analysis to evaluate operational air quality impacts of the ULSD Project.

## 1.7 AREAS OF CONTROVERSY

In accordance with CEQA Guidelines §15123(b)(2), the areas of controversy known to the lead agency, including issues raised by agencies and the public, shall be identified in the CEQA document. "Controversy" is defined as a difference in opinion or a dispute. As shown in Section 1.3, Legal History of the ULSD Project, the CEQA documents associated with the ULSD Project have been the subject of lawsuits challenging the SCAQMD's certification of the documents. Although other aspects of prior CEQA documents were challenged in the litigation, the main area of controversy was the proper baseline for analysis of operational air quality impacts from ULSD Project operations. The Supreme Court concluded that the environmental impacts of a proposed project must be compared to the environmental conditions that exist at the time CEQA analysis is commenced, not the level of development or activity that would be allowed under existing permits or approvals. Therefore, the SCAQMD has prepared this EIR to respond to the decision of the Supreme Court.

## 1.8 EXECUTIVE SUMMARY - CHAPTER 2: PROJECT DESCRIPTION

The ULSD Project at the Phillips 66 Los Angeles Refinery had two major components: (1) revamp the Mid-Barrel Hydrotreater Unit 90 to improve the hydrotreating reaction to meet the required diesel sulfur level; and (2) modify the Mid-barrel handling and logistics to segregate diesel from higher sulfur jet fuel. The Project also improved hydrogen distribution at the Wilmington Plant; and improved control of the Crude Unit heavy gas oil distillation cutpoint at the Carson Plant. A summary of the components of the ULSD Project is provided below.

**Mid-Barrel Hydrotreater Unit 90 Modifications:** Changes to Unit 90 included modifying the reactor loop to replace the existing reactors with two new larger reactors, and installation of new heat exchangers.

**Charge Heater Modifications:** The reactor charge heater B-201 was removed from service and replaced with a functionally identical replacement heater referred to as B-401, which included low NOx burners and a SCR Unit for NOx control to meet SCAQMD Best Available Control Technology requirements.

**SCR Unit:** SCR units control NOx emissions by injecting aqueous ammonia into the exhaust gas stream upstream of a catalyst. The aqueous ammonia used in the SCR Unit consists of 30 percent ammonia. Aqueous ammonia is supplied to the SCR's vaporizer system from an existing aqueous ammonia storage tank, so no new storage tank was required. A back-up supply consisting of two 150-pound cylinders of anhydrous ammonia was installed as part of the aqueous ammonia vaporization skid at heater B-401.

**Cooling Tower:** The cooling tower E-221 was demolished to make room for the new reactors and charge heater and was replaced in a different location.

**Mid Barrel Handling and Shipping Modifications:** Modifications to Mid-barrel handling and shipping at the Wilmington Plant improved segregation of ULSD and jet fuel. These modifications included a new ULSD shipping pump (the existing pump that previously shipped both diesel and jet fuel continues to be used to ship jet fuel); two new pumps for handling jet and diesel blendstocks; and one new sample pump and associated piping to create separate facilities for handling jet and diesel fuel.

**Hydrogen System:** The hydrogen distribution piping was changed to enable the exclusive use of high purity hydrogen at Unit 90 for maximizing hydrogen partial pressure at the reactor inlet. New piping was needed to properly distribute reformer hydrogen to other Refinery processes not requiring continued use of high purity hydrogen.

**Storage Tank Modifications:** As part of the ULSD Project, the service (contents) of Storage Tank 331 at the Wilmington Plant was changed into jet/diesel.

**Crude Unit DU-5 at the Carson Plant:** The Project scope included temperature monitoring equipment and modifications to flow control valves in order to improve crude distillation operations and minimize the high sulfur portion of the distilled crude routed to Unit 90. Maintenance workers performed the minor modifications (add pre-manufactured thermocouples and modify existing control valves) that were required to the unit. These changes did not result in physical impacts to the environment (air emissions, noise, traffic, etc.) so the environmental evaluation in this EIR is limited to the project activities at the Wilmington Plant (CEQA Guidelines §15064(d)(1)).

## 1.9 EXECUTIVE SUMMARY – CHAPTER 3: ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION MEASURES

### INTRODUCTION

The California Supreme Court decision invalidated only that aspect of the prior CEQA documents relating to the baseline used in the air quality impacts analysis for project operations. No other conclusions from the prior analysis that the ULSD Project would not significantly adversely affect any non-air quality environmental topics, was invalidated. In particular, the California Supreme Court concluded that the environmental impacts of a proposed Project must be compared to the environmental conditions that exist at the time the CEQA analysis is commenced, not the level of development or activity that would be allowed under existing permits or approvals. The Supreme Court left to the discretion of the SCAQMD the methodology for estimating the "actual existing levels of emissions" from the utility equipment, recognizing that refinery operations are highly complex and that these operations, including the steam generation, vary greatly with the season, crude oil supplies, market conditions and other factors. The Supreme Court concluded that "(w)hatever method the District uses, however, the comparison must be between existing physical conditions without the Diesel Project and the conditions expected to be produced by the project."

Environmental review for the ULSD Project began in early January 2004, when the 2004 Negative Declaration was prepared and published. Construction of the ULSD Project began in 2005 and was completed in 2006. The ULSD Project went through start-up and de-bugging procedures in April 2006 and was fully operational starting in May 2006. Thus, the 2002-2003 time period is considered to be the pre-ULSD Project or baseline conditions for Refinery operations as this represents the timeframe during the environmental analysis development for the ULSD Project prior to the construction and operation of the ULSD Project. This approach is consistent with CEQA Guidelines §15125, which indicates that an EIR must include a description of the physical environmental conditions in the vicinity of the project as they exist at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced.

Since the ULSD Project went through start-up and de-bugging procedures in April 2006, the "post-project" period is considered to be May 2006 and thereafter. For the purposes of evaluating air quality impacts from the ULSD Project, the "post-project" period for the ULSD Project is May 2006 through April 2008. This period length was selected in order to compare an equivalent period of time, two years of operation, to the baseline conditions, which were developed using two years (2002 – 2003) of historical data. A two year period allows the data to reflect the various changes in operation such as shut down for maintenance, market demands, etc. Where available data did not precisely match these pre- and post-Project periods, the impact analysis relies on the best available match.

## AIR QUALITY SETTING

The Phillips 66 Los Angeles Refinery is located within the SCAQMD jurisdiction which consists of the four-county South Coast Air Basin (Basin), including Orange, and the non-desert portions of Los Angles, Riverside, and San Bernardino counties, the Riverside County portions of the Salton Sea Air Basin (SSAB), and the Mojave Desert Air Basin (MDAB). The Basin is bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto mountain ranges to the north and east.

The climate in the Basin generally is characterized by sparse winter rainfall and hot summers tempered by cool ocean breezes. The mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, and Santa Ana winds. Temperature affects the air quality of the region in several ways. Local winds are the result of temperature differences between the relatively stable ocean air and the uneven heating and cooling that takes place in the Basin due to a wide variation in topography. Temperature also has a major effect on vertical mixing height and affects chemical and photochemical reaction times.

The sources of air contaminants in the Basin vary by pollutant but generally include on-road mobile sources (e.g., automobiles, trucks and buses), other off-road mobile sources (e.g., airplanes, ships, trains, construction equipment, etc.), stationary sources (e.g., fuel combustion, petroleum production and marketing, and other industrial processes), and solvent evaporation (e.g., consumer products and architectural coatings). Mobile sources are responsible for a large portion of the total Basin emissions of several pollutants.

Health-based air quality standards have been established by the U.S. EPA and the CARB for ozone, carbon monoxide (CO), NOx, particulate matter less than ten microns in diameter (PM10), PM2.5, SOx, and lead. California also has established standards for sulfate, visibility, hydrogen sulfide, and vinyl chloride. The Basin, including the Project area, is classified as attainment for both the state and federal standards for CO, NOx, SOx, sulfates, and lead and the state standard for sulfates. The Basin is currently designated as non-attainment for PM2.5 and ozone for both state and federal standards. The Basin has met the PM10 standard and U.S. EPA has proposed approval of the PM10 attainment designation.

When the ULSD Project was proposed and implemented, the SCAQMD was promulgating rules and regulations identified as control measures in the 2003 Air Quality Management Plan (AQMP). Subsequently, the SCAQMD adopted the 2007 AQMP and promulgated rules and regulations identified as control measures in that Plan. As a result of implementing AQMP control measures as rules or regulations, there have been substantial improvements in air quality since 2004 when the ULSD Project originally underwent an environmental analysis pursuant to CEQA. In December 2012, the SCAQMD adopted the 2012 AQMP and has already begun the process of promulgating rules to ensure attainment of the federal 24-hour PM2.5 standard.

The Project site is located within the SCAQMD's South Coastal Los Angeles County monitoring area. The area has shown a general improvement in air quality with decreasing or consistent concentrations of most pollutants. Air quality in the South Coastal Los Angeles County monitoring area complies with the state and federal ambient air quality standards for CO, NOx, SOx, lead, and sulfate. The air quality in the project area is also in compliance with the federal eight-hour ozone standard, the federal 24-hour PM10 standard, and the federal 24-hour and annual average PM2.5 standards. However, the air quality in the South Coastal Los Angeles County area is not in compliance with the state 24-hour PM10 and PM2.5 standards.

## ENVIRONMENTAL IMPACTS

Based on the court's decision on the previous CEQA documents for the Phillips 66 ULSD, the EIR focuses on the issues as directed by the court and is limited to air quality setting, discussed in the previous section, and air quality impacts from ULSD Project operations. An impact is considered significant under CEQA if it leads to a "substantial, or potentially substantial, adverse change in the environment." A summary of the ULSD Project impacts is provided in Table 1-1.

The baseline for the ULSD Project was Refinery operations in years 2002-2003 (pre-Project), which reflects the physical environmental setting at the time the environmental review of the ULSD Project began. The Project was constructed in 2005 and became operational in April 2006. Therefore, Project impacts were evaluated for April 2006 through December 2008 (post-Project). Since the ULSD Project has been built and is operational, the Project impacts are based on actual operational information as opposed to the engineering estimates that were used in previous CEQA documents.

The ULSD Project resulted in emission changes at the Wilmington Refinery. These emission changes included increased fugitive components (i.e., increases in VOC emissions), replacement heater B-401 (i.e., decreases in CO and NOx emissions, and minor increases in VOC, SOx, PM10 and PM2.5 emissions), and storage tank 331 modifications (i.e., increases in VOC emissions). It was unltimately determined that the

ULSD Project did not result in an increase in steam generation or result in an emission increase associated with steam generation. This conclusion is further explained and analyzed in Ch. 3 of this EIR. The ULSD Project resulted in indirect (off-site) emissions associated with increases in hydrogen production, electricity demand, and truck transport. Daily operational emissions are summarized in Table 3.3-7 and compared to the SCAQMD daily operational significance thresholds to determine impact significance. As demonstrated in the table, operation of the ULSD Project is not expected to exceed any significance thresholds. Therefore, the air quality impacts associated with operational emissions from the ULSD Project are less than significant.

A health risk assessment (HRA) was performed to determine if emissions of TACs generated by the ULSD Project would exceed the SCAQMD thresholds of significance for cancer risk and hazard indices, thus resulting in significant health impacts. The incremental cancer risk for the ULSD Project is $7.65 \times 10^{-8}$ or 0.08 per million for the residents (MEIR) and $9.20 \times 10^{-9}$ or about 0.01 per million for the workers (MEIW). The incremental chronic risk is 0.0008 and the incremental acute risk is 0.0001. The cancer risks for the TACs emitted from the ULSD Project are below the significance threshold of ten per million and chronic and acute hazard indices are below the 1.0 thresholds. Therefore, the cancer risk and hazard index thresholds are not considered to be significant and no significant health impacts are associated with the ULSD Project.

No significant air quality impacts have been identified and no mitigation measures are required for the ULSD Project. However, the SCAQMD will impose AQ-1, which contains specific reporting requirements, to ensure that the Refinery operations are consistent with the assumptions upon which the air quality analysis is based.

## TABLE 1-1

## Summary of Environmental Impacts, Mitigation Measures, and Residual Impacts

| IMPACT | MITIGATION MEASURES | RESIDUAL IMPACT |
|---|---|---|
| Operational emissions of criteria pollutants are less than significant for CO, VOC, NOx, SOx, PM10, and PM2.5. | None Required. However, the SCAQMD will impose AQ-1, which contains specific reporting requirements for fuel usage, to ensure that the refinery operations are consistent with the assumptions upon which the air quality analysis is based. | Operational emissions are expected to be less than significant CO, VOC, NOx, SOx, PM10, and PM2.5. |
| An ambient air quality screening analysis indicates that the Project emissions on $NO_2$, PM10, and PM2.5 will be below ambient air quality standards and are less than significant. | None required. | Project emissions of $NO_2$, PM10, and PM2.5 will be below ambient air quality standards and are less than significant. |
| The cancer risk due to the operation of the ULSD Project is expected to be less than the significance criterion of 10 per million, so that Project impacts are less than significant. | None required. | Cancer risk impacts are less than significant. |
| The ULSD Project impacts associated with exposure to non-carcinogenic compounds are expected to be less than significant. The chronic hazard index and the acute hazard index are both below 1.0. | None required. | No significant non-carcinogenic health impacts are expected. |

## 1.10 EXECUTIVE SUMMARY – CHAPTER 4: CUMULATIVE IMPACTS

### INTRODUCTION

The cumulative impact analysis focuses on whether the air quality impacts of the ULSD Project are cumulatively considerable within the context of impacts caused by other past, present, or reasonably foreseeable future projects. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. This cumulative impact analysis considers other related projects or projects causing related impacts within a geographic scope of approximately one mile from the Phillips 66 Wilmington Plant.

### PROJECTS CONSIDERED IN CUMULATIVE IMPACT ANALYSIS

The Project is located within the existing Phillips 66 Wilmington Plant, in the southwest portion of Los Angeles County within Southern California. The area has been used as a Refinery for nearly a century and a number of other industrial facilities are located nearby including petroleum storage facilities, warehouses and the Port of Los Angeles. A total of 43 of these projects (approved or proposed) have been identified within the general vicinity of the Project that could contribute to cumulative impacts.

Local impacts were assumed to include projects which would occur within the same timeframe as the construction and operation of the ULSD Project (about 2002 until 2012) and which are within a one-mile radius of the Refinery site. Impacts to most environmental resources are generally localized in nature (e.g., air quality, noise, and traffic). Consequently, there is sufficient distance between projects located over one mile away from the Wilmington Plant to avoid cumulative impacts.

### OPERATIONAL AIR QUALITY EMISSION IMPACTS

The ULSD Project operational emissions are substantially less than the SCAQMD project-specific significance thresholds. Therefore, project-specific air quality impacts associated with operational emissions from the ULSD Project are not considered to be a cumulatively considerable contribution to significant adverse cumulative air quality impacts, pursuant to CEQA Guidelines §15130 (A).

Other related projects at the Refinery included the construction of air pollution control equipment to reduce PM10 and NOx from the Phillips 66 Refinery. Therefore, the cumulative air quality impacts from the Refinery during this period were beneficial.

Other off-site cumulative projects could result in significant operational air quality impacts. However, as already noted above operational emissions from the ULSD Project are substantially less than the applicable project-specific operational significance thresholds and cumulative Refinery projects have resulted in a net reduction in emissions.

Therefore, operational emissions associated with the ULSD Project are not considered a cumulatively significant contribution to significant adverse cumulative air quality impacts, pursuant to CEQA Guidelines §15130 (A).

## TOXIC AIR CONTAMINANT IMPACTS

The impacts from TACs are localized impacts. For example, impacts from exposures to TACs decline by approximately 90 percent at 300 to 500 feet from the emissions source (SCAQMD, 2005). Most related projects are located at greater than 500 feet from the Phillips 66 Refinery or are projects that would not result in increases in TACs, such that potential TAC impacts would not overlap with the ULSD Project. The ULSD Project impacts on health effects associated with exposure to TACs are expected to be substantially below the SCAQMD's cancer risk and hazard index significance thresholds and, therefore, less than significant.

Other cumulative projects could result in increased localized emissions of TACs. However, as noted above, TAC emissions from the ULSD Project are substantially less than the applicable project-specific operational significance thresholds. Therefore, cumulative impacts of TACs on health are expected to be less than significant.

## LEVEL OF SIGNIFICANCE AFTER MITIGATION

The project-specific air quality impacts due to operational activities do not exceed the SCAQMD significance thresholds, are not considered to be cumulatively considerable, and do not contribute to significant adverse cumulative operational air quality impacts. The project-specific TAC health impacts are not significant, are also not considered to be cumulatively considerable, and do not generate significant adverse cumulative TAC impacts.

CEQA Guideline §15130(a) indicates that an EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable. Where a lead agency is examining a project with an incremental effect that is not cumulatively considerable, a lead agency need not consider the effect significant, but must briefly describe the basis for concluding that the incremental effect is not cumulatively considerable. Therefore, the Project's contribution to operational air emissions, including toxic air contaminant emissions, is not cumulatively considerable and thus not cumulatively significant because the environmental conditions would essentially be the same whether or not the ULSD Project is implemented (CEQA Guidelines §15130). This conclusion is consistent with CEQA Guidelines §15064(h)(4), which states, "The mere existence of cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's incremental effects are cumulatively considerable".

# 1.11 EXECUTIVE SUMMARY – CHAPTER 5: ALTERNATIVES ANALYSIS

## INTRODUCTION

This EIR provides a discussion of alternatives to the ULSD Project as required by CEQA. According to the CEQA Guidelines, alternatives should include realistic measures to attain the basic objectives of the proposed project and provide means for evaluating the comparative merits of each alternative. In addition, though the range of alternatives must be sufficient to permit a reasoned choice, they need not include every conceivable project alternative. Alternatives presented in this chapter were developed by reviewing alternative options to reduce the sulfur content of feed-stocks in order to obtain more CARB-compliant diesel blending stocks. The rationale for selecting specific components of the proposed project on which to focus the alternatives analysis rests on CEQA's requirements to present a range of reasonable project alternatives that could feasibly attain the basic objectives of the project, while generating fewer or less severe adverse environmental impacts. The objectives of the Project are to produce ULSD that complies with the diesel sulfur content standards set by the SCAQMD, CARB, and U.S. EPA, and to insure that adequate supplies of ULSD are available to meet future demand within current permitted limits.

## ALTERNATIVES REJECTED AS INFEASIBLE

In accordance with CEQA Guidelines, a CEQA document should identify any alternatives that were considered by the lead agency, but were rejected as infeasible during the scoping process and briefly explain the reason underlying the lead agency's determination. An alternative location for the ULSD Project has been rejected because it would not accomplish Project objectives and also because it is not feasible. To produce compliant diesel fuel at an alternative location would require the development of an entirely new refinery in an alternative location. This would require substantially more equipment and construction, be very costly, and potentially generate substantially greater impacts in many environmental categories than the ULSD Project. It also would require years of lead time to engineer, obtain permits and approvals, and construct. There is uncertainty the necessary permits would be approved in a timely manner. Therefore, an alternative site for the Project is not considered to be feasible.

The purchase of low sulfur feedstocks from off-site locations was also determined to be not feasible. Rather than reducing the sulfur content of diesel at the Phillips 66 Wilmington Plant, low sulfur blending components could be purchased by Phillips 66, transported to the Refinery, and blended with its manufactured streams. This alternative is rejected as infeasible because it is unlikely that sufficient quantities of low sulfur feedstocks within California would be available for purchase. The option of importing foreign feedstocks from outside of California would potentially generate significant adverse environmental impacts to more environmental topic areas or make existing impacts substantially worse because of the increase in marine vessels visits that would result in an increase in marine vessel emissions, which is inconsistent with the purpose of an alternatives analysis.

## DESCRIPTION OF PROJECT ALTERNATIVES

**Alternative 1 - No Project Alternative:** The No Project Alternative would not allow the Wilmington Plant to produce diesel fuel that complies with the U.S. EPA, CARB, and SCAQMD mandates for ultra low sulfur diesel (15 ppmw sulfur). Sufficient quantities of low sulfur feedstocks are not available to offset the ULSD produced under the Phillips 66 ULSD Project; however, low sulfur feedstocks may be occasionally available for purchase. Under the No Project, additional quantities of low sulfur feedstocks may be delivered via marine vessel to the marine terminal/Refinery. Nonetheless, under the No Project Alternative, Phillips 66 would produce little, if any, ULSD resulting in a decrease in ULSD in California. Dince all diesel fuel sold in California is required to have low sulfur content, the No Project would affect availability of diesel fuel that could have adverse effects on implementing other development projects (e.g., reduction of PM from DPFs.)

**Alternative 2 – New S-Zorb Unit:** Alternative 2 would use S-Zorb technology, which is an alternative hydrotreating technology, to produce ULSD. Alternative 2 would require replacement of the existing Unit 90 Hydrotreater and the construction of a new S-Zorb hydrotreating unit including the following equipment: feed filter and feed surge drum, reactor charge pump, reactor feed/effluent exchanger, reactor charge heater, reactor, reactor effluent filter, product separators, stabilizer, recycle hydrogen compressor, sorbent flow equipment (including reducer, reactor, and reactor receiver), regenerator feed drum, regenerator, and regenerator receiver. The S-Zorb hydrotreating process was developed by Phillips Petroleum Company and has been installed in one refinery. However, in operation, the S-Zorb has been less efficient than traditional hydrotreaters, and has never been used to commercially hydrotreat diesel fuels. Therefore, the current feasibility of this technology is questionable.

**Alternative 3 – High Pressure Hydrotreating:** Alternative 3 would use high pressure hydrotreating to not only produce ULSD, but also to reduce aromatic content below requirements to produce CARB compliant diesel. Alternative 3 would replace the existing Unit 90 Hydtrotreater with a new 1200 psig hydrotreater. However, Alternative 3 would require either a new hydrogen plant or the purchase of hydrogen from a third party. No other modifications are anticipated to the existing units at the Wilmington Plant.

## AIR QUALITY IMPACTS FROM THE PROJECT ALTERNATIVES COMPARED TO THE ULSD PROJECT

The No Project Alternative (Alternative 1) would eliminate the less than significant air quality impacts from the ULSD Project at the Wilmington Plant associated with the project. Other less than significant impacts identified in the previous CEQA documents for the ULSD Project (e.g., hazard and noise impacts) would also be eliminated at the

Wilmington Plant. However, Alternative 1 would increase operational emission and not achieve the objectives of the ULSD Project to continue producing diesel fuel that meets U.S. EPA, CARB, and SCAQMD ULSD requirements, and is therefore not a feasible option since Phillips 66 must comply with regulatory requirements and meeting future demand. Alternative 1 is also expected to generate additional marine vessel emissions, resulting in greater emissions than the ULSD Project.

Alternatives 2, and 3 would achieve the Project objectives of producing ULSD but would generate greater and potentially significant impacts to air quality impacts and TAC impacts as compared to the ULSD Project.

Based on the analysis in Chapter 5, Alternatives 1, 2, and 3 would potentially generate greater air quality impacts than the ULSD Project. Therefore, the ULSD Project is considered the environmentally superior alternative because it generates air quality impacts that would be less than the air quality impacts generated by Alternatives 1, 2 and 3.

## 1.12 EXECUTIVE SUMMARY – CHAPTER 6: REFERENCES

Information on references cited (including organizations and persons consulted) is presented in Chapters 6.

## 1.13 EXECUTIVE SUMMARY – CHAPTER 7: ACRONYMS AND GLOSSARY

Information on the acronyms and glossary are presented in Chapter 7.

# CHAPTER 2

# PROJECT DESCRIPTION

# 2.0 PROJECT DESCRIPTION

## 2.1 INTRODUCTION

The Phillips 66 Los Angeles Refinery first proposed modifications to produce Ultra Low Sulfur Diesel (ULSD) in 2004 to comply with the federal, state, and SCAQMD regulations that limit the sulfur content of diesel fuels. As the lead agency, pursuant to the California Environmental Quality Act (CEQA), the South Coast Air Quality Management District (SCAQMD) prepared a Negative Declaration, an Addendum, and a Subsequent Negative Declaration for the required modifications.

Following legal challenge, the California Supreme Court concluded that there were certain deficiencies in previously prepared CEQA documents for the Phillips 66 ULSD Project and required the SCAQMD to prepare an EIR to analyze the air quality impacts of the Project. The decision by the California Supreme Court resulted in decertification of the previously prepared CEQA documents but did not require that the issuance of required permits for the project be set aside. As a result, a Draft EIR is now being prepared for the ULSD Project as required by the California Supreme Court to correct deficiencies identified in the Court's decision and satisfy the court's request. However, the Refinery modifications proposed as part of the ULSD Project have been completed and Phillips 66 has been producing ULSD at its Los Angeles Refinery since 2006, as required by federal, state, and SCAQMD ULSD regulations.

## 2.2 PROJECT OBJECTIVES

The Phillips 66 ULSD Project was needed to comply with federal, state and SCAQMD regulations that limit the sulfur content of diesel fuels. Reducing the sulfur content of diesel fuel results in a reduction of SOx and particulate sulfate emissions from sources (such as vehicles and trucks) that use the fuel. The objectives of the ULSD Project are as follows:

- Reduce the sulfur content of diesel fuel produced at the Phillips 66 Los Angeles Refinery to reduce SOx and sulfate emissions from mobile sources in the basin.
- Reduce the sulfur content of diesel fuel produced at the Phillips 66 Los Angeles Refinery, which allows widespread use of particulate filters to reduce PM emissions that would otherwise fail if diesel fuel with a higher sulfur content is used.
- Comply with SCAQMD's Rule 431.2 which requires a reduction in sulfur content in diesel fuel used in stationary sources to 15 ppmw.
- Comply with CARB's 2000 Diesel Risk Reduction Plan to reduce risk exposure from diesel particulate matter.
- To ensure that adequate supplies of ULSD are available to meet future demand.

- Comply with the U.S. EPA's diesel fuel standards that required refiners to sell highway diesel fuel that meets a maximum sulfur standard of 15 ppmw.

## 2.3 PROJECT LOCATION

The Phillips 66 Los Angeles Refinery operates at two different sites in the South Coast Air Basin, which is a subarea of the SCAQMD's area of jurisdiction. One of the sites is located in the City of Carson (Carson Plant) and the other site is in the City of Los Angeles in the Wilmington community (Wilmington Plant). The Phillips 66 Wilmington Plant consists of approximately 400 acres and is located in Los Angeles County at 1660 West Anaheim Street, Wilmington, California (see Figures 2-1 and 2-2). The eastern part of the Wilmington Plant borders a residential area, a roofing materials plant, and a portion of the Harbor 110 Freeway. The northern portion of the site borders Harbor Lake Park, Harbor College, Harbor Golf Course, and a small residential area. The western part of the site borders Gaffey Street including a firing range, vacant fields, recreational fields, and a U.S. Navy fuel storage facility. Finally, the southern portion of the site shares a border with a warehouse facility. The ULSD Project occurs primarily at the Wilmington Plant, and only minor modifications were required at the Carson Plant.

The Carson Plant is bounded on the north by Sepulveda Boulevard; on the west by Wilmington Avenue; on the south by railroad tracks; and on the east by Alameda Boulevard. Property to the north of the Carson Plant is occupied by another refinery. The western boundary of the Carson Plant borders a shipping and container storage facility. Property across Wilmington Boulevard includes a residential neighborhood to the northwest and commercial uses to the southwest. Land uses to the south of the Carson Plant are heavy industrial. Land south of Lomita Avenue is dominated by port-related activities. Land east of Alameda Street is occupied by a storage tank farm and the Tesoro Refinery.

## 2.4 LAND USE AND ZONING

The ULSD project occurs primarily at the Phillips 66 Wilmington Plant, with minor modifications occurring at the Carson Plant. The project modifications to the Wilmington Plant have been developed entirely within the existing Wilmington Plant property boundaries. The nature of the overall function and products produced at the Wilmington Plant remains the same. Land use on the Wilmington Plant property is designated by the City of Los Angeles as M3, which is heavy industrial zoning. The ULSD project is consistent with the land use designation of heavy industry and manufacturing. No new land was required for the ULSD project and no zoning and/or land use changes were required as part of the ULSD project.

Land use at the Wilmington Plant, and in the surrounding vicinity, is consistent with the City of Los Angeles General Plan land use designations. The Land Use element of the General Plan currently in place was adopted in December 1992. No revisions to the Land Use element have occurred since December 1992.

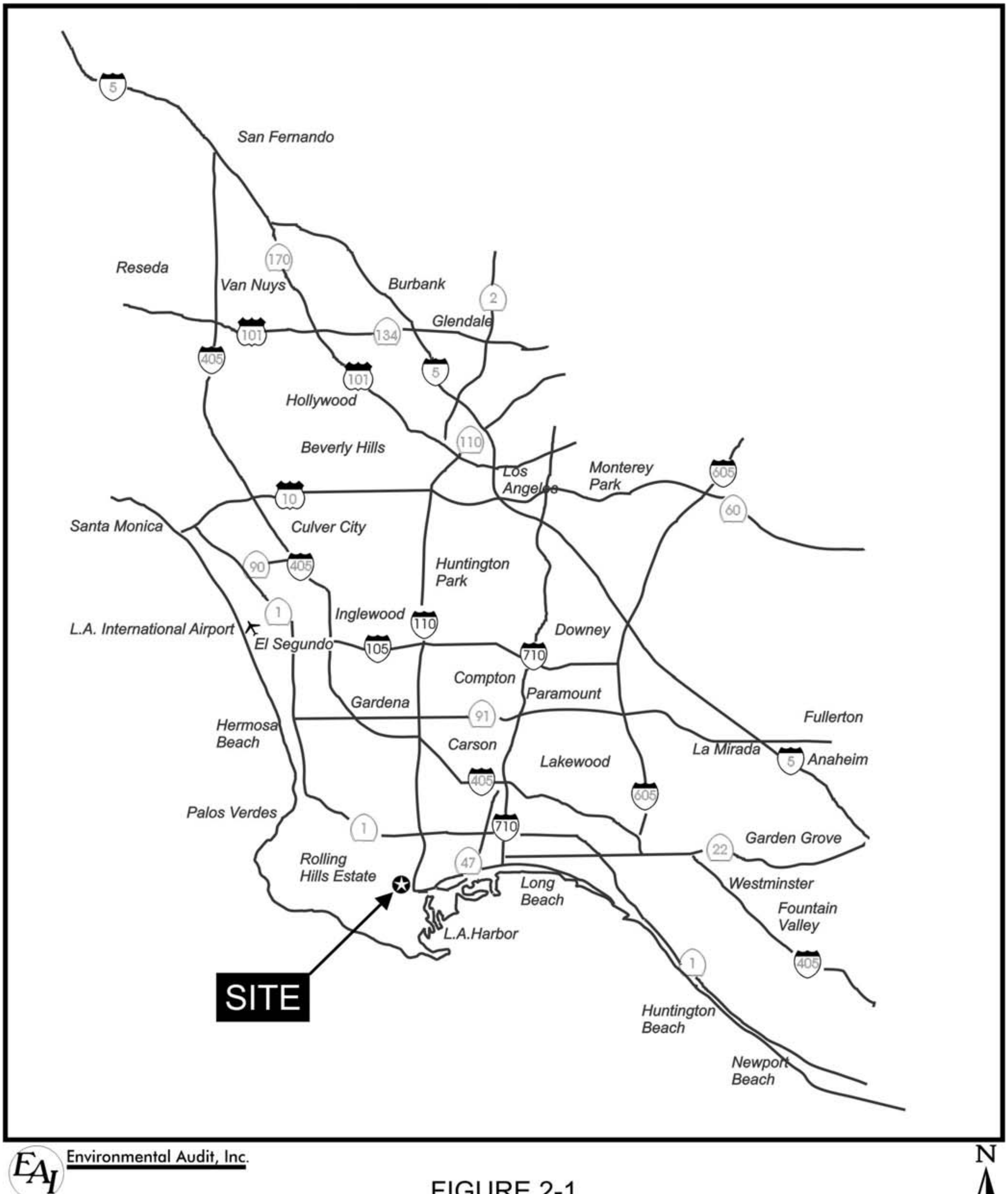



FIGURE 2-1
REGIONAL MAP
Phillips 66 Wilmington Plant

Project No. 2696

N:\2696\RegionalMap (rev.2).cdr

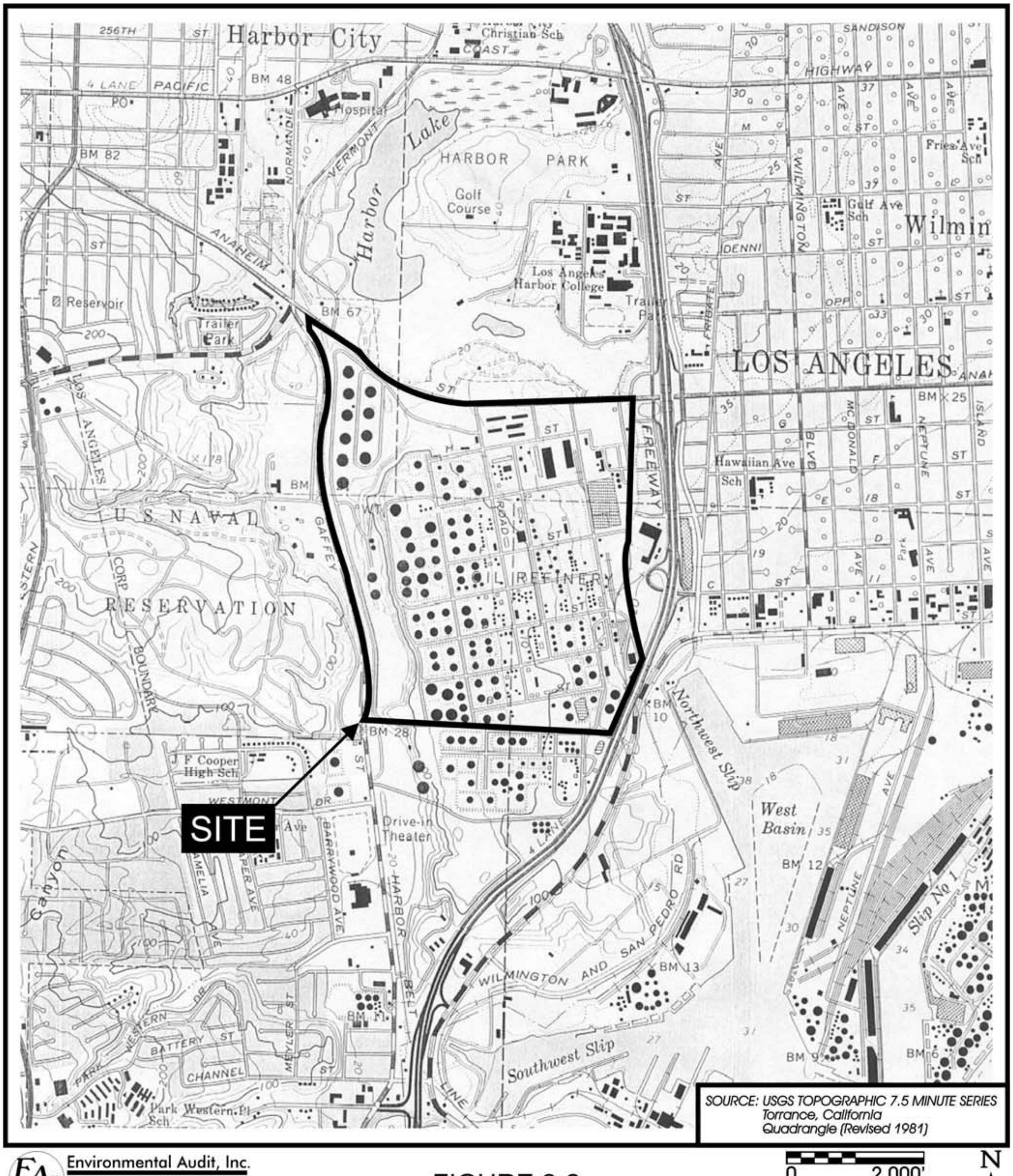



FIGURE 2-2
SITE LOCATION MAP
Phillips 66 Los Angeles Refinery
Wilmington Plant

Project No. 2696

N:\2696\Site Location Map (rev.2).cdr

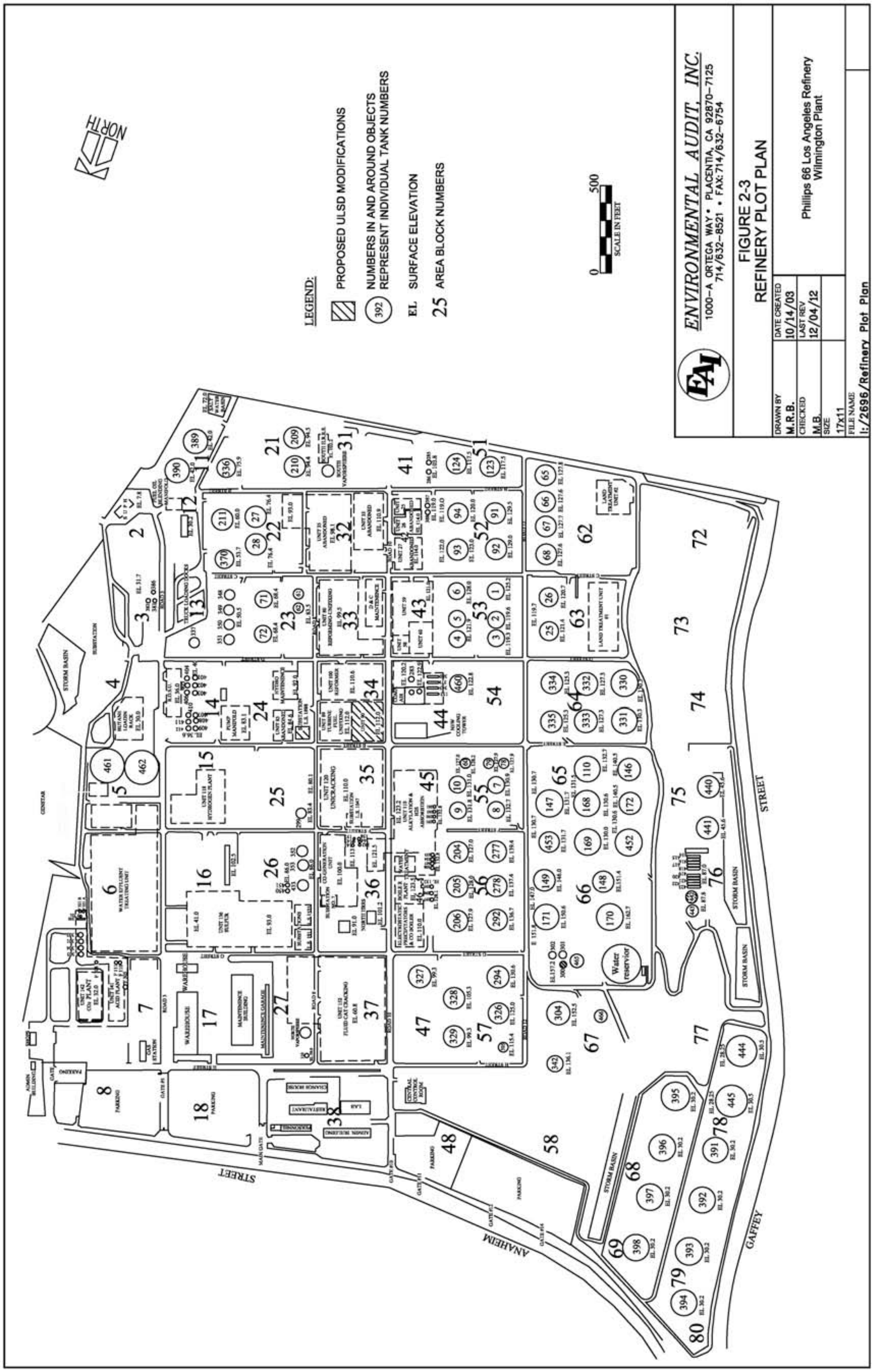
The ULSD modifications to the Carson Plant occurred entirely within the existing Carson Plant property boundaries. The nature of the overall function and products produced at the Carson Plant remains the same. The Carson Plant is designated as MH, Manufacturing Heavy land use zoning and all the surrounding land uses are heavy industrial, including other refinery facilities, tank farms, and transportation corridors. The ULSD project was and continues to be consistent with the current land use designation of heavy industry and manufacturing. No new property was acquired for the Carson Plant as part of the ULSD project. The ULSD project did not trigger changes to the zoning designations at the project sites.

## 2.5 EXISTING REFINERY CONFIGURATION AND OPERATION

Crude oil is a mixture of hydrocarbon compounds and relatively small amounts of other materials, such as oxygen, nitrogen, sulfur, salt, and water. Petroleum refining is a coordinated arrangement of manufacturing processes designed to produce physical and chemical changes in the crude oil to remove most of the non-hydrocarbon substances, break the crude oil into its various components, and blend them into various useful products. The overall refining process uses four kinds of techniques: (1) separation, including distilling hydrocarbon liquids into gases, gasoline, diesel fuel oil, and heavier residual materials; (2) cracking or breaking large hydrocarbon molecules into smaller ones by thermal or catalytic processes; (3) reforming using heat and catalysts to rearrange the chemical structure of a particular oil stream to improve its quality; and (4) combining by chemically combining two or more hydrocarbons to produce high-grade gasoline. The Phillips 66 Los Angeles Refinery produces a variety of products including gasoline, jet fuel, diesel fuel, petroleum gases, sulfuric acid, petroleum coke, and sulfur.

## 2.6 ULSD PROJECT DESCRIPTION

The ULSD Project at the Phillips 66 Los Angeles Refinery is comprised of two major components: (1) revamp the Mid-Barrel Hydrotreater Unit 90 to improve the hydrotreating reaction to comply with the required diesel sulfur content level; and (2) modify the Mid-barrel handling and logistics to segregate diesel from higher sulfur jet fuel; as well as several associated minor modifications. The Project also improves hydrogen distribution at the Wilmington Plant; and improves control of the Crude Unit heavy gas oil distillation cutpoint at the Carson Plant. The locations of equipment modified as part of the ULSD Project at the Wilmington Plant are shown in Figure 2-3. The main components of the ULSD Project are described in more detail in the following subsections.


NORTH
LEGEND:
PROPOSED ULSD MODIFICATIONS
392 NUMBERS IN AND AROUND OBJECTS REPRESENT INDIVIDUAL TANK NUMBERS
EL SURFACE ELEVATION
25 AREA BLOCK NUMBERS
0
500
SCALE IN FEET
ENVIRONMENTAL AUDIT, INC.
1000–A ORTEGA WAY • PLACENTIA, CA 92870–7125
714/632–8521 • FAX: 714/632–6754
FIGURE 2-3
REFINERY PLOT PLAN
Phillips 66 Los Angeles Refinery
Wilmington Plant
DRAWN BY
M.R.B.
CHECKED
M.B.
SIZE
17x11
FILE NAME
I:/2696/Refinery Plot Plan
DATE CREATED
10/14/03
LAST REV
12/04/12
ANAHEIM
STREET
GAFFEY
STREET

### Mid-Barrel Hydrotreater Unit 90 Modifications

The 2004 Final Negative Declaration included an analysis of changes to Unit 90 including modifying the reactor loop to replace the existing reactors with two new larger reactors oriented in series. The reactor effluent exchanger train was replaced with new exchangers to improve heat recovery and minimize pressure drop. The Project did not increase the maximum throughput capacity of Unit 90.

The existing recycle gas compressor was modified to double its capacity by replacing the compressor internals with a larger rotor. The recycle gas scrubber required tray replacement to handle the increase in the recycle gas rate.

### Charge Heater Modifications

The 2004 Final Negative Declaration included an analysis of the reactor charge heater B-201 which was removed from service, demolished, and replaced with a functionally identical replacement heater referred to as B-401. The heater had to be replaced to reduce the pressure drop through the tubes at the higher reactor inlet pressure, and to ensure the heater would meet the current American Petroleum Institute Standard No. 560, Fired Heaters for General Refinery Services, at all expected firing rates. Consistent with current SCAQMD policy, the air quality permit was updated to indicate the equipment's maximum design rating. Best Available Control Technology (BACT) for the new heater was determined to be low NOx burners and a SCR Unit for NOx control[1]. NOx emissions from replacement charge heater B-401 were limited to a concentration of five ppmv. BACT for CO and SOx control was 10 ppmv CO and 40 ppm total reduced sulfur, respectively. Heater B-401 and the SCR Unit were installed adjacent to the new reactors in Unit 90 (see 2-3, Block 34).

### SCR Unit

As indicated above, SCR technology is considered to be BACT and is required to reduce NOx emissions from the new charge heater B-401 that replaced the existing charge heater B-201, which was analyzed in the 2005 Final Subsequent Negative Declaration. SCR units control NOx emissions by injecting aqueous ammonia into the exhaust gas stream upstream of a catalyst. The aqueous ammonia used in the SCR Unit consists of 30 percent ammonia. NOx, ammonia, and oxygen react on the surface of the catalyst to form nitrogen and water. The catalyst is made from a metallic oxide (vanadium pentoxide) with NOx control efficiencies expected to be approximately 90 percent or more. The NOx concentration downstream from the SCR Unit is limited to five parts per million.

---

1 As analyzed in the 2004 Final Negative Declaration, ultra low NOx burners were originally considered to be BACT for the ULSD Project. However, upon further engineering review by SCAQMD staff, it was concluded that SCR in addition to low NOx burners constituted BACT for the Project. As a result, the 2005 Final Subsequent Negative Declaration was prepared to analyze the change in BACT from ultra low NOx burners to low NOx burners and SCR.

Aqueous ammonia is supplied to the SCR's vaporizer system from an aqueous ammonia storage tank that already existed at the site before implementing the ULSD Project, so no new storage tank was required. In addition, no physical modifications were required to the existing storage tank. The annual throughput of the existing aqueous ammonia tank increased slightly, but this did not cause an increase in emissions because the tank is pressurized with a vapor balanced system for filling. A back-up supply consisting of two 150-pound cylinders of anhydrous ammonia was installed as part of the aqueous ammonia vaporization skid at heater B-401. This back-up ammonia supply is manually activated only if the normal aqueous ammonia supply fails. The back-up ammonia cylinders require re-inspection under Department of Transportation requirements every ten years; therefore, the ammonia cylinders are replaced at least every ten years.

Anhydrous ammonia cylinders are also used as an emergency backup ammonia supply on other existing SCR Units at the Wilmington Plant. The anhydrous ammonia cylinders are supplied by a local company that supplies a variety of products to the Refinery, including ammonia and other products. The company makes weekly deliveries to the Wilmington Plant.

### Cooling Tower

The existing cooling tower E-221 was demolished and replaced with a new cooling tower of the same capacity as part of the ULSD Project, but at a different location at the Refinery, which was analyzed in the 2004 Final Negative Declaration. Demolishing existing cooling tower E-221 and relocating the new cooling tower was also necessary to make room for the new reactors and charge heater.

### Mid Barrel Handling and Shipping Modifications

Before implementing the ULSD Project, common pipeline facilities were used to transport jet and diesel fuels from the Wilmington Plant to the Phillips 66 Torrance Tank Farm (an existing tank farm in Torrance used to distribute finished product). The sulfur content of jet fuel is much higher than that of ULSD. Improved handling and shipping modifications were needed so that ULSD would not be contaminated with higher sulfur jet fuel, which could cause ULSD to exceed the 15 ppmw sulfur limit.

Modifications to Mid-barrel handling and shipping at the Wilmington Plant improved segregation of ULSD and jet fuel and were analyzed in the 2004 Final Negative Declaration. These modifications included a new ULSD shipping pump (the existing pump that previously shipped both diesel and jet fuel continues to be used to ship jet fuel); two new pumps for handling jet and diesel blendstocks; one new sample pump and associated piping to create separate facilities for handling jet and diesel fuel. The ULSD Project did not change the total combined quantity of diesel and jet fuel handled. Therefore, while there is a new shipping pump to handle the ULSD, there has been a corresponding reduction in use of the existing pump, which no longer is used to ship diesel.

**Hydrogen System**

The 2004 Final Negative Declaration included an analysis of changes to the hydrogen distribution piping which enabled the exclusive use of high purity hydrogen at Unit 90 for maximizing hydrogen partial pressure at the reactor inlet. New piping was installed to properly distribute reformer hydrogen to other refinery processes not requiring continuous use of high purity hydrogen.

**Storage Tank Modifications**

As part of the ULSD Project, the service (contents) of Storage Tank 331 at the Wilmington Plant was changed to jet/diesel, which was analyzed in the 2004 Final Negative Declaration. Tank 331 is an existing storage tank that had been empty for more than two years before implementing the ULSD Project. Tank 331 had been permitted previously by the SCAQMD, and the permit allowed storage of jet/diesel; therefore, no physical or permit modifications were required for this tank.

**Crude Unit DU-5 at the Carson Plant**

The Carson Plant processes straightrun diesel or heavy gas oil feed in the Unit 90, which contains sulfur species that are some of the most difficult to hydrotreat. To reduce sulfur content in the feed and maintain a desirable catalyst life, the crude column needed to be capable of controlling the temperature between 650 and 700°F. The ULSD Project included the installation of temperature monitoring equipment (thermocouples) and flow control valves in order to improve crude distillation operations and minimize the high sulfur portion of the distilled crude routed to Unit 90. This allowed the crude column to be operated on advanced computer control within the existing Crude Unit throughput capacity rate.

The 2004 Final Negative Declaration ULSD Project included an analysis of the physical modifications associated with the changes at the Carson Plant, which were concluded to be very minor. No major construction activities were required and these changes were incorporated into a normally scheduled refinery turnaround (i.e., refinery shutdown for routine maintenance) or into regular, ongoing maintenance activities. Maintenance workers performed the minor installation of pre-manufactured equipment (thermocouples and modify existing control valves) that were required to the unit. These changes did not result in physical impacts to any environmental topic identified in the environmental checklist in Chapter 2 of the 2004 Final Negative Declaration, so the environmental evaluation in this EIR is limited to the Wilmington Plant (CEQA Guidelines §15064(d)(1)).

## 2.7 CONSTRUCTION OF THE PROJECT

The construction schedule for ULSD project at the Wilmington Plant took place from approximately third quarter of 2005 and was completed in April 2006. Because the construction activities have already occurred and the court decision was based on operational air quality impacts, no further discussion of construction is warranted or necessary.

## 2.8 OPERATION OF THE PROJECT

The ULSD construction period concluded in April 2006 and the ULSD refinery modifications have been operating since that time. The ULSD project did not result in an increase in the permanent work force at the Refinery, and incrementally increased truck traffic at the Wilmington Plant only by a maximum of one truck per day of 30 percent aqueous ammonia. Additional truck trips associated with catalyst replacement are infrequent (e.g., once every 2-3 years for Unit 90 catalyst and once every 5-10 years for SCR catalyst). For the peak day operations, it was assumed that one ammonia truck and four catalyst trucks would be required.

## 2.9 PERMITS AND APPROVALS

The ULSD project required permits to construct/operate from the SCAQMD and building permits from the City of Los Angeles.

# CHAPTER 3

# ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION MEASURES

# 3.0 ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION MEASURES

## 3.1 INTRODUCTION

The California Supreme Court decision invalidated the baseline used in the air quality impacts analysis for project operations, but did not invalidate any other aspect of the prior CEQA documents, including the conclusions that the ULSD Project would not significantly adversely affect any non-air quality environmental topics.

In particular, the California Supreme Court concluded that the environmental impacts of a proposed project must be compared to the environmental conditions that exist at the time the CEQA analysis is commenced, not the level of development or activity that would be allowed under existing permits or approvals not previously evaluated in a CEQA analysis. The Supreme Court left to the discretion of the SCAQMD the methodology for estimating the "actual existing levels of emissions" from the utility equipment, recognizing that refinery operations are highly complex and that these operations, including the steam generation, vary greatly with the season, crude oil supplies, market conditions and other factors. The Supreme Court concluded that "(w)hatever method the District uses, however, the comparison must be between existing physical conditions without the Diesel Project and the conditions expected to be produced by the project."

Other aspects of the prior CEQA documents were challenged in the litigation, but those challenges were rejected by the trial court, and the trial court's rulings were upheld on appeal. Therefore, the Draft EIR for the Phillips 66 ULSD Project focuses on the issues as directed by the court and is limited to establishing the air quality setting, i.e., baseline, and air quality impacts from project operations. The analysis of construction emissions is not affected by the decision on environmental baseline. Construction emissions were part of the litigation and the courts determined that the analysis was adequate. Therefore, no further construction emission analysis is required. Further, construction emissions do not impact air quality operational impacts because they occur sequentially and the ULSD Project construction emissions did not overlap with the ULSD operational emissions. The current air quality setting, air quality impacts from operations, and mitigation measures for the ULSD project operations are presented and evaluated in this Chapter.

Environmental review for the ULSD project began in early January 2004, when the 2004 Negative Declaration was prepared, published, and approved. Construction of the project began in 2005 and was completed in 2006. The ULSD project went through start-up and de-bugging procedures in April 2006 and was fully operational starting in May 2006. The 2002-2003 time period is considered to be the pre-ULSD Project or baseline conditions for Refinery operations as this represents the timeframe during the environmental analysis development for the ULSD Project and was prior to the construction and operation of the ULSD Project. This approach is consistent with CEQA Guidelines §15125, which indicates that an EIR must include a description of the physical environmental conditions in the vicinity of the project as they exist at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced.

Because the ULSD Project went through start-up and de-bugging procedures in April 2006, the "post-project" period is considered to be May 2006 and thereafter. For the purposes of evaluating air quality impacts from the ULSD Project, the "post-project" period for the ULSD project is May 2006 through April 2008. This period length was selected in order to compare an equivalent period of time, two years of operation to the baseline conditions, which were developed using two years (2002 – 2003) of historical data. Where available data did not precisely match these pre- and post-project periods, the impact analysis relies on the best available match.

## 3.2 AIR QUALITY SETTING

### 3.2.1 WEATHER CONDITIONS

The Phillips 66 Los Angeles Refinery is located within the SCAQMD jurisdiction (referred to hereafter as the district). The district consists of the four-county South Coast Air Basin (Basin), that includes Orange, and the non-desert portions of Los Angles, Riverside, and San Bernardino counties, the Riverside County portions of the Salton Sea Air Basin (SSAB), and the Mojave Desert Air Basin (MDAB). The Basin is bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto mountain ranges to the north and east. The following subsections summarize general weather conditions in the Basin.

#### 3.2.1.1 Meteorological Conditions

The climate in the Basin generally is characterized by sparse winter rainfall and hot summers tempered by cool ocean breezes. A temperature inversion, a warm layer of air that traps the cool marine air layer underneath it and prevents vertical mixing, is the prime factor that allows contaminants to accumulate in the Basin. The mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, and Santa Ana winds. The climate of the area is not unique, but the high concentration of mobile and stationary sources of air contaminants in the western portion of the Basin, in addition to the mountains, which surround the perimeter of the Basin, contribute to poor air quality in the region.

#### 3.2.1.2 Temperature and Rainfall

Temperature affects the air quality of the region in several ways. Local winds are the result of temperature differences between the relatively stable ocean air and the uneven heating and cooling that takes place in the Basin due to a wide variation in topography. Temperature also has a major effect on vertical mixing height and affects chemical and photochemical reaction times. The annual average temperatures vary little throughout the

Basin, averaging 75°F. The coastal areas show little variation in temperature on a year round basis due to the moderating effect of the marine influence. On average, August is the warmest month while January is the coolest month. Most of the annual rainfall in the Basin falls between November and April. Annual average rainfall varies from nine inches in Riverside to 14 inches in downtown Los Angeles.

#### 3.2.1.3 Wind Flow Patterns

Wind flow patterns play an important role in the transport of air pollutants in the Basin. The winds flow from offshore and blow eastward during the daytime hours. In summer, the sea breeze starts in mid-morning, peaks at 10-15 miles per hour, and subsides after sundown. There is a calm period until about midnight. At that time, the land breeze begins from the northwest, typically becoming calm again about sunrise. In winter, the same general wind flow patterns exist except that summer wind speeds average slightly higher than winter wind speeds. This pattern of low wind speeds is a major factor that allows the pollutants to accumulate in the Basin.

The normal wind patterns in the Basin are interrupted by the unstable air accompanying the passing storms during the winter and infrequent strong northeasterly Santa Ana wind flows from the mountains and deserts north of the Basin.

### 3.2.2 EXISTING AIR QUALITY

Local air quality in the Basin is monitored by the SCAQMD, which operates a network of monitoring stations throughout the Basin. CARB operates additional monitoring stations.

#### 3.2.2.1 Criteria Pollutants

The sources of air contaminants in the Basin vary by pollutant but generally include on-road mobile sources (e.g., automobiles, trucks and buses), other off-road mobile sources (e.g., airplanes, ships, trains, construction equipment, etc.), stationary sources (e.g., fuel combustion, petroleum production and marketing, and other industrial processes), and solvent evaporation (e.g., consumer products and architectural coatings). Mobile sources are responsible for a large portion of the total Basin emissions of several pollutants (SCAQMD, 2012b)

Criteria air pollutants are those pollutants for which the federal and state governments have established ambient air quality standards or criteria for outdoor concentrations in order to protect public health with a margin of safety. The current health-based federal and state ambient air quality standards are shown in Table 3-1. (Note that the following ambient air quality standards have changed since the 2002-2003 timeframe: state 1-hour $NO_2$ standard, federal one-hour $SO_2$ standard, and the state and federal PM2.5 standards.) National Ambient Air Quality Standards (NAAQS) were first authorized by the federal Clean Air Act (CAA) of 1970 and were promulgated by the U.S. EPA in 1971. California Ambient Air Quality Standards were authorized by the state legislature in 1967 and promulgated by CARB in 1969. Air quality of a region is considered to be in attainment of the standards if the measured concentrations of air pollutants are continuously equal to or less than the air quality standards over the previous three-year period.

**TABLE 3.1-1**

**Ambient Air Quality Standards**

| Air Pollutant | State Standard Concentration/ Averaging Time | Federal Primary Standard Concentration/ Averaging Time | Most Relevant Effects |
|---|---|---|---|
| Ozone | 0.09 ppm (180 ug/m$^3$), 1-hr. avg.<br>0.070 ppm (137 ug/m$^3$), 8-hr | 0.075 ppm (147 ug/m$^3$), 8-hr avg. | (a) Short-term exposures: (1) Pulmonary function decrements and localized lung edema (2) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (b) Long-term exposures: Risk to public health implied by altered connective tissue metabolism and pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (c) Vegetation damage; (d) Property damage |
| Carbon Monoxide | 20 ppm (23 mg/m$^3$), 1-hr avg.<br>9.0 ppm (10 mg/m$^3$), 8-hr avg. | 35 ppm (40 mg/m$^3$), 1-hr avg.<br>9 ppm (10 mg/m$^3$), 8-hr avg. | (a) Aggravation of angina pectoris and other coronary heart disease; (b) Decreased exercise tolerance in persons with vascular disease and lung disease; (c) Impairment of central nervous system functions; (d) Possible increased risk to fetuses |
| Nitrogen Dioxide | 0.18 ppm (339 ug/m$^3$), 1-hr avg.<br>0.03 ppm (57 ug/m$^3$), ann. avg. | 0.100 ppm (188 ug/m$^3$), 1-hr avg.(1)<br>0.053 ppm (100 ug/m$^3$), ann. avg. | (a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (b) Risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; (c) Contribution to atmospheric discoloration |
| Sulfur Dioxide | 0.25 ppm (655 ug/m$^3$), 1-hr. avg.<br>0.04 ppm (105 ug/m$^3$), 24-hr avg. | 75 ppb (196 ug/m$^3$), 1-hr avg.(2)<br>0.5 ppm, 3-hr avg. (secondary) | Bronchoconstriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma |
| Suspended Particulate Matter (PM10) | 50 µg/ m$^3$, 24-hr avg.<br>20 µg/m$^3$, ann. arithmetic mean | 150 µg/ m$^3$, 24-hr avg. | (a) Excess deaths from short-term exposures and exacerbation of symptoms in sensitive patients with respiratory disease; (b) Excess seasonal declines in pulmonary function in children |
| Suspended Particulate Matter (PM2.5) | 12 µg/ m$^3$, ann. Arithmetic mean | 35 µg/ m$^3$, 24-hr avg.<br>15.0 µg/ m$^3$, annual arithmetic mean | Decreased lung function from exposures and exacerbation of symptoms in sensitive patients with respiratory disease; elderly; children. |
| Sulfates | 25 µg/ m$^3$, 24-hr avg. | Not Federal Standard | (a) Decrease in ventilatory function; (b) Aggravation of asthmatic symptoms; (c) Aggravation of cardio-pulmonary disease; (d) Vegetation damage; (e) Degradation of visibility; (f) Property damage |
| Lead | 1.5 µg/ m$^3$, 30-day avg. | 1.5 µg/ m$^3$, calendar quarter<br>0.15 µg/ m$^3$, rolling 3-month avg. | (a) Increased body burden; (b) Impairment of blood formation and nerve conduction |
| Visibility-Reducing Particles | In sufficient amount to give an extinction coefficient >0.23 inverse kilometers (visual range to less than 10 miles) with relative humidity less than 70%, 8-hour average (10am – 6pm PST) | Not Federal Standard | Nephelometry and AISI Tape Sampler; instrumental measurement on days when relative humidity is less than 70 percent |
| Hydrogen Sulfide | 0.03 ppm (42 ug/m$^3$), 1-hr avg. | Not Federal Standard | Breathing H2S at levels above the standard will result in exposure to a very disagreeable odor. |
| Vinyl Chloride | 0.01 ppm (26 ug/m$^3$), 24-hour avg. | Not Federal Standard | Short-term exposure to high levels of vinyl chloride in air causes central nervous system effects, such as dizziness, drowsiness, and headaches. Long-term exposure to vinyl chloride through inhalation and oral exposure causes in liver damage. Cancer is a major concern from exposure to vinyl chloride via inhalation. Vinyl chloride exposure has been shown to increase the risk of angiosarcoma, a rare form of liver cancer in humans. |

Footnotes:
(1) To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm. The U.S. EPA established a new 1-hour $NO_2$ standard effective April 7, 2010.

(2) Based on the 3-year average of the 99th percentile of the 1-hour daily maximum concentrations. The U.S. EPA revised the SO2 federal standard by establishing the new 1-hour standard of 75 ppb and revoking the existing annual (0.03 ppm) and 24-hour (0.14 ppm) standards, effective August 2, 2010.

Health-based air quality standards have been established by the U.S. EPA and the CARB for ozone, CO, $NO_2$, PM10, PM2.5, $SO_2$, and lead. The California standards are generally more stringent than the federal air quality standards. California also has established standards for sulfate, visibility, hydrogen sulfide, and vinyl chloride. Hydrogen sulfide and vinyl chloride currently are not monitored in the Basin because they are not a regional air quality problem, but are generally associated with localized emission sources. In addition, vinyl chloride emissions have been associated primarily with sources such as landfills. Because landfills in the district are subject to SCAQMD Rule 1150.1, which contains stringent requirements for landfill gas collection and control, potentially vinyl chloride emissions are below the level of detection. The Basin, including the project area, is classified as attainment for both the state and federal standards for CO, $NO_2$, $SO_2$, sulfates, and lead and the state standard for sulfates. The Basin is currently designated as non-attainment for PM2.5 and ozone for both state and federal standards. The Basin has met the federal 24 hour PM10 standard and U.S. EPA has proposed approval of the attainment.

### 3.2.2.2 Air Quality Management Plans

When the ULSD Project was proposed and implemented, the SCAQMD was promulgating rules and regulations identified as control measures in the 2003 AQMP. Subsequently, the SCAQMD adopted the 2007 AQMP and promulgated rules and regulations identified as control measures in that Plan. As a result of implementing AQMP control measures as rules or regulations, there have been substantial improvements in air quality since 2004 when the ULSD Project originally underwent an environmental analysis pursuant to CEQA. In December 2012, the SCAQMD adopted the 2012 AQMP and has already begun the process of promulgating rules to demonstrate attainment of the federal 24-hour PM2.5 standard. The main components of these three AQMPs are summarized in the following subsections.

#### 3.2.2.2.1 SCAQMD 2003 AQMP

The 2003 AQMP was approved and adopted by the SCAQMD in August 2003. The 2003 AQMP was never fully approved by the U.S. EPA as part of the State Implementation Plan (SIP). The 2003 AQMP was initially partially approved and partially disapproved by EPA. The 2003 AQMP addressed the following control strategies:

- Attain the federal PM10 ambient air quality standard for the South Coast Air Basin and Coachella Valley - these portions were approved by the U.S. EPA; in both areas, the ozone attainment demonstration was disapproved after the CARB withdrew its measures;
- Attain the federal one-hour ozone standard;

- Implement remaining 1997/1999 control measures not yet implemented;
- Revise the Post-1996 VOC Rate-of-Progress Plan and SIP for CO;
- Because U.S. EPA was in the process of adopting ambient air quality standards for PM2.5, include an initial analysis of emission reductions necessary to attain the PM2.5 and eight-hour ozone standards; etc.; and

In addition to the above strategies, as required by CARB, emissions inventories developed for the 2003 AQMP used 1997 as the base year. Future projected emissions incorporate rules and regulations adopted by U.S. EPA, CARB and SCAQMD from 1997 to October 2002. Information necessary to produce an emission inventory for the Basin is obtained from the SCAQMD and other governmental agencies including: CARB, California Department of Transportation (CalTrans), and SCAG. The inventories only include anthropogenic sources (i.e., those associated with human activity) (SCAQMD, 2003).

The 2003 AQMP revisions to the SCAQMD's CO Plan also served two purposes: it replaced the 1997 attainment demonstration and it provided the basis for a CO maintenance plan in the future.

3.2.2.2.2 SCAQMD 2007 AQMP

The SCAQMD Governing Board approved the 2007 AQMP on June 1, 2007. On September 27, 2007, CARB adopted the State Strategy for the 2007 State Implementation Plan and the 2007 South Coast Air Quality Management Plan as part of the SIP. The 2007 SIP was then forwarded to U.S. EPA for approval. The following summarize the major components of the 2007 AQMP:

- The most current air quality setting (e.g., 2005 data);
- Updated emission inventories using 2002 as the base year, which also incorporate measures adopted since adopting the 2003 AQMP;
- Updated emission inventories of stationary and mobile on-road and off-road sources;
- 2003 AQMP control measures not yet implemented (eight of the control measures originally contained in the 2003 AQMP were updated or revised for inclusion into the Draft 2007 AQMP);
- 24 new measures were incorporated into the 2007 AQMP based on replacing the SCAQMD's long-term control measures from the 2003 AQMP with more defined or new control measures and control measure adoption and implementation schedules;
- CARB's recommended control measures aimed at reducing emissions from sources that are primarily under State and federal jurisdiction, including on-road and off-road mobile sources, and consumer products;
- SCAG's regional transportation strategy and control measures; and

- Analysis of emission reductions necessary and attainment demonstrations to achieve the federal eight-hour ozone and PM2.5 air quality standards.

On November 22, 2010, U.S. EPA issued a notice of proposed partial approval and partial disapproval of the 2007 South Coast SIP for the 1997 Fine Particulate Matter Standards and the corresponding 2007 State Strategy. Specifically, U.S. EPA proposed approving the SIP's inventory and regional modeling analyses, but it also proposed disapproving the attainment demonstration because it relied too extensively on commitments to emission reductions in lieu of fully adopted, submitted, and SIP-approved rules. The notice also cited deficiencies in the SIP's contingency measures.

3.2.2.2.3 SCAQMD 2012 AQMP

The 2012 AQMP provides an updated air pollution control strategy to attain the 24-hour PM2.5 federal ambient air quality standard and to partially fulfill the 2007 AQMP Clean Air Act §182 (e)(5) reduction commitment. It was been developed as an integrated Plan taking into consideration: air quality, climate change, transportation, and energy needs. The 2012 AQMP focused on PM reductions to attain the federal 24-hour PM2.5 standard by 2014. The 2012 AQMP also includes ozone reduction strategies to make expeditious progress in attaining the state one-hour and eight-hour ozone standards and the federal eight-hour ozone standards (80 parts per billion (ppb) by 2023 and 75 ppb by 2032). The 2012 AQMP provides the strategy to meet the (revoked) one-hour federal ozone standard (by 2022). In particular, the ozone strategy approach relies heavily on NOx emission reductions, primarily from mobile sources, and identifies actions that can be taken in the next two to three years. The 2012 AQMP relies upon the most recent planning assumptions and the best available information such as CARB's latest EMFAC2011 for the on-road mobile source emissions inventory, CARB's OFF-ROAD 2011 model for the off-road mobile source emission inventory, the latest point source and improved area source inventories as well as the use of new episodes and air quality modeling analysis, and SCAG's forecast assumptions based on its recent 2012 Regional Transportation Plan. The 2012 AQMP includes the current and future air quality in the Coachella Valley. The 2012 AQMP also includes a discussion of ultra-fine particles, near roadway exposure and energy.

Based upon the modeling analysis described in the Program Environmental Impact Report for the 2012 AQMP, implementation of all control measures contained in the 2012 AQMP is anticipated to bring the district into compliance with the federal eight-hour ozone standard by 2023 and the state eight-hour ozone standard beyond 2023 (SCAQMD, 2012b).

### 3.2.2.3 Local Air Quality

The project site is located within the SCAQMD's South Coastal Los Angeles County monitoring area. Recent background air quality data for criteria pollutants for the South Coast Los Angeles County 1 Monitoring Station No. 072 is presented in Table 3.1-2. The area has shown a general improvement in air quality with decreasing or consistent concentrations of most pollutants (see Table 3.1-2). Air quality in the South Coastal Los Angeles County monitoring area complies with the state and federal ambient air quality standards for CO, $NO_2$, $SO_2$, lead, and sulfate.

**TABLE 3.1-2**

**South Coastal Los Angeles County 1 Monitoring Station No. 072**
**(2001-2012) Maximum Observed Concentrations**

| Constituent | | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|
| Ozone: | 1-Hour (ppm) | 0.091 | 0.084 | 0.099 | 0.090 | 0.126 | 0.17 |
| | Days Exceeding Federal Standard | (0) | (0) | (0) | (0) | (1) | (12) |
| | Days Exceeding State Standard | (0) | (0) | (1) | (0) | (11) | (76) |
| | 8-Hour (ppm) | 0.070 | 0.065 | 0.071 | 0.075 | 0.103 | 0.122 |
| | Days Exceeding Federal Standard | (0) | (0) | (0) | (0) | (3) | (53) |
| | Days Exceeding State Standard | | | | | (18) | (84) |
| Carbon Monoxide[a)]: | | | | | | | |
| | 1-Hour (ppm) | 6 | 6 | 6 | 4 | 3 | 3 |
| | 8-Hour (ppm) | 4.71 | 4.6 | 4.7 | 3.4 | 2.5 | 2.1 |
| Nitrogen Dioxide[b)]: | | | | | | | |
| | 1-Hour (ppm) | 0.13 | 0.13 | 0.14* | 0.12 | 0.08 | 0.08 |
| | Annual (ppm) | 0.0308 | 0.0298 | 0.0288* | 0.0280 | 0.0222 | 0.0199 |
| PM10: | 24-Hour[d,g)] ($\mu g/m^3$) | 91 | 74 | 63 | 72 | 80 | 125 |
| | Percent of Samples Exceeding Federal Standard | (0) | (0) | (0) | (0) | (0) | (0) |
| | Percent of Samples Exceeding State Standard | (17%) | (8.6%) | (6.6%) | (6.7%) | (31.7%) | (35.2%) |
| | Annual ($\mu g/m^3$) | | | | | 39.2 | 45.0 |
| | Geometric | 34.8 | 34.1 | (--) | (--) | -- | 68.5 |
| | Arithmetic | 37.4 | 35.9 | 32.8 | 33. | -- | (0.3%) |
| PM2.5: | 24-Hour[f,g)] ($\mu g/m^3$) | 72.9 | 62.7 | 35.0 | 66.6 | 98.7 | 19.0 |
| | Percent of Samples Exceeding Federal Standard | (0.3%) | (0%) | (0%) | (0.3%) | (1.2%) | |
| | Annual Arithmetic Mean ($\mu g/m^3$) | 21.4 | 19.5 | 10.5 | 17.6 | 21.0 | 0.01 |
| Sulfur Dioxide[c)]: | | | | | | | |
| | 1-Hour (ppm) | 0.05 | 0.03 | 0.04 | 0.04 | 0.02 | 0.0013 |
| | 24-Hour (ppm) | 0.012 | 0.008 | 0.006 | 0.012 | 0.011 | 0.01 |
| | Annual Arithmetic Mean (ppm) | (--) | (--) | (--) | (--) | (--) | 0.01 |
| Lead[h)]: | 30-Day ($\mu g/m^3$) | 0.05 | 0.03 | 0.10 | 0.02 | 0.02 | 10.8 |
| | Quarter ($\mu g/m^3$) | 0.04 | 0.02 | 0.05 | 0.01 | 0.02 | (0%) |
| Sulfate[i)]: | 24-Hour ($\mu g/m^3$) | 15.9 | 17.8 | 17.8 | 15.9 | 10.3 | 0.17 |
| | State Standard | (0%) | (0%) | (0%) | (0%) | (0%) | (12) |

Source: SCAQMD Air Quality Data Annual Summaries 2001-2012.

Notes: (%) = Percent of samples exceeding the federal or state standard, (--) = Pollutant not monitored, ppm = parts per million of air by volume, AAA = Annual Arithmetic Mean, $\mu g/m^3$ = micrograms per cubic meter. -- = Pollutant not monitored, * = Less than 12 months of data

## TABLE 3.1-2 (cont.)

| Constituent | | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|
| Ozone: | 1-Hour (ppm) | 0.139 | 0.142 | 0.089 | 0.101 | 0.073 | 0.084 |
| | Days Exceeding Federal Standard | (4) | (4) | (0) | | (0) | (0) |
| | Days Exceeding State Standard | (66) | (65) | (0) | (1) | (0) | (0) |
| | 8-Hour (ppm) | 0.116 | 0.114 | 0.068 | 0.084 | 0.061 | 0.067 |
| | Days Exceeding Federal Standard | (37) | (41) | (0) | (1) | (0) | (0) |
| | Days Exceeding State Standard | (88) | (94) | (0) | (1) | (0) | (0) |
| Carbon Monoxide [a]: | | | | | | | |
| | 1-Hour (ppm) | 4 | 3 | 3 | 3 | -- | -- |
| | 8-Hour (ppm) | 2.9 | 2.0 | 2.2 | 2.1 | 2.6 | 2.2 |
| Nitrogen Dioxide [b]: | | | | | | | |
| | 1-Hour (ppm) | 0.07 | 0.09 | 0.11 | 0.093* | 0.106 | 0.077* |
| | Annual (ppm) | 0.0206 | 0.0192 | 0.021 | 0.020* | 0.018 | 0.021* |
| PM10 [d]: | 24-Hour (μg/m³) | 120 | 115 | 62 | 44 | 43 | 45 |
| | Percent of Samples Exceeding Federal Standard | (0) | (0) | (0) | (0) | (0) | (0) |
| | Percent of Samples Exceeding State Standard | (54%) | (41%) | (5.3%)[(b)] | (0%) | (0%) | (0%) |
| | Annual [e] (μg/m³) (arithmetic mean) | 54.8 | 46.6 | 30.5 | 22.0 | 24.2 | 23.3 |
| PM2.5 [f]: | 24-Hour (μg/m³) | 75.7 | 57.7 | 63.4 | 35.0 | 39.7 | 49.8 |
| | Percent of Samples Exceeding Federal Standard | (1.0%) | (4.0%) | (1.6%)[(c)] | (0%) | (0.3%) | (1.1%) |
| | Annual Arithmetic Mean (μg/m³) | 19.1 | 16.4 | 13.0 | 10.5 | 11.0 | 10.4 |
| Sulfur Dioxide [c]: | | | | | | | |
| | 1-Hour (ppm) | 0.02 | 0.01 | 0.02 | .040* | 0.015 | 0.022* |
| | 24-Hour (ppm) | 0.002 | 0.003 | 0.005 | 0.006* | 0.011 | 0.014* |
| | Annual Arithmetic Mean (ppm) | 0.0017 | 0.0009 | (--) | (--) | (--) | (--) |
| Lead [h]: | 30-Day (μg/m³) | 0.02 | 0.01 | 0.00 | 0.00 | 0.010 | 0.005 |
| | Quarter (μg/m³) | 0.01 | 0.01 | 0.00 | 0.00 | 0.007 | 0.005 |
| Sulfate [i]: | 24-Hour (μg/m³) | 12.0 | 9.1 | 13.6 | 11.8 | 6.1 | 5.2 |
| | State Standard | (0%) | (0%) | (0%) | (0%) | (0%) | (0%) |

Source: SCAQMD Air Quality Data Annual Summaries 2001-2012.

Notes: (%) = Percent of samples exceeding the federal or state standard, (--) = Pollutant not monitored, ppm = parts per million of air by volume, AAA = Annual Arithmetic Mean, μg/m³ = micrograms per cubic meter. -- = Pollutant not monitored, * = Less than 12 months of data

a) - The federal 8-hour standard (8-hour average CO > 9 ppm) and state 8-hour standard (8-hour average CO > 9.0 ppm) were not exceeded. The federal and state 1-hour standards (35 ppm and 20 ppm) were not exceeded either.

b) - The $NO_2$ federal 1-hour standard is 100 ppb and the annual standard is annual arithmetic mean $NO_2$ > 0.0534 ppm (53.4 ppb). The state 1-hour and annual standards are
0.18 ppm (180 ppb) and 0.030 ppm (30 ppb).

c) - The federal $SO_2$ 1-hour standard is 75 ppb (0.075 ppm). The state standards are 1-hour average $SO_2$ > 0.25 ppm (250 ppb) and 24-hour average $SO_2$ > 0.04 ppm (40 ppb).

d) - Federal Reference Method (FRM) PM10 samples were collected every 6 days at all sites except for Stations 4144 and 4157, where samples were collected every 3 days. PM10 statistics listed above are for the FRM data only. Federal Equivalent Method (FEM) PM10 continuous monitors were operated at some of the above locations. Max 24-hour average PM10 at sites with FEM

monitoring was 142 $\mu g/m^3$ , at Palm Springs in Coachella Valley. The FEM Basin's max was 104 $\mu g/m^3$ at Mira Loma.
e) - Federal annual PM10 standard (AAM > 50 $\mu g/m^3$) was revoked in 2006. State standard is annual average (AAM) > 20 $\mu g/m^3$
f) - PM2.5 samples were collected every 3 days at all sites except for station numbers 069, 072, 077, 087, 3176, 4144 and 4165, where samples were taken daily, and station number 5818 where samples were taken every 6 days. PM2.5 statistics listed above are for the FRM data only. FEM PM2.5 continuous monitoring instruments were operated at some of the above locations. Max 24-hour average PM2.5 concentration recorded at FEM sites was 79.0 $\mu g/m^3$ at Central LA. U.S. EPA has revised the annual PM2.5 standard from annual average (AAM) 15.0 $\mu g/m^3$ to 12.0 $\mu g/m^3$, effective March 18, 2013. State standard is annual average (AAM) > 12.0 $\mu g/m^3$.
g) - High PM10 and PM2.5 data samples excluded in accordance with the EPA Exceptional Event Regulation are as follows: PM10 (FEM) data recorded on August 9 (270 $\mu g/m^3$) and January 21 (207 $\mu g/m^3$) both at Indio; PM2.5 (FRM) at Azusa (39.6 $\mu g/m^3$) and Fontana (39.9 $\mu g/m^3$), both recorded on July 5.
h) – Federal lead standard is 3-months rolling average > 0.15 $\mu g/m^3$; state standard is monthly average ≥1.5 $\mu g/m^3$. Lead statistics listed above are for population-oriented sites only; standards were not exceeded at any of these sites.
i) – State sulfate standard is 24-hour ≥25 $\mu g/m^3$. There is no federal standard for sulfate.

The air quality in the area also is in compliance with the federal eight-hour ozone standard, the federal 24-hour PM10 standard, and the federal 24-hour and annual average PM2.5 standards. The air quality in the South Coast Los Angeles County area is not in compliance with the state 24-hour PM10 and PM2.5 standards (SCAQMD, 2012a).

### 3.2.2.4 Air Quality Monitoring

This section provides an overview of air quality in the district. It is the responsibility of the SCAQMD to ensure that state and federal ambient air quality standards are achieved and maintained in its geographical jurisdiction. Health-based air quality standards have been established by California and the federal government for the following criteria air pollutants: ozone, CO, $NO_2$, PM10, PM2.5, SO2, lead, and sulfate. These standards were established to protect sensitive receptors with a margin of safety from adverse health impacts due to exposure to air pollution. The California standards are more stringent than the federal standards and in the case of PM10 and SO2. California has also established standards for sulfates, visibility reducing particles, hydrogen sulfide, and vinyl chloride. The state and national ambient air quality standards for each of these pollutants and their effects on health are summarized in Table 3.1-1. The SCAQMD monitors levels of various criteria pollutants at 34 monitoring stations. The 2001-2012 air quality data from SCAQMD's monitoring stations are presented in Table 3.1-2.

#### 3.2.2.4.1 Carbon Monoxide

CO is a colorless, odorless, relatively inert gas. It is a trace constituent in the unpolluted troposphere, and is produced by both natural processes and human activities. In remote areas far from human habitation, carbon monoxide occurs in the atmosphere at an average background concentration of 0.04 ppm, primarily as a result of natural processes such as forest fires and the oxidation of methane. Global atmospheric mixing of CO from urban and industrial sources creates higher background concentrations (up to 0.20 ppm) near urban areas. The major source of CO in urban areas is incomplete combustion of carbon-containing fuels, mainly gasoline.

CO is a primary pollutant, meaning that it is directly emitted into the air, not formed in the atmosphere by chemical reaction of precursors, as is the case with ozone and other secondary pollutants. Ambient concentrations of CO in the Basin exhibit large spatial and temporal variations due to variations in the rate at which CO is emitted and in the meteorological conditions that govern transport and dilution. Unlike ozone, CO tends to reach high concentrations in the fall and winter months. The highest concentrations frequently occur on weekdays at times consistent with rush hour traffic and late night during the coolest, most stable portion of the day.

In 2003, the SCAQMD monitored levels of various criteria pollutants at 32 monitoring stations. The Basin has technically met the CO standards since 2002. No exceedances of the CO standards occurred in 2004 and in 2005, CO concentrations did not exceed the standards anywhere in the Basin for the third consecutive year. As a result, in 2004, the SCAQMD formally requested the U.S. EPA to re-designate the Basin from non-attainment to attainment with the CO National Ambient Air Quality Standards. On February 24, 2007, U.S. EPA published in the Federal Register its proposed decision to re-designate the Basin from non-attainment to attainment for CO. The comment period on the re-designation proposal closed on March 16, 2007 with no comments received by the U.S. EPA. On May 11, 2007, U.S. EPA published in the Federal Register its final decision to approve the SCAQMD's request for re-designation from non-attainment to attainment for CO, effective June 11, 2007.

More recently, carbon monoxide concentrations were measured at 26 locations in the Basin and neighboring SSAB areas in 2012. Carbon monoxide concentrations did not exceed the standards between 2008 and 2012. The highest eight-hour average carbon monoxide concentration recorded (4.7 ppm in the South Central Los Angeles County area in 2011) was 52 percent of the federal eight-hour carbon monoxide standard of 9.0 ppm.

**CO Health Effects:** Individuals with a deficient blood supply to the heart are the most susceptible to the adverse effects of CO exposure. The effects observed include earlier onset of chest pain with exercise, and electrocardiograph changes indicative of worsening oxygen supply to the heart. Inhaled CO has no direct toxic effect on the lungs, but exerts its effect on tissues by interfering with oxygen transport by competing with oxygen to combine with hemoglobin present in the blood to form carboxyhemoglobin (COHb). Hence, conditions with an increased demand for oxygen supply can be adversely affected by exposure to CO. Individuals most at risk include patients with diseases involving heart and blood vessels, fetuses (unborn babies), and patients with chronic hypoxemia (oxygen deficiency) as seen in high altitudes.

Reductions in birth weight and impaired neurobehavioral development have been observed in animals chronically exposed to CO resulting in COHb levels similar to those observed in smokers. Recent studies have found increased risks for adverse birth outcomes with exposure to elevated CO levels. These include pre-term births and heart abnormalities.

3.2.2.4.2 Ozone

Ozone ($O_3$), a colorless gas with a sharp odor, is a highly reactive form of oxygen. Ozone is formed from atmospheric, photochemical reactions involving primarily NOx and VOCs, so it was not inventoried. High ozone concentrations exist naturally in the stratosphere. Some mixing of stratospheric ozone downward through the troposphere to the earth's surface does occur; however, the extent of ozone transport is limited. At the earth's surface in sites remote from urban areas ozone concentrations are normally very low (e.g., from 0.03 ppm to 0.05 ppm).

The district exceeded the federal health one-hour standard for ozone on 36 days in 2001, with maximum levels approximately 58 percent higher than the national ambient air quality standard. This represents the number of days a standard was exceeded anywhere in the district. In 2002, the district exceeded the federal health one-hour standard for ozone on 49 days, with maximum levels approximately 36 percent higher than the national ambient air quality standard (SCAQMD, 2003).

In 2005, the District regularly monitored ozone concentrations at 29 locations in the Basin and the SSAB. All areas monitored were below the stage 1 episode level (0.20 ppm), but the maximum concentrations in the Basin exceeded the health advisory level (0.15 ppm). Maximum ozone concentrations in the SSAB areas monitored by the SCAQMD were lower than in the Basin and were below the health advisory level (SCAQMD, 2007). The one-hour federal standard was not exceeded in areas along or near the coast, due in large part to the prevailing sea breeze which transports polluted air inland before high ozone concentrations can be reached.

In 2005, the location in the nation most frequently exceeding the federal standard levels for ozone was within the Basin. Also, five of the ten locations in the nation that most frequently exceeded the eight-hour average federal ozone standard level were located in the district. In 2005, the Basin exceeded the federal standards for ozone on a total of 84 days at one or more locations; this compares to 119 days in 2003 and 90 days in 2004 (based on the existing eight-hour average federal standard for ozone at the time).

The standard was exceeded most frequently in the Central San Bernardino Mountains extending from Central San Bernardino Valleys through the Riverside-San Bernardino area in the east, and in the Santa Clarita Valleys in the west. The Central San Bernardino Mountains area recorded the greatest number of exceedances of the state standard (80 days), one-hour and eight-hour federal standards (18 days and 69 days, respectively) and health advisory level (seven days). Similarly, maximum one-hour and eight-hour average ozone concentrations (0.182 ppm and 0.145 ppm, both recorded in Central San Bernardino Mountains areas) were 146 and 171 percent of the federal standard, respectively.

In 2010, the SCAQMD regularly monitored ozone concentrations at 29 locations in the Basin and SSAB. Maximum ozone concentrations for all areas monitored were below the stage 1 episode level (0.20 ppm) and below the health advisory level (0.15 ppm).

Maximum ozone concentrations in the SSAB areas monitored by the SCAQMD were lower than in the Basin and were below the health advisory level. Specifically, maximum one-hour and eight-hour average ozone concentrations were 0.143 ppm and 0.123 ppm, respectively (the maximum one-hour was recorded in the Central San Bernardino Valley 1 area, the eight-hour maximum was recorded in the Central San Bernardino Mountains area). The federal one-hour ozone standard was revoked and replaced by the eight-hour average ozone standard effective June 15, 2005. U.S. EPA has revised the federal eight-hour ozone standard from 0.84 ppm to 0.075 ppm, effective May 27, 2008. The maximum eight-hour concentration was 164 percent of the new federal standard. The maximum one-hour concentration was 159 percent of the one-hour state ozone standard of 0.09 ppm. The maximum eight-hour concentration was 175 percent of the eight-hour state ozone standard of 0.070 ppm.

In 2012, the former federal one-hour ozone standard of 0.124ppm was exceeded on 12 days. The current federal eight-hour standard for ozone of 0.075ppm was exceeded 111 days in 2012. The areas where the federal standards were exceeded the most frequently are in San Bernardino County and Metropolitan Riverside County. The maximum one-hour and eight-hour average ozone concentrations were recorded in the East San Gabriel Valley (0.147ppm(one-hour)) and Santa Clarita Valley and San Bernardino Mountain (0.112ppm(eight-hour)). These maximum concentrations for ozone represent 118 and 149 percent of the former federal one-hour standard and current eight-hour federal standard respectively. The current state one-hour (0.09ppm) and eight-hour (0.07ppm) were exceeded on 98 and 138 days respectively.

**Ozone Health Effects:** While ozone is beneficial in the stratosphere because it filters out skin-cancer-causing ultraviolet radiation, it is a highly reactive oxidant. It is this reactivity which accounts for its damaging effects on materials, plants, and human health at the earth’s surface.

The propensity of ozone for reacting with organic materials causes it to be damaging to living cells and ambient ozone concentrations in the Basin are frequently sufficient to cause health effects. Ozone enters the human body primarily through the respiratory tract and causes respiratory irritation and discomfort, makes breathing more difficult during exercise, and reduces the respiratory system’s ability to remove inhaled particles and fight infection.

Individuals exercising outdoors, children and people with preexisting lung disease, such as asthma and chronic pulmonary lung disease, are considered to be the most susceptible subgroups for ozone effects. Short-term exposures (lasting for a few hours) to ozone at levels typically observed in southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes. In recent years, a correlation between elevated ambient ozone levels and increases in daily hospital admission rates, as well as mortality, has also been reported. An increased risk for asthma has been found in children who participate in multiple sports and live in high ozone communities. Elevated ozone levels are also associated with increased school absences.

Ozone exposure under exercising conditions is known to increase the severity of the abovementioned observed responses. Animal studies suggest that exposures to a combination of pollutants which include ozone may be more toxic than exposure to ozone alone. Although lung volume and resistance changes observed after a single exposure diminish with repeated exposures, biochemical and cellular changes appear to persist, which can lead to subsequent lung structural changes.

3.2.2.4.3 Nitrogen Dioxide

$NO_2$ is a reddish-brown gas with a bleach-like odor. Nitric oxide (NO) is a colorless gas, formed from the nitrogen ($N_2$) and oxygen ($O_2$) in air under conditions of high temperature and pressure which are generally present during combustion of fuels; NO reacts rapidly with the oxygen in air to form $NO_2$. $NO_2$ is responsible for the brownish tinge of polluted air. The two gases, NO and $NO_2$, are referred to collectively as NOx. In the presence of sunlight, $NO_2$ reacts to form nitric oxide and an oxygen atom. The oxygen atom can react further to form ozone, via a complex series of chemical reactions involving hydrocarbons. Nitrogen dioxide may also react to form nitric acid ($HNO_3$) which reacts further to form nitrates, components of PM2.5 and PM10.

The Basin has not exceeded the federal standard for nitrogen dioxide (0.0534 ppm) since 1991, when the Los Angeles County portion of the Basin recorded the last exceedance of the standard in any county within the United States.

In 2010, nitrogen dioxide concentrations were monitored at 24 locations. No area of the Basin or SSAB exceeded the federal or state standards for nitrogen dioxide. In 2010, the maximum annual average concentration was 26.2 ppb recorded in the Pomona/Walnut Valley area. Effective March 20, 2008, CARB revised the nitrogen dioxide one-hour standard from 0.25 ppm to 0.18 ppm and established a new annual standard of 0.30 ppm. In addition, U.S. EPA has established a new federal one-hour $NO_2$ standard of 100 ppb (98th percentile concentration), effective April 7, 2010. The highest one-hour average concentration recorded (97.0 ppb in Pomona/Walnut Valley) was 53 percent of the state one-hour standard and the highest annual average concentration recorded (26.2 ppb in Pomona/Walnut Valley) was 87 percent of the state annual average standard. NOx emission reductions continue to be necessary because it is a precursor to both ozone and PM (PM2.5 and PM10) concentrations.

Most recently, the maximum one-hour average $NO_2$ concentration in 2011 (110 ppb, measured in Central Los Angeles), in 2012 (98ppb, measured in South Coastal Los Angeles County) was 109 and 98 percent of the federal standard respectively, exceeding the concentration level, but not the $98^{th}$ percentile form of the NAAQS.

**$NO_2$ Health Effects:** Population-based studies suggest that an increase in acute respiratory illness, including infections and respiratory symptoms in children (not infants), is associated with long-term exposures to $NO_2$ at levels found in homes with gas stoves, which are higher than ambient levels found in southern California. Increase in resistance to air flow and airway contraction is observed after short-term exposure to $NO_2$

in healthy subjects. Larger decreases in lung functions are observed in individuals with asthma and/or chronic obstructive pulmonary disease (e.g., chronic bronchitis, emphysema) than in healthy individuals, indicating a greater susceptibility of these sub-groups. More recent studies have found associations between $NO_2$ exposures and cardiopulmonary mortality, decreased lung function, respiratory symptoms and emergency room asthma visits.

In animals, exposure to levels of $NO_2$ considerably higher than ambient concentrations results in increased susceptibility to infections, possibly due to the observed changes in cells involved in maintaining immune functions. The severity of lung tissue damage associated with high levels of ozone exposure increases when animals are exposed to a combination of ozone and $NO_2$.

3.2.2.4.4 Sulfur Dioxide

Sulfur dioxide ($SO_2$) is a colorless gas with a sharp odor. It reacts in the air to form sulfuric acid ($H2SO_4$), which contributes to acid precipitation, and sulfates, which are components of PM10 and PM2.5. Most of the $SO_2$ emitted into the atmosphere is produced by burning sulfur-containing fuels.

No exceedances of federal or state standards for sulfur dioxide occurred in 2005 at any of the seven SCAQMD locations monitored. Though sulfur dioxide concentrations remain well below the standards, sulfur dioxide is a precursor to sulfate, which is a component of fine particulate matter, PM10, and PM2.5. The maximum concentration of federal 24-hour sulfur dioxide standard in 2005 occurred in Los Angeles County 1 area and was 0.012 ppm, which is nine percent of the standard. Sulfur dioxide was not measured at SSAB sites in 2005. Historical measurements showed concentrations to be well below standards and monitoring has been discontinued.

No exceedances of federal or state standards for sulfur dioxide occurred in 2010 at any of the seven district locations monitored. The maximum one-hour sulfur dioxide concentration was 40.0 ppb, as recorded in the South Coastal Los Angeles County 1 area. The maximum 24-hour sulfur dioxide concentration was 6.0 ppb, as recorded in South Coastal Los Angeles County 1 area. The U.S. EPA revised the federal sulfur dioxide standard by establishing a new one-hour standard of 0.075 ppm and revoking the existing annual arithmetic mean (0.03 ppm) and the 24-hour average (0.14 ppm), effective August 2, 2010. The state standards are 0.25 ppm for the one-hour average and 0.04 ppm for the 24-hour average.

No exceedances of federal or state standards for sulfur dioxide occurred in 2011 or 2012 at any of the eight district locations monitored. The maximum one-hour sulfur dioxide concentration was 51.3 in 2011, and 22.7 in 2012, as recorded in the Metropolitan Riverside County 1 and South Coastal LA County 3 area respectively. Though sulfur dioxide concentrations remain well below the standards, sulfur dioxide is a precursor to sulfate, which is a component of fine particulate matter, PM10, and PM2.5. Historical measurements showed concentrations to be well below standards and monitoring has been discontinued.

**$SO_2$ Health Effects:** Exposure of a few minutes to low levels of $SO_2$ can result in airway constriction in some asthmatics. All asthmatics are sensitive to the effects of $SO_2$. In asthmatics, increase in resistance to air flow, as well as reduction in breathing capacity leading to severe breathing difficulties, is observed after acute higher exposure to $SO_2$. In contrast, healthy individuals do not exhibit similar acute responses even after exposure to higher concentrations of $SO_2$.

Animal studies suggest that despite $SO_2$ being a respiratory irritant, it does not cause substantial lung injury at ambient concentrations. However, very high levels of exposure can cause lung edema (fluid accumulation), lung tissue damage, and sloughing off of cells lining the respiratory tract.

Some population-based studies indicate that the mortality and morbidity effects associated with fine particles show a similar association with ambient $SO_2$ levels. In these studies, efforts to separate the effects of $SO_2$ from those of fine particles have not been successful. It is not clear whether the two pollutants act synergistically or one pollutant alone is the predominant factor.

3.2.2.4.5 Particulate Matter (PM10 and PM2.5)

PM emissions, either PM10 or PM2.5, are formed by reaction of gaseous precursors, such as $SO_2$, sulfates, and ammonia in the atmosphere. NOx and VOCs also react to form nitrates and solid organic compounds, which are a significant fraction of PM10. PM emissions may also be directly emitted from fugitive dust sources such as re-entrained road dust, construction activities, farming operations and wind-blown dust (SCAQMD, 2003).

The federal annual PM10 standard was exceeded at only one location in the SCAQMD in 2005, Metropolitan Riverside County. The maximum PM10 concentration was 52 $\mu g/m^3$, which was 103 percent of the federal annual PM10 standard. In general, the highest PM10 concentrations were recorded in Riverside and San Bernardino counties in and around the Metropolitan Riverside County area and further inland in San Bernardino Valley areas. The federal 24-hour standard was not exceeded at any of the locations monitored in 2005. The much more stringent state standards were exceeded in most areas.

The SCAQMD began regular monitoring of PM2.5 in 1999 following the U.S. EPA's adoption of the national PM2.5 standards in 1997. In 2005, PM2.5 concentrations were monitored at 19 locations throughout the district. Maximum 24-hour average and annual average PM2.5 concentrations (132.7 µg/m3 recorded in East San Gabriel Valley area and 21.0 µg/m3 recorded in Metropolitan Riverside County area) were 203 and 139 percent of the federal 24-hour and annual average standards, respectively (SCAQMD, 2007).

The SCAQMD monitored PM10 concentrations at 21 locations in 2010. The federal 24-hour PM10 standard (150 µg/m3) was not exceeded at any of the locations monitored in 2010. The maximum 24-hour PM10 concentration of 107 µg/m3 was recorded in the Coachella Valley No. 2 area and was 71 percent of the federal standard and 214 percent of the much more stringent state 24-hour PM10 standard (50 µg/m3). The state 24-hour PM10 standard was exceeded at 12 of the 21 monitoring stations. The maximum annual average PM10 concentration of 42.3 µg/m3 was recorded in Mira Loma. The maximum annual average PM10 concentration in Mira Loma was 211 percent of the state standard. The federal annual PM10 standard has been revoked. The Basin has technically met the PM10 NAAQS and was redesignation for attainment for the federal PM10 standard in June 2013.

U.S. EPA revised the federal 24-hour PM2.5 standard from 65 µg/m3 to 35 µg/m3, effective December 17, 2006. In 2010, the maximum PM2.5 concentrations in the Basin exceeded the new federal 24-hour PM2.5 standard in all but six locations. The maximum 24-hour PM2.5 concentration of 54.2 µg/m3 was recorded in the Mira Loma area, which represents 154 percent of the federal standard of 35 µg/m3. The maximum annual average concentration of 15.2 µg/m3 was recorded in Mira Loma, which represents 101 percent of the federal standard of 15 µg/m3 and 126 percent of the state standard of 12 µg/m3.

In 2012, only one station in the Basin (Riverside County at Mira Loma) exceeded both the annual PM2.5 and the $98^{th}$ percentile form of the 24-hour PM2.5 NAAQS. The maximum 24-hour average PM2.5 concentration (58.7 $\mu g/m^3$, measured in Central LA) and annual average concentration (15.06 $\mu g/m^3$, measured in Riverside Countyat Mira Loma) were 168 and 125 percent of the federal 24-hour and annual average standard concentrations, respectively. Basin-wide, the federal PM2.5 24-hour standard level was exceeded on 15 sampling days in 2012.

**PM Health Effects:** Of great concern to public health are the particles small enough to be inhaled into the deepest parts of the lung. Respirable particles (particulate matter less than about 10 micrometers in diameter) can accumulate in the respiratory system and aggravate health problems such as asthma, bronchitis and other lung diseases. Children, the elderly, exercising adults, and those suffering from asthma are especially vulnerable to adverse health effects of PM10 and PM2.5.

A consistent correlation between elevated ambient fine particulate matter (PM10 and PM2.5) levels and an increase in mortality rates, respiratory infections, number and severity of asthma attacks and the number of hospital admissions has been observed in different parts of the United States and various areas around the world. Studies have reported an association between long-term exposure to air pollution dominated by fine particles (PM2.5) and increased mortality, reduction in life-span, and an increased mortality from lung cancer.

Daily fluctuations in fine particulate matter concentration levels have also been related to hospital admissions for acute respiratory conditions, to school and kindergarten absences, to a decrease in respiratory function in normal children and to increased medication use in children and adults with asthma. Studies have also shown lung function growth in children is reduced with long-term exposure to particulate matter. In addition to children, the elderly, and people with pre-existing respiratory and/or cardiovascular disease appear to be more susceptible to the effects of PM10 and PM2.5.

3.2.2.4.6 Lead

Lead in the atmosphere is present as a mixture of a number of lead compounds. Leaded gasoline and lead smelters have been the main sources of lead emitted into the air. Due to requirements to phase out leaded gasoline, there was a dramatic reduction in atmospheric lead in the Basin over the past three decades.

The federal and state standards for lead were not exceeded in any area of the district in 2005. There have been no violations of the lead standards at the SCAQMD's regular air monitoring stations since 1982, primarily the result of removing lead from gasoline. The maximum quarterly average lead concentration (0.03 $\mu g/m^3$) was two percent of the federal standard. Additionally, special monitoring stations immediately adjacent to stationary sources of lead (e.g., lead smelting facilities) have not recorded exceedances of the standards in localized areas of the Basin since 1991 and 1994 for the federal and state standards, respectively. The maximum monthly and quarterly average lead concentration (0.44 $\mu g/m^3$ and 0.34 $\mu g/m^3$ in Central Los Angeles), measured at special monitoring sites immediately adjacent to stationary sources of lead were 29 and 23 percent of the state and federal standards, respectively. No lead data were obtained at SSAB and Orange County stations in 2005 and, because historical lead data showed concentrations in SSAB and Orange County areas to be well below the standard, measurements have been discontinued.

The old federal and current state standards for lead were not exceeded in any area of the district in 2010. The maximum quarterly average lead concentration (0.01 µg/m3 at monitoring stations in South San Gabriel Valley, South Central Los Angeles County, and Central San Bernardino Valley No. 2) was 0.7 percent of the old federal quarterly average lead standard (1.5 µg/m3). The maximum monthly average lead concentration (0.01 µg/m3 in South San Gabriel Valley and South Central Los Angeles County), measured at special monitoring sites immediately adjacent to stationary sources of lead was 0.7 percent of the state monthly average lead standard. No lead data were obtained at SSAB and Orange County stations in 2010. Because historical lead data showed concentrations in SSAB and Orange County areas to be well below the standard, measurements have been discontinued.

On November 12, 2008, U.S. EPA published new national ambient air quality standards for lead, which became effective January 12, 2010. The existing national lead standard, 1.5 µg/m3, was reduced to 0.15 µg/m3, averaged over a rolling three-month period. This designation was based on two source-specific monitors in Vernon and in the City of Industry exceeding the new standard in the 2007-2009 timeframe. As a result, U.S. EPA designated the Los Angeles County portion of the Basin (excluding the high desert areas, San Clemente and Santa Catalina Islands) as non-attainment for the new lead standard, effective December 31, 2010, primarily based on emissions from two battery recycling facilities. For the 2009-2012 timeframe, only one of these stations exceeded the standard (Vernon). The remainder of the Basin remained in attainment of the lead standard.

**Lead Health Effects:** Fetuses, infants, and children are more sensitive than others to the adverse effects of lead exposure. Exposure to low levels of lead can adversely affect the development and function of the central nervous system, leading to learning disorders, distractibility, inability to follow simple commands, and lower intelligence quotient. In adults, increased lead levels are associated with increased blood pressure.

Lead poisoning can cause anemia, lethargy, seizures, and death. It appears that there are no direct effects of lead on the respiratory system. Lead can be stored in the bone from early-age environmental exposure, and elevated blood lead levels can occur due to breakdown of bone tissue during pregnancy, hyperthyroidism (increased secretion of hormones from the thyroid gland), and osteoporosis (breakdown of bone tissue). Fetuses and breast-fed babies can be exposed to higher levels of lead because of previous environmental lead exposure of their mothers.

3.2.2.4.7 Sulfates

Sulfates are chemical compounds which contain the sulfate ion and are part of the mixture of solid materials which make up PM10. Most of the sulfates in the atmosphere are produced by oxidation of SO2. Oxidation of sulfur dioxide yields sulfur trioxide ($SO_3$) which reacts with water to form sulfuric acid, which contributes to acid deposition. The reaction of sulfuric acid with basic substances such as ammonia yields sulfates, a component of PM10 and PM2.5.

In 2005, the state sulfate standard was not exceeded anywhere in the Basin. The maximum 24-hour sulfate concentration occurred in South Central Los Angeles County and was 17.3 $\mu g/m^3$, which is 69 percent of the standard. No sulfate data were obtained at SSAB and Orange County stations in 2005. Historical sulfate data showed concentrations in the SSAB and Orange County areas to be well below the standard, and measurements have been discontinued.

In 2010, the state 24-hour sulfate standard (25 µg/m3) was not exceeded in any of the monitoring locations in the district. No sulfate data were obtained at SSAB and Orange County stations in 2010. Historical sulfate data showed sulfate concentrations in the SSAB and Orange County areas to be well below the standard; thus, measurements in these areas have been discontinued. There are no federal sulfate standards.

**Sulfates Health Effects:** Most of the health effects associated with fine particles and SO2 at ambient levels are also associated with SOx. Thus, both mortality and morbidity effects have been observed with an increase in ambient SOx concentrations. However, efforts to separate the effects of SOx from the effects of other pollutants have generally not been successful.

Clinical studies of asthmatics exposed to sulfuric acid suggest that adolescent asthmatics are possibly a subgroup susceptible to acid aerosol exposure. Animal studies suggest that acidic particles such as sulfuric acid aerosol and ammonium bisulfate are more toxic than non-acidic particles like ammonium sulfate. Whether the effects are attributable to acidity or to particles remains unresolved.

3.2.2.4.8 Vinyl Chloride

Vinyl chloride is a colorless, flammable gas at ambient temperature and pressure. At room temperature, vinyl chloride is a gas with a sickly sweet odor that is easily condensed. However, it is stored as a liquid. Due to the hazardous nature of vinyl chloride to human health there are no end products that use vinyl chloride in its monomer form. Vinyl chloride is a chemical intermediate, not a final product. It is an important industrial chemical chiefly used to produce polymer polyvinyl chloride (PVC). The process involves vinyl chloride liquid fed to polymerization reactors where it is converted from a monomer to a polymer PVC. The final product of the polymerization process is PVC in either a flake or pellet form. Billions of pounds of PVC are sold on the global market each year. From its flake or pellet form, PVC is sold to companies that heat and mold the PVC into end products such as PVC pipe and bottles.

In the past, vinyl chloride emissions have been associated primarily with sources such as landfills. Risks from exposure to vinyl chloride are considered to be a localized impacts rather than regional impacts. Because landfills in the district are subject to SCAQMD 1150.1, which contains stringent requirements for landfill gas collection and control, potential vinyl chloride emissions are below the level of detection. Therefore, the SCAQMD does not monitor for vinyl chloride at its monitoring stations.

**Vinyl Chloride Health Effects:** Vinyl chloride is highly toxic and is classified by the American Conference of Governmental Industrial Hygienists (ACGIH) as A1 (confirmed carcinogen in humans) and by the International Agency for Research on Cancer (IARC) as 1 (known to be a human carcinogen) (Air Gas, 2010).

3.2.2.4.9 Volatile Organic Compounds

It should be noted that there are no state or national ambient air quality standards for VOCs because they are not classified as criteria pollutants. VOCs are regulated, however, because limiting VOC emissions reduces the rate of photochemical reactions that contribute to the formation of ozone. VOCs are also transformed into organic aerosols in the atmosphere, contributing to higher PM10 and lower visibility levels.

Total organic gases (TOG) incorporates all gaseous compounds containing the element carbon with the exception of the inorganic compounds, CO, carbon dioxide ($CO_2$), carbonic acid, carbonates, and metallic carbides. VOC is a subset of TOG and does not include acetone, ethane, methane, methylene chloride, methyl chloroform, perchloroethylene, methyl acetate, p-chlorobenzotrifluoride, and a number of Freon-type gases, because these substances do not generally contribute to ozone formation. In the

2003 AQMP, the amount of VOC in TOG was calculated for each process primarily using species and size fraction profiles provided by CARB. Besides average annual day emissions that are reported for all criteria pollutants, summer planning inventories (VOC and NOx) were reported for ozone purposes.

**VOC Health Effects:** Although health-based standards have not been established for VOCs, health effects can occur from exposures to high concentrations of VOCs because of interference with oxygen uptake. In general, ambient VOC concentrations in the atmosphere are suspected to cause coughing, sneezing, headaches, weakness, laryngitis, and bronchitis, even at low concentrations. Some hydrocarbon components classified as VOC emissions are thought or known to be hazardous. Benzene, for example, one hydrocarbon component of VOC emissions, is known to be a human carcinogen.

3.2.2.4.10 Visibility

In 2005, annual average visibility at Rudiboux (Riverside), the worst case, was just over 10 miles (SCAQMD, 2012b). With the exception of Lake County, which is designated in attainment, all of the air districts in California are currently designated as unclassified with respect to the CAAQS for visibility reducing particles.

In Class-I wilderness areas, which typically have visual range measured in tens of miles the deciview metric is used to estimate an individual's perception of visibility. The deciview index works inversely to visual range which is measured in miles or kilometers whereby a lower deciview is optimal. In the South Coast Air Basin, the Class-I areas are typically restricted to higher elevations (greater than 6,000 feet above sea level) or far downwind of the metropolitan emission source areas. Visibility in these areas is typically unrestricted due to regional haze despite being in close proximity to the urban setting. All of the Class-I wilderness areas reside in areas having average deciview values less than 20 with many portions of those areas having average deciview values less than 10. By contrast, Rubidoux, in the Basin has a deciview value exceeding 30. The closest Class-I area is the San Gabriel Wilderness area, located over 35 miles north of the Phillips 66 Wilmington Refinery.

### 3.2.2.5 Existing Refinery Criteria Pollutant Emissions

Operation of the existing Phillips 66 Los Angeles Refinery results in the emissions of criteria pollutants. The reported emissions of criteria air pollutants from the Refinery for the last 13 years are shown in Table 3.1-3. The emissions in Table 3.1-3 are based on actual operations as reported on annual emission reports to the SCAQMD (and not the maximum potential to emit allowed in permits).

**TABLE 3.1-3**

**Phillips 66 Refinery**
**Reported Criteria Pollutant Emissions (tons/year)(1)**

| Reporting Period | CO | NOx | VOC | SOx | PM10 |
|---|---|---|---|---|---|
| 2000 | 716.5 | 744.7 | 219.6 | 728.9 | 199.7 |
| 2001 | 861.6 | 592.5 | 259.4 | 735.8 | 202.6 |
| 2002 | 921.8 | 651.4 | 238.3 | 638.7 | 201.8 |
| 2003 | 652.8 | 719.9 | 198.1 | 627.6 | 168.6 |
| 2004 | 674.9 | 638.0 | 187.1 | 486.0 | 170.1 |
| 2005 | 749.3 | 624.1 | 261.8 | 434.7 | 284.3 |
| 2006 | 790.8 | 616.8 | 297.0 | 410.1 | 271.8 |
| 2007 | 325.8 | 323.0 | 136.3 | 242.5 | 135.8 |
| 2008 | 596.3 | 702.3 | 266.1 | 271.0 | 241.0 |
| 2009 | 461.2 | 630.5 | 264.2 | 104.7 | 167.6 |
| 2010 | 431.7 | 554.4 | 244.5 | 101.6 | 155.6 |
| 2011 | 400.2 | 582.5 | 241.5 | 115.3 | 115.8 |
| 2012 | 344.2 | 498.5 | 242.3 | 128.2 | 126.2 |
| 2013 | 302.1 | 762.4 | 253.7 | 125.1 | 172.4 |

(1) The reported emissions include emission estimates of RECLAIM pollutants calculated pursuant to the missing data provisions included in SCAQMD Regulation XX.

### 3.2.2.6 Toxic Air Contaminants (TACs)

TACs are air pollutants which may cause or contribute to an increase in mortality or severe illness, or which may pose a potential hazard to human health. The California Health and Safety Code (§39655) defines a toxic air contaminant as an air pollutant which may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health. Under California's TAC program (Assembly Bill 1807, Health and Safety Code §39650 et seq.), CARB, with the participation of the local air pollution control districts, evaluates and develops any needed control measures for air toxics. The general goal of regulatory agencies is to limit exposure to TACs to the maximum extent feasible.

Monitoring for TACs is limited compared to monitoring for criteria pollutants because toxic pollutant impacts are typically more localized than criteria pollutant impacts. CARB conducts air monitoring for a number of TACs every 12 days at approximately 20 sites throughout California. The ULSD Project is located closest to the North Long Beach station. A summary of the averaged monitoring data from the Long Beach station for various TACs is considered to be an appropriate estimate of the TAC concentration in the vicinity of the ULSD Project. Table 3.1-4 provides the TAC monitoring data from the Long Beach station for 2003 to show pre-project conditions. Table 3.1-5 provides the TAC monitoring data from the Long Beach station for 2011 to show post-project conditions. Comparison of the tables show a general increase in toxic monitored at the North Long Beach station over time.

**TABLE 3.1-4**

**Ambient Air Quality Toxic Air Contaminants**
**North Long Beach Peak 24-Hour Concentration 2003**

| Pollutant | Annual Average | Pollutant | Annual Average |
|---|---|---|---|
| **VOC's** | **ppb/v[(a)]** | | **ppb/v** |
| Acetaldehyde | 1.06 | Methyl Ethyl Ketone | 0.13 |
| Benzene | 0.705 | Methyl Tertiary Butyl Ether | 0.45 |
| 1,3-Butadiene | 0.142 | Methylene Chloride | 0.31 |
| Carbon Tetrachloride | 0.092 | Perchloroethylene | 0.076 |
| Chloroform | 0.05 | Styrene | 0.24 |
| o-Dichlorobenzene | 0.15 | Toluene | 2.1 |
| p-Dichlorobenzene | 0.2 | Trichloroethylene | 0.023 |
| Ethyl Benzene | 0.24 | meta-Xylene | 0.0 |
| Formaldehyde | 2.79 | ortho-xylene | 0.34 |
| Methyl Chloroform | 0.055 | | |
| **PAH's** | **nanograms/m[(b)]** | | **nanograms/m[(c)]** |
| Benzo(a)pyrene | 0.07 | Benzo(k)fluoranthene | 0.038 |
| Benzo(b)fluoranthene | 0.086 | Dibenz(a,h)anthracene | 0.026 |
| Benzo(g,h,i)perylene | 0.283 | Indeno(1,2,3-cd)pyrene | 0.121 |
| **Inorganic Compounds[(c)]** | **nanograms/m[(b)]** | | **nanograms/m[(c)]** |
| Aluminum | 1,140.0 | Nickel | 7.4 |
| Antimony | 3.8 | Phosphorus | 40.8 |
| Arsenic | 0.0 | Potassium | 433.0 |
| Barium | 48.4 | Rubidium | 2.2 |
| Bromine | 9.1 | Selenium | 1.1 |
| Calcium | 912.0 | Silicon | 2,950.0 |
| Chlorine | 1,550.0 | Strontium | 11.5 |
| Chromium | 5.9 | Sulfur | 1,430.0 |
| Cobalt | 8.0 | Tin | 5.0 |
| Copper | 34.5 | Titanium | 98.3 |
| Hexavalent Chromium | 0.076[(d)] | Uranium | 1.1 |
| Iron | 1,060.0 | Vanadium | 21.8 |
| Lead | 11.2 | Yttrium | 1.1 |
| Manganese | 19.6 | Zinc | 73.3 |
| Mercury | 1.7 | Zirconium | 5.1 |
| Molybdenum | 2.8 | | |

Source: California ARB website: Annual Toxics Summaries by Monitoring Sites, http://www.arb.ca.gov/adam/toxics/sitesubstance.html

a) ppb/v = parts per billion by volume.
b) nanograms/$m^3$ = nanograms per cubic meter.
c) Data for Inorganic Compounds is from the year 2001-the most recent year with 12 consecutive months of monitoring data.
d) Data is from year 2002- the most recent year with 12 consecutive months of monitoring data.

**TABLE 3.1-5**
**Ambient Air Quality Toxic Air Contaminants**
**North Long Beach Peak 24-Hour Concentration 2011**

| Pollutant | Peak 24-hour Concentration | Pollutant | Peak 24-hour Concentration |
|---|---|---|---|
| **VOCs** | **Ppbv** | | **ppbv** |
| Acetaldehyde [b] | 1.9 | Ethyl Benzene | 0.5 |
| Acetone | 11 | Formaldehyde [b] | 4.7 |
| Acetonitrile | 11 | Methyl Bromide | 0.06 |
| Acrolein | 1.0 | Methyl Chloroform | 0.02 |
| Benzene | 1.1 | Methyl Ethyl Ketone [b] | 0.7 |
| 1,3-Butadiene | 0.33 | Methyl Tertiary-Butyl Ether [f] | 2.0 |
| Carbon Disulfide [d] | 1.1 | Methylene Chloride | 1.1 |
| Carbon Tetrachloride | 0.10 | Perchloroethylene | 0.09 |
| Chloroform | 0.09 | Styrene | 0.3 |
| ortho-Dichlorobenzene[c] | 0.15 | Toluene | 2.9 |
| para-Dichlorobenzene[c] | 0.15 | Trichloroethylene | 0.067 |
| cis-1,3-Dichloropropene | 0.05 | ortho-Xylene | 0.6 |
| trans-1,3-Dichloropropene | 0.05 | | |
| **PAHs[e]** | **nanograms/m[c]** | | **nanograms/m[c]** |
| 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** | **nanograms/m[c]** | | **nanograms/m[c]** |
| Aluminum [g] | 2,100 | Nickel [a] | 4.5 |
| Antimony [a] | 9 | Phosphorous [g] | 61 |
| Arsenic [a] | 0.75 | Platinum [a] | 0.15 |
| Barium [g] | 91 | Potassium6[g] | 860 |
| Bromine [g] | 15 | Rubidium[g] | 4 |
| Cadmium [a] | 2.0 | Selenium [a] | 2.1 |
| Calcium [g] | 2,300 | Silicon[g] | 5,600 |
| Chlorine [g] | 6,900 | Strontium [a] | 25 |
| Chromium [a] | 7 | Sulfur [a] | 3,500 |
| Cobalt [a] | 0.75 | Tin [a] | 3.5 |
| Copper [a] | 68 | Titanium [a] | 85 |
| Hexavalent Chromium [b] | 0.11 | Uranium[g] | 2.0 |
| Iron [a] | 1,200 | Vanadium [a] | 10 |
| Lead [a] | 190 | Yttrium[g] | 3 |
| Manganese [a] | 46 | Zinc [a] | 250 |
| Mercury [g] | 4.0 | Zirconium [a] | 2.8 |
| Molybdenum [a] | 2.6 | | |

Source: CARB, 2010. Annual Ambient Toxic Monitoring Sites, North Long Beach,
Notes: ppbv = parts per billion by volume; nanograms/$m^3$ = nanograms per cubic meter
(a) The most recent complete year data is from 2010
(b) The most recent complete year data is from 2009
(c) The most recent complete year data is from 2006
(d) The most recent complete year data is from 2005
(e) The most recent complete year data for PAHs is from 2004.
(f) The most recent complete year data is from 2003
(g) The most recent complete year data is from 2002

The SCAQMD measured TAC concentrations as part of its Multiple Air Toxic Exposure Study (MATES). The purpose of the study was to provide an estimate of exposure to TACs to individuals within the Basin. In a second study, MATES-II, the SCAQMD conducted air sampling at about 24 different sites for over 30 different TACs between April 1998 and March 1999. The SCAQMD recently concluded a third study, referred to as MATES-III, that includes monitoring for 21 TACs at ten fixed, and five temporary, sites within the Basin in neighborhoods near toxic emission sources or in areas where community members are concerned about health risks from air pollution. The scope of the monitoring was from April 2004 through March 2006. The MATES-III found about 94 percent of the cancer risk is attributed to emissions associated with mobile sources and about six percent of the cancer risk is attributed to toxics emitted from stationary sources (e.g., industrial sources). The results indicate that diesel exhaust is the major contributor to cancer risk, accounting for about 84 percent of the total. Compared to previous studies of air toxics in the Basin, the MATES-III study found a decreasing cancer risk for air toxics exposure, with the population-weighted risk down by eight percent from the analysis in MATES-II, which was based on monitoring in 1998 and 1999. The highest risks are found near the Port area, an area near central Los Angeles and near transportation corridors. The average carcinogenic risk in the Basin is about 1,200 per million people. This means that 1,200 people out of a million are susceptible to contracting cancer from exposure to the known TACs over a 70-year period of time (SCAQMD, 2008). Of the monitoring sites in the MATES-III study, the West Long Beach study site is the closest to the Refinery. The estimated cancer risk at the West Long Beach station was about 1,650 per million (SCAQMD, 2008). Areas near the ports had the highest cancer risk in the Basin, ranging from 1,100 to 3,700 per million. An area of elevated risk was also found near Central Los Angeles with risks ranging from 1,400 to 1,900 per million. The areas projected to have higher risk followed transportation corridors, including freeways and railways (SCAQMD, 2008).

CARB completed air monitoring between May 2001 and July 2002, at Wilmington Park Elementary school because of the location of the school in proximity to refineries and the ports (CARB, 2003). Monitoring was completed for over 50 air pollutants. The key findings of the study were the following: (1) the air quality around the Wilmington Park Elementary school is similar to other parts of the Los Angeles urban area; (2) the estimated cancer risk in Wilmington was 278 per million as compared to Long Beach with a cancer risk of 279 per million and downtown Los Angeles at 341 per million; (3) local meteorology patterns in Wilmington appear to favor dispersion of local air pollution; and (4) PM10 levels measured in Wilmington were noticeably higher than in nearby Long Beach (CARB, 2003).

### 3.2.3 REGULATORY BACKGROUND

Ambient air quality standards in California are the responsibility of, and have been established by, both the U.S. EPA and CARB. These standards have been set at concentrations which provide margins of safety for the protection of public health and welfare. Federal and state air quality standards are presented in Table 3.3-1. The SCAQMD has established levels of episodic criteria and has indicated measures that must be initiated to immediately reduce contaminant emissions when these levels are reached or exceeded. The federal, state, and local air quality regulations are identified below in further detail.

### 3.2.3.1 Federal Regulations

The U.S. EPA is responsible for setting and enforcing the NAAQS for ozone, CO, $NO_2$, $SO_2$, PM10, PM2.5, and lead. The U.S. EPA has jurisdiction over emissions sources that are under the authority of the federal government including aircraft, locomotives, and emission sources outside state waters (Outer Continental Shelf). The U.S. EPA also establishes emission standards for vehicles sold in states other than California. Automobiles sold in California must meet the stricter emission requirements of CARB.

The Federal CAA and its subsequent amendments form the basis for the national air pollution control effort. U.S. EPA is responsible for implementing most aspects of the CAA. Basic elements of the act include the NAAQS for major air pollutants, hazardous air pollutant standards, attainment plans, motor vehicle emission standards, stationary source emission standards and permits, acid rain control measures, stratospheric ozone protection, and enforcement provisions. The CAA delegates the enforcement of the federal standards to the states. In California, CARB and the local air agencies have shared responsibility for enforcing air pollution regulations, with the local air agencies having primary responsibility for regulation stationary emission sources. In the Basin, the SCAQMD has this responsibility.

#### 3.2.3.1.1 State Implementation Plan

In areas that have not attained all NAAQSs, the CAA requires preparation of a SIP, detailing how the State will attain the NAAQS within mandated timeframes. In 2003, the SCAQMD and Southern California Association of Governments (SCAG) developed the 2003 Air Quality Management Plan (2003 AQMP), which upon approval by the SCAQMD and CARB was incorporated into the SIP. The focus of the 2003 AQMP was to demonstrate attainment of the federal PM10 standard by 2006 and the federal one-hour ozone standard by 2010, while making expeditious progress toward attainment of state standards. Since the Basin was close to attaining the federal CO standard, the 2003 AQMP also replaced the 1997 attainment demonstration for the federal CO standard, and provided a basis for a future maintenance plan for CO (SCAQMD, 2003). The SCAQMD and SCAG developed the 2007 AQMP for purposes of demonstrating compliance with the new NAAQS for PM2.5 and eight-hour ozone and other planning requirements, including compliance with the NAAQS for PM10 (SCAQMD, 2007). Since it will be more difficult to achieve the eight-hour ozone NAAQS compared to the one-hour NAAQS, the 2007 AQMP contains substantially more emission reduction measures compared to the 2003 AQMP. The SCAQMD adopted the 2007 AQMP in June 2007 (SCAQMD, 2007). On September 27, 2007, the CARB Board adopted the State Strategy for the 2007 State Implementation Plan and the 2007 South Coast AQMP as part of the SIP. The U.S. EPA approved the eight-hour SIP portion of the 2007 AQMP in 2011. The 2012 AQMP (approved by the SCAQMD Governing Board on December

7, 2012) demonstrates attainment of the federal 24 hour PM2.5 by 2014 and updates certain portions of the existing SIP, including the new 8-hour ozone control measures will be submitted into the SIP with commitments for corresponding emission reductions.

3.2.3.1.2 Emission Standards for Non-Road Diesel Engines

To reduce emissions from off-road diesel equipment other than marine vessels and locomotives, the U.S. EPA established a series of increasingly strict emission standards for new non-road diesel engines. Tier 1 standards were phased in from manufacture year 1996 to 2000, depending on the engine horsepower category. Tier 2 standards were phased in from 2001 to 2006. Tier 3 standards were phased in from 2006 to 2008. Tier 4 standards, which likely will require add-on emission control equipment to attain them, will be phased in from 2008 to 2015. The use of ULSD in mobile sources is required to achieve the non-diesel road engine standards as sulfur poisons some of the catalysts used in the Tier 4 technologies. These standards would apply to construction equipment, as well as other non-road diesel engines (Diesel Net, 2012).

3.2.3.1.3 Diesel Fuel Standards

On January 18, 2001, the U.S. EPA published a final rule on diesel fuels standards (40 CFR §§80, 500). The rule required refiners to begin selling highway diesel fuel that meets a maximum sulfur standard of 15 ppmw by June 1, 2006. The 2006 deadline was issued to ensure that adequate supplies of ULSD would be available to meet the demand in 2007, when all on-road, diesel-fuel vehicles were required to be equipped to run on ULSD fuel. In Los Angeles, heavy-duty trucks and busses contributed more than a quarter of the NOx emissions and 14 percent of the PM2.5 emissions from mobile sources. Pollution-control devices for heavy duty engines are sensitive to sulfur and would not work unless the amount of sulfur in the fuel was reduced (U.S. EPA, 2003). Therefore, the U.S. EPA implemented additional regulations to control sulfur in fuel and which ultimately led to particulate emissions controls on diesel fueled engines.

To reduce emissions from on-road, heavy-duty diesel trucks, U.S. EPA established a series of cleaner emission standards for new engines, starting in 1988. The U.S. EPA promulgated the 2007 Heavy Duty Highway Rule. The PM emission standard of 0.01 grams per horse power hour (g/hp-hr) was required for new vehicles beginning with the model year 2007. Also, the NOx and non-methane hydrocarbon (NMHC) standards of 0.20 g/hp-hr and 0.14 g/hp-hr, respectively, were phased in together between 2007 and 2010 on a percent-of-sales basis: 50 percent from 2007 to 2009 and 100 percent in 2010.

### 3.2.3.2 State Regulations

The CCAA adopted in 1988 mandates achievement of the maximum degree of emission reductions possible from vehicular and other mobile sources in order to attain the state ambient air quality standards by the earliest practical date. The CCAA requires non-attainment areas to achieve and maintain the state ambient air quality standards by the earliest practicable date and local air districts to develop plans for attaining the state ozone, CO, sulfur dioxide, and $NO_2$ standards. The CCAA also requires air districts to assess their progress toward attaining the air quality standards every three years. The triennial assessment is to report the extent of air quality improvement and the amounts of emission reductions achieved from control measures for the preceding three year period. The air districts must also review and revise attainment plans, if necessary, to correct for deficiencies in meeting progress, to incorporate new data or projections, to mitigate ozone transport, and to pursue the expeditious adoption of all feasible control measures.

CARB is responsible for ensuring implementation of the CCAA and federal CAA, and for regulating emissions from consumer products and motor vehicles. CARB has established CAAQS for all pollutants for which the federal government has established NAAQS and also has standards for sulfates, visibility, hydrogen sulfide, and vinyl chloride. California standards are generally more stringent than the NAAQS. CARB has established emission standards for vehicles sold in California and for various types of stationary equipment. Although CARB also has established fuel specifications to reduce vehicular emissions, it has no regulatory approval authority over the ULSD Project. Federal and state air quality standards are presented in Table 3.3-1.

#### 3.2.3.2.1 California Diesel Fuel Regulations

CARB set sulfur limitations for diesel fuel sold in California for use in on-road and off-road motor vehicles and to fulfill CARB's 2000 Diesel Risk Reduction Plan. Harbor craft and intrastate locomotives were originally excluded from the rule, but were later included by a 2004 rule amendment. Under this rule, diesel fuel used in motor vehicles except harbor craft and intrastate locomotives had been limited to 500 ppm sulfur since 1993. The sulfur limit was reduced to 15 ppm effective September 1, 2006. Diesel fuel used in intrastate locomotives (switch locomotives) was limited to 15 ppm sulfur effective January 1, 2007.

#### 3.2.3.2.2 Heavy Duty Diesel Truck Idling Regulation

This CARB rule affects heavy-duty diesel trucks in California starting February 1, 2005. The rule requires that heavy-duty trucks shall not idle for longer than five minutes at a time. However, truck idling for longer than five minutes while queuing is allowed if the queue is located beyond 100 feet from any homes or schools.

#### 3.2.3.2.3 Statewide Portable Equipment Registration Program

The Portable Equipment Registration Program (PERP) established a uniform program to regulate portable engines and portable engine-driven equipment units. Once registered in the PERP, engines and equipment units may operate throughout California without the need to obtain individual permits from local air districts. The PERP applies to back-up electricity generators.

#### 3.2.3.2.4 CARB Portable Diesel-Fueled Engines Air Toxic Control Measure

Effective September 12, 2007, all portable engines having a maximum rated horsepower of 50 bhp and greater and fueled with diesel must comply with this regulation and meet weighted fleet average PM emission standards. The first fleet standard compliance date is in 2013.

#### 3.2.3.2.5 CARB In-Use Off-Road Diesel Vehicle Rule

In later July 2007, CARB adopted a rule that requires owners of off-road mobile equipment powered by diesel engines 25 hp or larger to meet the fleet average or BACT requirements for NOx and PM emissions by March 1 of each year. The rule is structured by fleet size: large, medium and small. Medium sized fleets receive deferred compliance, and small fleets are exempt from NOx requirements and also get deferred compliance.

The original Regulation for In-Use Off-Road Diesel Vehicles was adopted in April, 2008. CARB subsequently amended the regulation to delay the turnover of Tier 1 equipment meeting the NOx performance requirements of the regulation, and then to delay overall implementation of the equipment turnover compliance schedule in response to the economic downturn in 2008 and 2009.

#### 3.2.3.2.6 CARB Surplus Off-Road Op-In for NOx

The Surplus Off-Road Opt-In for NOx (SOON) Program was originally adopted with the statewide Regulation for In-Use Off-Road Diesel Vehicles (Off-Road Rule) in 2008 and would apply to districts whose governing board elected to opt into to provision of the program. The SOON Program requires applicable fleets to meet a more stringent fleet-average NOx target than the statewide Off-Road Rule on a compliance schedule. The SCAQMD has opted into the SOON program and requires off-road equipment fleets to meet certain emissions Tier levels for NOx reduction.

#### 3.2.3.2.7 CARB Statewide Bus and Truck Regulation

In December 2008, CARB adopted Statewide Bus and Truck Regulation that requires installation of PM retrofits on all heavy duty trucks beginning January 1, 2012 and replacement of older trucks starting January 1, 2015. By January 1, 2023, all vehicles need to have 2010 model year engines or equivalent.

#### 3.2.3.2.8 Toxic Air Contaminants

California also has established a state air toxics program, California Toxic Air Contaminants Program (Tanner Bill) (AB1807), which was modified by the Revised Tanner Bill (AB2728). This program sets forth provisions to implement the national program for control of hazardous air pollutants.

The Air Toxic "Hot Spots" Information and Assessment Act (AB2588), as amended by Senate Bill 1731 (SB1731), requires operators of certain stationary sources to inventory air toxic emissions from their operations and, if directed to do so by the local air district, prepare a health risk assessment to determine the potential health impacts of such emissions. If the health impacts are determined to be "significant" (greater than 10 per one million exposures or non-cancer hazard index greater than 1.0), each facility operator must, upon approval of the health risk assessment, provide public notification to affected individuals.

#### 3.2.3.3 Regional Regulations

The Basin is under the jurisdiction of the SCAQMD which has regulatory authority over stationary source air pollution control and limited authority over mobile sources. The SCAQMD is responsible for air quality planning in the Basin and development of the AQMP. The AQMP establishes the strategies that will be used to achieve compliance with NAAQS and CAAQS.

SCAQMD's Rule 431.2 (Sulfur Content of Liquid Fuels, amended on September 15, 2000) contained a sulfur limit requirement consistent with the one later adopted by the U.S. EPA. At the time, the sulfur limit for diesel fuel sold for use in California was 500 ppmw which was approved by CARB in 1988 (Title 13, CCR §22). Rule 431.2 required a reduction in the sulfur content of diesel used in both stationary and mobile sources to 15 ppmw starting mid-2006.

The SCAQMD generally regulates stationary sources of air pollutants. There were a number of SCAQMD regulations that applied to the ULSD Project including Regulation II – Permits, Regulation III – Fees, Regulation IV – Prohibitions, Regulation IX – New Source Performance Standards, Regulation X - National Emissions Standards for Hazardous Air Pollutants (NESHAPS) Regulations, Regulation XI – Source Specific Standards, Regulation XIII – New Source Review, Regulation XIV – New Source Review of Carcinogenic Air Contaminants (including Rule 1401, New Source Review of Toxic Air Contaminants and Rule 1403, Asbestos Emissions from Demolition/Renovation Activities), Regulation XVII – Prevention of Significant Deterioration, Regulation XX – Regional Clean Air Incentives Market (RECLAIM) Program, and Regulation XXX – Title V Permits. SCAQMD permits were required for the construction and operation of the ULSD Project at Phillips 66.

## 3.3 ENVIRONMENTAL IMPACTS

This section provides an analysis of potential adverse environmental impacts associated with the ULSD Project described in Chapter 2. Based on the court's decision on the previous CEQA documents for the Phillips 66 ULSD, the EIR focuses on the issues as directed by the court and is limited to air quality setting, discussed in the previous section, and air quality impacts from project operations. An impact is considered significant under CEQA if it leads to a "substantial, or potentially substantial, adverse change in the environment." Impacts from the project fall within one of the following categories:

**Beneficial** - Impacts would have a positive effect on the environment.

**No impact** - There would be no impact to the identified resource as a result of the proposed project.

**Adverse but not significant** - Some impacts may result from the project; however, they are judged to be insignificant. Impacts are frequently considered insignificant when the changes are minor relative to the size of the available resource base or would not change an existing resource.

**Potentially significant but mitigation measures reduce impacts to insignificance** - Significant impacts may occur; however, with proper and feasible mitigation the impacts can be reduced to insignificance.

**Potentially significant and mitigation measures are not available to reduce impacts to insignificance** - Impacts may occur that would be significant even after mitigation measures have been applied to lessen their severity or no mitigation measures are available.

### 3.3.1 SIGNIFICANCE CRITERIA

To determine whether or not air quality impacts from the ULSD Project are significant, impacts will be evaluated and compared to the significance criteria in Table 3.3-6. If impacts equal or exceed any of the criteria in Table 3.3-6, they will be considered significant.

The SCAQMD makes significance determinations for operational emissions based on the maximum or peak daily allowable emissions during the operational phase.

## TABLE 3.3-6

## Air Quality Significance Thresholds

| Mass Daily Thresholds[(a)] | | |
|---|---|---|
| **Pollutant** | **Construction[(b)]** | **Operation[(c)]** |
| **$NO_x$** | 100 lbs/day | 55 lbs/day |
| **VOC** | 75 lbs/day | 55 lbs/day |
| **PM10** | 150 lbs/day | 150 lbs/day |
| **PM2.5** | 55 lbs/day | 55 lbs/day |
| **SOx** | 150 lbs/day | 150 lbs/day |
| **CO** | 550 lbs/day | 550 lbs/day |
| **Lead** | 3 lbs/day | 3 lbs/day |
| **Toxic Air Contaminants, Odor, and GHG Thresholds** | | |
| **TACs** (including carcinogens and non-carcinogens) | Maximum Incremental Cancer Risk $\geq$ 10 in 1 million<br>Chronic and Acute Hazard Index $\geq$ 1.0 (project increment)<br>Cancer Burden $\geq$ 0.5 excess cancer cases (in areas $\geq$ 1 in 1 million) | |
| **Odor** | Project creates an odor nuisance pursuant to SCAQMD Rule 402 | |
| **Ambient Air Quality for Criteria Pollutants[(d)]** | | |
| **$NO_2$**<br><br>1-hour average<br>annual average | In attainment; significant if project causes or contributes to an exceedance of any standard:<br>0.18 ppm (state)<br>0.03 ppm (state) and 0.0534 ppm (federal) | |
| **PM10**<br>24-hour<br>annual average | 10.4 $\mu g/m^3$ (construction)[(e)] and 2.5 $\mu g/m^3$ (operation)<br>1.0 $\mu g/m^3$ | |
| **PM2.5**<br>24-hour average | 10.4 $\mu g/m^3$ (construction)[(e)] and 2.5 $\mu g/m^3$ (operation) | |
| **$SO_2$**<br>1-hour average<br>24-hour average | 0.255 ppm (state) and 0.075 ppm federal – 99th percentile)<br>0.04 ppm (state) | |
| **Sulfate**<br>24-hour average | 25 $\mu g/m^3$ (state) | |
| **CO**<br><br>1-hour average<br>8-hour average | In attainment; significant if project causes or contributes to an exceedance of any standard:<br>20 ppm (state) and 35 ppm (federal)<br>9.0 ppm (state/federal) | |
| **Lead**<br>30-day average<br>Rolling 3-month average<br>Quarterly average | 1.5 $\mu g/m^3$ (state)<br>0.15$\mu g/m^3$ (federal)<br>1.5$\mu g/m^3$ (federal) | |

a) Source: SCAQMD CEQA Handbook (SCAQMD, 1993)
b) Construction thresholds apply to both the SCAB and Coachella Valley (Salton Sea and Mojave Desert Air Basin)
c) For Coachella Valley, the mass daily thresholds for operation are the same as the construction thresholds.
d) Ambient air quality thresholds for criteria pollutants based on SCAQMD Rule 1303, Table A-2 unless otherwise stated.
e) Ambient air quality threshold based on SCAQMD Rule 403.

KEY: ppm = parts per million; $\mu g/m^3$ = microgram per cubic meter; lbs/day = pounds per day; MT/yr CO2eq = metric tons per year of $CO_2$ equivalents, $\geq$ greater than or equal to, > = greater than

## 3.3.2 OPERATIONAL EMISSION IMPACTS

### 3.3.2.1 Criteria Pollutant Emissions

The baseline for the ULSD Project was Refinery operations in 2002-2003 (pre-project), which reflects the existing environmental setting when the environmental analysis development of the ULSD project began. The project was constructed in 2005 and became operational in April 2006. Therefore, project impacts were evaluated for April 2006 through December 2008 (post-project). Where the data set does not directly match these pre- and post-project periods, data were matched as closely as possible. Because the ULSD Project has been built and is operational, the project impacts are based on actual as-built information where available, as opposed to the engineering estimates that were used in previous CEQA documents. The ULSD Project resulted in refinery modifications that included emission increases, as well as emission reductions.

Operational emissions from the ULSD Project are summarized in Table 3.3-7. Detailed emission calculations are provided in Appendix B. The operational emission calculations provided in previous ULSD CEQA documents have been updated and modified to include information on the Project as it was built and has been operated. Detailed baseline and post-project information on each component of the ULSD Project is described in the following paragraphs.

**TABLE 3.3-7**

**ULSD Operational Emissions(1)**

| PROJECT COMPONENT | ULSD Project Emissions (lb/day) | | | | | |
|---|---|---|---|---|---|---|
| | **CO** | **VOC** | **NOx** | **SOx** | **PM10** | **PM2.5** |
| Fugitive Components | - | 5.2 | - | - | - | - |
| Replacement Heater(2) | -16.60 | 0.91 | -25.54 | 1.69 | 0.98 | 0.98 |
| Storage Tank 331 | - | 0.2 | - | - | - | - |
| Hydrogen Production | 2.28 | 2.28 | 3.50 | 0.10 | 2.73 | 2.73 |
| Electricity Demand | 3.7 | 0.2 | 21.3 | 2.2 | 0.7 | 0.7 |
| Truck Transport | 11.55 | 1.57 | 14.80 | 0.12 | 0.26 | 0.26 |
| Steam Demand | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL ULSD Project Emissions** | **0.93** | **10.36** | **14.06** | **4.11** | **4.67** | **4.67** |
| SCAQMD Significance Thresholds | 550 | 55 | 55 | 150 | 150 | 55 |
| Significant? | NO | NO | NO | NO | NO | NO |

(1) See Appendix B for detailed emission calculations. Differences in emissions in this table and Appendix B are due to rounding.
(2) A negative number indicates emission reductions.

**Fugitive Emissions:** Fugitive project components include pumps, compressors, valves, flanges, and process drains. The ULSD Project resulted in the installation of fugitive refinery components and the removal of others. The fugitive component emissions in previous CEQA documents were based on engineering estimates of the required changes in fugitive components. The emission estimates in this EIR are based on the actual as-built changes in fugitive component counts, including emission increases from the addition of new components and emission decreases associated with removal of older components. The Refinery is required to monitor fugitive components under SCAQMD Rule 1173 and maintains a database of components by unit. Therefore, the actual component counts installed as part of the ULSD Project were used to develop the fugitive emissions estimates. The ULSD Project resulted in a net emissions increase of about 5.2 pounds per day (lbs/day) VOC from fugitive components (valves, flanges, and process drains) (see Table 3.3-7 and Appendix B for detailed analysis).

**Replacement Charge Heater:** As part of the ULSD Project, Heater B-201 was removed from service and replaced with a new, functionally identical heater, B-401. Heater B-401 was equipped with low NOx burners and included the construction of an SCR Unit as BACT for NOx emissions. Baseline emissions from Heater B-201 were based on actual operating conditions for 2002 and 2003. The operating data for 2002 and 2003 were reviewed to determine the maximum emissions achieved by Heater B-201 during that timeframe.

The emissions from Heater B-401 (new heater) are based on the maximum potential to emit from the heater as estimated from the SCAQMD permit application. Heater B-401 was permitted to operate at a maximum fire duty of 34 million British Thermal Units per hour (mmBtu/hr). Therefore, the emissions from B-401 are based on the maximum potential to emit assuming the heater operates at 34 mmBtu/hr. Emissions of SOx, NOx, and CO are based on the SCAQMD permit limits for Heater B-401. Emissions of other criteria pollutants are based on SCAQMD-approved emission factors for combustion emissions. Heater B-401 is equipped with low NOx burners and an SCR Unit for NOx emission control. Therefore, maximum potential NOx emissions from Heater B-401 are less than Heater B-201 because of the additional pollution control (see Table 3.3-7 and Appendix B). CO emissions are also less because the SCAQMD established a reduced CO emission limit (10 ppm) based on BACT considerations.

**Storage Tanks:** As part of the ULSD Project, a storage tank (Tank 331) that was idle was put back into jet/diesel fuel service. Under the baseline conditions, Tank 331 was assumed to have no emissions as the tank was not in service. Emission increases associated with Tank 331 were estimated using the U.S. EPA TANKS model. The model bases emissions on the vapor pressure of material stored in the tank, tank diameter, volume, estimated throughput (or turnovers), and specific information on the type of construction (tank seals). The emissions from Tank 331 were estimated to be about 0.2 lb/day and no other changes to storage tanks occurred as part of the ULSD Project (see Table 3.3-7 and Appendix B). The SCAQMD Permit to Operate provides conditions to enforce tank operations and includes limitations on the tank throughput, material that can be stored, and the vapor pressure of material stored in the tank. Therefore, emissions are limited by permit conditions.

**Hydrogen Production:** Hydrotreaters use hydrogen in the presence of a catalyst to remove sulfur from feedstocks. The ULSD Project required increasing the size of the reaction vessel in Unit 90 thereby increasing the feed stock residence time, the amount of hydrogen consumed, and the amount of catalyst used in the reactor, resulting in a greater amount of sulfur removed from the feedstock. The blend stock produced by Unit 90, which now has a reduced sulfur content, is used to produce ultra low sulfur diesel. Therefore, the ULSD Project resulted in an increase in hydrogen demand, increasing the criteria pollutant emissions required to produce additional hydrogen.

The Refinery does not monitor hydrogen use in Unit 90 alone. The Refinery monitors the total hydrogen used in Unit 89 (jet hydrotreater) and Unit 90 (diesel hydrotreater) combined on an annual basis. The baseline hydrogen demand in Units 89 and 90 were based on monitoring data of hydrogen use in 2002-2003 for the two units combined. The ULSD Project was expected to increase hydrogen use in Unit 90. Conversely, no physical changes were made to Unit 89 during this period that would have increased its hydrogen use. Therefore, the total increase in hydrogen used by Units 89 and 90 combined between the pre-project and the post-project periods was attributed to the Unit 90 for ULSD project. The overall use of hydrogen increased over the baseline period by about 511 million standard cubic feet per year (mmscf/year) (see Appendix B). The analysis includes the conservative assumption that all of the increase in hydrogen use was attributed to the ULSD Project (Unit 90 hydrogen demand increase). The assumption is considered to be conservative because any increase in hydrogen demand compared to the baseline, regardless if it is from Unit 89 and/or Unit 90, is attributed to the ULSD Project. Although actual hydrogen demand varies on a daily basis, most of the increase in hydrogen came from a third party hydrogen supplier. The emission factors for the increased hydrogen production were based on the emission factors for a third party hydrogen supplier, as reported in the EIR for that facility (City of Carson, 1998). The emissions for increased hydrogen production are presented in Table 3.3-7, with detailed calculations in Appendix B.

**Electrical Generation:** The ULSD project resulted in the installation of additional equipment associated with the modifications to Unit 90. The installation of pumps, fans and air coolers resulted in an increase in electricity use at the Refinery (about 835 horsepower (HP)). In addition to the pumps, Phillips reactivated a 200 HP recycle gas compressor in Unit 89 (jet hydrotreater), as Unit 89 and Unit 90 could no longer share a compressor. Therefore, the total increase in electricity usage was 1,035 HP or about 18,623 kilowatt-hours per day. Emission increases associated with the increase in electricity use were calculated using emission factors in the SCAQMD CEQA Air Quality Handbook (SCAQMD, 1993) (see Appendix B for detailed analysis).

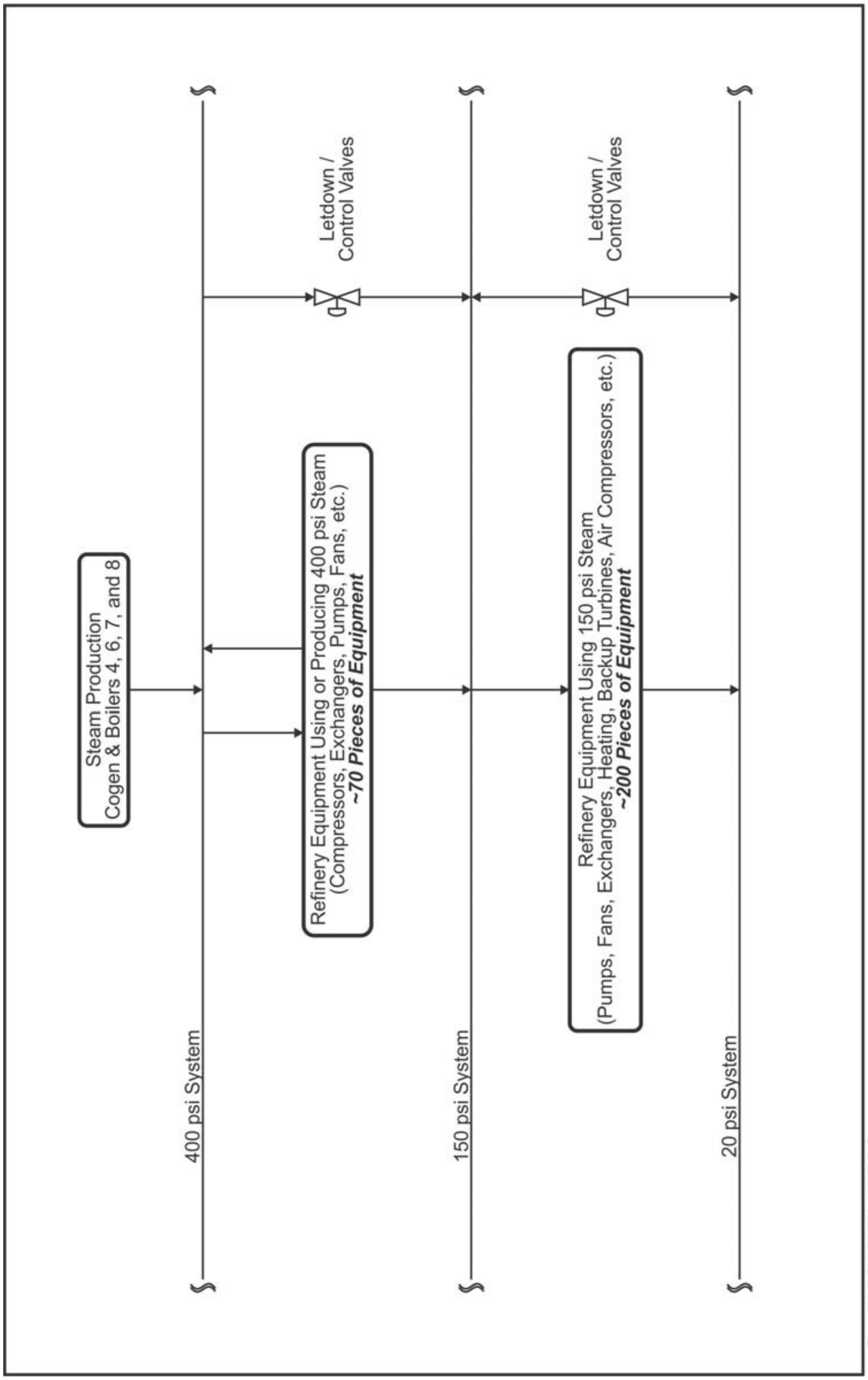
**Trucks:** The ULSD Project also resulted in an increase in trucks associated with the needed delivery of aqueous ammonia and an additional catalyst. A review of the activity associated with the delivery of aqueous ammonia and catalyst from the ULSD Project determined that the maximum truck deliveries per day were associated with the periodic change of catalyst in Unit 90, which resulted in a maximum of four truck trips per day over a two week period. The catalyst in Unit 90 has a life expectancy of two to three years, so catalyst replacement occurs once every two to three years. The catalyst in the SCR Unit has a life expectancy from five to ten years, so SCR catalyst replacement occurs once every five to ten years. The ULSD Project also resulted in an increase of one aqueous ammonia truck per year. Therefore, to determine the peak day emissions increase associated with new truck trips, it was assumed that maximum daily truck trips associated with the Unit 90 catalyst replacement and aqueous ammonia delivery would occur on the same day, resulting in a maximum of five trucks per day (see Table 3.3-7 and Appendix C). Truck trips are typically off-peak hour to minimize delivery time.

**Steam Demand**: Steam is used within a refinery for a variety of uses where energy (heat and/or power) are required. A large portion of steam used at the Wilmington Plant is generated in the refinery's four existing utility boilers (Boilers 4, 6, 7 and 8) and existing cogeneration unit by combusting refinery fuel gas and natural gas, which in turn produces air emissions. Therefore, the ULSD modifications were examined to assess whether the project has increased refinery steam demand in a way that has resulted in an increase in steam generation. Although specific equipment within Unit 90 requires more steam to operate following the ULSD modifications, this has not caused an increase in Refinery steam generation due to the refinery's integrated steam system. This is explained in further detail in the following sections. Because the generation of Refinery steam does not increase, the project emissions corresponding to steam demand does not increase and thus Table 3.3-7 lists zero emissions from steam demand

**Refinery Steam Production and Demand Systems:** Within a refinery, there is equipment that uses steam. Some refining units are both steam producers and consumers.

Refineries typically require steam at three different pressures (high pressure, medium pressure and low pressure). High pressure steam is normally generated in utility boilers and waste heat boilers in process units, and it is typically used to generate electrical power and to power turbine drivers in pumps, compressors and other machinery. High pressure steam also may be used for process heating in lieu of fired heaters. Medium pressure steam is usually obtained by recycling the exhaust from the turbines that use high pressure steam, by generating steam in process waste heat steam generators, and by direct pressure letdown from the high pressure system. Medium pressure steam is typically used in refineries in process heat exchangers, small turbine drivers, and ejectors used to maintain vacuum. Low pressure steam is used for process heat exchangers, tank heating, line tracing and miscellaneous services.(Lucas, 2000) Thus, refineries typically meet their steam requirements by (1) producing steam at different pressures, (2) reusing steam that has already lost some of its pressure, and (3) reducing the pressure of high pressure steam through let-down valves.

The Wilmington Plant operates an integrated steam system. The primary steam generators are four existing steam boilers and an existing cogeneration unit. As is typical for refineries, the Wilmington Plant uses steam at three different pressures: 400 pounds per square inch (psi) steam (high pressure system), 150 psi steam (medium pressure system), and 20 psi steam (low pressure system). Different equipment in the Refinery requires one or more of these different pressures of steam. However, the four steam boilers and cogeneration plant produce steam at only one pressure, 400 psi. There are two ways that 400 psi steam is reduced to 150 psi steam. First, a portion of the 400 psi steam passes through units requiring 400 psi steam, where some of the energy in the steam is put to work, and then the steam (now at lower pressure) is directed into the header for the 150 psi steam system. Second, some of the 400 psi steam passes to the 150 psi steam system directly through one of four letdown valves, where the pressure is deliberately reduced to maintain 150 psi (see Figure 3-1). The Refinery requires more 150 psi steam (to power~200 pieces of equipment) than it does 400 psi steam (to power~70 pieces of equipment). The Refinery also produces some 150 psi steam, but not enough to make up this shortfall. Therefore, the boilers and cogeneration plant always produce more 400 psi steam than is needed for the units that use 400 psi steam, and this additional 400 psi steam is reduced through letdown valves and sent to the 150 psi system.




ENVIRONMENTAL AUDIT, INC.

FIGURE 3-1
PHILLIPS 66 WILMINGTON PLANT STEAM SYSTEM

Project No. 2696
N:\2696\Flow Diagram\Wilmington Plant Steam System (rev.4).cdr

**Changes to Steam Demand and Generation from ULSD Project**: Within Unit 90, steam is used to drive the recycle gas compressor. This compressor circulates the hydrogen rich gas used, in the presence of a catalyst, to remove sulfur and other impurities from the hydrocarbon streams. As part of the ULSD project, the existing recycle gas compressor GB-301 was modified to increase its capacity. The recycle gas compressor capacity doubled, but this did not result in a corresponding increase in steam generated by the boilers and cogeneration unit at the Wilmington plant. The following provides a summary of the steam demand associated with the ULSD Project and why this did not cause an increase in the overall steam generation at the Refinery.

Refinery steam system flow demonstrates why steam generation did not increase as a result of the ULSD project. The recycle gas compressor in Unit 90 uses predominantly 400 psi steam. Given the integration between the 400 psi and 150 psi steam systems, if Unit 90 requires more 400 psi steam, any increased demand for steam is met by merely diverting 400 psi steam from the letdown valves to Unit 90. Within Unit 90, the 400 psi steam is put to work in the recycle gas compressor, and then it is exhausted to the 150 psi steam header for use elsewhere in the refinery. Thus, energy in the 400 psi steam is used in Unit 90, instead of passing the excess 400 psi steam through the letdown valves to produce 150 psi steam. The same amount of 400 psi steam is produced by the four refinery steam boilers and cogeneration unit, but there is a shift in the allocation of steam between the two pathways to the 150 psi system. More of the steam passes through Unit 90 to get to the 150 psi system and less of the steam passes through letdown valves to get to the 150 psi system, but the same amount of steam is being generated. In other words, since the 150 psi system creates the demand for steam, the increase in steam for Unit 90 merely shifts the path of the steam to travel through Unit 90 as opposed to the letdown valve.

A comparison of steam production per barrel of Refinery throughput before and after the project corroborates the conclusion that the ULSD project did not cause an increase in refinery steam demand and generation. Using the fuel fired in the four boilers and cogeneration unit, the pre-project and post-project steam production was calculated as follow:

Pre-project (2002-2003): 147.9 MMbtu/1000 bbl feed
Post-project (2006-2008): 147.7 MMbtu/1000 bbl feed

This calculation demonstrates that the steam production per barrel of Refinery throughput did not increase as a result of the ULSD project. Due to the Refinery's integrated steam system with high, medium and low pressure steam, the added 400 psi steam required by Unit 90 did not require that additional 400 psi steam be produced. Rather, it merely affected the pathway for the 400 psi steam to reach the 150 psi steam system. A portion of the 400 psi steam that would otherwise have gone through the step-down valve instead went through Unit 90 and was then released into the 150 psi system.

**Operational Criteria Emissions Summary:** Daily operational emissions are summarized in Table 3.3-7, together with the SCAQMD daily operational significance thresholds. As demonstrated in the table, operation of the ULSD Project does not exceed any significance thresholds. Therefore, the air quality impacts associated with operational emissions from the ULSD Project are less than significant.

While the Draft EIR does not identify any significant air quality impacts, a mitigation measure is being proposed to ensure that the Refinery operations are consistent with the assumptions upon which the analysis is based.

AQ-1 For five years, the facility permit operator shall monitor and report the fuel usage (standard cubic feet of gas) and the Higher Heating Values (Btu/scf), on an annual basis, for each of the following equipment:

Boiler No. 4 (Device ID D684)
Boiler No. 6 (Device ID D688)
Boiler No. 7 (Device ID D686)
Boiler No. 8 (Device ID D687)
Gas Turbine (Device ID D828)
Turbine Exhaust Heat Recovery Boiler (Device ID D829)

Using the fuel usage and Higher Heating Value data for the above equipment, the facility operator shall calculate and report the annual fuel consumption per barrels of feed (mmBtu/1000 bbl feed). The facility permit operator shall explain any increase in the annual fuel consumption per barrels of feed compared to the previous reporting year. The first reporting year (calendar year 2014) shall be compared to the pre-project (2002-2003) amount of 147.9 MMBtu/1000 bbl feed. For any year in which the reported fuel consumption per barrel of feed exceeds the amount reported for the prior year, the annual report shall also state whether the increase was due in whole or part to the Ultra-Low Sulfur Diesel Project. If the report discloses an increase but states that it is not due to the Ultra-Low Sulfur Diesel Project, then the report shall also explain the cause(s) or circumstance(s) for the increase. The report shall be submitted no later than March 31 of each year (2015 through 2019) for the prior calendar year.

The operator shall, for not less than three years, keep records of the fuel usage and Higher Heating Values used to prepare the reports, and shall make the records available to District personnel upon request.

### 3.3.2.2 CO Hot Spots

The potential for high concentration of CO emissions associated with truck/vehicle traffic was considered and evaluated per the requirements of the SCAQMD CEQA Air Quality Handbook (SCAQMD, 1993). The Handbook indicates that any project that could negatively impact levels of service at local intersections may create a CO hot spot and should be evaluated. Operation of the ULSD Project did not result in an increase in permanent workers, did not result in an increase in peak hour traffic and, consequently, did not result in a change in level of service that could create a CO hot spot. Therefore, no significant adverse impacts to ambient air quality due to the traffic impact at the intersections in the vicinity of the ULSD Project occurred, so no mitigation is required.

### 3.3.2.3 Ambient Air Quality Impacts

SCAQMD Rule 1303 (b)(1) requires ambient air quality modeling for stationary sources of new or modified facilities for NOx, CO, and particulate matter to assure that the source will not cause or contribute to a violation of ambient air quality standards. The only component of the ULSD Project subject to ambient air quality modeling is the Replacement Heater B-401 as it is the only stationary source that generates NOx, CO, and particulate matter. The other sources of combustion emissions associated with the ULSD Project include hydrogen production, electricity demand, and truck transport. These sources are located off-site (electricity generation and hydrogen production) or are mobile sources that would occur throughout the Basin and do not overlap with the onsite stationary sources associated with the ULSD Project.

SCAQMD Rule 1303 provides a screening analysis to determine the potential for ambient air quality impacts in lieu of formal modeling. If emissions are less than the threshold emissions provided in Table A-1 of Rule 1303, the emissions would not impact ambient air quality and no further analysis is required. Table A-1 of SCAQMD Rule 1303 is based on the modeling of emissions from different sizes of combustion sources, so emissions less than the threshold emissions in the table would comply with ambient air quality standards and rule requirements. Table 3.3-9 compares the emissions of NOx, CO, and particulate matter to the threshold emissions developed in SCAQMD Rule 1303 Table A-1. For all pollutants, the ULSD Project emissions would be less than the Rule 1303 threshold emissions. Therefore, no significant ambient air quality impact is associated with the ULSD Project.

**TABLE 3.3-9**

**Ambient Air Quality Analysis**

| | NOx | CO | PM10 | PM2.5(1) |
|---|---|---|---|---|
| Project Emissions (lbs/day) | -25.52 | -16.60 | 0.98 | 0.98 |
| Project Emissions (lbs/hr) (2) | -1.06 | -0.69 | 0.04 | 0.04 |
| Screening Thresholds(lbs/hr)(3) | 1.31 | 72.1 | 7.9 | 7.9 |
| Significant? | No | No | No | No |

(1) PM2.5 thresholds have not been developed for PM2.5 and are assumed to be the same as PM10.
(2) Based on 24 hours/day.
(3) SCAQMD Rule 1303, Appendix A, Screening Analysis, Table A-1 for 30-40 mmBtu/hr combustion sources.

### 3.3.2.4 Toxic Air Contaminant Impacts

A HRA was performed to determine if emissions of TACs generated by the ULSD Project would exceed the SCAQMD thresholds of significance for cancer risk and hazard indices, thus resulting in significant health impacts. The following subsections summarize the health risks associated with the ULSD Project. Details of the HRA are included in Appendix C. The worst-case project health risks have been determined by comparing the on-site health risks associated with Heater B-201 before the Project (baseline) with the health risks associated with Heater B-401 and the incremental increase in fugitive emissions from Unit 90 (post-Project) as a result of the ULSD Project.

#### 3.3.2.4.1 HRA Methodology

The CARB Hotspots Analysis Reporting Program (HARP) model is the most appropriate model for determining the air quality impacts from the ULSD Project. The HARP model is well suited for refinery modeling since it can accommodate multiple sources and receptors. However, the HARP model utilizes the U.S. EPA Industrial Source Complex dispersion, which has been replaced by AERMOD as the preferred air dispersion model. This analysis utilizes AERMOD for the dispersion and loaded the concentration profiles into HARP using the HARP On-Ramp add-on. The health risks were evaluated in HARP using the SCAQMD *Risk Assessment Procedures for Rules 1401 and 212 Version 7.0* (July 2005). The model default values were modified to conform to the SCAQMD Supplemental Guidelines for Preparing Risk Assessment for AB2588 (SCAQMD, 2005b).

#### 3.3.2.4.2 Hazard Identification

The ULSD Project generates various air contaminants. Some of these chemical compounds are potentially carcinogenic, toxic, or hazardous, depending on concentration or duration of exposure. Numerous federal, state, and local regulatory agencies have developed lists of TACs. The list of potentially-emitted substances considered in the preparation of the HRA for the proposed project is identified in Appendix A-I of the CARB AB2588 requirements and by OEHHA. The AB2588 TACs emitted from the proposed project are shown in Appendix C. Polycyclic aromatic hydrocarbons (PAHs) were speciated in this analysis. Health effects data are not available for all compounds. However, a total of 16 TACs were included in the air dispersion modeling (see Appendix C). For carcinogens, cancer potency slope factors were used to compute cancer risk through inhalation. If the carcinogen is a multi-pathway pollutant, a potency slope was used for estimation of risk from non-inhalation pathways. For non-cancer health effects, reference exposure levels (REL) and acceptable oral doses (for multi-pathway pollutants) were used. The non-carcinogenic hazard indices were computed for chronic and acute exposures with their respective toxicological endpoints shown.

### 3.3.2.4.3 Emission Estimations and Sources

The emissions estimates of TACs from the heaters are calculated using emission factors from a source test. Fugitive emissions are based on the refinery specific speciation of Unit 90. The emission factors used for emission sources are from the *2012 ConocoPhillips Company Los Angeles Refinery - Wilmington Plant AB 2588 Revision F 2006-2007* and *the 2001 Tosco Los Angeles Refinery Wilmington Plant AB2588 HRA*. The calculated TAC emissions are presented in Appendix C.

### 3.3.2.4.4 Baseline (Pre-Project) Health Risks

The results of the HRA are summarized in Table 3.3-10.

**Cancer Risk Analysis:** The baseline maximum cancer risk from Heater 201 for a maximum exposed individual resident (MEIR) is located approximately 260 east of the Refinery. The cancer risk is 7.35 x $10^{-8}$ or 0.07 in a million at the MEIR. Hexavalent chromium contributes approximately 75.5 percent of the calculated cancer risk at the MEIR. The inhalation pathway accounts for 84.4 percent of the cancer risk.

The baseline maximum exposed incremental cancer risk at an occupational exposure (MEIW) is located approximately 100 meters east of the Refinery. The incremental cancer risk is 1.89 x $10^{-8}$ or 0.02 in a million at the MEIW. Hexavalent chromium contributes approximately 67.7 percent of the calculated cancer risk at the MEIW. The inhalation pathway accounts for 75.7 percent of the cancer risk. Detailed cancer risk contributions by pathway and pollutants are presented in Appendix C.

**TABLE 3.3-10**

**Health Risk Assessment Summary(1)**

| Health Risk | Maximum Exposed Individual Resident | Maximum Exposed Individual Worker | Maximum Chronic Hazard Index | Maximum Acute Hazard Index |
|---|---|---|---|---|
| Baseline Health Risks | $7.35 \times 10^{-8}$ | $1.89 \times 10^{-8}$ | 0.00282 | 0.00012 |
| Post-Project Health Risks | $1.50 \times 10^{-7}$ | $2.81 \times 10^{-8}$ | 0.00366 | 0.00015 |
| Project Incremental Health Risks | $7.35 \times 10^{-8}$ | $9.20 \times 10^{-9}$ | 0.00084 | 0.000145 |
| Significance Threshold | $10 \times 10^{-6}$ | $10 \times 10^{-6}$ | 1.0 | 1.0 |
| Significant? | No | No | No | No |

(1) See Appendix C for more details on the HRA.

**Non-Cancer Risk Analysis:** The baseline maximum chronic hazard index (MCHI) total for Heater 201 for the respiratory system is 0.0028. The MCHI is located approximately 100 meters east of the Refinery. Arsenic contributes approximately 97.2 percent of the calculated MCHI.

The baseline maximum acute hazard index (MAHI) total for the central nervous system is 0.00012. The MAHI is located on the eastern boundary of the Refinery. Arsenic contributes approximately 90.3 percent of the calculated MAHI. Detailed contribution by pollutant to the acute hazard index for the maximum receptor locations are presented in Appendix C.

3.3.2.4.5 Post-Project Health Risk

**Cancer Risk Analysis:** The post-Project maximum cancer risk from Heater 401 and associated fugitives for the MEIR is located approximately 260 meters east of the Refinery. The cancer risk is $1.50 \times 10^{-7}$ or 0.15 in a million at the MEIR. Hexavalent chromium contributes approximately 48.1 percent of the calculated cancer risk at the MEIR. The inhalation pathway accounts for 59.1 percent of the cancer risk.

The post-Project maximum exposed incremental cancer risk at the MEIW is located approximately 100 meters east of the Refinery. The incremental cancer risk is $2.81 \times 10^{-8}$ or 0.03 in a million at the MEIW. Hexavalent chromium contributes approximately 58.7 percent of the calculated cancer risk at the MEIW. The inhalation pathway accounts for approximately 68 percent of the cancer risk. Detailed cancer risk contributions by pathway and pollutants are presented in Appendix C.

**Non-Cancer Risk Analysis:** The post-Project MCHI total for Heater 401 and associated fugitives for the respiratory system is 0.0037. The MCHI is located approximately 100 meters east of the Refinery. Arsenic contributes approximately 96.4 percent of the calculated MCHI. The post-Project MAHI total for the central nervous system is 0.0001. The MAHI is located at the northwestern boundary of the Refinery. Arsenic contributes approximately 90.3 percent of the calculated MAHI. Detailed contribution by pollutant to the acute hazard index for the maximum receptor location is presented in Appendix C.

3.3.2.4.6 Incremental Health Risk

As summarized in Table 3.3-10, the incremental cancer risk for the ULSD Project is 7.65 x $10^{-8}$ (0.15-0.07) or 0.08 per million at the MEIR and 9.20 x $10^{-9}$ (0.03-0.02) or about 0.01 per million at the MEIW. The incremental chronic risk is 0.0008 and the incremental acute risk is 0.0001. The cancer risks for the TACs emitted from the ULSD Project are below the significance threshold of ten per million and chronic and acute hazard indices are below the 1.0 thresholds. Therefore, the cancer risk and hazard index thresholds are not considered to be significant and no significant health impacts are associated with the ULSD Project.

### 3.3.3 MITIGATION MEASURES

No significant air quality impacts have been identified. Therefore, no mitigation measures are required for the ULSD Project. However, the SCAQMD will impose AQ-1, which contains specific reporting requirements, to ensure that the Refinery operations are consistent with the assumptions upon which the air quality analysis is based.

### 3.3.4 LEVEL OF SIGNIFICANCE

Air quality impacts associated with the ULSD Project are less than significant.

# CHAPTER 4

# CUMULATIVE IMPACTS

# 4.0 CUMULATIVE IMPACTS

## 4.1 INTRODUCTION

This chapter presents the requirements for analysis of the cumulative impacts, including the analysis of the potential for the ULSD Project, together with other past, present, and reasonably foreseeable future projects, to have significant cumulative effects. Following the presentation of the requirements related to cumulative impact analyses and a description of the related projects (Sections 4.1.1 and 4.1.2, respectively) and the analysis in Section 4.2 addresses cumulative air quality impacts. As per the Court's order, the required analysis of the ULSD Project is limited to operational air quality impacts. Therefore, the cumulative analysis is also limited to operational air quality impacts.

### 4.1.1 REQUIREMENTS FOR CUMULATIVE IMPACT ANALYSIS

State CEQA Guidelines (14 CCR §15130) require that an EIR include a reasonable analysis of the significant cumulative impacts of a proposed project. Cumulative impacts are defined by CEQA as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" (State CEQA Guidelines, §15355).

Cumulative impacts are further described as follows:

- The individual effects may be changes resulting from a single project or a number of separate projects.

- The cumulative impacts from several projects are the changes in the environment which result from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time (State CEQA Guidelines, §15355[b]).

- As defined in §15355, a "cumulative impact" consists of an impact that is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts. An EIR should not discuss impacts which do not result in part from the project evaluated in the EIR.

When considering whether or not a project contributes to cumulative impacts, it is also necessary to consider CEQA Guidelines §15064(h)(4), which states, "The mere existence of cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's incremental effects are cumulatively considerable."

The following cumulative impact analysis focuses on whether the air quality impacts of the ULSD Project are cumulatively considerable within the context of impacts caused by other past, present, or reasonably foreseeable future projects. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. This cumulative impact analysis considers other related projects or projects causing related impacts within a geographic scope of approximately one mile from the Phillips 66 Wilmington Plant. One mile is the area of maximum localized air quality impacts.

For this Draft EIR, related projects with a potential to contribute to cumulative impacts were identified using the "list" approach, using a list of closely related projects that would be constructed in the cumulative geographic scope. The list of related projects or projects causing related impacts utilized in this analysis is provided in Table 4-1.

### 4.1.2 PROJECTS CONSIDERED IN CUMULATIVE IMPACT ANALYSIS

The Project is located within the existing Phillips 66 Wilmington Plant, in the southwest portion of Los Angeles County within Southern California. The Project area includes a mixture of industrial, commercial, transportation, and residential/institutional uses. The Project site itself is located in an existing Refinery in the Wilmington community within the City of Los Angeles. The area has been used as a Refinery for nearly a century and a number of other industrial facilities are located nearby including petroleum storage facilities, warehouses and the Port of Los Angeles. Interstate 110 is located within the vicinity of the Project, just east of the Refinery. Residential areas of Wilmington, San Pedro, and Rancho Palos Verdes are located adjacent to this industrial area.

A number of projects in the vicinity of the ULSD Project were contemporaneous with the ULSD Project, have occurred subsequent to the ULSD Project, or are reasonably foreseeable future projects. A total of 46 of these projects (approved or proposed) have been identified within the general vicinity of the ULSD Project that could contribute to cumulative impacts. The list of cumulative projects is provided in Table 4-1 and the corresponding locations are shown in Figure 4-1.

The analysis of impacts of the ULSD Project has been limited to operational air quality, so the cumulative air quality impact analysis is also limited to operational air quality. The region of analysis for cumulative air quality impacts is the South Coast Air Basin, but the analysis is focused on the communities adjacent to the ULSD Project and generally within one mile of the Wilmington Plant (including portions of Wilmington, Carson, San Pedro, Rancho Palos Verdes, Lomita and Harbor City) because that is the area of maximum localized air quality impacts and the influence of Project emissions decreases with distance from the Refinery.

# TABLE 4-1

## List of Cumulative Projects

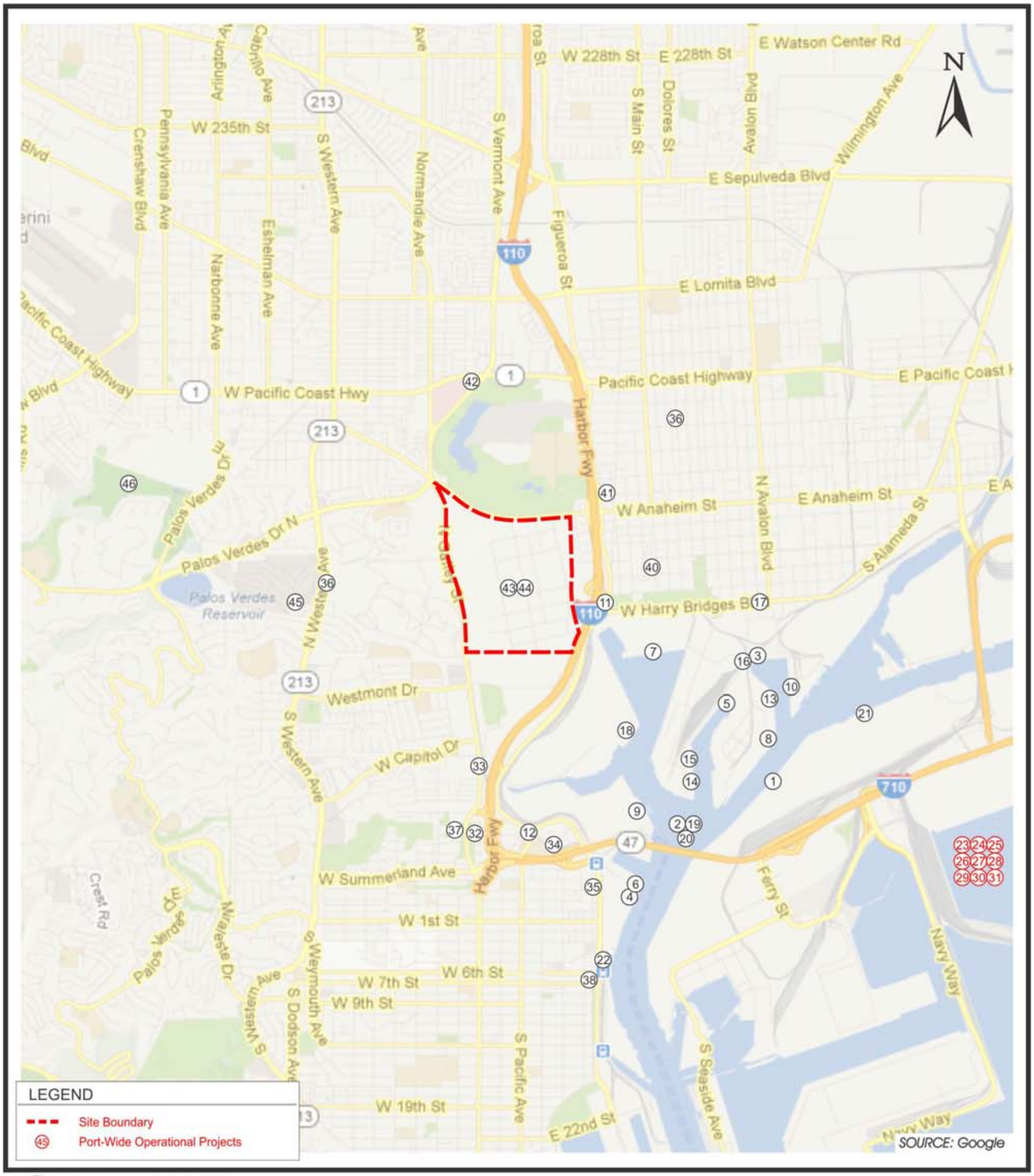
| No. in Figure 4-1 | Project Title and Location | Project Description | Project Status (Time Frame) |
|---|---|---|---|
| **Port of Los Angeles Projects** | | | |
| 1 | Berths 212-224 [YTI] Container Terminal Improvements Project | Wharf modifications at the YTI Marine Terminal Project involves wharf upgrades and backland reconfiguration, including new buildings. | Public review period for DEIS/DEIR to end June 16, 2014. |
| 2 | Port of Los Angeles Master Plan Update | Redevelopment of Fish Harbor, redevelopment of Terminal Island and consideration of on-dock rail expansion, and consolidation of San Pedro and Wilmington Waterfront districts. | FEIR published August 2013. |
| 3 | Wilmington Waterfront Development Project | The 94 acre proposed project site includes about 60 acres south of C street, north of Slip 5, east of Lagoon Avenue, and west of Broad Avenue. The major elements of the Project include pedestrian-oriented features, a Land Bridge park, and a waterfront promenade; new infrastructure for 150,000 sf of future industrial development; 70,000 sf of commercial/retail development; sustainable design elements; 1 acre Railroad Green Park; an observation tower; and transportation improvements. The proposed Project includes removal of the existing LADWP oil tanks. The proposed Project would also extend the Waterfront Red Car Line and California Coastal Trail along John S. Gibson Boulevard and Harry Bridges Boulevard, and potentially develop a 14,500 sf Red Car museum in the historic Berkin's Building complex. | FEIS/FEIR certified June 18, 2009. |
| 4 | From Bridge to Breakwater Master Development Plan for the San Pedro Waterfront and Promenade | The proposed project involves a 30-year, multiple phase, master development plan involving development projects and infrastructure improvements for approximately 418 acres. The project includes up to 9.64 acres of new water harbors, wharfs, piers, and floating docks for waterfront activities; creation of a 9.25 mile pedestrian promenade along the entire waterfront; creation of 4.50 miles of on-street bike, roller blade, and pedestrian paths; and approximately 171 acres of public open space areas, including new parks, beaches, recreational areas, landscaped areas, and promenades and plazas. The plan also includes approximately 182 acres of development parcels and 55.5 acres of public streets and sidewalks for up to approximately 1.5 million square feet of visitor-serving and maritime commercial retail, office, restaurants, recreational, and hotel uses. Harbor Boulevard would be realigned. The Red Car Line would be extended to Cabrillo Beach. Parking encompasses a series of surface parking lots and parking structures, spread throughout the project area. | NOP submitted September 8, 2005. FEIR certified September 9, 2009. Project ongoing. |
| 5 | Ultramar Inc. Marine Terminal Lease Renewal Project | Proposal to renew the lease between the Port of LA and Ultramar Inc., for continued operation of the marine terminal facilities at Berths 163-164, as well as associated tank farms and pipelines. Project includes upgrades to existing facilities to increase the proposed minimum throughput to 10 million barrels per year (mby), compared to the existing 7.5 mby minimum. | NOP submitted April 29, 2004. Currently on hold. |

| No. in Figure 4-1 | Project Title and Location | Project Description | Project Status (Time Frame) |
|---|---|---|---|
| 6 | Waterfront Gateway Development Project | The project includes a waterfront Boardwalk along the nothern portion of Slip 93; an entry plaza near the intersection of Harbor Blvd. and Swinford St.; a 50-ft-wide Pedestrian Pkwy between Swinford St. and 5th St. along the east side of Harbor Blvd.; streetscape improvements on both sides of Harbor Blvd. between Swinford St. and 5th St.; intersection improvements along Harbor Blvd. at Swinford St, First Street, 5th Street; and streetscape improvements along First St. between Harbor Blvd. and Gaffey St. | Project complete. |
| 7 | Berth 136-147 (TraPac) Container Terminal Project | Element of the West Basin Transportation Improvement Projects. Expansion and redevelopment of the TraPac Container Terminal to 243 acres, including improvement of Harry Bridges Boulevard and a 30-acre landscaped area, relocation of an existing rail yard and construction of a new on-dock rail yard, and reconfiguration of wharves and backlands (includes filling of the Northwest Slip, dredging, and construction of new wharves.) | Construction started in 2009 and ongoing through 2016. |
| 8 | Berths 171-181, Pasha Marine Terminal Improvements Project | Redevelopment of existing facilities at Berths 171-181 as an Omni (multi-use) facility. | Project EIR on hold. |
| 9 | Berth 97-109 [China Shipping] Container Terminal Project | Development of the China Shipping Terminal Phase I, II, and III, including wharf construction, landfill and terminal construction, and backland development. | Project complete. |
| 10 | Berths 195-200A WWL Vehicle Services Americas, Inc. Project | Expansion of vehicle offloading processing, and operations, including cargo increase up to 220,000 vehicles per year and construction of two additional rail loading racks. | MND certified August 16, 2012. |
| 11 | C Street/ Figueroa Street Interchange | The C Street/Figueroa Street interchange would be redesigned to include an elevated ramp from Harry Bridges Boulevard to I-110 Freeway, over John S. Gibson Boulevard. There would be a minimum 15-ft clearance for vehicles traveling on John S. Gibson Boulevard. An additional extension would connect from Figueroa Street to the new elevated ramp, over Harry Bridges Boulevard. | MND certified June 21, 2012. Construction expected 2013 through 2016. |
| 12 | John S. Gibson Boulevard/I-110 Access Ramps and SR-47/I-110 Connector Improvement Project | Program may include C Street/ I-110 access ramp intersection improvements, I-110 NB Ramp/John S. Gibson Boulevard intersection improvements, and SR-47 on- and off-ramp at Front Street. These projects would reduce delays and emissions in the I-110/SR-47 area and improve safety and access. | MND certified April 5, 2012. Construction expected 2012-2015. |
| 13 | Berths 176-181 Break Bulk Terminal Redevelopment | This project would expand the break bulk terminal at Berths 176-181 by up to 8 acres, demolish an existing shed, replace an 700-foot section of wharf, and include additional wharf improvements along Berths 179-181. | Conceptual planning stage. |
| 14 | SSA Marine Outer Harbor Fruit Facility Relocation | Proposal to relocate the existing fruit import facility at 22nd and Miner to Berth 153. | On hold. |
| 15 | Crescent Warehouse Company Relocation | Relocate the operations of Crescent Warehouse Company from Port Warehouses 1, 6, 9, and 10 to an existing warehouse at Berth 153. Relocate Catalina Freight operations from Berth 184 to same building at Berth 153. | Project complete. |

| No. in Figure 4-1 | Project Title and Location | Project Description | Project Status (Time Frame) |
|---|---|---|---|
| 16 | South Wilmington Grade Separation | An elevated grade separation would be constructed along a portion of Fries Avenue or Marine Avenue, over the existing rail line tracks, to eliminate vehicular traffic delays that would otherwise be caused by trains using the existing rail line and the new ICTF rail yard. The elevated grade would include a connection onto Water Street. There would be a minimum 24.5-ft clearance for railcars traveling under the grade separation. | Construction expected to be complete spring 2015. |
| 17 | Wilmington Waterfront Master Plan (Avalon Boulevard Corridor Project) | Planned development intended to provide waterfront access and promoting development specifically along Avalon Boulevard. | EIR certified June 18, 2009. Construction expected 2012 through 2014. |
| 18 | Berths 121-131 (Yang Ming) Container Terminal Improvements Project | Reconfiguration of wharves and backlands. Expansion and redevelopment of the Yang Ming Terminal. | Public review period for NOI/NOP ends May 25, 2014. |
| 19 | Port Transportation Master Plan | Port-wide transportation master plan for roadways in and around POLA facilities. Present and future traffic improvement needs are being determined, based on existing and projected traffic volumes. Some improvements under consideration include I-110/SR-47/Harbor Boulevard interchange improvements; south Wilmington grade separations; and additional traffic capacity analysis for the Vincent Thomas Bridge. | Conceptual planning document ongoing. |
| 20 | Channel Deepening Project | Dredging and sediment disposal. This project deepened the POLA Main Channel to a maximum depth of –53 ft mean lower low water (MLLW; lesser depths are considered as project alternatives) by approximately 4 were for up to 151 acres (61 hectares) of landfill biology, for new fill locations. The Additional Disposal Capacity Project would provide approximately 4 million cubic yards of disposal capacity needed to complete the Channel Deepening Project and maximize beneficial use of dredged material by constructing lands for eventual terminal development and provide environmental enhancements at various locations in the Port of Los Angeles. | Project complete. |
| 21 | Berths 206-209 Interim Container Terminal Reuse Project | Proposal to allow interim reuse of former Matson Terminal while implementing green terminal measures. | New EIR on hold. |
| 22 | POLA Charter School and Port Police Headquarters, San Pedro | Proposal to lease property for the POLA Charter School and to construct a Port Police Headquarters and office. 330 S. Centre Street, San Pedro. | Project complete. |
| **Port of Los Angeles and/or Port of Long Beach Potential Port-Wide Operational Projects** | | | |
| 23 | Navy Way/Seaside Avenue Interchange | Construction of a new flyover connector from northbound Navy Way to westbound Seaside Avenue. This improvement is part of the Ports Infrastructure Cargo Fee Program. | Conceptual planning stage. |
| 24 | Terminal Free Time | Port program to reduce container storage time and use gates at off-peak travel times. | Program in progress. |
| 25 | Extended Terminal Gates (Pier Pass) | Port program to use economic incentives to encourage cargo owners to use terminal gates during off-peak hours. | Program in progress. |

| No. in Figure 4-1 | Project Title and Location | Project Description | Project Status (Time Frame) |
|---|---|---|---|
| 26 | Shuttle Train/Inland Container Yard | ACTA program to encourage rail shuttle service between the on-dock rail facilities at the ports and a rail facility in Colton (in the Inland Empire). The pilot program will consist of a daily train to and from Colton. The containers will be trucked between the Colton rail facility and the cargo owners' facility. | Preliminary study in progress. |
| 27 | Origin/Destination and Toll Study | Port study to identify the origin and destination of international containers in the Los Angeles area, to determine the location of warehouses and identify the routes truck drivers use to move containers to and from the ports. The bridges serving Terminal Island (Vincent Thomas, Gerald Desmond and Heim Bridge) are not currently designed to handle the trade volumes projected at the ports. The ports are conducting a toll study to explore potential funding sources for bridge replacement and truck driver behavior if tolls were assessed on the bridges. | Study in progress. |
| 28 | Virtual Container Yard | ACTA and Ports program to explore implementing a system that would match an empty container from an import move to one from an empty export move. | Conceptual planning phase. |
| 29 | Increased On-Dock Rail Usage | ACTA and Ports program with shipping lines and terminal operators to consolidate intermodal volume of the neighboring terminals to create larger trains to interior points, thereby reducing need for truck transportation. | Conceptual planning phase. |
| 30 | Optical Character Recognition | Ports terminals have implemented Optical Character Recognition technology, which eliminates the need to type container numbers in the computer system. This expedites the passage of trucks through terminal gates. | Conceptual planning phase. |
| 31 | Truck Driver Appointment System | Appointment system that provides a pre-notification to terminals regarding which containers are planned to be picked up. | Conceptual planning phase. |
| **Community of San Pedro Projects** | | | |
| 32 | San Pedro Community Plan Update | The Proposed San Pedro Community Plan includes changes in land use designations and zones that are intended to accommodate growth anticipated in the SCAG 2030 Forecast. The Plan aims at preserving existing single-family residential neighborhoods and accommodating a variety of housing opportunities near public transit, services, and amenities. | DEIR submitted August 10, 2012. Circulation period ended September 24, 2012. |
| 33 | Single Family Homes (Gaffey Street) | Project to construct 135 single-family homes on about 2 acres. 1427 N Gaffey Street (at Basin Street), San Pedro. | Construction on-going. Several homes have been occupied. |
| 34 | Mixed-use development, 281 W 8th Street | Project to construct 72 condominiums and 7,000 square feet retail. 281 West 8th Street (near Centre Street), San Pedro. | Under construction. |
| 35 | 319 N. Harbor Boulevard | Construction of 94 unit residential condominiums. | Construction has not started. |
| 36 | Ponte Vista/Naval Site | Construct 1725 condominiums, 575 senior housing units, and 4 baseball fields at 26900 Western Avenue (near Green Hills Park), San Pedro. Rolling Hills Prep School being developed in an adjacent lot. | Under construction. |

| No. in Figure 4-1 | Project Title and Location | Project Description | Project Status (Time Frame) |
|---|---|---|---|
| 37 | Cabrillo Avenue Extension | This project will widen Cabrillo Avenue to 36-ft of roadway and 9-ft of sidewalk from Miraflores Avenue to existing alley. It will also widen the existing alley to 25-ft and connect it to Channel Street by acquiring right-of-way. | Construction is expected to begin in August 2013, and to be completed by July 2014. |
| 38 | Pacific Corridors Redevelopment Project | Development of commercial/retail, manufacturing, and residential components. Construction underway of four housing developments and Welcome Park. | Expected completion in 2032. |
| **Community of Wilmington Projects** | | | |
| 39 | Distribution Center and Warehouse | Project to construct a 135,000-square foot distribution center and warehouse on a 240,000-square foot lot with 47 parking spaces at 755 East L Street (at McFarland Avenue) in Wilmington. | Construction has not started. |
| 40 | Dana Strand Public Housing Redevelopment Project | Project to construct 413 units of mixed-income affordable housing in four phases: Phase I - 120 rental units; Phase II - 116 rental units; Phase III - 100 senior units; Phase IV - 77 single family homes. The plans also include a day care center, lifelong learning center, parks and landscaped open space. | Phases I and II have been completed and are being leased. Phases III and IV are currently under development. |
| 41 | 931 N. Frigate Avenue | Private school expansion for 72 student increase for a total of 350 students. | Construction has not started. |
| **Community of Harbor City Projects** | | | |
| 42 | Kaiser Permanente South Bay Master Plan | Project to construct a 303,000-square foot medical office building, 42,500 square feet of records center/ office/warehouse, and 260 hospital beds. 25825 Vermont Street, Harbor City (at PCH). | Project complete. |
| **Projects in Wilmington/Carson** | | | |
| 43 | ConocoPhillips Refinery Tank Replacement Project | ConocoPhillips operators are in the process of removing seven existing petroleum storage tanks and replacing them with six new tanks, four at the Carson Plant, and two new tanks at the Wilmington Plant. | ND certified July 2008. |
| 44 | Phillips 66 Los Angeles Refinery PM10 and NOx Reduction Projects | Proposed projects that will reduce particulate matter less than 10 microns in diameter and nitrogen oxide emissions at its existing Wilmington and Carson Plants. Modifications included new wet gas scrubber, wet electrostatic precipitator, and a selective catalytic reduction unit at the Wilmington Plant. A new selective catalytic reduction unit was also installed at the Carson Plant. | Project Complete. |
| **City of Rancho Palos Verdes Projects** | | | |
| 45 | Green Hills Master Plan Revision | Revision to the Green Hills Cemetery Master Plan, addressing ultimate build-out of the cemetery site over the next 30 to 50-years allowing up to a total of 643,259 cubic yards of grading. | Planning Comission approved on April 27, 2007. |
| **City of Rolling Hills Estates Projects** | | | |
| 46 | Chandler Rance / Rolling Hills Country Club Project | Project includes 114 new single family homes, a reconfigured 18-hole golf course, and a new approximately 61,000 square foot clubhouse and related facilities. The 228-acre project site is located on the existing sites of the Chandler Quarry and Rolling Hills Country Club. | City Council approved FEIR on July 26, 2011. |




Environmental Audit, Inc.

FIGURE 4-1
CUMULATIVE PROJECTS LOCATION MAP
Phillips 66 ULSD Project

Project No. 2696

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Local impacts were assumed to include projects which would occur within the same timeframe as the ULSD Project (about 2002 until 2012) and which are within a one-mile radius of the Refinery site. These projects generally include other Refinery projects, port projects, and projects in near-by cities. Figure 4-1 identifies by number the location of each of the projects. The numbers are used to identify the related projects throughout the discussion of cumulative impacts. Impacts to most environmental resources are generally localized in nature (e.g., air quality, noise, and traffic). Consequently, there is sufficient distance between projects located over one mile away from the Wilmington Plant to avoid cumulative impacts.

The cumulative projects in Table 4-1 have been identified using databases from the Port of Los Angeles, State Clearinghouse, City of Los Angeles (including for the communities of San Pedro and Wilmington), County of Los Angeles, SCAQMD, City of Carson, City of Harbor City, City of Lomita, City of Rancho Palos Verdes, and City of Rolling Hills Estates.

No major changes were required at the Phillips 66 Carson Plant because the project modifications at the Carson Plant did not result in direct physical impacts to the environment (e.g., air emissions, noise, traffic, etc.) (CEQA Guidelines §15064(d)(1)) or indirect environmental impacts (CEQA Guidelines §15064(d)(2)), there were no environmental impacts associated with modifications at the Carson Plant to be evaluated in Chapter 3 of this EIR. For the same reason, since there were no physical impacts to the environment at the Carson Plant, the cumulative impacts analysis will be limited to the Wilmington Plant and projects within approximately one mile of the Wilmington Plant.

## 4.2 CUMULATIVE AIR QUALITY IMPACTS

### 4.2.1 OPERATIONAL EMISSION IMPACTS

The past, present, and reasonably foreseeable future projects would have a significant cumulative impact. However, the ULSD Project operational emissions are substantially less than the SCAQMD project-specific significance thresholds (see Table 3.3-7). Therefore, project-specific air quality impacts associated with operational emissions from the ULSD Project are not considered to be a cumulatively considerable contribution to significant adverse cumulative air quality impacts.

Table 4-2 presents the maximum estimated daily emissions from the ULSD project as a percentage of the CEQA significance thresholds. The contribution of the project to cumulative air quality is very small. The peak daily emissions of CO, SOx, PM10 and PM 2.5 are all well below 10 percent of the project-specific CEQA significance thresholds, and CO is less than one percent of the threshold. In addition, while the table shows that peak daily emissions of NOx are approximately one quarter of the project-specific significance threshold, a substantial part of these emissions are related to concurrent truck deliveries of ammonia and catalyst that might occur a maximum of one day every two to three years. The delivery of up to four truck trips per day of Unit 90 catalyst will occur for two weeks every two to three years, and the delivery of one truck per day of ammonia will occur once per year; both events are infrequent, and they may never occur at the same time. On all other days, the ULSD project will result in a net reduction in NOx emissions.

**TABLE 4-2**

**ULSD Operational Emissions Cumulative Contribution**

| | CO | VOC | NOx | SOx | PM10 | PM2.5 |
|---|---|---|---|---|---|---|
| ULSD Project Emissions (lbs/day)(1) | **0.93** | **10.36** | **14.06**(2) | **4.11** | **4.67** | **4.67** |
| SCAQMD Significance Thresholds (lb/day) | 550 | 55 | 55 | 150 | 150 | 55 |
| Individually Significant? | NO | NO | NO | NO | NO | NO |
| Percentage of Significance Threshold | 0.17 | 18.83 | 25.56 | 2.74 | 3.11 | 8.49 |
| Cumulatively Considerable Contribution? | NO | NO | NO | NO | NO | NO |

(1) See Table 3.3-7.
(2) See Appendix B for detailed emission calculations. Differences in emissions in this table and Appendix B are due to rounding.

Other related projects at the Refinery included the construction of air pollution control equipment to reduce PM10 and NOx from the Phillips 66 Refinery (No. 40). This project resulted in large emission decreases in NOx, SOx, and particulate matter from the installation of a wet gas scrubber on the Fluid Catalytic Cracking Unit and an SCR Unit on Boiler 7. Therefore, cumulative air quality impacts from Refinery projects were beneficial during this period.

Other off-site cumulative projects could result in significant operational air quality impacts including a number of Port projects, such as Berth 212-224 Container Terminal Improvements (#1), San Pedro Waterfront Promenade (#4), Waterfront Gateway Project (#6), Berth 136-147 TraPac Terminal (#7), Berths 97-109 - China Shipping (#9), Berths 195-200A WWL Vehicle Terminal (#10), and Berth 121-131 Yang Ming Terminal (#18). In addition, projects could provide air quality improvements by reducing traffic delays, such as the South Wilmington Grade Separation (#16), I-110/C Street/Figueroa Street Interchange (#11), Port Transportation Master Plan (#19), and Increased On-dock Rail Usage (#29). However, as already noted above operational emissions from the ULSD Project are substantially less than the applicable project-specific operational significance thresholds and cumulative Refinery projects have resulted in a net reduction in emissions. Therefore, operational emissions associated with the ULSD Project are not considered a cumulatively significant contribution to significant adverse cumulative air quality impacts.

### 4.2.2 TOXIC AIR CONTAMINANT IMPACTS

The impacts from TACs are localized impacts. For example, impacts from exposures to TACs decline by approximately 90 percent at 300 to 500 feet from the emissions source (SCAQMD, 2005). As indicated in Table 4-1, most related projects are located at greater than 500 feet from the Phillips 66 Refinery or are projects that would not result in increases in TACs, such that potential

TAC impacts would not overlap with the ULSD Project. The ULSD Project impacts on health effects associated with exposure to TACs are expected to be substantially below the SCAQMD's cancer risk and hazard index significance thresholds and, therefore, less than significant. The ULSD Project impacts on cancer risk to the MEIR and MEIW were estimated to be $7.35 \times 10^{-8}$ (about 0.07 per million) and $9.20 \times 10^{-9}$ (about 0.009 per million), respectively, which is well below the significance threshold of ten per million. The chronic health index and acute health index was estimated to be 0.0008 and 0.0001, respectively, which is well below the significance threshold of one (1.0). Therefore, the ULSD Project impacts are not considered to be cumulatively considerable and, therefore; are not expected to contribute to significant adverse cumulative TAC impacts.

Other off-site cumulative projects could result in significant TAC emissions, including a number of port projects such as Berth 212-224 Container Terminal Improvements (#1), San Pedro Waterfront Promenade (#4), Waterfront Gateway Project (#6), Berth 136-147 TraPac Terminal (#7), Berths 97-109 - China Shipping (#9), Berths 195-200A WWL Vehicle Terminal (#10), and Berth 121-131 Yang Ming Terminal (#18). In addition, projects could provide air quality improvements, including TAC emissions, by reducing traffic delays, such as the South Wilmington Grade Separation (#16), C Street/Figueroa Street Interchange (#11), Port Transportation Master Plan (#19), I-110/SR-47 Connector Improvement Program (#12), and Increased On-dock Rail Usage (#29). However, as already noted above TAC emissions from the ULSD Project are substantially less than the applicable project-specific health risk significance thresholds. Therefore, cumulative impacts of TACs on health risks are expected to be less than significant.

### 4.2.3 MITIGATION MEASURES

No significant air quality impacts have been identified. Therefore, no mitigation measures are required for the ULSD Project. However, the SCAQMD will impose AQ-1, which contains specific reporting requirements, to ensure that the Refinery operations are consistent with the assumptions upon which the air quality analysis is based.

### 4.2.4 LEVEL OF SIGNIFICANCE AFTER MITIGATION

The project-specific air quality impacts due to operational activities do not exceed the SCAQMD significance thresholds, are not considered to be cumulatively considerable, and do not contribute to significant adverse cumulative operational air quality impacts. The project-specific TAC health impacts are not significant, are also not considered to be cumulatively considerable, and do not generate significant adverse cumulative TAC impacts.

CEQA Guideline §15130(a) indicates that an EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable. Where a lead agency is examining a project with an incremental effect that is not cumulatively considerable, a lead agency need not consider the effect significant, but must briefly describe the basis for concluding that the incremental effect is not cumulatively considerable. Therefore the project's contribution to operational air emissions, including toxic air contaminant emissions is not cumulatively considerable and thus not cumulatively significant because the environmental conditions would essentially be the same whether or not the ULSD Project is implemented (CEQA Guidelines §15130). This conclusion is consistent with CEQA Guidelines §15064(h)(4), which states, "The mere existence of cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's incremental effects are cumulatively considerable".

# CHAPTER 5

# PROJECT ALTERNATIVES

# 5.0 PROJECT ALTERNATIVES

## 5.1 INTRODUCTION

This EIR provides a discussion of alternatives to the ULSD Project as required by CEQA. According to the CEQA guidelines, alternatives should include realistic measures to attain the basic objectives of the proposed project and provide means for evaluating the comparative merits of each alternative. In addition, though the range of alternatives must be sufficient to permit a reasoned choice, they need not include every conceivable project alternative (CEQA Guidelines, §15126.6(a)). The key issue is whether the selection and discussion of alternatives fosters informed decision making and public participation.

Alternatives presented in this chapter were developed by reviewing alternative options to reduce the sulfur content of feed-stocks in order to obtain more CARB-compliant diesel blending stocks. Because of the limited range of options for reducing sulfur content in feedstocks, each project alternative described below is similar to the ULSD Project in most respects. The rationale for selecting specific components of the Project on which to focus the alternatives analysis rests on CEQA's requirements to present a range of reasonable project alternatives that could feasibly attain the basic objectives of the project, while generating fewer or less severe adverse environmental impacts.

The objectives of the Project are to produce ULSD that complies with the diesel sulfur content standards set by the SCAQMD, CARB, and U.S. EPA, and to insure that adequate supplies of ULSD are available to meet future demand. With the exception of the "No-Project" alternative, the alternatives presented in this chapter involve modifications to aspects of the specific equipment or operations of the ULSD Project that would still allow the Refinery to meet the objectives of producing ULSD meeting U.S. EPA, CARB, and SCAQMD specifications for gasoline and diesel fuel.

Section 15126.6(f) of the CEQA Guidelines stipulates that the range of alternatives required in an EIR is governed by a rule of reason in that the EIR must discuss only those alternatives "necessary to permit a reasoned choice" and those that could feasibly attain most of the basic objectives of the Refinery. As discussed in Section 1.4, no court decision invalidated any aspect of the prior CEQA documents except for the baseline used in the air quality impacts analysis for Refinery operations. The Draft EIR for the Phillips 66 ULSD Project focuses on the issues as directed by the court and is limited to air quality setting and impacts from Refinery operations. Therefore, the alternatives analysis is also limited to air quality impacts from Refinery operations.

## 5.2 ALTERNATIVES REJECTED AS INFEASIBLE

In accordance with CEQA Guidelines §15126.6(c), a CEQA document should identify any alternatives that were considered by the lead agency, but were rejected as infeasible during the scoping process and briefly explain the reason underlying the lead agency's determination. CEQA Guidelines §15126.6(c) also states that among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are: (1) failure to meet most of the basic project objectives;

(2) infeasibility; or (3) inability to avoid significant environmental impacts. Furthermore, CEQA Guidelines §15126.6(f)(2)(B) indicates that if the lead agency concludes that no feasible alternative locations for the project exist, it must disclose the reasons for this conclusion, and should include the reasons in the EIR. The objectives of the ULSD Project are as follows:

- Reduce the sulfur content of diesel fuel produced at the Phillips 66 Los Angeles Refinery to reduce SOx and sulfate emissions from mobile sources in the basin.
- Reduce the sulfur content of diesel fuel produced at the Phillips 66 Los Angeles Refinery, which allows widespread use of particulate filters to reduce PM emissions that would otherwise fail if diesel fuel with a higher sulfur content is used.
- Comply with SCAQMD's Rule 431.2 which requires a reduction in sulfur content in diesel fuel used in stationary sources to 15 ppmw.
- Comply with CARB's 2000 Diesel Risk Reduction Plan to reduce risk exposure from diesel particulate matter.
- To ensure that adequate supplies of ULSD are available to meet future demand.
- Comply with the U.S. EPA's diesel fuel standards that required refiners to sell highway diesel fuel that meets a maximum sulfur standard of 15 ppmw.

The following two sub-sections include descriptions of alternatives rejected as infeasible and the rationale for rejecting each alternative.

### 5.2.1 ALTERNATIVE SITES

CEQA Guidelines §15126.6(f)(2) includes consideration of an alternative location for a project if any significant effects of the project can be avoided or substantially lessened. An alternative location for the ULSD Project has been rejected because it would not accomplish Refinery objectives and also because it is not feasible. The objective of the ULSD Project was to modify the existing Refinery so that it can continue to produce diesel fuel meeting regulatory requirements, as those requirements have become more stringent over time. The Refinery operates as an integrated manufacturing complex in which raw materials, including crude oil, are put through a series of treatments in processing units to produce a range of different fuels and other products and by-products. In addition to processing units, the integrated plant requires ancillary equipment, utilities and infrastructure such as natural gas, water, and electric transmission infrastructures; petroleum product transportation infrastructure; emissions control and wastewater treatment systems. For example, a hydrotreater unit requires numerous services provided by the refinery, e.g., refinery fuel gas, flares, storage facilities, feedstocks, etc. Thus, it is not feasible to isolate the "ULSD" components of the Refinery and establish them at a separate location on an alternative site. To produce compliant diesel fuel at an alternative location would in fact require the development of an entirely new refinery in an alternative location. This would require substantially more equipment and construction, be very costly and potentially generate substantially greater impacts in many environmental categories (e.g., air quality, traffic and hazards) than the ULSD Project at the Refinery. It also would require years of lead time to engineer, obtain permits and approvals, and construct. In addition, there will be an uncertainty necessary permits would be approved in a timely manner. Therefore, an alternative site for the ULSD Project is not considered to be feasible.

### 5.2.2 PURCHASE OF LOW SULFUR FEEDSTOCKS

Rather than reducing the sulfur content of diesel at the Phillips 66 Wilmington Plant, low sulfur blending components could be purchased by Phillips 66, transported to the Refinery, and blended with its manufactured streams. This alternative would require: (1) that sufficient quantities of the appropriate blendstocks be available for purchase at an economic price; (2) that the required quantities can be delivered to the Refinery by marine vessel, railcar, truck or existing pipelines; and, (3) that the Refinery have sufficient tankage to store and handle the required quantities of imported blendstocks. Since the effective dates that the ULSD standards went into effect, existing refineries in California have been using all their low sulfur feedstocks to manufacture ULSD and maintain their own diesel output. Therefore, it is assumed that low sulfur feedstocks, if available, would be purchased from sources outside of California and transported to the Wilmington Plant via marine vessels, resulting in increased marine vessel emissions. Therefore, this alternative is rejected as infeasible because it is unlikely that sufficient quantities of low sulfur feedstocks within California would be available for purchase. The other option under this alternative of importing foreign feedstocks from outside of California would potentially generate significant adverse environmental impacts to more environmental topic areas or make existing impacts substantially worse, which is inconsistent with the objectives of an alternatives analysis.

## 5.3 DESCRIPTION OF THE PROJECT ALTERNATIVES

### 5.3.1 ALTERNATIVE 1 – NO PROJECT ALTERNATIVE

CEQA Guidelines§15126.6(e)(2) requires that the No Project Alternative "discuss the existing conditions at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved." For the ULSD Project and this EIR, the environmental baseline is considered to be the time that environmental analysis commenced which was generally the 2002-2003 timeframe, which will also serve as the basis for the analysis of the No Project Alternative. As noted earlier, the ULSD Project has been constructed and is operational. However, in order to provide an unbiased analysis of the No Project Alternative, the environmental analysis of this alternative will assume the 2002-2003 timeframe as if the ULSD Project had not been approved and built.

The No Project Alternative would not allow the Wilmington Plant to produce diesel fuel that complies with the U.S. EPA, CARB, and SCAQMD mandates for ultra low sulfur diesel (15 ppmw sulfur). Under this scenario, any excess high sulfur diesel material that could not be processed at either the FCC or Hydrocracker Units would have to be sold into the cutter/gas oil market and likely shipped outside of the country. This would mean that there would be increased marine shipments of higher sulfur material via marine vessel. It is expected that the Jet Fuel Hydrotreater Unit 89 would be shutdown. This alternative could require that additional facilities be installed, including a Vapor Recovery Unit at the Marine Terminal, to accommodate large and frequent marine shipments of high sulfur diesel material.

In addition, low sulfur diesel blendstocks could be shipped into the Refinery, if it could be found for purchase on the market. As discussed under Section 5.2.2, low sulfur feedstocks, if available, could be purchased from sources outside of California and transported to the Wilmington Plant via marine vessels. Sufficient quantities of low sulfur feedstocks are not available to offset the ULSD produced under the Phillips 66 ULSD Project; however, low sulfur feedstocks may be occasionally available for purchase. Under the No Project Alternative, additional quantities of low sulfur feedstocks may be delivered via marine vessel to the marine terminal/Refinery. Nonetheless, under the No Project Alternative, Phillips 66 would produce little, if any, ULSD, resulting in a decrease in ULSD in California.

### 5.3.2 ALTERNATIVE 2 – NEW S-ZORB UNIT

Alternative 2 would use S-Zorb technology, which is an alternative hydrotreating technology, to produce ULSD. S-Zorb involves similar technology to other hydrotreaters and includes a reactor, regenerator, and reducer. The main chemical reactions in the S-Zorb reactor are sulfur adsorption, olefin hydrogenation, and olefin hydroisomerization. The sorbent absorbs sulfur compounds from the feedstocks in the presence of hydrogen. Sorbent regeneration and reduction occur in the regenerator and reducer. S-Zorb removes sulfur by producing sulfur dioxide which would be fed to a sulfuric acid plant or treated by a control device. Traditional hydrotreaters treat feedstocks using a catalyst in the presence of hydrogen to produce hydrogen sulfide.

Under Alternative 2, the existing Unit 90 Hydrotreater would be replaced. Therefore, Alternative 2 would require the construction of a new S-Zorb hydrotreating unit including the following equipment: feed filter and feed surge drum, reactor charge pump, reactor feed/effluent exchanger, reactor charge heater, reactor, reactor effluent filter, product separators, stabilizer, recycle hydrogen compressor, sorbent flow equipment (including reducer, reactor, and reactor receiver), regenerator feed drum, regenerator, and regenerator receiver. Other Refinery modifications would be needed to process the sulfur dioxide bearing off-gas generated by the S-Zorb process.

The S-Zorb hydrotreating process was developed by Phillips Petroleum Company in the late 1990's and has been installed in one refinery for treating gasoline. S-Zorb has never been used to commercially hydrotreat diesel fuels, therefore, the current feasibility of this technology for producing ULSD is not proven.

### 5.3.3 ALTERNATIVE 3 – HIGH PRESSURE HYDROTREATING

Alternative 3 would use high pressure hydrotreating to not only reduce sulfur to meet ULSD requirements, but would also alter other properties of diesel fuel not required to meet ULSD specifications. Under Alternative 3, the existing Unit 90 Hydrotreater would be replaced. Alternative 3 would require the construction of an entirely new unit, a 1200 psig hydrotreater, instead of only modifying the existing medium pressure Unit 90. In addition, Alternative 3 would require either a new hydrogen plant or the purchase of additional hydrogen from a third party due to the more extensive hydrotreating of a high pressure unit, which is beyond that required to remove sulfur to ULSD levels. Alternative 3 would require substantially more construction activities as a new hydrotreating unit would be required and potentially a new hydrogen production unit, as compared to modification of an existing unit. Therefore, Alternative 3 would result in greater construction activities, higher emissions, higher hazard impacts and higher costs than the ULSD Project.

## 5.4 AIR QUALITY IMPACTS FROM THE PROJECT ALTERNATIVES COMPARED TO THE ULSD PROJECT

### 5.4.1 ALTERNATIVE 1 – NO PROJECT ALTERNATIVE

#### 5.4.1.1 Air Quality

Air quality impacts associated with construction of the ULSD Project would be eliminated under Alternative 1. Construction emissions associated with the ULSD Project were considered less than significant for all pollutants in previous environmental analyses (SCAQMD, 2004 and 2005). Alternative 1 could require construction activities associated with additional vapor recovery at the marine terminal to transport greater quantities of low sulfur feed stocks. Construction activities required under the No Project Alternative are also expected to be less than significant.

The stationary source emissions associated with the operational phase of Alternative 1 would be less than the ULSD Project within the Basin since limited modifications would be required to the Refinery under Alternative 1. Although less than significant, the operational emissions associated with the ULSD Project identified in Table 3.3-7 would be eliminated.

Under Alternative 1, the Refinery would continue to produce gasoline, diesel and jet fuel range blending materials as a result of the crude refining process. Without the ULSD Project, these the diesel fuel blending materials would exceed sulfur limits and could generally not be sold in the United States. It is expected that additional quantities of high sulfur feed stocks (e.g., diesel fuel or diesel blending stocks) would be delivered to the marine terminals for transfer offshore to other countries. Therefore, the No Project Alternative would result in increased off-shore or rail transportation emissions associated with the transport of higher sulfur feedstocks, likely via marine vessel.

Under Alternative 1, it is also expected that additional quantities of low sulfur feed stocks (e.g., diesel fuel or diesel blending stocks) would be delivered to the marine terminal/Refinery, when found available for purchase on the market. The No Project Alternative could also result in increased ground transportation emissions associated with the transport of low sulfur feedstocks. The No Project Alternative is expected to result in additional transport of products using marine vessels, resulting in higher transportation emissions than under the ULSD Project. Therefore, air quality impacts under the No Project Alternative are expected to be greater than the ULSD Project and are expected to be significant.

Alternative 1 would eliminate the increased toxic air contaminant emissions from stationary sources associated with the ULSD Project and the associated health risks. The health risks associated with the ULSD Project (both carcinogenic and non-carcinogenic) were considered to be less than significant. However, under Alternative 1, there could be increased transportation of diesel fuel blendstocks to the terminals/Refinery along with the associated increased transportation emissions, including increased diesel particulate emissions and the related health risk associated with exposure to diesel particulate emissions. Because of the cancer risk associated with diesel particulates is high compared to the combustion of other fuel sources, it is expected that the toxic air contaminant impacts would be greater under Alternative 1 than the ULSD Project and potentially significant.

## 5.4.2 ALTERNATIVE 2 – NEW S-ZORB UNIT

### 5.4.2.1 Air Quality

Air quality impacts associated with construction under Alternative 2 would increase because Alternative 2 would require the construction of a new S-Zorb unit, which is essentially a new hydrotreater unit, as well as modifications to the Sulfuric Acid Plant. Under Alternative 2, the construction activities are expected to be greater than the peak construction activities associated with the ULSD Project, since an entire new unit would need to be constructed and demolition of existing facilities would likely be required. Based on this assumption, the construction emissions under Alternative 2 are expected to be significant for CO, VOC, NOx, PM10 and PM2.5

Operational air quality impacts generated by Alternative 2 are expected to be greater than operational air quality impacts from the ULSD Project because a new unit will be operated (rather than modifications to an existing unit). Alternative 2 is expected to have higher fugitive VOC emissions than the ULSD Project because the S-Zorb Unit is a more complicated unit than the Unit 90 Hydrotreater, and thus would require more fugitive components (pumps, valves, and flanges) than Unit 90. In addition, the S-Zorb Unit uses a fluidized catalyst to remove sulfur, which would create particulate emissions that would be discharged through a flue gas stack. A new charge heater would also be required but is expected to be the same size as the existing heater. Overall, the air quality impacts associated with Alternative 2 are expected to be greater than the ULSD Project, but still less than significant due to the SCAQMD requirement to use BACT.

Alternative 2 would result in an increase in fugitive and particulate emissions, resulting in increased toxic air contaminant emissions from the new unit and increased health risks. Therefore, the health risks associated with Alternative 2 are expected to be greater than the ULSD Project, but are still expected to be less than significant due to the use of BACT. The health risks associated with the ULSD Project (both carcinogenic and non-carcinogenic) were considered to be less than significant.

## 5.4.3 ALTERNATIVE 3 – HIGH PRESSURE HYDROTREATING

### 5.4.3.1 Air Quality

Air quality impacts associated with construction under Alternative 3 would increase compared to the proposed Project because of the additional construction activities required. Construction activities include the construction of the new Hydrotreater Unit and possibly a new Hydrogen

Plant. The construction activities are expected to be about four times greater than the peak construction activities associated with the ULSD Project. Based on this assumption, the construction emissions from construction activities would be significant for CO, VOC, NOx, PM10 and PM2.5.

Under Alternative 3 air quality impacts are expected to be greater in the operational phase due to the construction and operation of two new units compared to the ULSD Project. The operation of a new hydrogen plant and hydrotreater units would require additional heat sources so a new heater is expected to be required. The charge heater for the new Hydrotreater would be larger than the existing heater as more heat is required to operate the high pressure hydrotreater. Therefore, the air quality impacts associated with Alternative 3 are expected to be higher than the existing Unit 90 Hydrotreater in the proposed Project because of the need for additional hydrogen and increased firing of combustion sources. Overall, the air quality impacts associated with Alternative 3 are expected to be greater than the ULSD Project, but still less than significant due to the SCAQMD requirement to use BACT that reduces operational air quality impacts.

Alternative 3 would result in an increase in toxic air contaminant emissions from all of the new units and an increase in the associated health risks. Therefore, the health risks associated with Alternative 3 are expected to be greater than the ULSD Project, but are still expected to be less than significant due to the use of BACT that reduces operation toxic risk.

## 5.5 CONCLUSION

Table 5-1 compares the potential environmental impacts of the various alternatives relative to the ULSD Project.

The No Project Alternative (Alternative 1) would eliminate less than significant air quality impacts from the ULSD project. Other less than significant impacts identified in the previous CEQA documents for the ULSD Project (e.g., hazard and noise impacts) would also be eliminated at the Wilmington Plant. However, Alternative 1 would increase operational emissions and not achieve the objectives of the ULSD Project to modify the existing Refinery to continue producing diesel meeting U.S. EPA, CARB, and SCAQMD ULSD requirements. Additional marine vessel emissions under Alternative 1 will result in greater emissions than the ULSD Project.

Alternatives 2 and 3 would achieve the Project objectives of producing ULSD but would generate greater and potentially significant impacts to air quality impacts from construction and TAC impacts as compared to the ULSD Project.

Based on the analysis in Chapter 5, Alternatives 1, 2, and 3 have the potential to generate greater air quality impacts than the ULSD Project. Therefore, the ULSD Project is considered the environmentally superior alternative because it generates air quality impacts that would be less than the air quality impacts generated by Alternatives 1, 2 and 3.

## TABLE 5-1

## ENVIRONMENTAL IMPACTS OF ALTERNATIVES AS COMPARED TO ULSD PROJECT

| ENVIRONMENTAL TOPIC | ULSD Project | Alternative 1[(1)] | Alternative 2[(1)] | Alternative 3[(1)] |
|---|---|---|---|---|
| **Air Quality** | | | | |
| Construction | NS | NS(-) | S | S |
| Operation | NS | S(+) | NS(+) | NS(+) |
| Toxic Air Contaminants | NS | NS(+) | NS(+) | NS(+) |

(1) See pages 5-4 through 5-6 for further details.

Notes:
S = Significant
NS = Not Significant
(-) = Potential impacts are less than the ULSD Project.
(+) = Potential impacts are greater than the ULSD Project.
(=) = Potential impacts are approximately the same as the ULSD Project.

# CHAPTER 6

# REFERENCES

# 6.0 REFERENCES

## 6.1 REFERENCES

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## 6.2 ORGANIZATIONS AND PERSONS CONSULTED

The CEQA statues and Guidelines require that organizations and persons consulted be provided in the EIR. The following organizations and persons have provided input into this document.

### 6.2.1 INDIVIDUALS AND ORGANIZATIONS

Phillips 66
Marshall Waller
Jimmy Greene

South Coast Air Quality Management District
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## 6.3 LIST OF ENVIRONMENTAL IMPACT REPORT PREPARERS

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# CHAPTER 7

# ACRONYMS AND GLOSSARY

# CHAPTER 7.0

# ACRONYMS AND GLOSSARY

| ABBREVIATION | DESCRIPTION |
|---|---|
| 2003 AQMP | 2003 Air Quality Management Plan |
| AB | Assembly Bill |
| AB1807 | California Toxic Air Contaminants Program (Tanner Bill) |
| AB2728 | Revised Tanner Bill |
| AB2588 | Air Toxic "Hot Spots" Information and Assessment Act |
| ACGIH | American Conference of Governmental Industrial Hygienists |
| AQMP | Air Quality Management Plan |
| BACT | Best Available Control Technology |
| Basin | South Coast Air Basin |
| CAA | Clean Air Act |
| Caltrans | California Department of Transportation |
| CARB | California Air Resources Board |
| CCAA | California Clean Air Act |
| CEQA | California Environmental Quality Act |
| CO | carbon monoxide |
| $CO_2$ | carbon dioxide |
| COHb | carboxyhemoglobin |
| EIR | Environmental Impact Report |
| g/hp-hr | grams per horse power hour |
| $H_2SO_4$ | sulfuric acid |
| HARP | Hotspots Analysis Reporting Program |
| hp | horsepower |
| HRA | health risk assessment |
| $HNO_3$ | nitric acid |
| IARC | International Agency for Research on Cancer |
| lbs/day | pounds per day |
| MATES | Multiple Air Toxic Exposure Study |
| MAHI | maximum acute hazard index |
| MCHI | maximum chronic hazard index |
| MDAB | Mojave Desert Air Basin |
| MEIR | maximum exposed individual resident |
| MEIW | Maximum Exposed Individual Worker |
| mmBtu/hr | million British Thermal Units per hour |
| mmscf/year | million standard cubic feet per year |
| $N_2$ | nitrogen |
| NAAQS | National Ambient Air Quality Standards |
| NESHAPS | National Emission Standards for Hazardous Air Pollutants |

| | |
|---|---|
| NMHC | non-methane hydrocarbon |
| NOI | Notice of Intent |
| NO | nitric oxide |
| NOx | nitrogen oxide |
| $O_2$ | oxygen |
| $O_3$ | ozone |
| PAHs | polycyclic aromatic hydrocarbons |
| PERP | Portable Equipment Registration Program |
| PM10 | particulate matter less than 10 microns in diameter |
| PM2.5 | particulate matter less than 2.5 microns in diameter |
| Port | Port of Los Angeles |
| ppb | parts per billion |
| ppmw | parts per million by weight |
| psi | pounds per square inch |
| PMPU | Port of Los Angeles Master Plan Update |
| PVC | polymer polyvinyl chloride |
| RECLAIM | Regional Clean Air Incentives Market |
| Refinery | Phillips 66 Los Angeles Refinery |
| REL | reference exposure levels |
| SCAG | Southern California Association of Governments |
| SCAQMD | South Coast Air Quality Management District |
| SCR | Selective Catalytic Reduction |
| SIP | State Implementation Plan |
| SOON | Surplus Off-Road Opt-In for NOx |
| $SO_2$ | sulfur dioxide |
| SO3 | sulfur trioxide |
| SOx | sulfur oxide |
| SSAB | Salton Sea Air Basin |
| TAC | Toxic Air Contaminant |
| TOG | Total Organic Gases |
| ULSD | ultra low sulfur diesel |
| U.S. EPA | United States Environmental Protection Agency |
| $ug/m^3$ | micrograms per cubic meter |

## GLOSSARY

| TERM | DEFINITION |
|---|---|
| Alkylation | The reaction of low-molecular-weight olefins with an isoparafin to produce a saturated compound of high octane number. |
| Alkylate | The product of an alkylation process. |
| Aqueous | Formed from water, having a water base. |
| Aromatics | Hydrocarbons which contain one or more benzene rings. |
| Barrel | 42 gallons. |
| Blending | One of the final operations in refining, in which two or more different components are mixed together to obtain the desired range of properties in the finished product. |
| Catalyst | A substance that promotes a chemical reaction to take place but which is not itself chemically changed. |
| Caustic Scrubber | Equipment used for the removal of potentially harmful gas emissions from various industrial processes through the application of a caustic scrubbing chemical which dissolves or destroys the harmful gases. |
| Cooling Tower | A cooling tower is a heat rejection device, which extracts waste heat to the atmosphere through the cooling of a water stream to a lower temperature. Common applications for cooling towers are providing cooled water for manufacturing and electric power generation. |
| Condensate | Steam that has been condensed back into water by either raising its pressure or lowering its temperature |
| Cogeneration | A cogeneration unit is a unit that produces electricity. |
| Cracking | The process of breaking down higher molecular weight hydrocarbons to components with smaller molecular weights by the application of heat; cracking in the presence of a suitable |

| | |
|---|---|
| | catalyst produces an improvement in product yield and quality over simple thermal cracking. |
| Crude Oil | Crude oil is "unprocessed" oil, which has been extracted from the subsurface. It is also known as petroleum and varies in color, from clear to tar-black, and in viscosity, from water to almost solid. |
| Distillation | The process of heating a liquid to its boiling point and condensing and collecting the vapor. |
| Feedstock | Material used as a stream in the refining process. |
| Flares | Emergency equipment used to incinerate refinery gases during upset, startup, or shutdown conditions. |
| Flue Gas | Gases produced by burning fuels in a furnace, heater or boiler. |
| Heat exchanger | Process equipment used to transfer heat from one medium to another. |
| Heater | Process equipment used to raise the temperature of refinery streams processing. |
| Hydrocarbon | Organic compound containing hydrogen and carbon, commonly occurring in petroleum, natural gas, and coal. |
| Hydrotreater | A machine that treats hydrocarbons. |
| Hydrotreating | A process to catalytically stabilize petroleum products of feedstocks by reacting them with hydrogen. |
| Isomerization | The rearrangement of straight-chain hydrocarbon molecules to form branch chain products; normal butane may be isomerized to provide a portion of the isobutane feed needed for the alkylation process. |
| Liquefied Petroleum Gas (LPG) | Liquefied light end gases often used for home heating and cooking; this gas is usually 95 percent propane, the remainder being split between ethane and butane. |
| Naphtha | A crude distillation unit cut in the range of $C_7$-420$^o$; naphthas are subdivided – according to the actual crude distillation cuts - into light, intermediate, heavy, and very heavy virgin naphthas; a typical crude distillation operation would be: |

| | | |
|---|---|---|
| $C_7$-160$^o$ | - | light naphtha |
| 160-280$^o$ | - | intermediate naphtha |
| 280-330$^o$ | - | heavy naphtha |
| 330-420$^o$ | - | very heavy naphtha |

| | |
|---|---|
| Natural Gas | A mixture of hydrocarbon gases that occurs with petroleum deposits, principally methane together with varying quantities of ethane, propane, butane, and other gases. |
| Octane | Measurement of the burning quality of the gasoline; reflects the Suitability of gasoline to perform in internal combustion engines smoothly without letting the engine knock or ping. |
| Olefins | Hydrocarbons that contain at least two carbons joined by double bonds; olefins do not naturally occur in crude oils but are formed during the processing. |
| Pentane | Colorless, flammable isomeric hydrocarbon, derived from petroleum and used as a solvent. |
| Reactor | Vessels in which desired reactions take place. |
| Refinery gas (fuel gas) | Gas produced from refinery operations used primarily for combustion in refinery heaters and boilers. |
| Reformate | One of the products from a reformer; a reformed naptha; the naptha is then upgraded in octane by means of catalytic or thermal reforming process. |
| Reformulated gasoline | New gasoline required under the federal Clean Air Act and California Air Resources Board to reduce emissions. |
| Reid Vapor Pressure | The vapor pressure of a product determined in a volume of air four times greater than the liquid volume at 100$^o$F; Reid vapor pressure (RVP) is an indication of the vapor-lock tendency of a motor gasoline, as well as explosion and evaporation hazards. |
| Selective Catalyst Reduction | An air pollution control technology that uses a catalyst to remove nitrogen oxides from flue gas. |
| Stripper or Splitter | Refinery equipment used to separate two components in a feed stream; examples include sour water strippers and naphtha splitters. |

# APPENDIX A

## NOTICE OF PREPARATION

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South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4182
(909) 396-2000 • www.aqmd.gov

**SUBJECT: NOTICE OF PREPARATION OF DRAFT ENVIRONMENTAL IMPACT REPORT**

**PROJECT TITLE: CONOCOPHILLIPS LOS ANGELES REFINERY ULTRA LOW SULFUR DIESEL PROJECT**

In accordance with the California Environmental Quality Act (CEQA), the South Coast Air Quality Management District (SCAQMD) is the Lead Agency and will prepare a Draft Environmental Impact Report (EIR) for the project identified above.

The ConocoPhillips Los Angeles Refinery first proposed modifications to produce Ultra Low Sulfur Diesel (ULSD) in 2004 and, pursuant to CEQA, the SCAQMD prepared CEQA documents for the proposed modifications. A Draft EIR is now being prepared for the Project because a decision by the California Supreme Court found certain deficiencies in previously prepared CEQA documents for the ConocoPhillips ULSD Project. Specifically, the court invalidated the baseline used in the previous air quality impact analysis. Therefore, the Draft EIR for the ULSD Project will address the air quality setting and air quality impacts associated with the ULSD Project. Additional information on the legal history of the ULSD project is attached to this cover letter.

The Notice of Preparation (NOP) normally serves two purposes: to solicit information on the scope of the environmental analysis for the ULSD Project and notify the public that the SCAQMD will prepare a Draft EIR to further assess air quality impacts that may have resulted from implementing the ULSD Project. However, as explained above and in the attached pages, in response to a California Supreme Court decision on previous CEQA documents for the ULSD project, the analysis will focus only on the air quality setting and impacts from the project.

The attached NOP is not an SCAQMD application or form requiring a response from you. The purpose of the NOP is simply to provide information to you on the above project. If the ULSD Project has no bearing on you or your organization, no action on your part is necessary. The project's description and location are described in the attached NOP.

Comments focusing on your area of expertise, your agency's area of jurisdiction, or issues relative to the air quality setting and impacts analysis should be addressed to Mr. Jeff Inabinet at the address shown above, sent by FAX to (909) 396-3324, or e-mailed to jinabinet@aqmd.gov. Comments must be received no later than 5:00 p.m. on April 26, 2012. Please include the name and phone number of the contact person for your organization.

**Project Applicant:** ConocoPhillips Los Angeles Refinery

**Date: March 23, 2012** **Signature:** Steve Smith

Steve Smith, Ph.D.
Program Supervisor
Planning, Rule Development and Area Sources

Reference: California Code of Regulations, Title 14, Sections 15082, 15103, and 15375

## LEGAL HISTORY OF THE CONOCOPHILLIPS ULSD PROJECT

On July 16, 2004, two lawsuits were filed challenging the SCAQMD's certification of the 2004 Final Negative Declaration and Addendum and approval of an SCAQMD permit for the ULSD Project (California Superior Court, Los Angeles County, Case Nos. BS091275 and BS091276). These lawsuits asserted that, among other things, an environmental impact report should have been prepared to review the impacts associated with the ConocoPhillips ULSD Project. The petitioners sought a preliminary injunction or stay to prevent Project construction during the pendency of the lawsuits; however, the court denied these requests. The lawsuits were amended following certification of a 2005 Subsequent Negative Declaration to add claims associated with that CEQA document and associated air permits issued by the SCAQMD. The trial occurred in two phases. Phase I challenged the SCAQMD's decision to prepare the Negative Declaration and Addendum. The Phase II trial was held a year later and challenged the Subsequent Negative Declaration, as well as SCAQMD's decision not to apply its Regulation XVII permitting program. Following each trial, the Los Angeles Superior Court concluded that the SCAQMD was correct on all counts. More specifically, the court concluded that the 2004 Final Negative Declaration, the 2004 Addendum, and the 2005 Final Subsequent Negative Declaration all complied with CEQA and that the permitting decisions complied with law. On June 29, 2006, the Superior Court entered Judgment. CBE and Valdez et al. filed notices of appeal in August 2006.

On appeal, plaintiffs argued substantial evidence that supported a fair argument that the Project would have a significant environmental impact on air quality, requiring the SCAQMD to prepare an EIR. On January 16, 2008, the Court of Appeal upheld the decision of the Superior Court on all claims but one. In the Court's opinion, an improper baseline was used to evaluate air quality impacts during operations. It concluded that the increased use of existing equipment should have been evaluated as part of the ULSD Project, not as part of the baseline, and, that if the proper baseline had been used, there was substantial evidence supporting a fair argument of significant NOx emissions, requiring preparation of an EIR. The SCAQMD filed a Petition for Review to the California Supreme Court on February 25, 2008, in which ConocoPhillips joined. The Petition sought review only of the portion of the Appellate Court's decision concerning baseline for evaluation of air quality impacts, and no other portion of the opinion was challenged by any party. On April 16, 2008, the Supreme Court granted review of the case.

On March 15, 2010, the Supreme Court concluded that the environmental impacts of a proposed Project must be compared to the environmental conditions that exist at the time the CEQA analysis is commenced, not the level of development or activity that would be allowed under existing permits or approvals. Because the ULSD Project may require increased utilization of existing boilers and other steam generating equipment, it was inconsistent with CEQA to use the maximum permitted operating capacity of this utility equipment as the baseline against which to compare NOx emissions from the proposed Project, rather than an estimate of the actual NOx emissions from the equipment under current operating conditions. Therefore, the SCAQMD is preparing an EIR for the ConocoPhillips ULSD Project to respond to the findings of the Supreme Court.

The Supreme Court left to the discretion of the SCAQMD the methodology for estimating the "actual existing levels of emissions" from the utility equipment. The Court explained:

> "The District and ConocoPhillips emphasized that refinery operations are highly complex and that these operations, including the steam generation system, vary greatly with the season, crude oil supplies, market conditions, and other factors. . . .

> "We do not attempt here to answer any technical questions as to how existing refinery operations should be measured for baseline purposes in this case or how similar baseline conditions should be measured in future cases. CEQA Guidelines section 15125 (Cal. Code Regs., tit. 14, § 15125, subd. (a) directs that the lead agency 'normally' use a measure of physical conditions 'at the time the notice of preparation [of an EIR] is published, or if no notice of preparation is published, at the time environmental analysis is commenced.' But, as one appellate court observed, 'the date for establishing baseline cannot be a rigid one. Environmental conditions may vary from year to year and in some cases it is necessary to consider conditions over a range of time periods.' . . . In some circumstances, peak impacts or recurring periods of resource scarcity may be as important environmentally as average conditions. Where environmental conditions are expected to change quickly during the period of environmental review for reasons other than the proposed project, project effects might reasonably be compared to predicted conditions at the expected date of approval, rather than to conditions at the time analysis is begun. . . A temporary lull or spike in operations that happens to occur at the time environmental review for a new project begins should not depress or elevate the baseline; overreliance on short term activity averages might encourage companies to temporarily increase operations artificially, simply in order to establish a higher baseline.
>
> "Neither CEQA nor the CEQA Guidelines mandates a uniform, inflexible rule for determination of the existing conditions baseline. Rather, the agency enjoys the discretion to decide, in the first instance, exactly how the existing physical conditions without the project can most realistically be measured, subject to review, as with all CEQA factual determinations, for support by substantial evidence."

The Court observed that the SCAQMD had previously calculated NOx emissions from the proposed ULSD Project. However, it also stated that the SCAQMD is not required to use the same measurement method in the EIR that was used in the Negative Declaration. "Whatever method the District uses, however, the comparison must be between existing physical conditions without the Diesel Project and the conditions expected to be produced by the project."

It should be noted that neither the Court of Appeal decision nor the Supreme Court decision invalidated any aspect of the prior CEQA documents except for the baseline used in the air quality impacts analysis. Other aspects of the prior CEQA documents were challenged in the litigation, but those challenges were rejected by the trial court, and the trial court's rulings were upheld on appeal. Therefore, the Draft EIR for the ULSD Project will be focused on the issues as directed by the court and will be limited to air quality setting and impacts from project operations.

The Refinery modifications proposed as part of the ULSD Project have been completed and ConocoPhillips has been producing ULSD at its Los Angeles Refinery since 2006, as required by these regulations. However, applying the court's decision, an EIR is required for the ConocoPhillips ULSD Project to address air quality impacts from the proposed project. Thus, the SCAQMD need not evaluate further impacts to other environmental topic areas from the project. Consequently, the SCAQMD will not prepare an initial study and has begun preparing the EIR in response to direction by the Court.

## PROJECT OBJECTIVES

The project objectives for the ConocoPhillips ULSD Project were developed to comply with federal, state and SCAQMD regulations that limit the sulfur content of diesel fuels and are included below as part of this notice. Reducing the sulfur content of diesel fuel leads to a reduction of sulfur oxides (SOx) and particulate sulfate emissions from sources (such as vehicles and trucks) that use the fuel. The objectives of the ULSD Project are the following:

- Reduce the sulfur content of diesel fuel produced at the Los Angeles Refinery.
- Comply with SCAQMD's Rule 431.2 which required a reduction in sulfur content in diesel fuel used in stationary sources to 15 ppmw.
- Comply with CARB's 2000 Diesel Risk Reduction Plan to reduce exposure to diesel particulate matter.
- Comply with the U.S. EPA's diesel fuel standards that required refiners to sell highway diesel fuel that meets a maximum sulfur standard of 15 ppmw.

**PUBLIC RESOURCES CODE §21092.6 – LIST RELATING TO HAZARDOUS WASTE**

Government Code §65962.5 refers to the "Hazardous Waste and Substances Site List", which is a list of facilities that may be subject to the Resource Conservation and Recovery Act (RCRA) corrective action program. Neither the ConocoPhillips Wilmington Plant nor the Carson Plant are included on the list prepared by the Department of Toxic Substances Control (DTSC) pursuant to Government Code §65962.5 (DTSC, 2012). Nonetheless, the ConocoPhillips Carson Plant is included on a list of RCRA-permitted sites that require corrective action as identified by DTSC (DTSC, 2012). Furthermore, both plants are subject to corrective action under the "Spills, Leaks, Investigation & Cleanup (SLIC) Program" administered by the Los Angeles Regional Water Quality Control Board pursuant to California Water Code §13304. In order to provide full public disclosure per CEQA (Public Resources Code §21092.6) with regard to corrective actions required by local agency, the following information is provided:

| | |
|---|---|
| Applicant: | **ConocoPhillips Carson Plant** |
| Address: | 1520 East Sepulveda Boulevard, Carson, CA 90745 |
| Phone: | (310) 522-9300 |
| Address of Site: | 1520 East Sepulveda Boulevard, Carson, CA 90745 |
| Local Agency: | City of Carson |
| Assessor's Book: | 7315-002-021 |
| List: | DTSC and SLIC Corrective Action |
| SLIC Case No: | 0232 |

| | |
|---|---|
| Applicant: | **ConocoPhillips Wilmington Plant** |
| Address: | 1660 West Anaheim Street, Wilmington, CA 90748 |
| Phone: | (310) 952-6000 |
| Address of Site: | 1660 West Anaheim Street, Wilmington, CA 90748 |
| Local Agency: | City of Los Angeles |
| Assessor's Book: | 7412-015-003; 7412-022-008, 009 & 010; 7412-024-033 & 006; 7412-025-008 |
| List: | SLIC Corrective Action |
| SLIC Case No: | 0231 |

## CONCLUSION

No court decision invalidated any aspect of the prior CEQA documents except for the baseline used in the air quality impacts analysis for project operations. Other aspects of the prior CEQA documents were challenged in the litigation, but those challenges were rejected by the trial court, and the trial court's rulings were upheld on appeal. Therefore, the analysis of impacts in the Draft EIR for the ULSD Project will be limited to air quality setting and impacts from project operations, as directed by the court.

**SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT**
**21865 Copley Drive, Diamond Bar, California 91765-4182**

## NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT

**Project Title:**
ConocoPhillips Los Angeles Refinery Ultra Low Sulfur Diesel Project

**Project Location:**
The ConocoPhillips Los Angeles Refinery operates at two locations: the ConocoPhillips Carson Plant is located at 1520 East Sepulveda Boulevard, Carson, California, 90745. The ConocoPhillips Wilmington Plant is located at 1660 West Anaheim Street, Wilmington, CA 90744. The Ultra Low Sulfur Diesel Project is located at the Los Angeles Wilmington Plant.

**Description of Nature, Purpose, and Beneficiaries of Project:**
The ConocoPhillips ULSD project was developed to comply with the federal, state and SCAQMD regulations that limit the sulfur content of diesel fuels. The project includes the following activities: 1) modifications to Hydrotreater Unit 90; 2) replacement of an existing charge heater with a functionally identical replacement heater; 3) installation of a Selective Catalytic Reduction Unit to control NOx emissions from the replacement heater, with aqueous ammonia supplied from an existing aqueous ammonia storage tank; 4) demolition of an existing cooling tower and replacement with a new cooling tower of the same capacity; 5) minor modifications to the mid barrel handling and shipping system including a new jet shipping pump, two new pumps for handling jet and diesel blendstocks, and one new sample pump and associated piping to create separate facilities for handling jet and diesel fuel; 6) minor modifications to the hydrogen distribution system including new hydrogen distribution piping; 7) and modifications to one storage tank to allow a change of service (i.e., contents). In response to the court's decision on the 2004 Final Negative Declaration and Addendum, an EIR is required for the ConocoPhillips ULSD Project to address air quality impacts only from the proposed project.

| **Lead Agency:** | **Division:** |
|---|---|
| South Coast Air Quality Management District | Planning, Rule Development and Area Sources |

**Initial Study and all Supporting Documentation are Available at:**

| SCAQMD Headquarters<br>21865 Copley Drive<br>Diamond Bar, CA 91765 | Or by Calling:<br>(909) 396-2039 |
|---|---|

The Initial Study is also available by accessing:
http://aqmd.gov/ceqa/nonaqmd.html

**The Notice of Preparation is provided through the following:**

| | | |
|---|---|---|
| ☑ Los Angeles Times (March 28, 2012) | ☑ Daily Breeze (March 28, 2012) | ☑ SCAQMD Website |
| ☑ SCAQMD Public Information Center | ☑ Interested Parties | ☑ SCAQMD Mailing List |

**Review Period:**
March 28, 2012 through April 26, 2012

| **CEQA Contact Person:** | **Phone Number:** | **E-Mail Address** |
|---|---|---|
| Jeff Inabinet | (909) 396-2453 | jinabinet@aqmd.gov |

## APPENDIX B

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## AIR EMISSION CALCULATIONS

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# Appendix B

## Phillips 66
## Ultra Low Sulfur Diesel Project

### Operational Emissions Summary

| Source | Estimated Emissions (lbs/day) | | | | | |
|---|---|---|---|---|---|---|
| | CO | VOC | NOx | SOx | PM10 | PM2.5 |
| **Pre-Project** | | | | | | |
| **Stationary Sources** | | | | | | |
| Fugitives | | | | | | |
| Pumps | 0.00 | 4.41 | 0.00 | 0.00 | 0.00 | 0.00 |
| Compressors | 0.00 | 2.82 | 0.00 | 0.00 | 0.00 | 0.00 |
| Valves | 0.00 | 64.49 | 0.00 | 0.00 | 0.00 | 0.00 |
| Flanges | 0.00 | 12.44 | 0.00 | 0.00 | 0.00 | 0.00 |
| Process Drains | 0.00 | 10.74 | 0.00 | 0.00 | 0.00 | 0.00 |
| Heater B-201 | 22.64 | 4.53 | 30.50 | 2.50 | 4.85 | 4.85 |
| **Total Pre-Project Emissions** | **22.64** | **99.42** | **30.50** | **2.50** | **4.85** | **4.85** |
| **Post-Project** | | | | | | |
| **Stationary Sources** | | | | | | |
| Fugitives | | | | | | |
| Pumps | 0.00 | 4.41 | 0.00 | 0.00 | 0.00 | 0.00 |
| Compressors | 0.00 | 2.82 | 0.00 | 0.00 | 0.00 | 0.00 |
| Valves | 0.00 | 66.16 | 0.00 | 0.00 | 0.00 | 0.00 |
| Flanges | 0.00 | 15.09 | 0.00 | 0.00 | 0.00 | 0.00 |
| Process Drains | 0.00 | 11.62 | 0.00 | 0.00 | 0.00 | 0.00 |
| Heater B-401 | 6.04 | 5.44 | 4.96 | 4.19 | 5.83 | 5.83 |
| Tank 331 | | 0.20 | | | | |
| Hydrogen Production | 2.28 | 2.28 | 3.50 | 0.10 | 2.73 | 2.73 |
| **Construction** | | | | | | |
| 30-Year Amortized GHG | | | | | | |
| **Off-site Sources** | | | | | | |
| Delivery Trucks | 11.55 | 1.57 | 14.80 | 0.12 | 0.26 | 0.26 |
| Electricity Production | 2.29 | 0.11 | 13.17 | 1.37 | 0.46 | 0.46 |
| **Total Post-Project Emissions** | **22.15** | **109.70** | **36.43** | **5.79** | **9.28** | **9.28** |
| | | | | | | |
| **Net Emissions Increases** | **-0.48** | **10.28** | **5.93** | **3.29** | **4.43** | **4.43** |

Net Emissions Increases = Post-Project Emissions - Pre-Project Emissions

# Appendix B

## Phillips 66
## Ultra Low Sulfur Diesel Project

### Unit 90 Fugitive Emissions

| Component/ Control | | Service(1) | EF(2) lb/yr/ source | Pre-Project(3) | | | Post-Project(4) | | | Change | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Count | lb/yr | lb/day | Count | lb/yr | lb/day | Count | lb/yr | lb/day |
| **Pumps** | Sealless | LL | 0 | 0 | 0.0 | 0.0 | 0 | 0.0 | 0.0 | 0 | 0.0 | 0.0 |
| | Mechanical seal | LL | 104 | 7 | 728.0 | 2.0 | 7 | 728.0 | 2.0 | 0 | 0.0 | 0.0 |
| | Mechanical seal | HL | 80 | 11 | 880.0 | 2.4 | 11 | 880.0 | 2.4 | 0 | 0.0 | 0.0 |
| **Compressors** | | G/V | 514 | 2 | 1028.0 | 2.8 | 2 | 1028.0 | 2.8 | 0 | 0.0 | 0.0 |
| **Valves** | Bellows sealed | G/V/LL | 0 | 17 | 0.0 | 0.0 | 243 | 0.0 | 0.0 | 226 | 0.0 | 0.0 |
| | Approved I&M prog.(< 500 ppm) | G/V | 23 | 712 | 16376.0 | 44.9 | 746 | 17158.0 | 47.0 | 34 | 782.0 | 2.1 |
| | Approved I&M prog.(< 500 ppm) | LL | 19 | 377 | 7163.0 | 19.6 | 368 | 6992.0 | 19.2 | -9 | -171.0 | -0.5 |
| **PSVs** | Closed vent system | G/V/LL | 0 | 18 | 0.0 | 0.0 | 17 | 0.0 | 0.0 | -1 | 0.0 | 0.0 |
| **Flanges** | | G/V/LL | 1.5 | 1426 | 2139.0 | 5.9 | 1584 | 2376.0 | 6.5 | 158 | 237.0 | 0.6 |
| **Connections** | | G/V/LL | 1.5 | 1488 | 2232.0 | 6.1 | 1923 | 2884.5 | 7.9 | 435 | 652.5 | 1.8 |
| **Others** | | G/V/LL | 1.5 | 113 | 169.5 | 0.5 | 164 | 246.0 | 0.7 | 51 | 76.5 | 0.2 |
| **Process Drains** | | | 80 | 49 | 3920.0 | 10.7 | 53 | 4240.0 | 11.6 | 4 | 320.0 | 0.9 |
| **Total** | | | | | | **94.9** | | | **100.1** | | | **5.2** |

(1) G = gas, V = vapor, LL = light liquid, HL = heavy liquid

(2) Emission Factors from the Jay Chen Memo, BACT/LAER for Valves as VOC Fugitive Sources, April 2, 1999.

(3) Based on actual component counts prior to the Project.

(4) Based on as-built survey following completion of the Project..

Approach: The Project resulted in changes to the number of components in the unit, which would potentially increase fugitive VOC emissions. Fugitive emissions components are required to be monitored under Rule 1173 and accurate component counts are available. Potential increases in emissions would be those emissions associated with the increase in the number of a particular type of component. Project Impact = Post-Project - Pre-Project.

## Appendix B

## Phillips 66
## Ultra Low Sulfur Diesel Project

### Heater Emissions Change

**Heater B-201(1)**

| | CO | VOC | NOx | SOx | PM10 | PM2.5 |
|---|---|---|---|---|---|---|
| Emissions (lbs/day) | 22.6 | 4.5 | 30.5 | 2.5 | 4.9 | 4.9 |
| Emissions (tonnes/yr) | | | | | | |

**Heater B-401(2)**

| | CO | VOC | NOx | SOx | PM10 | PM2.5 |
|---|---|---|---|---|---|---|
| Emission Factor (lb/mmscf) | | 7 | | | 7.5 | 7.5 |
| Emission Factor (lb/hr) | 0.25 | | 0.21 | | | |
| Emission Factor (lb/mmBtu) | | | | 0.0051 | | |
| Emissions (lbs/day) | 6.04 | 5.4 | 4.96 | 4.19 | 5.83 | 5.83 |
| Emissions (tonnes/yr) | | | | | | |

| | CO | VOC | NOx | SOx | PM10 | PM2.5 |
|---|---|---|---|---|---|---|
| Total Emissions Change (lbs/day) | -16.60 | 0.91 | -25.54 | 1.69 | 0.98 | 0.98 |

(1) Heater B-201 emissions are peak emissions during 2002 and 2003.

(2) Heater B-401 emissions based on maximum duty of 34 mmBtu/hr using permit-limitted emission factors or SCAQMD default factors, as appropriate.

Approach: Heater B-201 was removed and replaced with Heater B-401, which has the same firing rate, 34 mmBtu/hr, as B-201. During 2002 and 2003, B-201 did not operate at the maximum rated capacity on a daily basis. Therefore, the emissions for the peak operating day were used to evaluate the increase in emissions associated with the ULSD Project.

# Appendix B

## Phillips 66
## Ultra Low Sulfur Diesel Project

### Hydrogen Production

**Hydrogen Production Demand from Proposed Project**

| | Production (mmscf/yr) |
|---|---|
| Pre-Project | 3,686.50 |
| Post-Project | 4,197.50 |
| Incremental Change | 511.00 |

**Emissions Associated with Hydrogen Production**

| | CO | VOC | NOx | SOx | PM10 | PM2.5 (1) |
|---|---|---|---|---|---|---|
| Emission Factor (lb/mmscf) (2) | 1.63 | 1.63 | 2.5 | 0.07 | 1.95 | 1.95 |
| Emissions (lbs/day) | 2.28 | 2.28 | 3.50 | 0.10 | 2.73 | 2.73 |

(1) PM2.5 emissions are assumed to be equivalent to PM10 emissions.

(2) City of Carson, EIR for the Air Products Hydrogen Facility and Specialty Gas Facility (SCH# 97071078), June 15, 1998.

Approach: The hydrogen demand for Units 89 and 90 combined was compared from 2002-2003 and 2006-2008. The increase was attributed to U90 solely to ensure the worst-case demand was attributed to the ULSD project.

**Appendix B**

**Phillips 66**
**Ultra Low Sulfur Diesel Project**

## Electricity Production

### Electricity Demand

| | Power (hp) | Power (MWh) |
|---|---|---|
| Pre-Project | 640 | 0.5 |
| Post-Project | 1675 | 1.2 |

### Electricity Generation Emissions

| | CO | VOC | NOx | SOx | PM10 | PM2.5[2] |
|---|---|---|---|---|---|---|
| Pre-Project Emission Factor (lbs/MW-hr)[1] | 0.2 | 0.01 | 1.15 | 0.12 | 0.04 | 0.04 |
| Post-Project Emission Factor (lbs/MW-hr)[1] | 0.2 | 0.01 | 1.15 | 0.12 | 0.04 | 0.04 |
| Pre-Project Emissions (lbs/day) | 2.3 | 0.1 | 13.2 | 1.4 | 0.5 | 0.5 |
| Post-Project Emissions (lbs/day) | 6.0 | 0.3 | 34.5 | 3.6 | 1.2 | 1.2 |
| **Net Emissions (lbs/day)** | **3.7** | **0.2** | **21.3** | **2.2** | **0.7** | **0.7** |

(1) Source: SCAQMD CEQA Air Quality Handbook, Table A9-11-B (SCAQMD, 1993)

(2) PM2.5 emissions assumed to be equivalent to PM10 emissions.

# Appendix B

## Phillips 66
## Ultra Low Sulfur Diesel Project

### Vehicle Emissions

On Road Mobile Emission Factors from California ARB EMFAC2002 Scenario Year 2004 (Model Years A11965 to 2004)

| Vehicle Type | CO Emissions Factor (lb/mile) | VOC Emission Factor (lb/mile) | NOx Emissions Factor (lb/mile) | SOx Emissions Factor (lb/mile) | PM10 Emissions Factor (lb/mile) | PM2.5 Emissions Factor (lb/mile)(1) |
|---|---|---|---|---|---|---|
| Workers Commuting | 0.016559 | 0.001771 | 0.0018 | 0.00001 | 0.000079 | 0.000079 |
| Light Duty Trucks | 0.016559 | 0.001771 | 0.0018 | 0.00001 | 0.000079 | 0.000079 |
| Bus | 0.02309 | 0.003148 | 0.029607 | 0.000243 | 0.000519 | 0.000519 |
| Heavy Diesel Trucks | 0.02309 | 0.003148 | 0.029607 | 0.000243 | 0.000519 | 0.000519 |

| | Parameters | | | Peak Day Emissions, lbs/day | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Source | Number of Vehicles | Total Number of Trips | Distance Traveled | CO | VOC | NOx | SOx | PM10 | PM2.5 |
| Workers Commuting | 0 | 0 | 16.2 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| On-site Cars | 0 | 0 | 10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Light Duty Trucks | 0 | 0 | 16.2 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Buses | 0 | 0 | 1.5 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Daily Delivery Trucks(2) | 5 | 10 | 50 | 11.55 | 1.57 | 14.80 | 0.12 | 0.26 | 0.26 |
| Heavy Diesel Trucks | 0 | 0 | 4 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Total Vehicle Emisions** | | | | 11.55 | 1.57 | 14.80 | 0.12 | 0.26 | 0.26 |

(1) PM2.5 emissions assumed to be equivalent to PM10 emissions.

(2) Based on 1 ammonia delivery and catalyst change out requiring 4 trucks per day for 14 days (5 total trucks on the peak day).

## Appendix B

## Phillips 66
## Ultra Low Sulfur Diesel Project

## Tank Emissions



# TANKS 4.0
## Emissions Report - Summary Format
## Tank Identification and Physical Characteristics

**Identification**

| | |
|---|---|
| User Identification: | Tank 331 (ULSD) |
| City: | Wilmington |
| State: | California |
| Company: | ConocoPhillips |
| Type of Tank: | External Floating Roof Tank |
| Description: | |

**Tank Dimensions**

| | |
|---|---|
| Diameter (ft): | 120.00 |
| Volume (gallons): | 3,444,000.00 |
| Turnovers: | 14.24 |

**Paint Characteristics**

| | |
|---|---|
| Internal Shell Condition: | Light Rust |
| Shell Color/Shade: | White/White |
| Shell Condition: | Good |

**Roof Characteristics**

| | |
|---|---|
| Type: | Double Deck |
| Fitting Category: | Detail |

**Tank Construction and Rim-Seal System**

| | |
|---|---|
| Construction: | Welded |
| Primary Seal: | Mechanical Shoe |
| Secondary Seal: | Rim-mounted |

| Deck Fitting/Status | Quantity |
|---|---|
| Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed | 1 |
| Automatic Gauge Float Well/Unbolted Cover, Ungasketed | 1 |
| Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask. | 1 |
| Unslotted Guide-Pole Well/Gasketed Sliding Cover, w. Sleeve | 1 |
| Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask. | 1 |
| Roof Drain (3-in. Diameter)/Open | 1 |
| Roof Leg (3-in. Diameter)/Adjustable, Double-Deck Roofs | 34 |
| Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask. | 1 |

Meteorological Data used in Emissions Calculations: Long Beach, California (Avg Atmospheric Pressure = 14.7 psia)

# Appendix B

## Phillips 66
## Ultra Low Sulfur Diesel Project

External Floating Roof Tank
Wilmington, California

# TANKS 4.0
## Emissions Report - Summary Format
## Liquid Contents of Storage Tank

| Mixture/Component | Month | Daily Liquid Surf. Temperatures (deg F) Avg. | Min. | Max. | Liquid Bulk Temp. (deg F) | Vapor Pressures (psia) Avg. | Min. | Max. | Vapor Mol. Weight | Liquid Mass Fract. | Vapor Mass Fract. | Mol. Weight | Basis for Vapor Pressure Calculations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unifined Heavy Cat Gas | All | 66.43 | 60.99 | 71.87 | 64.33 | 0.0100 | N/A | N/A | 68.0000 | | | 108.00 | Option 1: VP60 = .01 VP70 = .01 |

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# Appendix B

## Phillips 66
## Ultra Low Sulfur Diesel Project

External Floating Roof Tank
Wilmington, California

### TANKS 4.0
### Emissions Report - Summary Format
### Individual Tank Emission Totals

**Annual Emissions Report**

| | Losses(lbs) | | | | |
|---|---|---|---|---|---|
| Components | Rim Seal Loss | Withdrawal Loss | Deck Fitting Loss | Deck Seam Loss | Total Emissions |
| Unifined Heavy Cat Gas | 4.36 | 77.10 | 1.84 | 0.00 | 83.31 |

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# APPENDIX C

## HEALTH RISK ASSESSMENT

# Phillips 66 Los Angeles Refinery
# Wilmington Plant
# Health Risk Analysis
# Ultra Low Sulfur Diesel Project

**January 11, 2013**

Prepared for: Phillips 66 Los Angeles Refinery – Wilmington Plant
Prepared by: Environmental Audit, Inc.
1000 Ortega Way, Suite A
Placentia, CA 92780
714-632-8521

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## FACILITY INFORMATION

The Phillips 66 Los Angeles Refinery – Wilmington Plant (Refinery) is located at 1660 W. Anaheim Street, Wilmington, California (see Figure 1). The Refinery processes crude oil into marketable products including gasoline, diesel fuel, jet fuel, and other products. The Refinery is bordered by a residential area, a roofing materials plant, and a portion of the Harbor 110 Freeway to the east; the Ken Malloy Harbor Regional Park, Harbor College, Harbor Park Municipal Golf Course, and a small residential area to the north; Gaffey Street including a firing range, vacant fields, recreational fields, and a U.S. Navy fuel storage facility to the west; and, a warehouse facility to the south. The closest resident is adjacent to the eastern Refinery property boundary. The South Coast Air Quality Management District (SCAQMD) identification number for the facility is 171107.

## INTRODUCTION

Following legal challenge, the California Supreme Court concluded that there were certain deficiencies in previously prepared CEQA documents for the Phillips 66 ULSD Project and required the SCAQMD to prepare an EIR to analyze the air quality impacts of the Project. As a result, a Draft Environmental Impact Report (EIR) is now being prepared for the ULSD Project as required by the California Supreme Court to correct deficiencies identified in the Court's decision. However, the Refinery modifications proposed as part of the ULSD Project have been completed and Phillips 66 has been producing ULSD at its Los Angeles Refinery since 2006, as required by federal, state, and SCAQMD ULSD regulations.

As part of the CEQA process, Environmental Audit Inc. (EAI) has performed a health risk analysis for the ULSD Project. EAI has calculated emissions to evaluate the maximum potential impacts of toxic air contaminants (TACs) associated with the improvements from the ULSD Project. The physical modifications in Unit 90, as a result of the Project, included replacing Heater B-201 with Heater B-401 and an increase in the number of fugitive components (i.e., valves, flange, pumps, etc.) in Unit 90. Therefore, to determine the project health risk has been determined by comparing the health risks associated with Heater B-201 before the project with the health risks associated with Heater B-401 and the incremental increase in fugitive emissions in Unit 90 as a result of the ULSD Project.

Based on information provided by Phillips 66, the USLD Project has been modeled as the net difference between the previously existing Unit 90 Heater B-201 (U90B201) and replacement Heater B-401 (U90B401) and associated fugitives (U90FUG). The previously existing U90B201 was modeled as a point source (See Figure 2). The replacement U90B401 and U90FUG were modeled as a point source and a volume source, respectively (See Figure 3). The incremental health risk for the ULSD Project is the net difference between the pre-project and post-project health risk.

TACs in the emissions from the sources are included in the SCAQMD Rule 1401 – New Source Review for Toxic Air Contaminants. The health risks were evaluated using the SCAQMD *Risk*

*Assessment Procedures for Rules 1401 and 212 Version 7.0* (July 2005). The analysis for cancer and non-cancer risks is presented below. The sources are expected to emit 26 chemicals which are chemicals listed in Attachment I of the SCAQMD Rule 1401 Guidelines – 12 are considered carcinogens, 22 are considered to have adverse chronic health effects, and 11 are considered to have adverse acute health effects (See Attachment B).

## EMISSION ESTIMATES

The emissions estimates of TACs from the heaters are calculated using emission factors from a source test. Fugitive emissions are based on the refinery specific speciation of Unit 90. The emission factors used for emission sources are from the *2012 ConocoPhillips Company Los Angeles Refinery - Wilmington Plant AB 2588 Revision F 2006-2007* (ConocoPhillips, 2012) and *the 2001 Tosco Los Angeles Refinery Wilmington Plant AB2588 HRA* (Tosco, 2001). The calculated emissions are presented in Attachment A.

## HEALTH RISK ASSESSMENT

The California Air Resources Board (CARB) Hotspots Analysis Reporting Program (HARP) model is the most appropriate model for determining the air quality impact from ULSD Project. The HARP model (CARB, 2005) combines the dispersion model with a risk calculation model based on the Air Toxics Hot Spots Program Risk Assessment Guidelines (OEHHA, 2003). The dispersion portion of the model provides estimates of source-specific annual and hourly maximum ambient groundlevel concentrations. The risk calculator in the HARP model estimates the cancer risk, chronic index, and acute index values. The HARP model incorporates US EPA Industrial Source Complex as the dispersion model, however, AERMOD is now the preferred dispersion model, and therefore, this analysis utilizes HARP On-Ramp to import groundlevel concentrations from AERMOD into HARP. The model default values were modified to conform to the SCAQMD Supplement Guidelines for Preparing Risk Assessment for the Air Toxics “Hot Spots” Information and Assessment Act (AB2588) (SCAQMD, 2005).

The pre-project analysis is modeled as a single point source (U90B201). The post-project analysis is modeled as a point source (U90B401) and a volume source (U90FUG). The source parameters are listed in Attachment C. The locations of the sources were identified based on data provided by Phillips 66 and the Torrance USGS Quadrangles (see attached Figure 2 and 3).

The receptors used in the model include a fenceline receptor grid and a fine receptor grid. The Refinery is located on a hillside; therefore, terrain variations were included for the receptor networks. The fenceline receptor grid (maximal spacing every 100 meters(m)) were used to determine the maximum concentrations at the property line of the Refinery. A fine receptor grid (100 m x 100 m spacing) was used to identify the maximum impact locations. The pre-project and post-project analyses used identical receptor grids. Figures 2 and 3 shows all modeled receptors.

All maximum impact locations are verified as credible locations for receptors (i.e., streets, railroad tracks, and waterways are not considered valid receptor locations). The locations of the maximum impacts are then verified for the type of receptor and are reported below. Selected tables from the

HARP model are included in Attachment D. The applicable output results from the HARP model are in Attachment E.

## PRE-PROJECT RISK ANALYSIS

### Cancer Risk Analysis

Under the pre-project or baseline case, the maximum cancer risk from Unit 90 Heater B-201 for an exposed individual resident (MEIR) is located approximately 260 east of the Refinery (No. 861, UTM Coordinates 381700, 3737600, See Figure 2). The cancer risk is 7.35 x $10^{-8}$ or 0.07 cancer cases in one million at the MEIR. Hexavalent chromium contributes approximately 75.5 percent of the calculated cancer risk at the MEIR. The inhalation pathway accounts for 84.4 percent of the cancer risk. Detailed cancer risk contributions by pathway and pollutants are presented in Attachment D.

The maximum exposed incremental cancer risk at an occupational exposure (MEIW) is located approximately 100 meters east of the Refinery (No. 788, UTM Coordinates 382500, 3737400, See Figure 2). The incremental cancer risk is 1.89 x $10^{-8}$ or 0.02 cancer cases in one million at the MEIW. Hexavalent chromium contributes approximately 67.7 percent of the calculated cancer risk at the MEIW. The inhalation pathway accounts for 75.7 percent of the cancer risk. Detailed cancer risk contributions by pathway and pollutants are presented in Attachment D.

### Non-Cancer Risk Analysis

Under the pre-project or baseline case, the maximum chronic hazard index (MCHI) total for Unit 90 Heater B-201 for the respiratory system is 0.0028. The MCHI is located approximately 100 meters east of the Refinery (No. 788, UTM Coordinates 382500, 3737400, See Figure 2). Arsenic contributes approximately 97.2 percent of the calculated MCHI. Detailed contribution by pollutant to the chronic hazard index for the maximum receptor location is presented in Attachment D.

The maximum acute hazard index (MAHI) total for the central nervous system is 0.0001. The MAHI is located on the eastern boundary of the Refinery (No. 778, UTM Coordinates 381500, 3737400, See Figure 2). Arsenic contributes approximately 90.3 percent of the calculated MAHI. Detailed contribution by pollutant to the acute hazard index for the maximum receptor location is presented in Attachment D.

## POST-PROJECT RISK ANALYSIS

### Cancer Risk Analysis

Under the post-project case, the maximum cancer risk from Unit 90 Heater B-401 and associated fugitives for the MEIR is located approximately 260 meters east of the Refinery (No. 861, UTM Coordinates 381700, 3737600, See Figure 3). The cancer risk is 1.50 x $10^{-7}$ or 0.15 cancer cases in one million at the MEIR. Hexavalent chromium contributes approximately 48.1 percent of the calculated cancer risk at the MEIR. The inhalation pathway accounts for 59.1 percent of the cancer risk. Detailed cancer risk contributions by pathway and pollutants are presented in Attachment D.

The MEIW is located approximately 100 meters east of the Refinery (No. 788, UTM Coordinates 382500, 3737400, See Figure 3). The incremental cancer risk is 2.81 x $10^{-8}$ or 0.03 cancer cases in one million at the MEIW. Hexavalent chromium contributes approximately 58.7 percent of the calculated cancer risk at the MEIW. The inhalation pathway accounts for approximately 68.0 percent of the cancer risk. Detailed cancer risk contributions by pathway and pollutants are presented in Attachment D.

### Non-Cancer Risk Analysis

Under the post-project case, the maximum chronic hazard index (MCHI) total for Unit 90 Heater B-401 and associated fugitives for the respiratory system is 0.0037. The MCHI is located approximately 100 meters east of the Refinery (No. 788, UTM Coordinates 382500, 3737400, See Figure 3). Arsenic contributes approximately 96.4 percent of the calculated MCHI. Detailed contribution by pollutant to the chronic hazard index for the maximum receptor location is presented in Attachment D.

The maximum acute hazard index (MAHI) total for the central nervous system is 0.0001. The MAHI is located at the northwestern boundary of the Refinery (No. 1933, UTM Coordinates 380641, 3738324, See Figure 3). Arsenic contributes approximately 90.3 percent of the calculated MAHI. Detailed contribution by pollutant to the acute hazard index for the maximum receptor location is presented in Attachment D.

## INCREMENTAL RISK ANALYSIS

As shown in Table D-1 in Attachment D, the incremental cancer risk of the ULSD Project is 7.65 x $10^{-8}$ (0.15-0.07) or 0.08 per million at the MEIR and 9.20 x $10^{-9}$ (0.03-0.02) or 0.01 per million at the MEIW. Table D-1 in Attachment D also shows the incremental MCHI is 0.0008. The acute risk for the replacement heater is at a different location from the previous heater, therefore, the acute risk for U90 B-201 cannot be subtracted from the new acute risk value. The acute risk value for the ULSD project is 0.0001. The health risks for the TACs emitted from the ULSD Project are below the significance threshold of ten cancer cases per one million for cancer risk and chronic and acute hazard indices are below the 1.0 non-cancer risk significance thresholds.

## CONCLUSIONS

The health risks for the TACs emitted from the USLD Project are below the significance threshold of ten cancer cases in one million for cancer risk and chronic and acute hazard indices are below the 1.0 non-cancer risk significance threshold established under CEQA. Therefore, cancer risk and hazard index thresholds for the ULSD Project are not expected to be exceeded at any receptor location.

## REFERENCES

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OEHHA, 2003. *Air Toxics Hot Spots Program Risk Assessment Guideline: The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessment*, August 2003.

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# FIGURES

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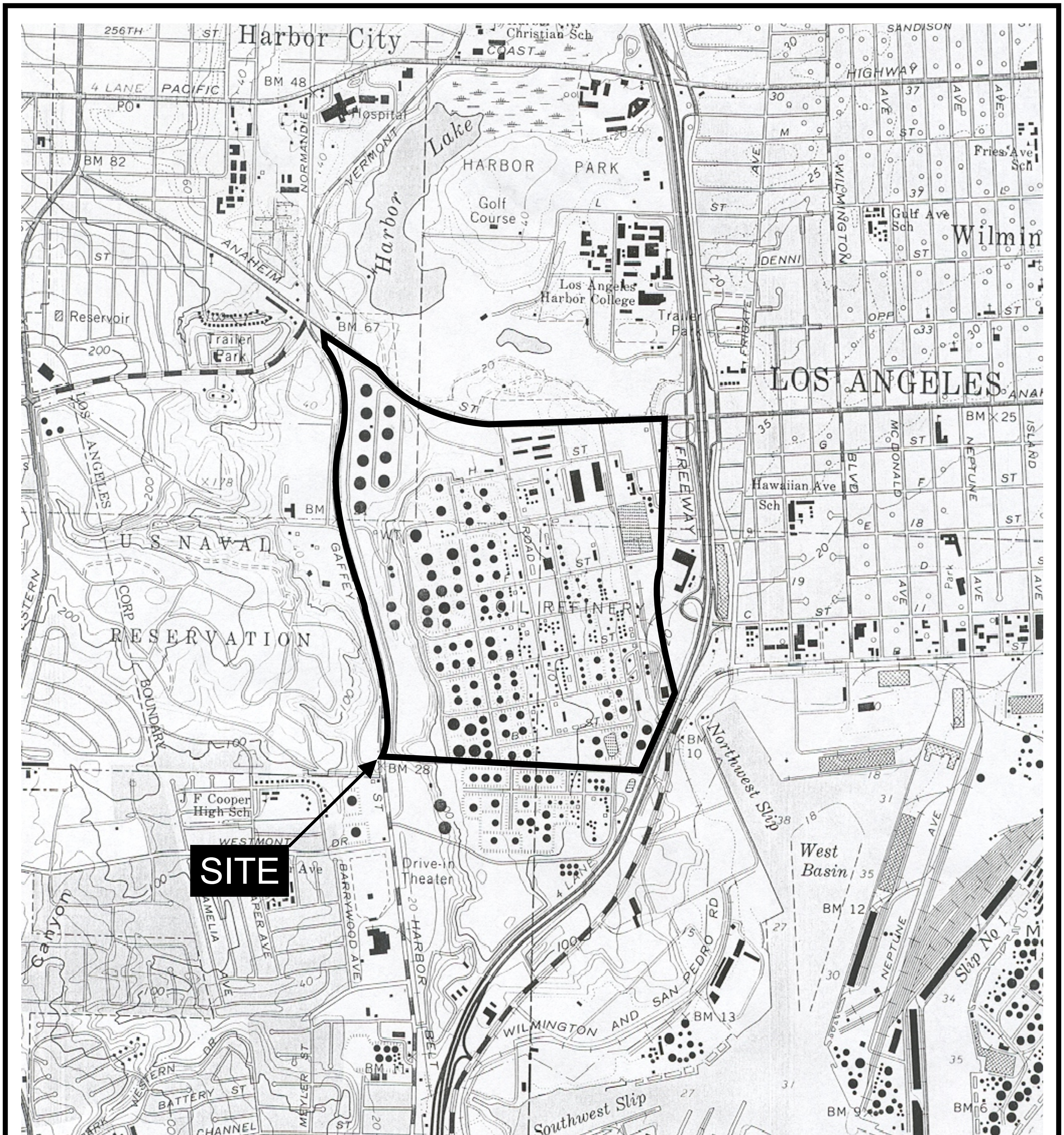


Environmental Audit, Inc.

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FIGURE 1
SITE LOCATION MAP
Phillips 66 Los Angeles Refinery
Wilmington Plant

Project No. 2696

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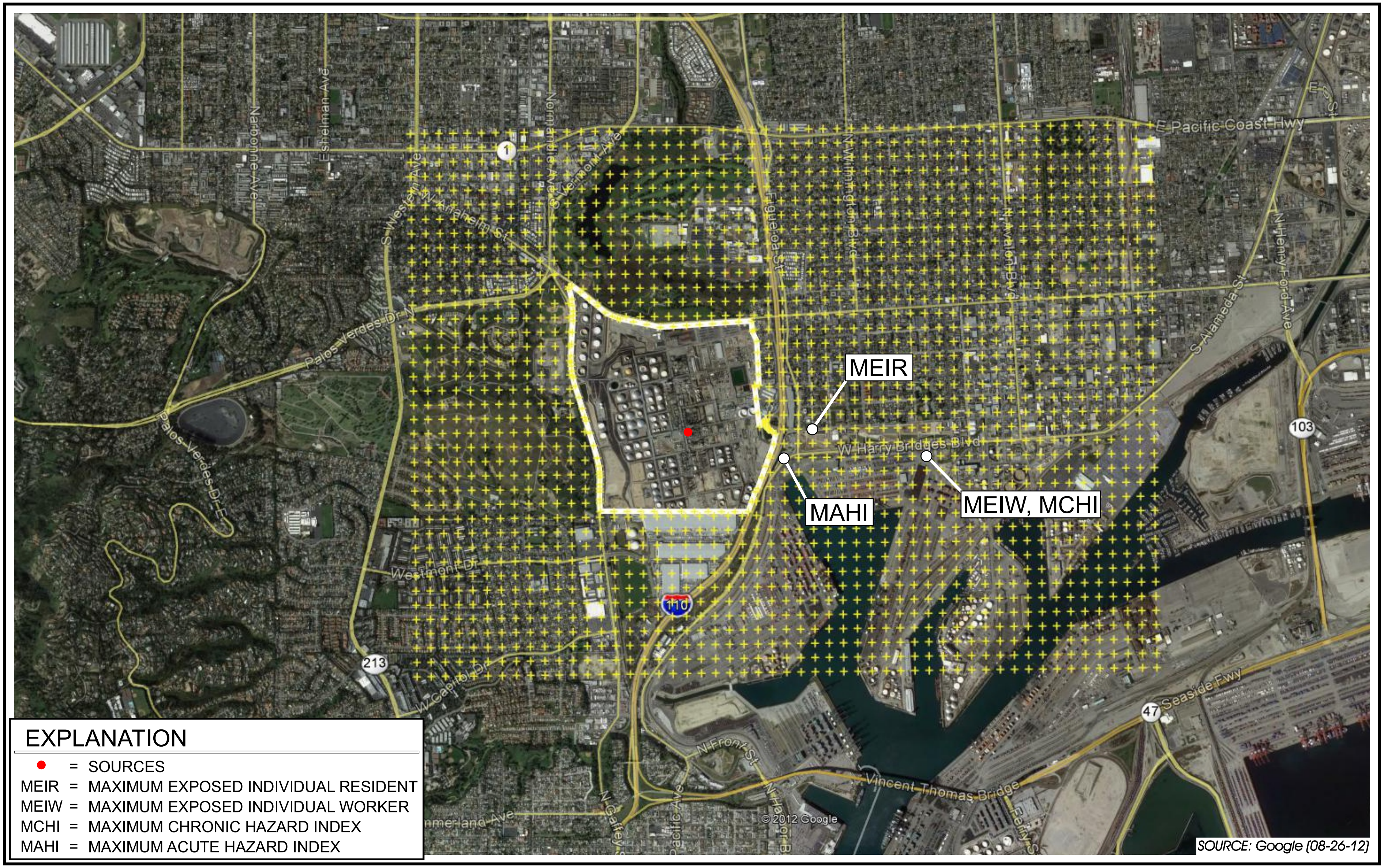


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FIGURE 2
PRE-PROJECT - MAX IMPACT LOCATION MAP
Phillips 66 Los Angeles Refinery
Wilmington Plant

Project No. 2696
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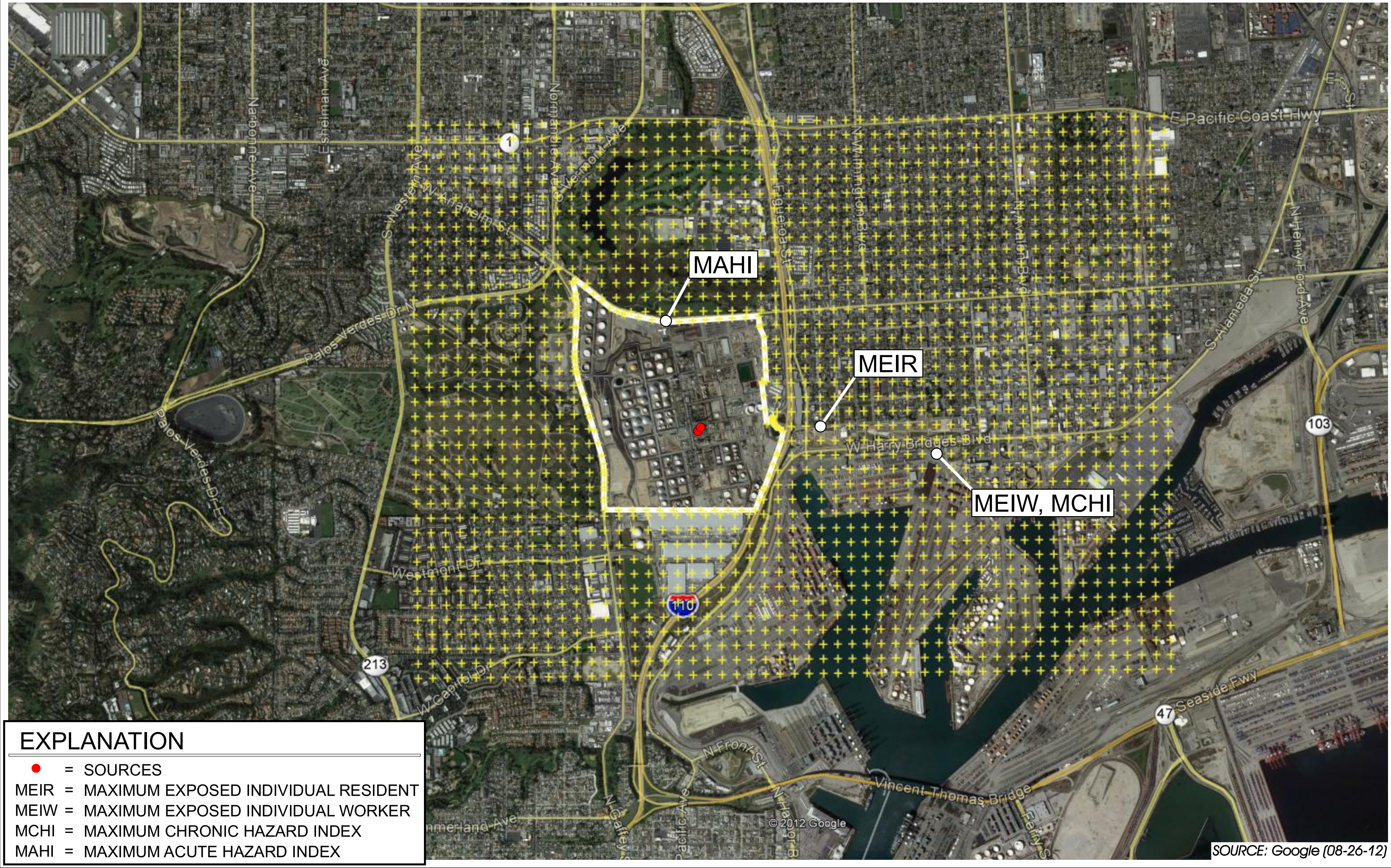


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FIGURE 3
POST-PROJECT - MAX IMPACT LOCATION MAP
Phillips 66 Los Angeles Refinery
Wilmington Plant

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Project No. 2696
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# ATTACHMENT A

## Emission Calculations

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**Attachment A**
**Phillips 66 - Wilmington Plant**
**ULSD Project**
**Table A-1**
**Pre-Project Heater 201 Emissions**

| | |
|---|---|
| **Process Equipment Description:** | U90 B-201 Htr |
| **Fuel Type:** | Refinery Fuel |
| **Process Units:** | MMCF |
| **Control Equipment:** | Low NOx Burner |
| **Control Type:** | HLNX |
| **Estimation Method:** | Source Testing |
| **Yearly Emis. Est. Equation:** | $F_y$ x EF |
| **Max Hourly Emis. Est. Equation:** | $F_m$ x EF |

| **Parameter Symbols/Names** | **Values** | |
|---|---|---|
| **$F_y$ = Total Yearly Amount of Fuel Burned** | 188.35 | MMCF/yr |
| **$F_m$ = Maximum Hourly Amount of Fuel Burned** | 0.02 | MMCF/hr |
| **EF = Source Test Emission Factor** | (see below) | lbs/MMCF |
| **Process Operation Schedule** | 24 | hours/day |
| | 7 | days/week |
| | 52 | weeks/year |
| **Refinery Fuel Gas HHV** | 1316 | btu/scf |
| **Firing Rate** | 679.1 | mmbtu/day |

| Emittent Species Name (1) | Emittent ID (CAS Number) | Rule 1401 | Emission Factor (2) (lbs/MMCF) | Annual Avg Emissions (lbs/yr) | Hourly Max Emissions (lbs/hr) |
|---|---|---|---|---|---|
| Acenaphthene | 83329 | | 4.74E-06 | 8.93E-04 | 1.02E-07 |
| Acenaphthylene | 208968 | | 3.00E-06 | 5.65E-04 | 6.45E-08 |
| Acetaldehyde | 75070 | Y | 1.00E-02 | 1.89E+00 | 2.15E-04 |
| Anthracene | 120127 | | 5.10E-06 | 9.61E-04 | 1.10E-07 |
| Antimony | 7440360 | | 1.53E-03 | 2.88E-01 | 3.29E-05 |
| Arsenic | 7440382 | Y | 1.00E-03 | 1.89E-01 | 2.16E-05 |
| Barium | 7440393 | | ND | ND | ND |
| Benz (a) Anthracene | 56553 | Y | ND | ND | ND |
| Benzene | 71432 | Y | 1.32E-02 | 2.49E+00 | 2.85E-04 |
| Benzo (a) Pyrene | 50328 | Y | ND | ND | ND |
| Benzo (b) Fluoranthene | 205992 | Y | ND | ND | ND |
| Benzo (g,h,i) perylene | 191242 | Y | ND | ND | ND |
| Benzo (k) Fluoranthene | 207089 | Y | ND | ND | ND |
| Beryllium | 7440417 | Y | 2.69E-04 | 5.06E-02 | 5.77E-06 |
| Cadmium | 7440439 | Y | 6.59E-04 | 1.24E-01 | 1.42E-05 |
| Chromium (Hexavalent) | 18540299 | Y | 4.29E-04 | 8.08E-02 | 9.22E-06 |
| Chromium (Total) | 7440473 | | 5.37E-04 | 1.01E-01 | 1.15E-05 |
| Chrysene | 218019 | Y | ND | ND | ND |
| Copper | 7440508 | Y | ND | ND | ND |
| Dibenz (a, h) Anthracene | 53703 | Y | ND | ND | ND |
| Fluoranthene | 206440 | | 5.79E-06 | 1.09E-03 | 1.24E-07 |
| Fluorene | 86737 | | 2.63E-05 | 4.94E-03 | 5.64E-07 |
| Formaldehyde | 50000 | Y | 6.11E-05 | 1.15E-02 | 1.31E-06 |
| Hydrogen Sulfide | 7783064 | Y | 1.44E-02 | 2.72E+00 | 3.11E-04 |
| Indeno (1, 2, 3-cd) Pyrene | 193395 | Y | 5.60E-07 | 1.05E-04 | 1.20E-08 |
| Lead | 7439921 | Y | ND | ND | ND |
| Manganese | 7439965 | Y | 4.40E-03 | 8.28E-01 | 9.45E-05 |
| Mercury | 7439976 | Y | 1.01E-04 | 1.89E-02 | 2.16E-06 |
| Naphthalene | 91203 | Y | 3.26E-04 | 6.13E-02 | 7.00E-06 |
| Nickel | 7440020 | Y | ND | ND | ND |
| PAHs | 1150 | Y | 4.02E-04 | 7.57E-02 | 8.64E-06 |
| Phenanthrene | 85018 | | 2.03E-05 | 3.81E-03 | 4.35E-07 |
| Phenol | 108952 | Y | 7.77E-04 | 1.46E-01 | 1.67E-05 |
| Phosphorous | 7723140 | | 4.49E-03 | 8.45E-01 | 9.64E-05 |
| Pyrene | 129000 | | 1.18E-05 | 2.22E-03 | 2.53E-07 |
| Selenium | 7782492 | Y | 2.69E-03 | 5.06E-01 | 5.77E-05 |
| Silver | 7440224 | Y | 5.37E-04 | 1.01E-01 | 1.15E-05 |
| Thallium | 7440280 | | 1.88E-03 | 3.53E-01 | 4.03E-05 |
| Toluene | 108883 | Y | 1.58E-02 | 2.97E+00 | 3.39E-04 |
| Zinc | 7440666 | | 1.34E-02 | 2.52E+00 | 2.88E-04 |

(1) PAHs present the total of Acenaphthene, Acenaphthylene, Anthracene, Benz(a)Anthracene, Benzo(a)Pyrene, Benzo(b)Fluoranthene, Benzo(g,h,i)Perylene, Benzo(k)Fluoranthene, Chrysene, Dibenzo(a,b)Anthracene, Fluoroanthene, Fluorene, Indeno(1,2,3-cd)Pyrene, Naphthalene, Phenanthrene, and Pyrene.

(2) Emission factors provided by Unocal were derived from a source test conducted on process heater unit 100 (heater equipped with low NOx burner) on December 15-22, 1992 with the exception to the factors for Benzene, Hydrogen Sulfide, Phenol, and Toluene, where the emission factors were derived from WSPA, Low NOx process heater burning refinery gas, tested on June 2, 1992, pg.30.

ND = Non-detect for all three test runs.

**Attachment A**
**Phillips 66 - Wilmington Plant**
**ULSD Project**
**Table A-2**
**Post-Project Heater 401 Emissions**

| | |
|---|---|
| **Process Equipment Description:** | U90 B-401 Htr |
| **Fuel Type:** | Refinery Fuel |
| **Process Units:** | MMCF |
| **Control Equipment:** | Low NOx Burner & SCR |
| **Control Type:** | HLNX & SCR |
| **Estimation Method:** | Source Testing |
| **Yearly Emis. Est. Equation:** | $F_y$ x EF |
| **Max Hourly Emis. Est. Equation:** | $F_m$ x EF |

| **Parameter Symbols/Names** | **Values** | |
|---|---|---|
| **$F_y$ = Total Yearly Amount of Fuel Burned** | 226.32 | MMCF/yr |
| **$F_m$ = Maximum Hourly Amount of Fuel Burned** | 0.03 | MMCF/hr |
| **EF = Source Test Emission Factor** | (see below) | lbs/MMCF |
| **Process Operation Schedule** | 24 | hours/day |
| | 7 | days/week |
| | 52 | weeks/year |
| **Refinery Fuel Gas HHV** | 1316 | btu/scf |
| **Firing Rate** | 34 | mmbtu/hr |

| Emittent Species Name [(1)] | Emittent ID (CAS Number) | Rule 1401 | Emission Factor [(2)] (lbs/MMCF) | Annual Avg Emissions (lbs/yr) | Hourly Max Emissions (lbs/hr) |
|---|---|---|---|---|---|
| Acenaphthene | 83329 | | 5.06E-06 | 1.14E-03 | 1.31E-07 |
| Acenaphthylene | 208968 | | 3.20E-06 | 7.24E-04 | 8.27E-08 |
| Acetaldehyde | 75070 | Y | 1.07E-02 | 2.42E+00 | 2.76E-04 |
| Ammonia (lb/hr) | 7664417 | Y | 1.07E-01 | 9.38E+02 | 1.07E-01 |
| Anthracene | 120127 | | 5.44E-06 | 1.23E-03 | 1.41E-07 |
| Antimony | 7440360 | | 1.63E-03 | 3.69E-01 | 4.22E-05 |
| Arsenic | 7440382 | Y | 1.07E-03 | 2.42E-01 | 2.77E-05 |
| Barium | 7440393 | | ND | ND | ND |
| Benz (a) Anthracene | 56553 | Y | ND | ND | ND |
| Benzene | 71432 | Y | 1.41E-02 | 3.20E+00 | 3.65E-04 |
| Benzo (a) Pyrene | 50328 | Y | ND | ND | ND |
| Benzo (b) Fluoranthene | 205992 | Y | ND | ND | ND |
| Benzo (g,h,i) perylene | 191242 | Y | ND | ND | ND |
| Benzo (k) Fluoranthene | 207089 | Y | ND | ND | ND |
| Beryllium | 7440417 | Y | 2.86E-04 | 6.48E-02 | 7.40E-06 |
| Cadmium | 7440439 | Y | 7.02E-04 | 1.59E-01 | 1.81E-05 |
| Chromium (Hexavalent) | 18540299 | Y | 4.58E-04 | 1.04E-01 | 1.18E-05 |
| Chromium (Total) | 7440473 | | 5.73E-04 | 1.30E-01 | 1.48E-05 |
| Chrysene | 218019 | Y | ND | ND | ND |
| Copper | 7440508 | Y | ND | ND | ND |
| Dibenz (a, h) Anthracene | 53703 | Y | ND | ND | ND |
| Fluoranthene | 206440 | | 6.18E-06 | 1.40E-03 | 1.60E-07 |
| Fluorene | 86737 | | 2.80E-05 | 6.34E-03 | 7.23E-07 |
| Formaldehyde | 50000 | Y | 6.51E-05 | 1.47E-02 | 1.68E-06 |
| Hydrogen Sulfide | 7783064 | Y | 1.54E-02 | 3.49E+00 | 3.98E-04 |
| Indeno (1, 2, 3-cd) Pyrene | 193395 | Y | 5.97E-07 | 1.35E-04 | 1.54E-08 |
| Lead | 7439921 | Y | ND | ND | ND |
| Manganese | 7439965 | Y | 4.69E-03 | 1.06E+00 | 1.21E-04 |
| Mercury | 7439976 | Y | 1.07E-04 | 2.43E-02 | 2.77E-06 |
| Naphthalene | 91203 | Y | 3.47E-04 | 7.86E-02 | 8.97E-06 |
| Nickel | 7440020 | Y | ND | ND | ND |
| PAHs | 1150 | Y | 4.29E-04 | 9.70E-02 | 1.11E-05 |
| Phenanthrene | 85018 | | 2.16E-05 | 4.89E-03 | 5.58E-07 |
| Phenol | 108952 | Y | 8.29E-04 | 1.88E-01 | 2.14E-05 |
| Phosphorous | 7723140 | | 4.78E-03 | 1.08E+00 | 1.24E-04 |
| Pyrene | 129000 | | 1.25E-05 | 2.84E-03 | 3.24E-07 |
| Selenium | 7782492 | Y | 2.86E-03 | 6.48E-01 | 7.40E-05 |
| Silver | 7440224 | Y | 5.73E-04 | 1.30E-01 | 1.48E-05 |
| Thallium | 7440280 | | 2.00E-03 | 4.53E-01 | 5.17E-05 |
| Toluene | 108883 | Y | 1.68E-02 | 3.80E+00 | 4.34E-04 |
| Zinc | 7440666 | | 1.43E-02 | 3.23E+00 | 3.69E-04 |

[(1)] PAHs present the total of Acenaphthene, Acenaphthylene, Anthracene, Benz(a)Anthracene, Benzo(a)Pyrene, Benzo(b)Fluoranthene, Benzo(g,h,i)Perylene, Benzo(k)Fluoranthene, Chrysene, Dibenzo(a,b)Anthracene, Fluoroanthene, Fluorene, Indeno(1,2,3-cd)Pyrene, Naphthalene, Phenanthrene, and Pyrene.

[(2)] Emission factors provided by Unocal were derived from a source test conducted on process heater unit 100 (heater equipped with low NOx burner) on December 15-22, 1992 with the exception to the factors for Benzene, Hydrogen Sulfide, Phenol, and Toluene, where the emission factors were derived from WSPA, Low NOx process heater burning refinery gas, tested on June 2, 1992, pg.30.
Ammonia emissions were based on the permitted limit of 5 ppmv with flue gas rate of 1258 lb-mole/hr.

ND = Non-detect for all three test runs.

# Attachment A
# Phillips 66 - Wilmington Plant
# ULSD Project
# Table A-3
# Post-Project Incremental Fugitive Emissions

| Emittent Species Name | Emittent ID (CAS Number) | Rule 1401 | Emission Factor [1] (lb/lb VOC) | Annual Avg Emissions (lbs/yr) | Daily Avg Emissions (lbs/day) | Hourly Max Emissions (lbs/hr) |
|---|---|---|---|---|---|---|
| Total VOC | NA | NA | NA | 1898.00 | 5.20 | 0.22 |
| 1,2,4-Trimethylbenzene | 95636 | | 2.21E-03 | 4.19E+00 | 1.15E-02 | 1.31E-06 |
| 1,3-Butadiene | 106990 | Y | 1.17E-04 | 2.23E-01 | 6.10E-04 | 6.96E-08 |
| 2,2,4-Trimethylpentane | 540841 | | 6.46E-04 | 1.23E+00 | 3.36E-03 | 3.84E-07 |
| Benzene | 71432 | Y | 1.59E-04 | 3.02E-01 | 8.28E-04 | 9.45E-08 |
| Chrysene | 218019 | Y | 3.52E-05 | 6.68E-02 | 1.83E-04 | 2.09E-08 |
| Cumene | 98828 | | 2.37E-04 | 4.50E-01 | 1.23E-03 | 1.41E-07 |
| Cyclohexane | 110827 | | 3.97E-04 | 7.54E-01 | 2.06E-03 | 2.36E-07 |
| Ethylbenzene | 100414 | Y | 5.05E-04 | 9.59E-01 | 2.63E-03 | 3.00E-07 |
| Ethylene | 74851 | Y | 1.17E-04 | 2.23E-01 | 6.10E-04 | 6.96E-08 |
| Hexane | 110543 | Y | 2.11E-03 | 4.01E+00 | 1.10E-02 | 1.25E-06 |
| Hydrogen Sulfide | 7783064 | Y | 7.81E-06 | 1.48E-02 | 4.06E-05 | 4.64E-09 |
| Indeno[1,2,3-cd]pyrene | 193395 | Y | 1.76E-04 | 3.34E-01 | 9.15E-04 | 1.04E-07 |
| m-Cresol | 108394 | Y | 3.52E-05 | 6.68E-02 | 1.83E-04 | 2.09E-08 |
| m-Xylene | 108383 | Y | 7.70E-04 | 1.46E+00 | 4.01E-03 | 4.57E-07 |
| Naphthalene | 91203 | Y | 1.70E-03 | 3.22E+00 | 8.83E-03 | 1.01E-06 |
| o-Cresol | 95487 | Y | 3.52E-05 | 6.68E-02 | 1.83E-04 | 2.09E-08 |
| o-Xylene | 95476 | Y | 7.39E-04 | 1.40E+00 | 3.84E-03 | 4.39E-07 |
| p-Cresol | 106445 | Y | 3.52E-05 | 6.68E-02 | 1.83E-04 | 2.09E-08 |
| Phenol | 108952 | Y | 3.52E-05 | 6.68E-02 | 1.83E-04 | 2.09E-08 |
| Propylene | 115071 | Y | 1.17E-04 | 2.23E-01 | 6.10E-04 | 6.96E-08 |
| p-Xylene | 106423 | Y | 7.70E-04 | 1.46E+00 | 4.01E-03 | 4.57E-07 |
| Styrene | 100425 | Y | 1.32E-04 | 2.50E-01 | 6.86E-04 | 7.83E-08 |
| Toluene | 108883 | Y | 6.38E-04 | 1.21E+00 | 3.32E-03 | 3.79E-07 |
| Xylenes, mixed | 1210 | Y | 2.28E-03 | 4.33E+00 | 1.19E-02 | 1.35E-06 |

(1) Speciation from 2001 Tosco AB2588 HRA for Unit 90.

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# ATTACHMENT B

## Health Risk Tables

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# Attachment B
# Phillips 66 - Wilmington Plant
# ULSD Project
# Health Data

| CHEMICAL | CAS NO. | CancerPF (Inhalation) $(mg/kg\text{-}d)^{-1}$ | CancerPF (Oral) $(mg/kg\text{-}d)^{-1}$ | ChronicREL (Inhalation) ($\mu g/m^3$) | ChronicREL (Oral) (mg/kg-d) | AcuteREL (Inhalation) ($\mu g/m^3$) |
|---|---|---|---|---|---|---|
| 1,3-Butadiene | 106990 | 0.6 | * | 20 | * | * |
| Acetaldehyde | 75070 | 1.00E-02 | * | 140 | * | 470 |
| Arsenic | 1016 | 12 | 1.5 | 0.015 | 0.0000035 | 0.2 |
| Benzene | 71432 | 1.00E-01 | * | 60 | * | 1300 |
| Beryllium | 7440417 | 8.4 | * | 0.007 | 0.002 | * |
| Cadmium | 7440439 | 15 | * | 0.02 | 0.0005 | * |
| Chrysene | 218019 | 0.039 | 0.12 | * | * | * |
| Chromium (VI) | 18540299 | 5.10E+02 | * | 0.2 | 0.02 | * |
| Cresols | 1319773 | * | * | 600 | * | * |
| Ethyl Benzene | 100414 | 0.0087 | * | 2000 | * | * |
| Formaldehyde | 50000 | 0.021 | * | 9.00E+00 | * | 55 |
| Hydrogen Sulfide | 7783064 | * | * | 1.00E+01 | * | 42 |
| Hexane | 110543 | * | * | 7000 | * | * |
| Indeno[1,2,3-cd]pyrene | 193395 | 3.90E-01 | 1.20E+00 | * | * | * |
| Manganese | 7439965 | * | * | 9.00E-02 | * | * |
| Mercury | 7439976 | * | * | 3.00E-02 | 0.00016 | 0.6 |
| Naphthalene | 91203 | 0.12 | * | 9 | * | * |
| Ammonia | 7664417 | * | * | 200 | * | 3200 |
| PAHs | 1150 | * | * | * | * | * |
| Phenol | 108952 | * | * | 200 | * | 5800 |
| Propylene | 115071 | * | * | 3000 | * | * |
| Selenium | 7782492 | * | * | 2.00E+01 | * | * |
| Silver | 7440224 | * | * | * | * | * |
| Styrene | 100425 | * | * | 900 | * | 21000 |
| Toluene | 108883 | * | * | 300 | * | 37000 |
| Xylenes | 1330207 | * | * | 700 | * | 22000 |

PF = Potency Factor
REL = Reference Exposure Limit
Source: SCAQMD, Risk Assessment Proceedures for Rules 1401 and 212,
Attachment L, Tables for Applications Deemed Complete on or after July 1, 2005.

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# ATTACHMENT C

## Source Parameters

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# Attachment C
# Phillips 66 - Wilmington Plant
# ULSD Project
# Source Parameters

| Source Name | UTME (m) | UTMN (m) | Length (m) | Width (m) | Height (m) | Diameter (m) | Velocity (m/s) | Temp (F) |
|---|---|---|---|---|---|---|---|---|
| U90B201 | 380844 | 3737597 | | | 45.73 | 1.43 | 1.092 | 785 |
| U90B401 | 380870 | 3737598 | | | 45.73 | 1.43 | 1.092 | 785 |
| U90FUG | 380560 | 3737580 | 70 | 70 | 1.83 | | | |

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## ATTACHMENT D

## Detailed Risk Tables

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# Attachment D
# Phillips 66 - Wilmington Plant
# ULSD Project
# Table D-1
# HRA Risk Summary

| Scenario | MEIR | MEIW | MCHI | MAHI |
|---|---|---|---|---|
| Pre-Project | 7.35E-08 | 1.89E-08 | 2.82E-03 | 1.24E-04 |
| Post-Project | 1.50E-07 | 2.81E-08 | 3.66E-03 | 1.45E-04 |
| **Incremental Risk** | **7.65E-08** | **9.20E-09** | **8.40E-04** | **1.45E-04** |

**Attachment D**
**Phillips 66 - Wilmington Plant**
**ULSD Project**
**Table D-2**
**Pre-Project Maxium Exposed Individual Resident**

| CHEM | INHAL | DERM | SOIL | MOTHER | FISH | WATER | VEG | DAIRY | BEEF | CHICK | PIG | EGG | MEAT | ORAL | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acetaldehyde | 2.54E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.54E-11 |
| Arsenic | 3.05E-09 | 7.31E-09 | 3.56E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.54E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.15E-08 | 1.46E-08 |
| Benzene | 3.35E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.35E-10 |
| Beryllium | 5.72E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.72E-10 |
| Cadmium | 2.50E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.50E-09 |
| Chromium(VI) | 5.55E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.55E-08 |
| Formaldehyde | 3.25E-13 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.25E-13 |
| Hydrogen Sulfide | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Indeno[1,2,3-cd]pyrene | 4.95E-14 | 6.58E-13 | 9.86E-14 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.35E-13 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.59E-12 | 1.64E-12 |
| Manganese | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Mercury | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Naphthalene | 9.90E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.90E-12 |
| PAHs | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Phenol | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Selenium | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Silver | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Toluene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| SUM | 6.20E-08 | 7.31E-09 | 3.56E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.54E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.15E-08 | 7.35E-08 |

| CHEM | INHAL | DERM | SOIL | MOTHER | FISH | WATER | VEG | DAIRY | BEEF | CHICK | PIG | EGG | MEAT | ORAL | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acetaldehyde | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Arsenic | 4.1% | 9.9% | 4.8% | 0.0% | 0.0% | 0.0% | 0.9% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 15.6% | 19.9% |
| Benzene | 0.5% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.5% |
| Beryllium | 0.8% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.8% |
| Cadmium | 3.4% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 3.4% |
| Chromium(VI) | 75.5% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 75.5% |
| Formaldehyde | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Hydrogen Sulfide | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Indeno[1,2,3-cd]pyrene | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Manganese | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Mercury | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Naphthalene | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| PAHs | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Phenol | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Selenium | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Silver | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Toluene | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| SUM | 84.4% | 9.9% | 4.8% | 0.0% | 0.0% | 0.0% | 0.9% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 15.6% | 100.0% |

Oral is the combined risk of all non-inhalation pathways.

M:\MC\2696 Conoco - ULSD\HRA\2696 ULSD HRA Tables.xls:PreMEIR

**Attachment D**
**Phillips 66 - Wilmington Plant**
**ULSD Project**
**Table D-3**
**Pre-Project Maxium Exposed Individual Worker**

| CHEM | INHAL | DERM | SOIL | MOTHER | FISH | WATER | VEG | DAIRY | BEEF | CHICK | PIG | EGG | MEAT | ORAL | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acetaldehyde | 5.87E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.87E-12 |
| Arsenic | 7.04E-10 | 3.24E-09 | 1.37E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.61E-09 | 5.32E-09 |
| Benzene | 7.73E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.73E-11 |
| Beryllium | 1.32E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.32E-10 |
| Cadmium | 5.78E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.78E-10 |
| Chromium(VI) | 1.28E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.28E-08 |
| Formaldehyde | 7.50E-14 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.50E-14 |
| Hydrogen Sulfide | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Indeno[1,2,3-cd]pyrene | 1.27E-14 | 2.92E-13 | 3.79E-14 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.30E-13 | 3.43E-13 |
| Manganese | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Mercury | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Naphthalene | 2.28E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.28E-12 |
| PAHs | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Phenol | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Selenium | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Silver | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Toluene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| SUM | 1.43E-08 | 3.24E-09 | 1.37E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.61E-09 | 1.89E-08 |

| CHEM | INHAL | DERM | SOIL | MOTHER | FISH | WATER | VEG | DAIRY | BEEF | CHICK | PIG | EGG | MEAT | ORAL | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acetaldehyde | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Arsenic | 3.7% | 17.1% | 7.2% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 24.4% | 28.1% |
| Benzene | 0.4% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.4% |
| Beryllium | 0.7% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.7% |
| Cadmium | 3.1% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 3.1% |
| Chromium(VI) | 67.7% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 67.7% |
| Formaldehyde | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Hydrogen Sulfide | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Indeno[1,2,3-cd]pyrene | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Manganese | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Mercury | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Naphthalene | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| PAHs | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Phenol | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Selenium | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Silver | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Toluene | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| SUM | 75.7% | 17.1% | 7.2% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 24.4% | 100.0% |

Oral is the combined risk of all non-inhalation pathways.

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**Attachment D**
**Phillips 66 - Wilmington Plant**
**ULSD Project**
**Table D-4**
**Pre-Project Maxium Chronic Hazard Index**

| CHEM | CV | CNS | BONE | DEVEL | ENDO | EYE | GILV | IMMUN | KIDN | REPRO | RESP | SKIN | BLOOD | MAX | CNS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acetaldehyde | 0.00E+00 | **0.00E+00** | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.34E-08 | 0.00E+00 | 0.00E+00 | 7.34E-08 | **0.0%** |
| Arsenic | 2.74E-03 | **2.74E-03** | 0.00E+00 | 2.74E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.74E-03 | 2.74E-03 | 0.00E+00 | 2.74E-03 | **97.2%** |
| Benzene | 0.00E+00 | **2.26E-07** | 0.00E+00 | 2.26E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.26E-07 | 2.26E-07 | **0.0%** |
| Beryllium | 0.00E+00 | **0.00E+00** | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.53E-07 | 3.93E-05 | 0.00E+00 | 0.00E+00 | 3.93E-05 | 0.00E+00 | 0.00E+00 | 3.93E-05 | **0.0%** |
| Cadmium | 0.00E+00 | **0.00E+00** | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.03E-05 | 0.00E+00 | 3.37E-05 | 0.00E+00 | 0.00E+00 | 5.03E-05 | **0.0%** |
| Chromium(VI) | 0.00E+00 | **0.00E+00** | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.20E-06 | 0.00E+00 | 1.04E-07 | 2.20E-06 | **0.0%** |
| Formaldehyde | 0.00E+00 | **0.00E+00** | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.94E-09 | 0.00E+00 | 0.00E+00 | 6.94E-09 | **0.0%** |
| Hydrogen Sulfide | 0.00E+00 | **0.00E+00** | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.48E-06 | 0.00E+00 | 0.00E+00 | 1.48E-06 | **0.0%** |
| Manganese | 0.00E+00 | **5.00E-05** | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.00E-05 | **1.8%** |
| Mercury | 0.00E+00 | **2.28E-05** | 0.00E+00 | 2.28E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.28E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.28E-05 | **0.8%** |
| Naphthalene | 0.00E+00 | **0.00E+00** | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.70E-08 | 0.00E+00 | 0.00E+00 | 3.70E-08 | **0.0%** |
| PAHs | 0.00E+00 | **0.00E+00** | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | **0.0%** |
| Phenol | 3.97E-09 | **3.97E-09** | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.97E-09 | 0.00E+00 | 3.97E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.97E-09 | **0.0%** |
| Selenium | 1.37E-07 | **1.37E-07** | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.37E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.37E-07 | **0.0%** |
| Toluene | 0.00E+00 | **5.38E-08** | 0.00E+00 | 5.38E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.38E-08 | 0.00E+00 | 0.00E+00 | 5.38E-08 | **0.0%** |
| SUM | 2.74E-03 | **2.82E-03** | 0.00E+00 | 2.77E-03 | 0.00E+00 | 0.00E+00 | 7.94E-07 | 3.93E-05 | 7.31E-05 | 0.00E+00 | 2.82E-03 | 2.74E-03 | 3.29E-07 | 2.82E-03 | **100.0%** |

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**Attachment D**
**Phillips 66 - Wilmington Plant**
**ULSD Project**
**Table D-5**
**Pre-Project Maxium Acute Hazard Index**

| CHEM | CV | CNS | BONE | DEVEL | ENDO | EYE | GILV | IMMUN | KIDN | REPRO | RESP | SKIN | BLOOD | MAX | CNS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acetaldehyde | 0.00E+00 | **0.00E+00** | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.75E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.75E-07 | 0.00E+00 | 0.00E+00 | 4.75E-07 | **0.0%** |
| Arsenic | 1.12E-04 | **1.12E-04** | 0.00E+00 | 1.12E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.12E-04 | **90.3%** |
| Benzene | 0.00E+00 | **0.00E+00** | 0.00E+00 | 2.28E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.28E-07 | 0.00E+00 | 2.28E-07 | 0.00E+00 | 0.00E+00 | 2.28E-07 | 2.28E-07 | **0.0%** |
| Formaldehyde | 0.00E+00 | **0.00E+00** | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.48E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.48E-08 | **0.0%** |
| Hydrogen Sulfide | 0.00E+00 | **7.70E-06** | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.70E-06 | **6.2%** |
| Mercury | 0.00E+00 | **3.74E-06** | 0.00E+00 | 3.74E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.74E-06 | **3.0%** |
| Phenol | 0.00E+00 | **0.00E+00** | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.99E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.99E-09 | 0.00E+00 | 0.00E+00 | 2.99E-09 | **0.0%** |
| Toluene | 0.00E+00 | **9.52E-09** | 0.00E+00 | 9.52E-09 | 0.00E+00 | 9.52E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.52E-09 | 9.52E-09 | 0.00E+00 | 0.00E+00 | 9.52E-09 | **0.0%** |
| SUM | 1.12E-04 | **1.24E-04** | 0.00E+00 | 1.16E-04 | 0.00E+00 | 5.13E-07 | 0.00E+00 | 2.28E-07 | 0.00E+00 | 2.37E-07 | 4.88E-07 | 0.00E+00 | 2.28E-07 | 1.24E-04 | **100.0%** |

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**Attachment D**
**Phillips 66 - Wilmington Plant**
**ULSD Project**
**Table D-6**
**Post-Project Maxium Exposed Individual Resident**

| CHEM | INHAL | DERM | SOIL | MOTHER | FISH | WATER | VEG | DAIRY | BEEF | CHICK | PIG | EGG | MEAT | ORAL | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,3-Butadiene | 1.62E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.62E-09 |
| Acetaldehyde | 3.29E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.29E-11 |
| Arsenic | 3.95E-09 | 9.44E-09 | 4.60E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.44E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.49E-08 | 1.88E-08 |
| Benzene | 7.99E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.99E-10 |
| Beryllium | 7.39E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.39E-10 |
| Cadmium | 3.24E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.24E-09 |
| Chrysene | 2.82E-11 | 3.75E-10 | 5.62E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.76E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.08E-10 | 9.36E-10 |
| Chromium(VI) | 7.21E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.21E-08 |
| Cresols | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Ethyl Benzene | 1.01E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.01E-10 |
| Formaldehyde | 4.19E-13 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.19E-13 |
| Hydrogen Sulfide | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Hexane | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Indeno[1,2,3-cd]pyrene | 1.41E-09 | 1.88E-08 | 2.81E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.38E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.54E-08 | 4.68E-08 |
| Manganese | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Mercury | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Naphthalene | 4.68E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.68E-09 |
| Ammonia | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| PAHs | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Phenol | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Propylene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Selenium | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Silver | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Styrene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Toluene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Xylenes | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| SUM | 8.86E-08 | 2.86E-08 | 7.46E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.51E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.12E-08 | 1.50E-07 |

| CHEM | INHAL | DERM | SOIL | MOTHER | FISH | WATER | VEG | DAIRY | BEEF | CHICK | PIG | EGG | MEAT | ORAL | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,3-Butadiene | 1.1% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 1.1% |
| Acetaldehyde | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Arsenic | 2.6% | 6.3% | 3.1% | 0.0% | 0.0% | 0.0% | 0.6% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 9.9% | 12.5% |
| Benzene | 0.5% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.5% |
| Beryllium | 0.5% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.5% |
| Cadmium | 2.2% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 2.2% |
| Chrysene | 0.0% | 0.3% | 0.0% | 0.0% | 0.0% | 0.0% | 0.3% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.6% | 0.6% |
| Chromium(VI) | 48.1% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 48.1% |
| Cresols | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Ethyl Benzene | 0.1% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.1% |
| Formaldehyde | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Hydrogen Sulfide | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Hexane | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Indeno[1,2,3-cd]pyrene | 0.9% | 12.5% | 1.9% | 0.0% | 0.0% | 0.0% | 15.9% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 30.3% | 31.2% |
| Manganese | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Mercury | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Naphthalene | 3.1% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 3.1% |
| Ammonia | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| PAHs | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Phenol | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Propylene | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Selenium | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Silver | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Styrene | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Toluene | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Xylenes | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| SUM | 59.1% | 19.1% | 5.0% | 0.0% | 0.0% | 0.0% | 16.7% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 40.8% | 100.0% |

Oral is the combined risk of all non-inhalation pathways.

**Attachment D**
**Phillips 66 - Wilmington Plant**
**ULSD Project**
**Table D-7**
**Post-Project Maxium Exposed Individual Worker**

| CHEM | INHAL | DERM | SOIL | MOTHER | FISH | WATER | VEG | DAIRY | BEEF | CHICK | PIG | EGG | MEAT | ORAL | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,3-Butadiene | 1.21E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.21E-10 |
| Acetaldehyde | 7.55E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.55E-12 |
| Arsenic | 9.06E-10 | 4.17E-09 | 1.76E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.93E-09 | 6.84E-09 |
| Benzene | 1.27E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.27E-10 |
| Beryllium | 1.70E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.70E-10 |
| Cadmium | 7.44E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.44E-10 |
| Chrysene | 2.35E-12 | 5.39E-11 | 7.00E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.09E-11 | 6.32E-11 |
| Chromium(VI) | 1.65E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.65E-08 |
| Cresols | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Ethyl Benzene | 7.52E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.52E-12 |
| Formaldehyde | 9.63E-14 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.63E-14 |
| Hydrogen Sulfide | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Hexane | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Indeno[1,2,3-cd]pyrene | 1.17E-10 | 2.70E-09 | 3.50E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.05E-09 | 3.16E-09 |
| Manganese | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Mercury | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Naphthalene | 3.51E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.51E-10 |
| Ammonia | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| PAHs | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Phenol | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Propylene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Selenium | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Silver | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Styrene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Toluene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Xylenes | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| SUM | 1.91E-08 | 6.92E-09 | 2.12E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.04E-09 | 2.81E-08 |

| CHEM | INHAL | DERM | SOIL | MOTHER | FISH | WATER | VEG | DAIRY | BEEF | CHICK | PIG | EGG | MEAT | ORAL | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,3-Butadiene | 0.4% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.4% |
| Acetaldehyde | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Arsenic | 3.2% | 14.8% | 6.3% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 21.1% | 24.3% |
| Benzene | 0.5% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.5% |
| Beryllium | 0.6% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.6% |
| Cadmium | 2.6% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 2.6% |
| Chrysene | 0.0% | 0.2% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.2% | 0.2% |
| Chromium(VI) | 58.7% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 58.7% |
| Cresols | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Ethyl Benzene | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Formaldehyde | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Hydrogen Sulfide | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Hexane | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Indeno[1,2,3-cd]pyrene | 0.4% | 9.6% | 1.2% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 10.9% | 11.2% |
| Manganese | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Mercury | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Naphthalene | 1.2% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 1.2% |
| Ammonia | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| PAHs | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Phenol | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Propylene | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Selenium | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Silver | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Styrene | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Toluene | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Xylenes | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| SUM | 68.0% | 24.6% | 7.5% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 32.2% | 100.0% |

Oral is the combined risk of all non-inhalation pathways.

M:\MC\2696 Conoco - ULSD\HRA\2696 ULSD HRA Tables.xls:PostMEIW

**Attachment D**
**Phillips 66 - Wilmington Plant**
**ULSD Project**
**Table D-8**
**Post-Project Maxium Chronic Hazard Index**

| CHEM | CV | CNS | BONE | DEVEL | ENDO | EYE | GILV | IMMUN | KIDN | REPRO | RESP | SKIN | BLOOD | MAX | RESP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,3-Butadiene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.76E-07 | **0.00E+00** | 0.00E+00 | 0.00E+00 | 1.76E-07 | **0.0%** |
| Acetaldehyde | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | **9.44E-08** | 0.00E+00 | 0.00E+00 | 9.44E-08 | **0.0%** |
| Arsenic | 3.53E-03 | 3.53E-03 | 0.00E+00 | 3.53E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | **3.53E-03** | 3.53E-03 | 0.00E+00 | 3.53E-03 | **96.4%** |
| Benzene | 0.00E+00 | 3.71E-07 | 0.00E+00 | 3.71E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | **0.00E+00** | 0.00E+00 | 3.71E-07 | 3.71E-07 | **0.0%** |
| Beryllium | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.40E-07 | 5.05E-05 | 0.00E+00 | 0.00E+00 | **5.05E-05** | 0.00E+00 | 0.00E+00 | 5.05E-05 | **1.4%** |
| Cadmium | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.48E-05 | 0.00E+00 | **4.34E-05** | 0.00E+00 | 0.00E+00 | 6.48E-05 | **1.2%** |
| Chromium(VI) | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | **2.84E-06** | 0.00E+00 | 1.34E-07 | 2.84E-06 | **0.1%** |
| Cresols | 0.00E+00 | 5.26E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | **0.00E+00** | 0.00E+00 | 0.00E+00 | 5.26E-09 | **0.0%** |
| Ethyl Benzene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.56E-09 | 7.56E-09 | 0.00E+00 | 7.56E-09 | 0.00E+00 | 7.56E-09 | 0.00E+00 | **0.00E+00** | 0.00E+00 | 0.00E+00 | 7.56E-09 | **0.0%** |
| Formaldehyde | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | **8.92E-09** | 0.00E+00 | 0.00E+00 | 8.92E-09 | **0.0%** |
| Hydrogen Sulfide | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | **1.93E-06** | 0.00E+00 | 0.00E+00 | 1.93E-06 | **0.1%** |
| Hexane | 0.00E+00 | 9.03E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | **0.00E+00** | 0.00E+00 | 0.00E+00 | 9.03E-09 | **0.0%** |
| Manganese | 0.00E+00 | 6.43E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | **0.00E+00** | 0.00E+00 | 0.00E+00 | 6.43E-05 | **0.0%** |
| Mercury | 0.00E+00 | 2.94E-05 | 0.00E+00 | 2.94E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.94E-05 | 0.00E+00 | **0.00E+00** | 0.00E+00 | 0.00E+00 | 2.94E-05 | **0.0%** |
| Naphthalene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | **5.69E-06** | 0.00E+00 | 0.00E+00 | 5.69E-06 | **0.2%** |
| Ammonia | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | **2.56E-05** | 0.00E+00 | 0.00E+00 | 2.56E-05 | **0.7%** |
| Phenol | 1.04E-08 | 1.04E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.04E-08 | 0.00E+00 | 1.04E-08 | 0.00E+00 | **0.00E+00** | 0.00E+00 | 0.00E+00 | 1.04E-08 | **0.0%** |
| Propylene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | **1.17E-09** | 0.00E+00 | 0.00E+00 | 1.17E-09 | **0.0%** |
| Selenium | 1.77E-07 | 1.77E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.77E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | **0.00E+00** | 0.00E+00 | 0.00E+00 | 1.77E-07 | **0.0%** |
| Styrene | 0.00E+00 | 4.38E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | **0.00E+00** | 0.00E+00 | 0.00E+00 | 4.38E-09 | **0.0%** |
| Toluene | 0.00E+00 | 1.33E-07 | 0.00E+00 | 1.33E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | **1.33E-07** | 0.00E+00 | 0.00E+00 | 1.33E-07 | **0.0%** |
| Xylenes | 0.00E+00 | 9.75E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | **9.75E-08** | 0.00E+00 | 0.00E+00 | 9.75E-08 | **0.0%** |
| SUM | 3.53E-03 | 3.62E-03 | 0.00E+00 | 3.56E-03 | 7.56E-09 | 0.00E+00 | 1.03E-06 | 5.05E-05 | 9.43E-05 | 1.76E-07 | **3.66E-03** | 3.53E-03 | 5.05E-07 | 3.66E-03 | **100.0%** |

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**Attachment D**
**Phillips 66 - Wilmington Plant**
**ULSD Project**
**Table D-9**
**Post-Project Maxium Acute Hazard Index**

| CHEM | CV | CNS | BONE | DEVEL | ENDO | EYE | GILV | IMMUN | KIDN | REPRO | RESP | SKIN | BLOOD | MAX | CNS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acetaldehyde | 0.00E+00 | **0.00E+00** | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.56E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.56E-07 | 0.00E+00 | 0.00E+00 | 5.56E-07 | **0.0%** |
| Arsenic | 1.31E-04 | **1.31E-04** | 0.00E+00 | 1.31E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.31E-04 | **90.3%** |
| Benzene | 0.00E+00 | **0.00E+00** | 0.00E+00 | 2.66E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.66E-07 | 0.00E+00 | 2.66E-07 | 0.00E+00 | 0.00E+00 | 2.66E-07 | 2.66E-07 | **0.0%** |
| Formaldehyde | 0.00E+00 | **0.00E+00** | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.89E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.89E-08 | **0.0%** |
| Hydrogen Sulfide | 0.00E+00 | **8.97E-06** | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.97E-06 | **6.2%** |
| Mercury | 0.00E+00 | **4.37E-06** | 0.00E+00 | 4.37E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.37E-06 | **3.0%** |
| Ammonia | 0.00E+00 | **0.00E+00** | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.17E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.17E-05 | 0.00E+00 | 0.00E+00 | 3.17E-05 | **0.0%** |
| Phenol | 0.00E+00 | **0.00E+00** | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.51E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.51E-09 | 0.00E+00 | 0.00E+00 | 3.51E-09 | **0.0%** |
| Styrene | 0.00E+00 | **0.00E+00** | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.23E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.23E-11 | 0.00E+00 | 0.00E+00 | 1.23E-11 | **0.0%** |
| Toluene | 0.00E+00 | **1.11E-08** | 0.00E+00 | 1.11E-08 | 0.00E+00 | 1.11E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.11E-08 | 1.11E-08 | 0.00E+00 | 0.00E+00 | 1.11E-08 | **0.0%** |
| Xylenes | 0.00E+00 | **0.00E+00** | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.03E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.03E-10 | 0.00E+00 | 0.00E+00 | 2.03E-10 | **0.0%** |
| SUM | 1.31E-04 | **1.45E-04** | 0.00E+00 | 1.36E-04 | 0.00E+00 | 3.23E-05 | 0.00E+00 | 2.66E-07 | 0.00E+00 | 2.77E-07 | 3.22E-05 | 0.00E+00 | 2.66E-07 | 1.45E-04 | **100.0%** |

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# ATTACHMENT E

## Electronic Files

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```
This file: C:\HARP\PROJECTS\2696CP\2696B201\2696 B201 MEIR.txt

Created by HARP Version 1.4f  Build 23.11.01
Uses ISC Version 99155
Uses BPIP (Dated: 04112)
Creation date: 1/4/2013 5:35:57 PM


EXCEPTION REPORT
   (there have been no changes or exceptions)

INPUT FILES:
   Source-Receptor file: C:\HARP\PROJECTS\2696CP\2696B201\2696B201.SRC
   Averaging period adjustment factors file: not applicable
   Emission rates file: 2696B201.EMS
   Site parameters file: C:\HARP\PROJECTS\resident pathway.sit

Coordinate system: UTM NAD83

Screening mode is OFF

Exposure duration: 70 year (adult resident)
Analysis method:   Derived  (Adjusted) Method
Health effect:     Cancer Risk
Receptor(s):       861
Sources(s):        All
Chemicals(s):      All

SITE PARAMETERS

DEPOSITION

   Deposition rate (m/s)             0.02

DRINKING WATER

*** Pathway disabled ***

FISH

*** Pathway disabled ***

PASTURE

*** Pathway disabled ***

HOME GROWN PRODUCE

   HUMAN INGESTION
   Fraction of ingested leafy vegetable
     from home grown source          0.052
   Fraction of ingested exposed vegetable
     from home grown source          0.052
   Fraction of ingested protected vegetable
     from home grown source          0.052
   Fraction of ingested root vegetable
```

from home grown source 0.052

PIGS, CHICKENS AND EGGS

*** Pathway disabled ***

DERMAL ABSORPTION

*** Pathway enabled ***

SOIL INGESTION

*** Pathway enabled ***

MOTHER'S MILK

*** Pathway enabled ***

CHEMICAL CROSS-REFERENCE TABLE AND BACKGROUND CONCENTRATIONS

| CHEM | CAS | ABBREVIATION | POLLUTANT NAME | BACKGROUND (ug/m^3) |
|---|---|---|---|---|
| 0001 | 75070 | Acetaldehyde | Acetaldehyde | 0.000E+00 |
| 0002 | 7440382 | Arsenic | Arsenic | 0.000E+00 |
| 0003 | 71432 | Benzene | Benzene | 0.000E+00 |
| 0004 | 7440417 | Beryllium | Beryllium | 0.000E+00 |
| 0005 | 7440439 | Cadmium | Cadmium | 0.000E+00 |
| 0006 | 18540299 | Cr(VI) | Chromium, hexavalent (& compounds) | 0.000E+00 |
| 0007 | 50000 | Formaldehyde | Formaldehyde | 0.000E+00 |
| 0008 | 7783064 | H2S | Hydrogen sulfide | 0.000E+00 |
| 0009 | 193395 | In[1,2,3-cd]pyr | Indeno[1,2,3-cd]pyrene | 0.000E+00 |
| 0010 | 7439965 | Manganese | Manganese | 0.000E+00 |
| 0011 | 7439976 | Mercury | Mercury | 0.000E+00 |
| 0012 | 91203 | Naphthalene | Naphthalene | 0.000E+00 |
| 0013 | 1150 | PAHs-w/ | PAHs, total, with individ. components also reported | 0.000E+00 |
| 0014 | 108952 | Phenol | Phenol | 0.000E+00 |
| 0015 | 7782492 | Selenium | Selenium | 0.000E+00 |
| 0016 | 7440224 | Silver | Silver | 0.000E+00 |
| 0017 | 108883 | Toluene | Toluene | 0.000E+00 |

CHEMICAL HEALTH VALUES

| CHEM | CAS | ABBREVIATION | CancerPF(Inh) (mg/kg-d)^-1 | CancerPF(Oral) (mg/kg-d)^-1 | ChronicREL(Inh) ug/m^3 | ChronicREL(Oral) mg/kg-d | AcuteREL ug/m^3 |
|---|---|---|---|---|---|---|---|
| 0001 | 75070 | Acetaldehyde | 1.00E-02 | * | 1.40E+02 | * | 4.70E+02 |
| 0002 | 7440382 | Arsenic | 1.20E+01 | 1.50E+00 | 1.50E-02 | 3.50E-06 | 2.00E-01 |
| 0003 | 71432 | Benzene | 1.00E-01 | * | 6.00E+01 | * | 1.30E+03 |
| 0004 | 7440417 | Beryllium | 8.40E+00 | * | 7.00E-03 | 2.00E-03 | * |
| 0005 | 7440439 | Cadmium | 1.50E+01 | * | 2.00E-02 | 5.00E-04 | * |
| 0006 | 18540299 | Cr(VI) | 5.10E+02 | * | 2.00E-01 | 2.00E-02 | * |
| 0007 | 50000 | Formaldehyde | 2.10E-02 | * | 9.00E+00 | * | 5.50E+01 |
| 0008 | 7783064 | H2S | * | * | 1.00E+01 | * | 4.20E+01 |
| 0009 | 193395 | In[1,2,3-cd]pyr | 3.90E-01 | 1.20E+00 | * | * | * |
| 0010 | 7439965 | Manganese | * | * | 9.00E-02 | * | * |
| 0011 | 7439976 | Mercury | * | * | 3.00E-02 | 1.60E-04 | 6.00E-01 |
| 0012 | 91203 | Naphthalene | 1.20E-01 | * | 9.00E+00 | * | * |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0013 | 1150 | PAHs-w/ | * | * | * | * | * |
| 0014 | 108952 | Phenol | * | * | 2.00E+02 | * | 5.80E+03 |
| 0015 | 7782492 | Selenium | * | * | 2.00E+01 | * | * |
| 0016 | 7440224 | Silver | * | * | * | * | * |
| 0017 | 108883 | Toluene | * | * | 3.00E+02 | * | 3.70E+04 |

EMISSIONS DATA SOURCE: Emission rates loaded from file: C:\HARP\PROJECTS\2696CP\2696B201\2696B201.EMS
CHEMICALS ADDED OR DELETED: none

EMISSIONS FOR FACILITY FAC=1 DEV=* PRO=* STK=1 NAME=U90B201 EMS (lbs/yr)
SOURCE MULTIPLIER=1

| CAS | ABBREV | MULTIPLIER | BG (ug/m^3) | AVRG (lbs/yr) | MAX (lbs/hr) |
|---|---|---|---|---|---|
| 75070 | Acetaldehyde | 1 | 0 | 1.89E+00 | 2.15E-04 |
| 7440382 | Arsenic | 1 | 0 | 1.89E-01 | 2.16E-05 |
| 71432 | Benzene | 1 | 0 | 2.49E+00 | 2.85E-04 |
| 7440417 | Beryllium | 1 | 0 | 5.06E-02 | 5.77E-06 |
| 7440439 | Cadmium | 1 | 0 | 1.24E-01 | 1.42E-05 |
| 18540299 | Cr(VI) | 1 | 0 | 8.08E-02 | 9.22E-06 |
| 50000 | Formaldehyde | 1 | 0 | 1.15E-02 | 1.31E-06 |
| 7783064 | H2S | 1 | 0 | 2.72E+00 | 3.11E-04 |
| 193395 | In[1,2,3-cd]pyr | 1 | 0 | 1.05E-04 | 1.20E-08 |
| 7439965 | Manganese | 1 | 0 | 8.28E-01 | 9.45E-05 |
| 7439976 | Mercury | 1 | 0 | 1.89E-02 | 2.16E-06 |
| 91203 | Naphthalene | 1 | 0 | 6.13E-02 | 7.00E-06 |
| 1150 | PAHs-w/ | 1 | 0 | 7.57E-02 | 8.64E-06 |
| 108952 | Phenol | 1 | 0 | 1.46E-01 | 1.67E-05 |
| 7782492 | Selenium | 1 | 0 | 5.06E-01 | 5.77E-05 |
| 7440224 | Silver | 1 | 0 | 1.01E-01 | 1.15E-05 |
| 108883 | Toluene | 1 | 0 | 2.97E+00 | 3.39E-04 |

CANCER RISK REPORT

DOMINANT PATHWAYS, Receptor 861

| CHEM | INHAL | DERM | SOIL | MOTHER | FISH | WATER | VEG | DAIRY | BEEF | CHICK | PIG | EGG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0001 | A | - | - | - | - | - | - | - | - | - | - | - |
| 0002 | A | YES | - | - | - | - | - | - | - | - | - | - |
| 0003 | A | - | - | - | - | - | - | - | - | - | - | - |
| 0004 | A | - | - | - | - | - | - | - | - | - | - | - |
| 0005 | A | - | - | - | - | - | - | - | - | - | - | - |
| 0006 | A | - | - | - | - | - | - | - | - | - | - | - |
| 0007 | A | - | - | - | - | - | - | - | - | - | - | - |
| 0008 | - | - | - | - | - | - | - | - | - | - | - | - |
| 0009 | - | YES | - | - | - | - | YES | - | - | - | - | - |
| 0010 | - | - | - | - | - | - | - | - | - | - | - | - |
| 0011 | - | - | - | - | - | - | - | - | - | - | - | - |
| 0012 | A | - | - | - | - | - | - | - | - | - | - | - |
| 0013 | - | - | - | - | - | - | - | - | - | - | - | - |
| 0014 | - | - | - | - | - | - | - | - | - | - | - | - |
| 0015 | - | - | - | - | - | - | - | - | - | - | - | - |
| 0016 | - | - | - | - | - | - | - | - | - | - | - | - |
| 0017 | - | - | - | - | - | - | - | - | - | - | - | - |

DERIVED CANCER RISK, RECEPTOR 861

| CHEM | INHAL | DERM | SOIL | MOTHER | FISH | WATER | VEG | DAIRY | BEEF | CHICK | PIG | EGG | MEAT | ORAL | TOTAL | UTME |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0001 | 2.54E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.54E-11 | |
| 0002 | 3.05E-09 | 7.31E-09 | 3.56E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.54E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.15E-08 | 1.46E-08 | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0003 | 3.35E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.35E-10 | | |
| 0004 | 5.72E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.72E-10 | | |
| 0005 | 2.50E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.50E-09 | | |
| 0006 | 5.55E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.55E-08 | | |
| 0007 | 3.25E-13 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.25E-13 | | |
| 0008 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0009 | 4.95E-14 | 6.58E-13 | 9.86E-14 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.35E-13 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.59E-12 | 1.64E-12 | | |
| 0010 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0011 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0012 | 9.90E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.90E-12 | | |
| 0013 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0014 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0015 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0016 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0017 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| SUM | 6.20E-08 | 7.31E-09 | 3.56E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.54E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.15E-08 | 7.35E-08 | 381700 | 373 |

```
This file: C:\HARP\PROJECTS\2696CP\2696B201\2696 B201 MEIW.txt

Created by HARP Version 1.4f  Build 23.11.01
Uses ISC Version 99155
Uses BPIP (Dated: 04112)
Creation date: 1/4/2013 5:37:14 PM


EXCEPTION REPORT
   (there have been no changes or exceptions)

INPUT FILES:
   Source-Receptor file: C:\HARP\PROJECTS\2696CP\2696B201\2696B201.SRC
   Averaging period adjustment factors file: not applicable
   Emission rates file: 2696B201.EMS
   Site parameters file: C:\HARP\PROJECTS\worker pathway.sit

Coordinate system: UTM NAD83

Screening mode is OFF

Exposure duration: Standard work schedule (49 wks/yr, 5 days/wk, 8 hrs/day, 40 yrs)
Analysis method:   Point estimate
Health effect:     Cancer Risk
Receptor(s):       788
Sources(s):        All
Chemicals(s):      All

SITE PARAMETERS

DEPOSITION

   Deposition rate (m/s)             0.02

DRINKING WATER

*** Pathway disabled ***

FISH

*** Pathway disabled ***

PASTURE

*** Pathway disabled ***

HOME GROWN PRODUCE

*** Pathway disabled ***

PIGS, CHICKENS AND EGGS

*** Pathway disabled ***

DERMAL ABSORPTION
```

*** Pathway enabled ***

SOIL INGESTION

*** Pathway enabled ***

MOTHER'S MILK

*** Pathway disabled ***

CHEMICAL CROSS-REFERENCE TABLE AND BACKGROUND CONCENTRATIONS

| CHEM | CAS | ABBREVIATION | POLLUTANT NAME | BACKGROUND (ug/m^3) |
|---|---|---|---|---|
| 0001 | 75070 | Acetaldehyde | Acetaldehyde | 0.000E+00 |
| 0002 | 7440382 | Arsenic | Arsenic | 0.000E+00 |
| 0003 | 71432 | Benzene | Benzene | 0.000E+00 |
| 0004 | 7440417 | Beryllium | Beryllium | 0.000E+00 |
| 0005 | 7440439 | Cadmium | Cadmium | 0.000E+00 |
| 0006 | 18540299 | Cr(VI) | Chromium, hexavalent (& compounds) | 0.000E+00 |
| 0007 | 50000 | Formaldehyde | Formaldehyde | 0.000E+00 |
| 0008 | 7783064 | H2S | Hydrogen sulfide | 0.000E+00 |
| 0009 | 193395 | In[1,2,3-cd]pyr | Indeno[1,2,3-cd]pyrene | 0.000E+00 |
| 0010 | 7439965 | Manganese | Manganese | 0.000E+00 |
| 0011 | 7439976 | Mercury | Mercury | 0.000E+00 |
| 0012 | 91203 | Naphthalene | Naphthalene | 0.000E+00 |
| 0013 | 1150 | PAHs-w/ | PAHs, total, with individ. components also reported | 0.000E+00 |
| 0014 | 108952 | Phenol | Phenol | 0.000E+00 |
| 0015 | 7782492 | Selenium | Selenium | 0.000E+00 |
| 0016 | 7440224 | Silver | Silver | 0.000E+00 |
| 0017 | 108883 | Toluene | Toluene | 0.000E+00 |

CHEMICAL HEALTH VALUES

| CHEM | CAS | ABBREVIATION | CancerPF(Inh) (mg/kg-d)^-1 | CancerPF(Oral) (mg/kg-d)^-1 | ChronicREL(Inh) ug/m^3 | ChronicREL(Oral) mg/kg-d | AcuteREL ug/m^3 |
|---|---|---|---|---|---|---|---|
| 0001 | 75070 | Acetaldehyde | 1.00E-02 | * | 1.40E+02 | * | 4.70E+02 |
| 0002 | 7440382 | Arsenic | 1.20E+01 | 1.50E+00 | 1.50E-02 | 3.50E-06 | 2.00E-01 |
| 0003 | 71432 | Benzene | 1.00E-01 | * | 6.00E+01 | * | 1.30E+03 |
| 0004 | 7440417 | Beryllium | 8.40E+00 | * | 7.00E-03 | 2.00E-03 | * |
| 0005 | 7440439 | Cadmium | 1.50E+01 | * | 2.00E-02 | 5.00E-04 | * |
| 0006 | 18540299 | Cr(VI) | 5.10E+02 | * | 2.00E-01 | 2.00E-02 | * |
| 0007 | 50000 | Formaldehyde | 2.10E-02 | * | 9.00E+00 | * | 5.50E+01 |
| 0008 | 7783064 | H2S | * | * | 1.00E+01 | * | 4.20E+01 |
| 0009 | 193395 | In[1,2,3-cd]pyr | 3.90E-01 | 1.20E+00 | * | * | * |
| 0010 | 7439965 | Manganese | * | * | 9.00E-02 | * | * |
| 0011 | 7439976 | Mercury | * | * | 3.00E-02 | 1.60E-04 | 6.00E-01 |
| 0012 | 91203 | Naphthalene | 1.20E-01 | * | 9.00E+00 | * | * |
| 0013 | 1150 | PAHs-w/ | * | * | * | * | * |
| 0014 | 108952 | Phenol | * | * | 2.00E+02 | * | 5.80E+03 |
| 0015 | 7782492 | Selenium | * | * | 2.00E+01 | * | * |
| 0016 | 7440224 | Silver | * | * | * | * | * |
| 0017 | 108883 | Toluene | * | * | 3.00E+02 | * | 3.70E+04 |

EMISSIONS DATA SOURCE: Emission rates loaded from file: C:\HARP\PROJECTS\2696CP\2696B201\2696B201.EMS
CHEMICALS ADDED OR DELETED: none

EMISSIONS FOR FACILITY FAC=1 DEV=* PRO=* STK=1 NAME=U90B201 EMS (lbs/yr)
SOURCE MULTIPLIER=1

| CAS | ABBREV | MULTIPLIER | BG (ug/m^3) | AVRG (lbs/yr) | MAX (lbs/hr) |
|---|---|---|---|---|---|
| 75070 | Acetaldehyde | 1 | 0 | 1.89E+00 | 2.15E-04 |
| 7440382 | Arsenic | 1 | 0 | 1.89E-01 | 2.16E-05 |
| 71432 | Benzene | 1 | 0 | 2.49E+00 | 2.85E-04 |
| 7440417 | Beryllium | 1 | 0 | 5.06E-02 | 5.77E-06 |
| 7440439 | Cadmium | 1 | 0 | 1.24E-01 | 1.42E-05 |
| 18540299 | Cr(VI) | 1 | 0 | 8.08E-02 | 9.22E-06 |
| 50000 | Formaldehyde | 1 | 0 | 1.15E-02 | 1.31E-06 |
| 7783064 | H2S | 1 | 0 | 2.72E+00 | 3.11E-04 |
| 193395 | In[1,2,3-cd]pyr | 1 | 0 | 1.05E-04 | 1.20E-08 |
| 7439965 | Manganese | 1 | 0 | 8.28E-01 | 9.45E-05 |
| 7439976 | Mercury | 1 | 0 | 1.89E-02 | 2.16E-06 |
| 91203 | Naphthalene | 1 | 0 | 6.13E-02 | 7.00E-06 |
| 1150 | PAHs-w/ | 1 | 0 | 7.57E-02 | 8.64E-06 |
| 108952 | Phenol | 1 | 0 | 1.46E-01 | 1.67E-05 |
| 7782492 | Selenium | 1 | 0 | 5.06E-01 | 5.77E-05 |
| 7440224 | Silver | 1 | 0 | 1.01E-01 | 1.15E-05 |
| 108883 | Toluene | 1 | 0 | 2.97E+00 | 3.39E-04 |

CANCER RISK REPORT

AVERAGE CANCER RISK, RECEPTOR 788

| CHEM | INHAL | DERM | SOIL | MOTHER | FISH | WATER | VEG | DAIRY | BEEF | CHICK | PIG | EGG | MEAT | ORAL | TOTAL | UTME |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0001 | 5.87E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.87E-12 | |
| 0002 | 7.04E-10 | 3.24E-09 | 1.37E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.61E-09 | 5.32E-09 | |
| 0003 | 7.73E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.73E-11 | |
| 0004 | 1.32E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.32E-10 | |
| 0005 | 5.78E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.78E-10 | |
| 0006 | 1.28E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.28E-08 | |
| 0007 | 7.50E-14 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.50E-14 | |
| 0008 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0009 | 1.27E-14 | 2.92E-13 | 3.79E-14 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.30E-13 | 3.43E-13 | |
| 0010 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0011 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0012 | 2.28E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.28E-12 | |
| 0013 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0014 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0015 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0016 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0017 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| SUM | 1.43E-08 | 3.24E-09 | 1.37E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.61E-09 | 1.89E-08 | 382500 373 |

```
This file: C:\HARP\PROJECTS\2696CP\2696B201\2696 B201 MCHI.txt

Created by HARP Version 1.4f  Build 23.11.01
Uses ISC Version 99155
Uses BPIP (Dated: 04112)
Creation date: 1/4/2013 5:36:19 PM


EXCEPTION REPORT
   (there have been no changes or exceptions)

INPUT FILES:
   Source-Receptor file: C:\HARP\PROJECTS\2696CP\2696B201\2696B201.SRC
   Averaging period adjustment factors file: not applicable
   Emission rates file: 2696B201.EMS
   Site parameters file: C:\HARP\PROJECTS\resident pathway.sit

Coordinate system: UTM NAD83

Screening mode is OFF

Exposure duration: resident
Analysis method:   Derived (OEHHA) Method
Health effect:     Chronic HI
Receptor(s):       788
Sources(s):        All
Chemicals(s):      All

SITE PARAMETERS

DEPOSITION

   Deposition rate (m/s)             0.02

DRINKING WATER

*** Pathway disabled ***

FISH

*** Pathway disabled ***

PASTURE

*** Pathway disabled ***

HOME GROWN PRODUCE

   HUMAN INGESTION
   Fraction of ingested leafy vegetable
     from home grown source          0.052
   Fraction of ingested exposed vegetable
     from home grown source          0.052
   Fraction of ingested protected vegetable
     from home grown source          0.052
   Fraction of ingested root vegetable
```

from home grown source 0.052

PIGS, CHICKENS AND EGGS

*** Pathway disabled ***

DERMAL ABSORPTION

*** Pathway enabled ***

SOIL INGESTION

*** Pathway enabled ***

MOTHER'S MILK

*** Pathway enabled ***

CHEMICAL CROSS-REFERENCE TABLE AND BACKGROUND CONCENTRATIONS

| CHEM | CAS | ABBREVIATION | POLLUTANT NAME | BACKGROUND (ug/m^3) |
|---|---|---|---|---|
| 0001 | 75070 | Acetaldehyde | Acetaldehyde | 0.000E+00 |
| 0002 | 7440382 | Arsenic | Arsenic | 0.000E+00 |
| 0003 | 71432 | Benzene | Benzene | 0.000E+00 |
| 0004 | 7440417 | Beryllium | Beryllium | 0.000E+00 |
| 0005 | 7440439 | Cadmium | Cadmium | 0.000E+00 |
| 0006 | 18540299 | Cr(VI) | Chromium, hexavalent (& compounds) | 0.000E+00 |
| 0007 | 50000 | Formaldehyde | Formaldehyde | 0.000E+00 |
| 0008 | 7783064 | H2S | Hydrogen sulfide | 0.000E+00 |
| 0009 | 193395 | In[1,2,3-cd]pyr | Indeno[1,2,3-cd]pyrene | 0.000E+00 |
| 0010 | 7439965 | Manganese | Manganese | 0.000E+00 |
| 0011 | 7439976 | Mercury | Mercury | 0.000E+00 |
| 0012 | 91203 | Naphthalene | Naphthalene | 0.000E+00 |
| 0013 | 1150 | PAHs-w/ | PAHs, total, with individ. components also reported | 0.000E+00 |
| 0014 | 108952 | Phenol | Phenol | 0.000E+00 |
| 0015 | 7782492 | Selenium | Selenium | 0.000E+00 |
| 0016 | 7440224 | Silver | Silver | 0.000E+00 |
| 0017 | 108883 | Toluene | Toluene | 0.000E+00 |

CHEMICAL HEALTH VALUES

| CHEM | CAS | ABBREVIATION | CancerPF(Inh) (mg/kg-d)^-1 | CancerPF(Oral) (mg/kg-d)^-1 | ChronicREL(Inh) ug/m^3 | ChronicREL(Oral) mg/kg-d | AcuteREL ug/m^3 |
|---|---|---|---|---|---|---|---|
| 0001 | 75070 | Acetaldehyde | 1.00E-02 | * | 1.40E+02 | * | 4.70E+02 |
| 0002 | 7440382 | Arsenic | 1.20E+01 | 1.50E+00 | 1.50E-02 | 3.50E-06 | 2.00E-01 |
| 0003 | 71432 | Benzene | 1.00E-01 | * | 6.00E+01 | * | 1.30E+03 |
| 0004 | 7440417 | Beryllium | 8.40E+00 | * | 7.00E-03 | 2.00E-03 | * |
| 0005 | 7440439 | Cadmium | 1.50E+01 | * | 2.00E-02 | 5.00E-04 | * |
| 0006 | 18540299 | Cr(VI) | 5.10E+02 | * | 2.00E-01 | 2.00E-02 | * |
| 0007 | 50000 | Formaldehyde | 2.10E-02 | * | 9.00E+00 | * | 5.50E+01 |
| 0008 | 7783064 | H2S | * | * | 1.00E+01 | * | 4.20E+01 |
| 0009 | 193395 | In[1,2,3-cd]pyr | 3.90E-01 | 1.20E+00 | * | * | * |
| 0010 | 7439965 | Manganese | * | * | 9.00E-02 | * | * |
| 0011 | 7439976 | Mercury | * | * | 3.00E-02 | 1.60E-04 | 6.00E-01 |
| 0012 | 91203 | Naphthalene | 1.20E-01 | * | 9.00E+00 | * | * |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0013 | 1150 | PAHs-w/ | * | * | * | * | * |
| 0014 | 108952 | Phenol | * | * | 2.00E+02 | * | 5.80E+03 |
| 0015 | 7782492 | Selenium | * | * | 2.00E+01 | * | * |
| 0016 | 7440224 | Silver | * | * | * | * | * |
| 0017 | 108883 | Toluene | * | * | 3.00E+02 | * | 3.70E+04 |

EMISSIONS DATA SOURCE: Emission rates loaded from file: C:\HARP\PROJECTS\2696CP\2696B201\2696B201.EMS
CHEMICALS ADDED OR DELETED: none

EMISSIONS FOR FACILITY FAC=1 DEV=* PRO=* STK=1 NAME=U90B201 EMS (lbs/yr)
SOURCE MULTIPLIER=1

| CAS | ABBREV | MULTIPLIER | BG (ug/m^3) | AVRG (lbs/yr) | MAX (lbs/hr) |
|---|---|---|---|---|---|
| 75070 | Acetaldehyde | 1 | 0 | 1.89E+00 | 2.15E-04 |
| 7440382 | Arsenic | 1 | 0 | 1.89E-01 | 2.16E-05 |
| 71432 | Benzene | 1 | 0 | 2.49E+00 | 2.85E-04 |
| 7440417 | Beryllium | 1 | 0 | 5.06E-02 | 5.77E-06 |
| 7440439 | Cadmium | 1 | 0 | 1.24E-01 | 1.42E-05 |
| 18540299 | Cr(VI) | 1 | 0 | 8.08E-02 | 9.22E-06 |
| 50000 | Formaldehyde | 1 | 0 | 1.15E-02 | 1.31E-06 |
| 7783064 | H2S | 1 | 0 | 2.72E+00 | 3.11E-04 |
| 193395 | In[1,2,3-cd]pyr | 1 | 0 | 1.05E-04 | 1.20E-08 |
| 7439965 | Manganese | 1 | 0 | 8.28E-01 | 9.45E-05 |
| 7439976 | Mercury | 1 | 0 | 1.89E-02 | 2.16E-06 |
| 91203 | Naphthalene | 1 | 0 | 6.13E-02 | 7.00E-06 |
| 1150 | PAHs-w/ | 1 | 0 | 7.57E-02 | 8.64E-06 |
| 108952 | Phenol | 1 | 0 | 1.46E-01 | 1.67E-05 |
| 7782492 | Selenium | 1 | 0 | 5.06E-01 | 5.77E-05 |
| 7440224 | Silver | 1 | 0 | 1.01E-01 | 1.15E-05 |
| 108883 | Toluene | 1 | 0 | 2.97E+00 | 3.39E-04 |



CHRONIC HI REPORT

DOMINANT PATHWAYS, Receptor 788

| CHEM | INHAL | DERM | SOIL | MOTHER | FISH | WATER | VEG | DAIRY | BEEF | CHICK | PIG | EGG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0001 | YES | - | - | - | - | - | - | - | - | - | - | - |
| 0002 | YES | YES | YES | - | - | - | - | - | - | - | - | - |
| 0003 | YES | - | - | - | - | - | - | - | - | - | - | - |
| 0004 | YES | - | YES | - | - | - | YES | - | - | - | - | - |
| 0005 | YES | - | YES | - | - | - | YES | - | - | - | - | - |
| 0006 | YES | - | YES | - | - | - | YES | - | - | - | - | - |
| 0007 | YES | - | - | - | - | - | - | - | - | - | - | - |
| 0008 | YES | - | - | - | - | - | - | - | - | - | - | - |
| 0009 | YES | YES | - | - | - | - | YES | - | - | - | - | - |
| 0010 | YES | - | - | - | - | - | - | - | - | - | - | - |
| 0011 | YES | YES | - | - | - | - | YES | - | - | - | - | - |
| 0012 | YES | - | - | - | - | - | - | - | - | - | - | - |
| 0013 | - | - | - | - | - | - | - | - | - | - | - | - |
| 0014 | YES | - | - | - | - | - | - | - | - | - | - | - |
| 0015 | YES | - | - | - | - | - | - | - | - | - | - | - |
| 0016 | YES | - | - | - | - | - | - | - | - | - | - | - |
| 0017 | YES | - | - | - | - | - | - | - | - | - | - | - |

DERIVED CHRONIC HI, RECEPTOR 788

| CHEM | CV | CNS | BONE | DEVEL | ENDO | EYE | GILV | IMMUN | KIDN | REPRO | RESP | SKIN | BLOOD | MAX | UTME | UTMN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0001 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.34E-08 | 0.00E+00 | 0.00E+00 | 7.34E-08 | | |
| 0002 | 2.74E-03 | 2.74E-03 | 0.00E+00 | 2.74E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.74E-03 | 2.74E-03 | 0.00E+00 | 2.74E-03 | | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0003 | 0.00E+00 | 2.26E-07 | 0.00E+00 | 2.26E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.26E-07 | 2.26E-07 | | |
| 0004 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.53E-07 | 3.93E-05 | 0.00E+00 | 0.00E+00 | 3.93E-05 | 0.00E+00 | 0.00E+00 | 3.93E-05 | | |
| 0005 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.03E-05 | 0.00E+00 | 3.37E-05 | 0.00E+00 | 0.00E+00 | 5.03E-05 | | |
| 0006 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.20E-06 | 0.00E+00 | 1.04E-07 | 2.20E-06 | | |
| 0007 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.94E-09 | 0.00E+00 | 0.00E+00 | 6.94E-09 | | |
| 0008 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.48E-06 | 0.00E+00 | 0.00E+00 | 1.48E-06 | | |
| 0009 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0010 | 0.00E+00 | 5.00E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.00E-05 | | |
| 0011 | 0.00E+00 | 2.28E-05 | 0.00E+00 | 2.28E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.28E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.28E-05 | | |
| 0012 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.70E-08 | 0.00E+00 | 0.00E+00 | 3.70E-08 | | |
| 0013 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0014 | 3.97E-09 | 3.97E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.97E-09 | 0.00E+00 | 3.97E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.97E-09 | | |
| 0015 | 1.37E-07 | 1.37E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.37E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.37E-07 | | |
| 0016 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0017 | 0.00E+00 | 5.38E-08 | 0.00E+00 | 5.38E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.38E-08 | 0.00E+00 | 0.00E+00 | 5.38E-08 | | |
| SUM | 2.74E-03 | 2.82E-03 | 0.00E+00 | 2.77E-03 | 0.00E+00 | 0.00E+00 | 7.94E-07 | 3.93E-05 | 7.31E-05 | 0.00E+00 | 2.82E-03 | 2.74E-03 | 3.29E-07 | 2.82E-03 | 382500 | 3737400 |

This file: C:\HARP\PROJECTS\2696CP\2696B201\2696 B201 MAHI.txt

Created by HARP Version 1.4f  Build 23.11.01
Uses ISC Version 99155
Uses BPIP (Dated: 04112)
Creation date: 1/4/2013 5:35:34 PM

EXCEPTION REPORT
(there have been no changes or exceptions)

INPUT FILES:
Source-Receptor file: C:\HARP\PROJECTS\2696CP\2696B201\2696B201.SRC
Averaging period adjustment factors file: not applicable
Emission rates file: 2696B201.EMS
Site parameters file: C:\HARP\PROJECTS\resident pathway.sit

Coordinate system: UTM NAD83

Screening mode is OFF

Analysis method: Point Estimate
Health effect: Acute HI Simple (Concurrent Max.)
Receptor(s): 778
Sources(s): All
Chemicals(s): All

CHEMICAL CROSS-REFERENCE TABLE AND BACKGROUND CONCENTRATIONS

| CHEM | CAS | ABBREVIATION | POLLUTANT NAME | BACKGROUND (ug/m^3) |
|---|---|---|---|---|
| 0001 | 75070 | Acetaldehyde | Acetaldehyde | 0.000E+00 |
| 0002 | 7440382 | Arsenic | Arsenic | 0.000E+00 |
| 0003 | 71432 | Benzene | Benzene | 0.000E+00 |
| 0004 | 7440417 | Beryllium | Beryllium | 0.000E+00 |
| 0005 | 7440439 | Cadmium | Cadmium | 0.000E+00 |
| 0006 | 18540299 | Cr(VI) | Chromium, hexavalent (& compounds) | 0.000E+00 |
| 0007 | 50000 | Formaldehyde | Formaldehyde | 0.000E+00 |
| 0008 | 7783064 | H2S | Hydrogen sulfide | 0.000E+00 |
| 0009 | 193395 | In[1,2,3-cd]pyr | Indeno[1,2,3-cd]pyrene | 0.000E+00 |
| 0010 | 7439965 | Manganese | Manganese | 0.000E+00 |
| 0011 | 7439976 | Mercury | Mercury | 0.000E+00 |
| 0012 | 91203 | Naphthalene | Naphthalene | 0.000E+00 |
| 0013 | 1150 | PAHs-w/ | PAHs, total, with individ. components also reported | 0.000E+00 |
| 0014 | 108952 | Phenol | Phenol | 0.000E+00 |
| 0015 | 7782492 | Selenium | Selenium | 0.000E+00 |
| 0016 | 7440224 | Silver | Silver | 0.000E+00 |
| 0017 | 108883 | Toluene | Toluene | 0.000E+00 |

CHEMICAL HEALTH VALUES

| CHEM | CAS | ABBREVIATION | CancerPF(Inh) (mg/kg-d)^-1 | CancerPF(Oral) (mg/kg-d)^-1 | ChronicREL(Inh) ug/m^3 | ChronicREL(Oral) mg/kg-d | AcuteREL ug/m^3 |
|---|---|---|---|---|---|---|---|
| 0001 | 75070 | Acetaldehyde | 1.00E-02 | * | 1.40E+02 | * | 4.70E+02 |
| 0002 | 7440382 | Arsenic | 1.20E+01 | 1.50E+00 | 1.50E-02 | 3.50E-06 | 2.00E-01 |
| 0003 | 71432 | Benzene | 1.00E-01 | * | 6.00E+01 | * | 1.30E+03 |
| 0004 | 7440417 | Beryllium | 8.40E+00 | * | 7.00E-03 | 2.00E-03 | * |
| 0005 | 7440439 | Cadmium | 1.50E+01 | * | 2.00E-02 | 5.00E-04 | * |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0006 | 18540299 | Cr(VI) | 5.10E+02 | * | 2.00E-01 | 2.00E-02 | * |
| 0007 | 50000 | Formaldehyde | 2.10E-02 | * | 9.00E+00 | * | 5.50E+01 |
| 0008 | 7783064 | H2S | * | * | 1.00E+01 | * | 4.20E+01 |
| 0009 | 193395 | In[1,2,3-cd]pyr | 3.90E-01 | 1.20E+00 | * | * | * |
| 0010 | 7439965 | Manganese | * | * | 9.00E-02 | * | * |
| 0011 | 7439976 | Mercury | * | * | 3.00E-02 | 1.60E-04 | 6.00E-01 |
| 0012 | 91203 | Naphthalene | 1.20E-01 | * | 9.00E+00 | * | * |
| 0013 | 1150 | PAHs-w/ | * | * | * | * | * |
| 0014 | 108952 | Phenol | * | * | 2.00E+02 | * | 5.80E+03 |
| 0015 | 7782492 | Selenium | * | * | 2.00E+01 | * | * |
| 0016 | 7440224 | Silver | * | * | * | * | * |
| 0017 | 108883 | Toluene | * | * | 3.00E+02 | * | 3.70E+04 |

EMISSIONS DATA SOURCE: Emission rates loaded from file: C:\HARP\PROJECTS\2696CP\2696B201\2696B201.EMS
CHEMICALS ADDED OR DELETED: none

EMISSIONS FOR FACILITY FAC=1 DEV=* PRO=* STK=1 NAME=U90B201 EMS (lbs/yr)
SOURCE MULTIPLIER=1

| CAS | ABBREV | MULTIPLIER | BG (ug/m^3) | AVRG (lbs/yr) | MAX (lbs/hr) |
|---|---|---|---|---|---|
| 75070 | Acetaldehyde | 1 | 0 | 1.89E+00 | 2.15E-04 |
| 7440382 | Arsenic | 1 | 0 | 1.89E-01 | 2.16E-05 |
| 71432 | Benzene | 1 | 0 | 2.49E+00 | 2.85E-04 |
| 7440417 | Beryllium | 1 | 0 | 5.06E-02 | 5.77E-06 |
| 7440439 | Cadmium | 1 | 0 | 1.24E-01 | 1.42E-05 |
| 18540299 | Cr(VI) | 1 | 0 | 8.08E-02 | 9.22E-06 |
| 50000 | Formaldehyde | 1 | 0 | 1.15E-02 | 1.31E-06 |
| 7783064 | H2S | 1 | 0 | 2.72E+00 | 3.11E-04 |
| 193395 | In[1,2,3-cd]pyr | 1 | 0 | 1.05E-04 | 1.20E-08 |
| 7439965 | Manganese | 1 | 0 | 8.28E-01 | 9.45E-05 |
| 7439976 | Mercury | 1 | 0 | 1.89E-02 | 2.16E-06 |
| 91203 | Naphthalene | 1 | 0 | 6.13E-02 | 7.00E-06 |
| 1150 | PAHs-w/ | 1 | 0 | 7.57E-02 | 8.64E-06 |
| 108952 | Phenol | 1 | 0 | 1.46E-01 | 1.67E-05 |
| 7782492 | Selenium | 1 | 0 | 5.06E-01 | 5.77E-05 |
| 7440224 | Silver | 1 | 0 | 1.01E-01 | 1.15E-05 |
| 108883 | Toluene | 1 | 0 | 2.97E+00 | 3.39E-04 |

ACUTE HI REPORT

ACUTE HI, RECEPTOR 778

| CHEM | CV | CNS | BONE | DEVEL | ENDO | EYE | GILV | IMMUN | KIDN | REPRO | RESP | SKIN | BLOOD | MAX | UTME | UTMN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0001 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.75E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.75E-07 | 0.00E+00 | 0.00E+00 | 4.75E-07 | | |
| 0002 | 1.12E-04 | 1.12E-04 | 0.00E+00 | 1.12E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.12E-04 | | |
| 0003 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.28E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.28E-07 | 0.00E+00 | 2.28E-07 | 0.00E+00 | 0.00E+00 | 2.28E-07 | 2.28E-07 | | |
| 0004 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0005 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0006 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0007 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.48E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.48E-08 | | |
| 0008 | 0.00E+00 | 7.70E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.70E-06 | | |
| 0009 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0010 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0011 | 0.00E+00 | 3.74E-06 | 0.00E+00 | 3.74E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.74E-06 | | |
| 0012 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0013 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0014 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.99E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.99E-09 | 0.00E+00 | 0.00E+00 | 2.99E-09 | | |
| 0015 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0016 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0017 | 0.00E+00 | 9.52E-09 | 0.00E+00 | 9.52E-09 | 0.00E+00 | 9.52E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.52E-09 | 9.52E-09 | 0.00E+00 | 0.00E+00 | 9.52E-09 | | |
| SUM | 1.12E-04 | 1.24E-04 | 0.00E+00 | 1.16E-04 | 0.00E+00 | 5.13E-07 | 0.00E+00 | 2.28E-07 | 0.00E+00 | 2.37E-07 | 4.88E-07 | 0.00E+00 | 2.28E-07 | 1.24E-04 | 381500 | 3737400 |

```
This file: C:\HARP\PROJECTS\2696CP\2696B401\2696 B401 MEIR.txt

Created by HARP Version 1.4f  Build 23.11.01
Uses ISC Version 99155
Uses BPIP (Dated: 04112)
Creation date: 1/4/2013 5:47:23 PM


EXCEPTION REPORT
   (there have been no changes or exceptions)

INPUT FILES:
   Source-Receptor file: C:\HARP\PROJECTS\2696CP\2696B401\2696B401.SRC
   Averaging period adjustment factors file: not applicable
   Emission rates file: 2696B401.EMS
   Site parameters file: C:\HARP\PROJECTS\resident pathway.sit

Coordinate system: UTM NAD83

Screening mode is OFF

Exposure duration: 70 year (adult resident)
Analysis method:   Derived  (Adjusted) Method
Health effect:     Cancer Risk
Receptor(s):       861
Sources(s):        All
Chemicals(s):      All

SITE PARAMETERS

DEPOSITION

   Deposition rate (m/s)             0.02

DRINKING WATER

*** Pathway disabled ***

FISH

*** Pathway disabled ***

PASTURE

*** Pathway disabled ***

HOME GROWN PRODUCE

   HUMAN INGESTION
   Fraction of ingested leafy vegetable
     from home grown source          0.052
   Fraction of ingested exposed vegetable
     from home grown source          0.052
   Fraction of ingested protected vegetable
     from home grown source          0.052
   Fraction of ingested root vegetable
```

from home grown source 0.052

PIGS, CHICKENS AND EGGS

*** Pathway disabled ***

DERMAL ABSORPTION

*** Pathway enabled ***

SOIL INGESTION

*** Pathway enabled ***

MOTHER'S MILK

*** Pathway enabled ***

CHEMICAL CROSS-REFERENCE TABLE AND BACKGROUND CONCENTRATIONS

| CHEM | CAS | ABBREVIATION | POLLUTANT NAME | BACKGROUND (ug/m^3) |
|---|---|---|---|---|
| 0001 | 106990 | 1,3-Butadiene | 1,3-Butadiene | 0.000E+00 |
| 0002 | 75070 | Acetaldehyde | Acetaldehyde | 0.000E+00 |
| 0003 | 1016 | As cmpd(inorg) | Arsenic compounds (inorganic) | 0.000E+00 |
| 0004 | 71432 | Benzene | Benzene | 0.000E+00 |
| 0005 | 7440417 | Beryllium | Beryllium | 0.000E+00 |
| 0006 | 7440439 | Cadmium | Cadmium | 0.000E+00 |
| 0007 | 218019 | Chrysene | Chrysene | 0.000E+00 |
| 0008 | 18540299 | Cr(VI) | Chromium, hexavalent (& compounds) | 0.000E+00 |
| 0009 | 1319773 | Cresols | Cresols (mixtures of) {Cresylic acid} | 0.000E+00 |
| 0010 | 100414 | Ethyl Benzene | Ethyl benzene | 0.000E+00 |
| 0011 | 50000 | Formaldehyde | Formaldehyde | 0.000E+00 |
| 0012 | 7783064 | H2S | Hydrogen sulfide | 0.000E+00 |
| 0013 | 110543 | Hexane | Hexane | 0.000E+00 |
| 0014 | 193395 | In[1,2,3-cd]pyr | Indeno[1,2,3-cd]pyrene | 0.000E+00 |
| 0015 | 7439965 | Manganese | Manganese | 0.000E+00 |
| 0016 | 7439976 | Mercury | Mercury | 0.000E+00 |
| 0017 | 91203 | Naphthalene | Naphthalene | 0.000E+00 |
| 0018 | 7664417 | NH3 | Ammonia | 0.000E+00 |
| 0019 | 1150 | PAHs-w/ | PAHs, total, with individ. components also reported | 0.000E+00 |
| 0020 | 108952 | Phenol | Phenol | 0.000E+00 |
| 0021 | 115071 | Propylene | Propylene | 0.000E+00 |
| 0022 | 7782492 | Selenium | Selenium | 0.000E+00 |
| 0023 | 7440224 | Silver | Silver | 0.000E+00 |
| 0024 | 100425 | Styrene | Styrene | 0.000E+00 |
| 0025 | 108883 | Toluene | Toluene | 0.000E+00 |
| 0026 | 1330207 | Xylenes | Xylenes (mixed) | 0.000E+00 |

CHEMICAL HEALTH VALUES

| CHEM | CAS | ABBREVIATION | CancerPF(Inh) (mg/kg-d)^-1 | CancerPF(Oral) (mg/kg-d)^-1 | ChronicREL(Inh) ug/m^3 | ChronicREL(Oral) mg/kg-d | AcuteREL ug/m^3 |
|---|---|---|---|---|---|---|---|
| 0001 | 106990 | 1,3-Butadiene | 6.00E-01 | * | 2.00E+01 | * | * |
| 0002 | 75070 | Acetaldehyde | 1.00E-02 | * | 1.40E+02 | * | 4.70E+02 |
| 0003 | 1016 | As cmpd(inorg) | 1.20E+01 | 1.50E+00 | 1.50E-02 | 3.50E-06 | 2.00E-01 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0004 | 71432 | Benzene | 1.00E-01 | * | 6.00E+01 | * | 1.30E+03 |
| 0005 | 7440417 | Beryllium | 8.40E+00 | * | 7.00E-03 | 2.00E-03 | * |
| 0006 | 7440439 | Cadmium | 1.50E+01 | * | 2.00E-02 | 5.00E-04 | * |
| 0007 | 218019 | Chrysene | 3.90E-02 | 1.20E-01 | * | * | * |
| 0008 | 18540299 | Cr(VI) | 5.10E+02 | * | 2.00E-01 | 2.00E-02 | * |
| 0009 | 1319773 | Cresols | * | * | 6.00E+02 | * | * |
| 0010 | 100414 | Ethyl Benzene | 8.70E-03 | * | 2.00E+03 | * | * |
| 0011 | 50000 | Formaldehyde | 2.10E-02 | * | 9.00E+00 | * | 5.50E+01 |
| 0012 | 7783064 | H2S | * | * | 1.00E+01 | * | 4.20E+01 |
| 0013 | 110543 | Hexane | * | * | 7.00E+03 | * | * |
| 0014 | 193395 | In[1,2,3-cd]pyr | 3.90E-01 | 1.20E+00 | * | * | * |
| 0015 | 7439965 | Manganese | * | * | 9.00E-02 | * | * |
| 0016 | 7439976 | Mercury | * | * | 3.00E-02 | 1.60E-04 | 6.00E-01 |
| 0017 | 91203 | Naphthalene | 1.20E-01 | * | 9.00E+00 | * | * |
| 0018 | 7664417 | NH3 | * | * | 2.00E+02 | * | 3.20E+03 |
| 0019 | 1150 | PAHs-w/ | * | * | * | * | * |
| 0020 | 108952 | Phenol | * | * | 2.00E+02 | * | 5.80E+03 |
| 0021 | 115071 | Propylene | * | * | 3.00E+03 | * | * |
| 0022 | 7782492 | Selenium | * | * | 2.00E+01 | * | * |
| 0023 | 7440224 | Silver | * | * | * | * | * |
| 0024 | 100425 | Styrene | * | * | 9.00E+02 | * | 2.10E+04 |
| 0025 | 108883 | Toluene | * | * | 3.00E+02 | * | 3.70E+04 |
| 0026 | 1330207 | Xylenes | * | * | 7.00E+02 | * | 2.20E+04 |

EMISSIONS DATA SOURCE: Emission rates loaded from file: C:\HARP\PROJECTS\2696CP\2696B401\2696B401.EMS
CHEMICALS ADDED OR DELETED: none

EMISSIONS FOR FACILITY FAC=1 DEV=* PRO=* STK=1 NAME=U90B401 EMS (lbs/yr)
SOURCE MULTIPLIER=1

| CAS | ABBREV | MULTIPLIER | BG (ug/m^3) | AVRG (lbs/yr) | MAX (lbs/hr) |
|---|---|---|---|---|---|
| 106990 | 1,3-Butadiene | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 75070 | Acetaldehyde | 1 | 0 | 2.42E+00 | 2.76E-04 |
| 1016 | As cmpd(inorg) | 1 | 0 | 2.42E-01 | 2.77E-05 |
| 71432 | Benzene | 1 | 0 | 3.20E+00 | 3.65E-04 |
| 7440417 | Beryllium | 1 | 0 | 6.48E-02 | 7.40E-06 |
| 7440439 | Cadmium | 1 | 0 | 1.59E-01 | 1.81E-05 |
| 218019 | Chrysene | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 18540299 | Cr(VI) | 1 | 0 | 1.04E-01 | 1.18E-05 |
| 1319773 | Cresols | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 100414 | Ethyl Benzene | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 50000 | Formaldehyde | 1 | 0 | 1.47E-02 | 1.68E-06 |
| 7783064 | H2S | 1 | 0 | 3.49E+00 | 3.98E-04 |
| 110543 | Hexane | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 193395 | In[1,2,3-cd]pyr | 1 | 0 | 1.35E-04 | 1.54E-08 |
| 7439965 | Manganese | 1 | 0 | 1.06E+00 | 1.21E-04 |
| 7439976 | Mercury | 1 | 0 | 2.43E-02 | 2.77E-06 |
| 91203 | Naphthalene | 1 | 0 | 7.86E-02 | 8.97E-06 |
| 7664417 | NH3 | 1 | 0 | 9.38E+02 | 1.07E-01 |
| 1150 | PAHs-w/ | 1 | 0 | 9.70E-02 | 1.11E-05 |
| 108952 | Phenol | 1 | 0 | 1.88E-01 | 2.14E-05 |
| 115071 | Propylene | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 7782492 | Selenium | 1 | 0 | 6.48E-01 | 7.40E-05 |
| 7440224 | Silver | 1 | 0 | 1.30E-01 | 1.48E-05 |
| 100425 | Styrene | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 108883 | Toluene | 1 | 0 | 3.80E+00 | 4.34E-04 |
| 1330207 | Xylenes | 1 | 0 | 0.00E+00 | 0.00E+00 |

EMISSIONS FOR FACILITY FAC=1 DEV=* PRO=* STK=2 NAME=U90FUG EMS (lbs/yr)
SOURCE MULTIPLIER=1

| CAS | ABBREV | MULTIPLIER | BG (ug/m^3) | AVRG (lbs/yr) | MAX (lbs/hr) |
|---|---|---|---|---|---|
| 106990 | 1,3-Butadiene | 1 | 0 | 2.23E-01 | 6.96E-08 |
| 75070 | Acetaldehyde | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 1016 | As cmpd(inorg) | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 71432 | Benzene | 1 | 0 | 3.02E-01 | 9.45E-08 |
| 7440417 | Beryllium | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 7440439 | Cadmium | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 218019 | Chrysene | 1 | 0 | 6.68E-02 | 2.09E-08 |
| 18540299 | Cr(VI) | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 1319773 | Cresols | 1 | 0 | 2.00E-01 | 6.26E-08 |
| 100414 | Ethyl Benzene | 1 | 0 | 9.59E-01 | 3.00E-07 |
| 50000 | Formaldehyde | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 7783064 | H2S | 1 | 0 | 1.48E-02 | 4.64E-09 |
| 110543 | Hexane | 1 | 0 | 4.01E+00 | 1.25E-06 |
| 193395 | In[1,2,3-cd]pyr | 1 | 0 | 3.34E-01 | 1.04E-07 |
| 7439965 | Manganese | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 7439976 | Mercury | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 91203 | Naphthalene | 1 | 0 | 3.22E+00 | 1.01E-06 |
| 7664417 | NH3 | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 1150 | PAHs-w/ | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 108952 | Phenol | 1 | 0 | 6.68E-02 | 2.09E-08 |
| 115071 | Propylene | 1 | 0 | 2.23E-01 | 6.96E-08 |
| 7782492 | Selenium | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 7440224 | Silver | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 100425 | Styrene | 1 | 0 | 2.50E-01 | 7.83E-08 |
| 108883 | Toluene | 1 | 0 | 1.21E+00 | 3.79E-07 |
| 1330207 | Xylenes | 1 | 0 | 4.33E+00 | 1.35E-06 |

CANCER RISK REPORT

DOMINANT PATHWAYS, Receptor 861

| CHEM | INHAL | DERM | SOIL | MOTHER | FISH | WATER | VEG | DAIRY | BEEF | CHICK | PIG | EGG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0001 | A | - | - | - | - | - | - | - | - | - | - | - |
| 0002 | A | - | - | - | - | - | - | - | - | - | - | - |
| 0003 | A | YES | - | - | - | - | - | - | - | - | - | - |
| 0004 | A | - | - | - | - | - | - | - | - | - | - | - |
| 0005 | A | - | - | - | - | - | - | - | - | - | - | - |
| 0006 | A | - | - | - | - | - | - | - | - | - | - | - |
| 0007 | - | YES | - | - | - | - | YES | - | - | - | - | - |
| 0008 | A | - | - | - | - | - | - | - | - | - | - | - |
| 0009 | - | - | - | - | - | - | - | - | - | - | - | - |
| 0010 | A | - | - | - | - | - | - | - | - | - | - | - |
| 0011 | A | - | - | - | - | - | - | - | - | - | - | - |
| 0012 | - | - | - | - | - | - | - | - | - | - | - | - |
| 0013 | - | - | - | - | - | - | - | - | - | - | - | - |
| 0014 | - | YES | - | - | - | - | YES | - | - | - | - | - |
| 0015 | - | - | - | - | - | - | - | - | - | - | - | - |
| 0016 | - | - | - | - | - | - | - | - | - | - | - | - |
| 0017 | A | - | - | - | - | - | - | - | - | - | - | - |
| 0018 | - | - | - | - | - | - | - | - | - | - | - | - |
| 0019 | - | - | - | - | - | - | - | - | - | - | - | - |
| 0020 | - | - | - | - | - | - | - | - | - | - | - | - |
| 0021 | - | - | - | - | - | - | - | - | - | - | - | - |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0022 | - | - | - | - | - | - | - | - | - | - | - | - |
| 0023 | - | - | - | - | - | - | - | - | - | - | - | - |
| 0024 | - | - | - | - | - | - | - | - | - | - | - | - |
| 0025 | - | - | - | - | - | - | - | - | - | - | - | - |
| 0026 | - | - | - | - | - | - | - | - | - | - | - | - |

DERIVED CANCER RISK, RECEPTOR 861

| CHEM | INHAL | DERM | SOIL | MOTHER | FISH | WATER | VEG | DAIRY | BEEF | CHICK | PIG | EGG | MEAT | ORAL | TOTAL | UTME |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0001 | 1.62E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.62E-09 | |
| 0002 | 3.29E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.29E-11 | |
| 0003 | 3.95E-09 | 9.44E-09 | 4.60E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.44E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.49E-08 | 1.88E-08 | |
| 0004 | 7.99E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.99E-10 | |
| 0005 | 7.39E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.39E-10 | |
| 0006 | 3.24E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.24E-09 | |
| 0007 | 2.82E-11 | 3.75E-10 | 5.62E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.76E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.08E-10 | 9.36E-10 | |
| 0008 | 7.21E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.21E-08 | |
| 0009 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0010 | 1.01E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.01E-10 | |
| 0011 | 4.19E-13 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.19E-13 | |
| 0012 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0013 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0014 | 1.41E-09 | 1.88E-08 | 2.81E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.38E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.54E-08 | 4.68E-08 | |
| 0015 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0016 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0017 | 4.68E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.68E-09 | |
| 0018 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0019 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0020 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0021 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0022 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0023 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0024 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0025 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0026 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| SUM | 8.86E-08 | 2.86E-08 | 7.46E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.51E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.12E-08 | 1.50E-07 | 381700 373 |

```
This file: C:\HARP\PROJECTS\2696CP\2696B401\2696 B401 MEIW.txt

Created by HARP Version 1.4f  Build 23.11.01
Uses ISC Version 99155
Uses BPIP (Dated: 04112)
Creation date: 1/4/2013 5:48:30 PM


EXCEPTION REPORT
   (there have been no changes or exceptions)

INPUT FILES:
   Source-Receptor file: C:\HARP\PROJECTS\2696CP\2696B401\2696B401.SRC
   Averaging period adjustment factors file: not applicable
   Emission rates file: 2696B401.EMS
   Site parameters file: C:\HARP\PROJECTS\worker pathway.sit

Coordinate system: UTM NAD83

Screening mode is OFF

Exposure duration: Standard work schedule (49 wks/yr, 5 days/wk, 8 hrs/day, 40 yrs)
Analysis method:   Point estimate
Health effect:     Cancer Risk
Receptor(s):       788
Sources(s):        All
Chemicals(s):      All

SITE PARAMETERS

DEPOSITION

   Deposition rate (m/s)            0.02

DRINKING WATER

*** Pathway disabled ***

FISH

*** Pathway disabled ***

PASTURE

*** Pathway disabled ***

HOME GROWN PRODUCE

*** Pathway disabled ***

PIGS, CHICKENS AND EGGS

*** Pathway disabled ***

DERMAL ABSORPTION
```

*** Pathway enabled ***

SOIL INGESTION

*** Pathway enabled ***

MOTHER'S MILK

*** Pathway disabled ***

CHEMICAL CROSS-REFERENCE TABLE AND BACKGROUND CONCENTRATIONS

| CHEM | CAS | ABBREVIATION | POLLUTANT NAME | BACKGROUND (ug/m^3) |
|---|---|---|---|---|
| 0001 | 106990 | 1,3-Butadiene | 1,3-Butadiene | 0.000E+00 |
| 0002 | 75070 | Acetaldehyde | Acetaldehyde | 0.000E+00 |
| 0003 | 1016 | As cmpd(inorg) | Arsenic compounds (inorganic) | 0.000E+00 |
| 0004 | 71432 | Benzene | Benzene | 0.000E+00 |
| 0005 | 7440417 | Beryllium | Beryllium | 0.000E+00 |
| 0006 | 7440439 | Cadmium | Cadmium | 0.000E+00 |
| 0007 | 218019 | Chrysene | Chrysene | 0.000E+00 |
| 0008 | 18540299 | Cr(VI) | Chromium, hexavalent (& compounds) | 0.000E+00 |
| 0009 | 1319773 | Cresols | Cresols (mixtures of) {Cresylic acid} | 0.000E+00 |
| 0010 | 100414 | Ethyl Benzene | Ethyl benzene | 0.000E+00 |
| 0011 | 50000 | Formaldehyde | Formaldehyde | 0.000E+00 |
| 0012 | 7783064 | H2S | Hydrogen sulfide | 0.000E+00 |
| 0013 | 110543 | Hexane | Hexane | 0.000E+00 |
| 0014 | 193395 | In[1,2,3-cd]pyr | Indeno[1,2,3-cd]pyrene | 0.000E+00 |
| 0015 | 7439965 | Manganese | Manganese | 0.000E+00 |
| 0016 | 7439976 | Mercury | Mercury | 0.000E+00 |
| 0017 | 91203 | Naphthalene | Naphthalene | 0.000E+00 |
| 0018 | 7664417 | NH3 | Ammonia | 0.000E+00 |
| 0019 | 1150 | PAHs-w/ | PAHs, total, with individ. components also reported | 0.000E+00 |
| 0020 | 108952 | Phenol | Phenol | 0.000E+00 |
| 0021 | 115071 | Propylene | Propylene | 0.000E+00 |
| 0022 | 7782492 | Selenium | Selenium | 0.000E+00 |
| 0023 | 7440224 | Silver | Silver | 0.000E+00 |
| 0024 | 100425 | Styrene | Styrene | 0.000E+00 |
| 0025 | 108883 | Toluene | Toluene | 0.000E+00 |
| 0026 | 1330207 | Xylenes | Xylenes (mixed) | 0.000E+00 |

CHEMICAL HEALTH VALUES

| CHEM | CAS | ABBREVIATION | CancerPF(Inh) (mg/kg-d)^-1 | CancerPF(Oral) (mg/kg-d)^-1 | ChronicREL(Inh) ug/m^3 | ChronicREL(Oral) mg/kg-d | AcuteREL ug/m^3 |
|---|---|---|---|---|---|---|---|
| 0001 | 106990 | 1,3-Butadiene | 6.00E-01 | * | 2.00E+01 | * | * |
| 0002 | 75070 | Acetaldehyde | 1.00E-02 | * | 1.40E+02 | * | 4.70E+02 |
| 0003 | 1016 | As cmpd(inorg) | 1.20E+01 | 1.50E+00 | 1.50E-02 | 3.50E-06 | 2.00E-01 |
| 0004 | 71432 | Benzene | 1.00E-01 | * | 6.00E+01 | * | 1.30E+03 |
| 0005 | 7440417 | Beryllium | 8.40E+00 | * | 7.00E-03 | 2.00E-03 | * |
| 0006 | 7440439 | Cadmium | 1.50E+01 | * | 2.00E-02 | 5.00E-04 | * |
| 0007 | 218019 | Chrysene | 3.90E-02 | 1.20E-01 | * | * | * |
| 0008 | 18540299 | Cr(VI) | 5.10E+02 | * | 2.00E-01 | 2.00E-02 | * |
| 0009 | 1319773 | Cresols | * | * | 6.00E+02 | * | * |
| 0010 | 100414 | Ethyl Benzene | 8.70E-03 | * | 2.00E+03 | * | * |
| 0011 | 50000 | Formaldehyde | 2.10E-02 | * | 9.00E+00 | * | 5.50E+01 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0012 | 7783064 | H2S | * | * | 1.00E+01 | * | 4.20E+01 |
| 0013 | 110543 | Hexane | * | * | 7.00E+03 | * | * |
| 0014 | 193395 | In[1,2,3-cd]pyr | 3.90E-01 | 1.20E+00 | * | * | * |
| 0015 | 7439965 | Manganese | * | * | 9.00E-02 | * | * |
| 0016 | 7439976 | Mercury | * | * | 3.00E-02 | 1.60E-04 | 6.00E-01 |
| 0017 | 91203 | Naphthalene | 1.20E-01 | * | 9.00E+00 | * | * |
| 0018 | 7664417 | NH3 | * | * | 2.00E+02 | * | 3.20E+03 |
| 0019 | 1150 | PAHs-w/ | * | * | * | * | * |
| 0020 | 108952 | Phenol | * | * | 2.00E+02 | * | 5.80E+03 |
| 0021 | 115071 | Propylene | * | * | 3.00E+03 | * | * |
| 0022 | 7782492 | Selenium | * | * | 2.00E+01 | * | * |
| 0023 | 7440224 | Silver | * | * | * | * | * |
| 0024 | 100425 | Styrene | * | * | 9.00E+02 | * | 2.10E+04 |
| 0025 | 108883 | Toluene | * | * | 3.00E+02 | * | 3.70E+04 |
| 0026 | 1330207 | Xylenes | * | * | 7.00E+02 | * | 2.20E+04 |

EMISSIONS DATA SOURCE: Emission rates loaded from file: C:\HARP\PROJECTS\2696CP\2696B401\2696B401.EMS
CHEMICALS ADDED OR DELETED: none

EMISSIONS FOR FACILITY FAC=1 DEV=* PRO=* STK=1 NAME=U90B401 EMS (lbs/yr)
SOURCE MULTIPLIER=1

| CAS | ABBREV | MULTIPLIER | BG (ug/m^3) | AVRG (lbs/yr) | MAX (lbs/hr) |
|---|---|---|---|---|---|
| 106990 | 1,3-Butadiene | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 75070 | Acetaldehyde | 1 | 0 | 2.42E+00 | 2.76E-04 |
| 1016 | As cmpd(inorg) | 1 | 0 | 2.42E-01 | 2.77E-05 |
| 71432 | Benzene | 1 | 0 | 3.20E+00 | 3.65E-04 |
| 7440417 | Beryllium | 1 | 0 | 6.48E-02 | 7.40E-06 |
| 7440439 | Cadmium | 1 | 0 | 1.59E-01 | 1.81E-05 |
| 218019 | Chrysene | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 18540299 | Cr(VI) | 1 | 0 | 1.04E-01 | 1.18E-05 |
| 1319773 | Cresols | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 100414 | Ethyl Benzene | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 50000 | Formaldehyde | 1 | 0 | 1.47E-02 | 1.68E-06 |
| 7783064 | H2S | 1 | 0 | 3.49E+00 | 3.98E-04 |
| 110543 | Hexane | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 193395 | In[1,2,3-cd]pyr | 1 | 0 | 1.35E-04 | 1.54E-08 |
| 7439965 | Manganese | 1 | 0 | 1.06E+00 | 1.21E-04 |
| 7439976 | Mercury | 1 | 0 | 2.43E-02 | 2.77E-06 |
| 91203 | Naphthalene | 1 | 0 | 7.86E-02 | 8.97E-06 |
| 7664417 | NH3 | 1 | 0 | 9.38E+02 | 1.07E-01 |
| 1150 | PAHs-w/ | 1 | 0 | 9.70E-02 | 1.11E-05 |
| 108952 | Phenol | 1 | 0 | 1.88E-01 | 2.14E-05 |
| 115071 | Propylene | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 7782492 | Selenium | 1 | 0 | 6.48E-01 | 7.40E-05 |
| 7440224 | Silver | 1 | 0 | 1.30E-01 | 1.48E-05 |
| 100425 | Styrene | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 108883 | Toluene | 1 | 0 | 3.80E+00 | 4.34E-04 |
| 1330207 | Xylenes | 1 | 0 | 0.00E+00 | 0.00E+00 |

EMISSIONS FOR FACILITY FAC=1 DEV=* PRO=* STK=2 NAME=U90FUG EMS (lbs/yr)
SOURCE MULTIPLIER=1

| CAS | ABBREV | MULTIPLIER | BG (ug/m^3) | AVRG (lbs/yr) | MAX (lbs/hr) |
|---|---|---|---|---|---|
| 106990 | 1,3-Butadiene | 1 | 0 | 2.23E-01 | 6.96E-08 |
| 75070 | Acetaldehyde | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 1016 | As cmpd(inorg) | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 71432 | Benzene | 1 | 0 | 3.02E-01 | 9.45E-08 |

| | | | | | |
|---|---|---|---|---|---|
| 7440417 | Beryllium | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 7440439 | Cadmium | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 218019 | Chrysene | 1 | 0 | 6.68E-02 | 2.09E-08 |
| 18540299 | Cr(VI) | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 1319773 | Cresols | 1 | 0 | 2.00E-01 | 6.26E-08 |
| 100414 | Ethyl Benzene | 1 | 0 | 9.59E-01 | 3.00E-07 |
| 50000 | Formaldehyde | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 7783064 | H2S | 1 | 0 | 1.48E-02 | 4.64E-09 |
| 110543 | Hexane | 1 | 0 | 4.01E+00 | 1.25E-06 |
| 193395 | In[1,2,3-cd]pyr | 1 | 0 | 3.34E-01 | 1.04E-07 |
| 7439965 | Manganese | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 7439976 | Mercury | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 91203 | Naphthalene | 1 | 0 | 3.22E+00 | 1.01E-06 |
| 7664417 | NH3 | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 1150 | PAHs-w/ | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 108952 | Phenol | 1 | 0 | 6.68E-02 | 2.09E-08 |
| 115071 | Propylene | 1 | 0 | 2.23E-01 | 6.96E-08 |
| 7782492 | Selenium | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 7440224 | Silver | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 100425 | Styrene | 1 | 0 | 2.50E-01 | 7.83E-08 |
| 108883 | Toluene | 1 | 0 | 1.21E+00 | 3.79E-07 |
| 1330207 | Xylenes | 1 | 0 | 4.33E+00 | 1.35E-06 |

CANCER RISK REPORT

AVERAGE CANCER RISK, RECEPTOR 788

| CHEM | INHAL | DERM | SOIL | MOTHER | FISH | WATER | VEG | DAIRY | BEEF | CHICK | PIG | EGG | MEAT | ORAL | TOTAL | UTME |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0001 | 1.21E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.21E-10 | |
| 0002 | 7.55E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.55E-12 | |
| 0003 | 9.06E-10 | 4.17E-09 | 1.76E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.93E-09 | 6.84E-09 | |
| 0004 | 1.27E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.27E-10 | |
| 0005 | 1.70E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.70E-10 | |
| 0006 | 7.44E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.44E-10 | |
| 0007 | 2.35E-12 | 5.39E-11 | 7.00E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.09E-11 | 6.32E-11 | |
| 0008 | 1.65E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.65E-08 | |
| 0009 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0010 | 7.52E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.52E-12 | |
| 0011 | 9.63E-14 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.63E-14 | |
| 0012 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0013 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0014 | 1.17E-10 | 2.70E-09 | 3.50E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.05E-09 | 3.16E-09 | |
| 0015 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0016 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0017 | 3.51E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.51E-10 | |
| 0018 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0019 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0020 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0021 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0022 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0023 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0024 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0025 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 0026 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| SUM | 1.91E-08 | 6.92E-09 | 2.12E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.04E-09 | 2.81E-08 | 382500 373 |

```
This file: C:\HARP\PROJECTS\2696CP\2696B401\2696 B401 MCHI.txt

Created by HARP Version 1.4f  Build 23.11.01
Uses ISC Version 99155
Uses BPIP (Dated: 04112)
Creation date: 1/4/2013 5:47:36 PM


EXCEPTION REPORT
   (there have been no changes or exceptions)

INPUT FILES:
   Source-Receptor file: C:\HARP\PROJECTS\2696CP\2696B401\2696B401.SRC
   Averaging period adjustment factors file: not applicable
   Emission rates file: 2696B401.EMS
   Site parameters file: C:\HARP\PROJECTS\resident pathway.sit

Coordinate system: UTM NAD83

Screening mode is OFF

Exposure duration: resident
Analysis method:   Derived (OEHHA) Method
Health effect:     Chronic HI
Receptor(s):       788
Sources(s):        All
Chemicals(s):      All

SITE PARAMETERS

DEPOSITION

   Deposition rate (m/s)             0.02

DRINKING WATER

*** Pathway disabled ***

FISH

*** Pathway disabled ***

PASTURE

*** Pathway disabled ***

HOME GROWN PRODUCE

   HUMAN INGESTION
   Fraction of ingested leafy vegetable
     from home grown source          0.052
   Fraction of ingested exposed vegetable
     from home grown source          0.052
   Fraction of ingested protected vegetable
     from home grown source          0.052
   Fraction of ingested root vegetable
```

from home grown source 0.052

PIGS, CHICKENS AND EGGS

*** Pathway disabled ***

DERMAL ABSORPTION

*** Pathway enabled ***

SOIL INGESTION

*** Pathway enabled ***

MOTHER'S MILK

*** Pathway enabled ***

CHEMICAL CROSS-REFERENCE TABLE AND BACKGROUND CONCENTRATIONS

| CHEM | CAS | ABBREVIATION | POLLUTANT NAME | BACKGROUND (ug/m^3) |
|---|---|---|---|---|
| 0001 | 106990 | 1,3-Butadiene | 1,3-Butadiene | 0.000E+00 |
| 0002 | 75070 | Acetaldehyde | Acetaldehyde | 0.000E+00 |
| 0003 | 1016 | As cmpd(inorg) | Arsenic compounds (inorganic) | 0.000E+00 |
| 0004 | 71432 | Benzene | Benzene | 0.000E+00 |
| 0005 | 7440417 | Beryllium | Beryllium | 0.000E+00 |
| 0006 | 7440439 | Cadmium | Cadmium | 0.000E+00 |
| 0007 | 218019 | Chrysene | Chrysene | 0.000E+00 |
| 0008 | 18540299 | Cr(VI) | Chromium, hexavalent (& compounds) | 0.000E+00 |
| 0009 | 1319773 | Cresols | Cresols (mixtures of) {Cresylic acid} | 0.000E+00 |
| 0010 | 100414 | Ethyl Benzene | Ethyl benzene | 0.000E+00 |
| 0011 | 50000 | Formaldehyde | Formaldehyde | 0.000E+00 |
| 0012 | 7783064 | H2S | Hydrogen sulfide | 0.000E+00 |
| 0013 | 110543 | Hexane | Hexane | 0.000E+00 |
| 0014 | 193395 | In[1,2,3-cd]pyr | Indeno[1,2,3-cd]pyrene | 0.000E+00 |
| 0015 | 7439965 | Manganese | Manganese | 0.000E+00 |
| 0016 | 7439976 | Mercury | Mercury | 0.000E+00 |
| 0017 | 91203 | Naphthalene | Naphthalene | 0.000E+00 |
| 0018 | 7664417 | NH3 | Ammonia | 0.000E+00 |
| 0019 | 1150 | PAHs-w/ | PAHs, total, with individ. components also reported | 0.000E+00 |
| 0020 | 108952 | Phenol | Phenol | 0.000E+00 |
| 0021 | 115071 | Propylene | Propylene | 0.000E+00 |
| 0022 | 7782492 | Selenium | Selenium | 0.000E+00 |
| 0023 | 7440224 | Silver | Silver | 0.000E+00 |
| 0024 | 100425 | Styrene | Styrene | 0.000E+00 |
| 0025 | 108883 | Toluene | Toluene | 0.000E+00 |
| 0026 | 1330207 | Xylenes | Xylenes (mixed) | 0.000E+00 |

CHEMICAL HEALTH VALUES

| CHEM | CAS | ABBREVIATION | CancerPF(Inh) (mg/kg-d)^-1 | CancerPF(Oral) (mg/kg-d)^-1 | ChronicREL(Inh) ug/m^3 | ChronicREL(Oral) mg/kg-d | AcuteREL ug/m^3 |
|---|---|---|---|---|---|---|---|
| 0001 | 106990 | 1,3-Butadiene | 6.00E-01 | * | 2.00E+01 | * | * |
| 0002 | 75070 | Acetaldehyde | 1.00E-02 | * | 1.40E+02 | * | 4.70E+02 |
| 0003 | 1016 | As cmpd(inorg) | 1.20E+01 | 1.50E+00 | 1.50E-02 | 3.50E-06 | 2.00E-01 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0004 | 71432 | Benzene | 1.00E-01 | * | 6.00E+01 | * | 1.30E+03 |
| 0005 | 7440417 | Beryllium | 8.40E+00 | * | 7.00E-03 | 2.00E-03 | * |
| 0006 | 7440439 | Cadmium | 1.50E+01 | * | 2.00E-02 | 5.00E-04 | * |
| 0007 | 218019 | Chrysene | 3.90E-02 | 1.20E-01 | * | * | * |
| 0008 | 18540299 | Cr(VI) | 5.10E+02 | * | 2.00E-01 | 2.00E-02 | * |
| 0009 | 1319773 | Cresols | * | * | 6.00E+02 | * | * |
| 0010 | 100414 | Ethyl Benzene | 8.70E-03 | * | 2.00E+03 | * | * |
| 0011 | 50000 | Formaldehyde | 2.10E-02 | * | 9.00E+00 | * | 5.50E+01 |
| 0012 | 7783064 | H2S | * | * | 1.00E+01 | * | 4.20E+01 |
| 0013 | 110543 | Hexane | * | * | 7.00E+03 | * | * |
| 0014 | 193395 | In[1,2,3-cd]pyr | 3.90E-01 | 1.20E+00 | * | * | * |
| 0015 | 7439965 | Manganese | * | * | 9.00E-02 | * | * |
| 0016 | 7439976 | Mercury | * | * | 3.00E-02 | 1.60E-04 | 6.00E-01 |
| 0017 | 91203 | Naphthalene | 1.20E-01 | * | 9.00E+00 | * | * |
| 0018 | 7664417 | NH3 | * | * | 2.00E+02 | * | 3.20E+03 |
| 0019 | 1150 | PAHs-w/ | * | * | * | * | * |
| 0020 | 108952 | Phenol | * | * | 2.00E+02 | * | 5.80E+03 |
| 0021 | 115071 | Propylene | * | * | 3.00E+03 | * | * |
| 0022 | 7782492 | Selenium | * | * | 2.00E+01 | * | * |
| 0023 | 7440224 | Silver | * | * | * | * | * |
| 0024 | 100425 | Styrene | * | * | 9.00E+02 | * | 2.10E+04 |
| 0025 | 108883 | Toluene | * | * | 3.00E+02 | * | 3.70E+04 |
| 0026 | 1330207 | Xylenes | * | * | 7.00E+02 | * | 2.20E+04 |

EMISSIONS DATA SOURCE: Emission rates loaded from file: C:\HARP\PROJECTS\2696CP\2696B401\2696B401.EMS
CHEMICALS ADDED OR DELETED: none

EMISSIONS FOR FACILITY FAC=1 DEV=* PRO=* STK=1 NAME=U90B401 EMS (lbs/yr)
SOURCE MULTIPLIER=1

| CAS | ABBREV | MULTIPLIER | BG (ug/m^3) | AVRG (lbs/yr) | MAX (lbs/hr) |
|---|---|---|---|---|---|
| 106990 | 1,3-Butadiene | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 75070 | Acetaldehyde | 1 | 0 | 2.42E+00 | 2.76E-04 |
| 1016 | As cmpd(inorg) | 1 | 0 | 2.42E-01 | 2.77E-05 |
| 71432 | Benzene | 1 | 0 | 3.20E+00 | 3.65E-04 |
| 7440417 | Beryllium | 1 | 0 | 6.48E-02 | 7.40E-06 |
| 7440439 | Cadmium | 1 | 0 | 1.59E-01 | 1.81E-05 |
| 218019 | Chrysene | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 18540299 | Cr(VI) | 1 | 0 | 1.04E-01 | 1.18E-05 |
| 1319773 | Cresols | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 100414 | Ethyl Benzene | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 50000 | Formaldehyde | 1 | 0 | 1.47E-02 | 1.68E-06 |
| 7783064 | H2S | 1 | 0 | 3.49E+00 | 3.98E-04 |
| 110543 | Hexane | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 193395 | In[1,2,3-cd]pyr | 1 | 0 | 1.35E-04 | 1.54E-08 |
| 7439965 | Manganese | 1 | 0 | 1.06E+00 | 1.21E-04 |
| 7439976 | Mercury | 1 | 0 | 2.43E-02 | 2.77E-06 |
| 91203 | Naphthalene | 1 | 0 | 7.86E-02 | 8.97E-06 |
| 7664417 | NH3 | 1 | 0 | 9.38E+02 | 1.07E-01 |
| 1150 | PAHs-w/ | 1 | 0 | 9.70E-02 | 1.11E-05 |
| 108952 | Phenol | 1 | 0 | 1.88E-01 | 2.14E-05 |
| 115071 | Propylene | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 7782492 | Selenium | 1 | 0 | 6.48E-01 | 7.40E-05 |
| 7440224 | Silver | 1 | 0 | 1.30E-01 | 1.48E-05 |
| 100425 | Styrene | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 108883 | Toluene | 1 | 0 | 3.80E+00 | 4.34E-04 |
| 1330207 | Xylenes | 1 | 0 | 0.00E+00 | 0.00E+00 |

EMISSIONS FOR FACILITY FAC=1 DEV=* PRO=* STK=2 NAME=U90FUG EMS (lbs/yr)
SOURCE MULTIPLIER=1

| CAS | ABBREV | MULTIPLIER | BG (ug/m^3) | AVRG (lbs/yr) | MAX (lbs/hr) |
|---|---|---|---|---|---|
| 106990 | 1,3-Butadiene | 1 | 0 | 2.23E-01 | 6.96E-08 |
| 75070 | Acetaldehyde | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 1016 | As cmpd(inorg) | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 71432 | Benzene | 1 | 0 | 3.02E-01 | 9.45E-08 |
| 7440417 | Beryllium | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 7440439 | Cadmium | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 218019 | Chrysene | 1 | 0 | 6.68E-02 | 2.09E-08 |
| 18540299 | Cr(VI) | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 1319773 | Cresols | 1 | 0 | 2.00E-01 | 6.26E-08 |
| 100414 | Ethyl Benzene | 1 | 0 | 9.59E-01 | 3.00E-07 |
| 50000 | Formaldehyde | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 7783064 | H2S | 1 | 0 | 1.48E-02 | 4.64E-09 |
| 110543 | Hexane | 1 | 0 | 4.01E+00 | 1.25E-06 |
| 193395 | In[1,2,3-cd]pyr | 1 | 0 | 3.34E-01 | 1.04E-07 |
| 7439965 | Manganese | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 7439976 | Mercury | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 91203 | Naphthalene | 1 | 0 | 3.22E+00 | 1.01E-06 |
| 7664417 | NH3 | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 1150 | PAHs-w/ | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 108952 | Phenol | 1 | 0 | 6.68E-02 | 2.09E-08 |
| 115071 | Propylene | 1 | 0 | 2.23E-01 | 6.96E-08 |
| 7782492 | Selenium | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 7440224 | Silver | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 100425 | Styrene | 1 | 0 | 2.50E-01 | 7.83E-08 |
| 108883 | Toluene | 1 | 0 | 1.21E+00 | 3.79E-07 |
| 1330207 | Xylenes | 1 | 0 | 4.33E+00 | 1.35E-06 |

CHRONIC HI REPORT

DOMINANT PATHWAYS, Receptor 788

| CHEM | INHAL | DERM | SOIL | MOTHER | FISH | WATER | VEG | DAIRY | BEEF | CHICK | PIG | EGG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0001 | YES | - | - | - | - | - | - | - | - | - | - | - |
| 0002 | YES | - | - | - | - | - | - | - | - | - | - | - |
| 0003 | YES | YES | YES | - | - | - | - | - | - | - | - | - |
| 0004 | YES | - | - | - | - | - | - | - | - | - | - | - |
| 0005 | YES | - | YES | - | - | - | YES | - | - | - | - | - |
| 0006 | YES | - | YES | - | - | - | YES | - | - | - | - | - |
| 0007 | YES | YES | - | - | - | - | YES | - | - | - | - | - |
| 0008 | YES | - | YES | - | - | - | YES | - | - | - | - | - |
| 0009 | YES | - | - | - | - | - | - | - | - | - | - | - |
| 0010 | YES | - | - | - | - | - | - | - | - | - | - | - |
| 0011 | YES | - | - | - | - | - | - | - | - | - | - | - |
| 0012 | YES | - | - | - | - | - | - | - | - | - | - | - |
| 0013 | YES | - | - | - | - | - | - | - | - | - | - | - |
| 0014 | YES | YES | - | - | - | - | YES | - | - | - | - | - |
| 0015 | YES | - | - | - | - | - | - | - | - | - | - | - |
| 0016 | YES | YES | - | - | - | - | YES | - | - | - | - | - |
| 0017 | YES | - | - | - | - | - | - | - | - | - | - | - |
| 0018 | YES | - | - | - | - | - | - | - | - | - | - | - |
| 0019 | - | - | - | - | - | - | - | - | - | - | - | - |
| 0020 | YES | - | - | - | - | - | - | - | - | - | - | - |
| 0021 | YES | - | - | - | - | - | - | - | - | - | - | - |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0022 | YES | - | - | - | - | - | - | - | - | - | - | - |
| 0023 | YES | - | - | - | - | - | - | - | - | - | - | - |
| 0024 | YES | - | - | - | - | - | - | - | - | - | - | - |
| 0025 | YES | - | - | - | - | - | - | - | - | - | - | - |
| 0026 | YES | - | - | - | - | - | - | - | - | - | - | - |

DERIVED CHRONIC HI, RECEPTOR 788

| CHEM | CV | CNS | BONE | DEVEL | ENDO | EYE | GILV | IMMUN | KIDN | REPRO | RESP | SKIN | BLOOD | MAX | UTME | UTMN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0001 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.76E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.76E-07 | | |
| 0002 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.44E-08 | 0.00E+00 | 0.00E+00 | 9.44E-08 | | |
| 0003 | 3.53E-03 | 3.53E-03 | 0.00E+00 | 3.53E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.53E-03 | 3.53E-03 | 0.00E+00 | 3.53E-03 | | |
| 0004 | 0.00E+00 | 3.71E-07 | 0.00E+00 | 3.71E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.71E-07 | 3.71E-07 | | |
| 0005 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.40E-07 | 5.05E-05 | 0.00E+00 | 0.00E+00 | 5.05E-05 | 0.00E+00 | 0.00E+00 | 5.05E-05 | | |
| 0006 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.48E-05 | 0.00E+00 | 4.34E-05 | 0.00E+00 | 0.00E+00 | 6.48E-05 | | |
| 0007 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0008 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.84E-06 | 0.00E+00 | 1.34E-07 | 2.84E-06 | | |
| 0009 | 0.00E+00 | 5.26E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.26E-09 | | |
| 0010 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.56E-09 | 7.56E-09 | 0.00E+00 | 7.56E-09 | 0.00E+00 | 7.56E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.56E-09 | | |
| 0011 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.92E-09 | 0.00E+00 | 0.00E+00 | 8.92E-09 | | |
| 0012 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.93E-06 | 0.00E+00 | 0.00E+00 | 1.93E-06 | | |
| 0013 | 0.00E+00 | 9.03E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.03E-09 | | |
| 0014 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0015 | 0.00E+00 | 6.43E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.43E-05 | | |
| 0016 | 0.00E+00 | 2.94E-05 | 0.00E+00 | 2.94E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.94E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.94E-05 | | |
| 0017 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.69E-06 | 0.00E+00 | 0.00E+00 | 5.69E-06 | | |
| 0018 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.56E-05 | 0.00E+00 | 0.00E+00 | 2.56E-05 | | |
| 0019 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0020 | 1.04E-08 | 1.04E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.04E-08 | 0.00E+00 | 1.04E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.04E-08 | | |
| 0021 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.17E-09 | 0.00E+00 | 0.00E+00 | 1.17E-09 | | |
| 0022 | 1.77E-07 | 1.77E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.77E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.77E-07 | | |
| 0023 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0024 | 0.00E+00 | 4.38E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.38E-09 | | |
| 0025 | 0.00E+00 | 1.33E-07 | 0.00E+00 | 1.33E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.33E-07 | 0.00E+00 | 0.00E+00 | 1.33E-07 | | |
| 0026 | 0.00E+00 | 9.75E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.75E-08 | 0.00E+00 | 0.00E+00 | 9.75E-08 | | |
| SUM | 3.53E-03 | 3.62E-03 | 0.00E+00 | 3.56E-03 | 7.56E-09 | 0.00E+00 | 1.03E-06 | 5.05E-05 | 9.43E-05 | 1.76E-07 | 3.66E-03 | 3.53E-03 | 5.05E-07 | 3.66E-03 | 382500 | 3737400 |

File: M:\MC\2696 Conoco - ULSD\HRA\Risk Files\2696 B401 MAHI.txt 1/4/2013, 5:47:01PM

This file: C:\HARP\PROJECTS\2696CP\2696B401\2696 B401 MAHI.txt

Created by HARP Version 1.4f Build 23.11.01
Uses ISC Version 99155
Uses BPIP (Dated: 04112)
Creation date: 1/4/2013 5:46:59 PM

EXCEPTION REPORT
(there have been no changes or exceptions)

INPUT FILES:
Source-Receptor file: C:\HARP\PROJECTS\2696CP\2696B401\2696B401.SRC
Averaging period adjustment factors file: not applicable
Emission rates file: 2696B401.EMS
Site parameters file: C:\HARP\PROJECTS\resident pathway.sit

Coordinate system: UTM NAD83

Screening mode is OFF

Analysis method: Point Estimate
Health effect: Acute HI Simple (Concurrent Max.)
Receptor(s): 1933
Sources(s): All
Chemicals(s): All

CHEMICAL CROSS-REFERENCE TABLE AND BACKGROUND CONCENTRATIONS

| CHEM | CAS | ABBREVIATION | POLLUTANT NAME | BACKGROUND (ug/m^3) |
|---|---|---|---|---|
| 0001 | 106990 | 1,3-Butadiene | 1,3-Butadiene | 0.000E+00 |
| 0002 | 75070 | Acetaldehyde | Acetaldehyde | 0.000E+00 |
| 0003 | 1016 | As cmpd(inorg) | Arsenic compounds (inorganic) | 0.000E+00 |
| 0004 | 71432 | Benzene | Benzene | 0.000E+00 |
| 0005 | 7440417 | Beryllium | Beryllium | 0.000E+00 |
| 0006 | 7440439 | Cadmium | Cadmium | 0.000E+00 |
| 0007 | 218019 | Chrysene | Chrysene | 0.000E+00 |
| 0008 | 18540299 | Cr(VI) | Chromium, hexavalent (& compounds) | 0.000E+00 |
| 0009 | 1319773 | Cresols | Cresols (mixtures of) {Cresylic acid} | 0.000E+00 |
| 0010 | 100414 | Ethyl Benzene | Ethyl benzene | 0.000E+00 |
| 0011 | 50000 | Formaldehyde | Formaldehyde | 0.000E+00 |
| 0012 | 7783064 | H2S | Hydrogen sulfide | 0.000E+00 |
| 0013 | 110543 | Hexane | Hexane | 0.000E+00 |
| 0014 | 193395 | In[1,2,3-cd]pyr | Indeno[1,2,3-cd]pyrene | 0.000E+00 |
| 0015 | 7439965 | Manganese | Manganese | 0.000E+00 |
| 0016 | 7439976 | Mercury | Mercury | 0.000E+00 |
| 0017 | 91203 | Naphthalene | Naphthalene | 0.000E+00 |
| 0018 | 7664417 | NH3 | Ammonia | 0.000E+00 |
| 0019 | 1150 | PAHs-w/ | PAHs, total, with individ. components also reported | 0.000E+00 |
| 0020 | 108952 | Phenol | Phenol | 0.000E+00 |
| 0021 | 115071 | Propylene | Propylene | 0.000E+00 |
| 0022 | 7782492 | Selenium | Selenium | 0.000E+00 |
| 0023 | 7440224 | Silver | Silver | 0.000E+00 |
| 0024 | 100425 | Styrene | Styrene | 0.000E+00 |
| 0025 | 108883 | Toluene | Toluene | 0.000E+00 |
| 0026 | 1330207 | Xylenes | Xylenes (mixed) | 0.000E+00 |

CHEMICAL HEALTH VALUES

| CHEM | CAS | ABBREVIATION | CancerPF(Inh) (mg/kg-d)^-1 | CancerPF(Oral) (mg/kg-d)^-1 | ChronicREL(Inh) ug/m^3 | ChronicREL(Oral) mg/kg-d | AcuteREL ug/m^3 |
|---|---|---|---|---|---|---|---|
| 0001 | 106990 | 1,3-Butadiene | 6.00E-01 | * | 2.00E+01 | * | * |
| 0002 | 75070 | Acetaldehyde | 1.00E-02 | * | 1.40E+02 | * | 4.70E+02 |
| 0003 | 1016 | As cmpd(inorg) | 1.20E+01 | 1.50E+00 | 1.50E-02 | 3.50E-06 | 2.00E-01 |
| 0004 | 71432 | Benzene | 1.00E-01 | * | 6.00E+01 | * | 1.30E+03 |
| 0005 | 7440417 | Beryllium | 8.40E+00 | * | 7.00E-03 | 2.00E-03 | * |
| 0006 | 7440439 | Cadmium | 1.50E+01 | * | 2.00E-02 | 5.00E-04 | * |
| 0007 | 218019 | Chrysene | 3.90E-02 | 1.20E-01 | * | * | * |
| 0008 | 18540299 | Cr(VI) | 5.10E+02 | * | 2.00E-01 | 2.00E-02 | * |
| 0009 | 1319773 | Cresols | * | * | 6.00E+02 | * | * |
| 0010 | 100414 | Ethyl Benzene | 8.70E-03 | * | 2.00E+03 | * | * |
| 0011 | 50000 | Formaldehyde | 2.10E-02 | * | 9.00E+00 | * | 5.50E+01 |
| 0012 | 7783064 | H2S | * | * | 1.00E+01 | * | 4.20E+01 |
| 0013 | 110543 | Hexane | * | * | 7.00E+03 | * | * |
| 0014 | 193395 | In[1,2,3-cd]pyr | 3.90E-01 | 1.20E+00 | * | * | * |
| 0015 | 7439965 | Manganese | * | * | 9.00E-02 | * | * |
| 0016 | 7439976 | Mercury | * | * | 3.00E-02 | 1.60E-04 | 6.00E-01 |
| 0017 | 91203 | Naphthalene | 1.20E-01 | * | 9.00E+00 | * | * |
| 0018 | 7664417 | NH3 | * | * | 2.00E+02 | * | 3.20E+03 |
| 0019 | 1150 | PAHs-w/ | * | * | * | * | * |
| 0020 | 108952 | Phenol | * | * | 2.00E+02 | * | 5.80E+03 |
| 0021 | 115071 | Propylene | * | * | 3.00E+03 | * | * |
| 0022 | 7782492 | Selenium | * | * | 2.00E+01 | * | * |
| 0023 | 7440224 | Silver | * | * | * | * | * |
| 0024 | 100425 | Styrene | * | * | 9.00E+02 | * | 2.10E+04 |
| 0025 | 108883 | Toluene | * | * | 3.00E+02 | * | 3.70E+04 |
| 0026 | 1330207 | Xylenes | * | * | 7.00E+02 | * | 2.20E+04 |

EMISSIONS DATA SOURCE: Emission rates loaded from file: C:\HARP\PROJECTS\2696CP\2696B401\2696B401.EMS
CHEMICALS ADDED OR DELETED: none

EMISSIONS FOR FACILITY FAC=1 DEV=* PRO=* STK=1 NAME=U90B401 EMS (lbs/yr)
SOURCE MULTIPLIER=1

| CAS | ABBREV | MULTIPLIER | BG (ug/m^3) | AVRG (lbs/yr) | MAX (lbs/hr) |
|---|---|---|---|---|---|
| 106990 | 1,3-Butadiene | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 75070 | Acetaldehyde | 1 | 0 | 2.42E+00 | 2.76E-04 |
| 1016 | As cmpd(inorg) | 1 | 0 | 2.42E-01 | 2.77E-05 |
| 71432 | Benzene | 1 | 0 | 3.20E+00 | 3.65E-04 |
| 7440417 | Beryllium | 1 | 0 | 6.48E-02 | 7.40E-06 |
| 7440439 | Cadmium | 1 | 0 | 1.59E-01 | 1.81E-05 |
| 218019 | Chrysene | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 18540299 | Cr(VI) | 1 | 0 | 1.04E-01 | 1.18E-05 |
| 1319773 | Cresols | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 100414 | Ethyl Benzene | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 50000 | Formaldehyde | 1 | 0 | 1.47E-02 | 1.68E-06 |
| 7783064 | H2S | 1 | 0 | 3.49E+00 | 3.98E-04 |
| 110543 | Hexane | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 193395 | In[1,2,3-cd]pyr | 1 | 0 | 1.35E-04 | 1.54E-08 |
| 7439965 | Manganese | 1 | 0 | 1.06E+00 | 1.21E-04 |
| 7439976 | Mercury | 1 | 0 | 2.43E-02 | 2.77E-06 |
| 91203 | Naphthalene | 1 | 0 | 7.86E-02 | 8.97E-06 |
| 7664417 | NH3 | 1 | 0 | 9.38E+02 | 1.07E-01 |
| 1150 | PAHs-w/ | 1 | 0 | 9.70E-02 | 1.11E-05 |

| | | | | | |
|---|---|---|---|---|---|
| 108952 | Phenol | 1 | 0 | 1.88E-01 | 2.14E-05 |
| 115071 | Propylene | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 7782492 | Selenium | 1 | 0 | 6.48E-01 | 7.40E-05 |
| 7440224 | Silver | 1 | 0 | 1.30E-01 | 1.48E-05 |
| 100425 | Styrene | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 108883 | Toluene | 1 | 0 | 3.80E+00 | 4.34E-04 |
| 1330207 | Xylenes | 1 | 0 | 0.00E+00 | 0.00E+00 |

EMISSIONS FOR FACILITY FAC=1 DEV=* PRO=* STK=2 NAME=U90FUG EMS (lbs/yr)
SOURCE MULTIPLIER=1

| CAS | ABBREV | MULTIPLIER | BG (ug/m^3) | AVRG (lbs/yr) | MAX (lbs/hr) |
|---|---|---|---|---|---|
| 106990 | 1,3-Butadiene | 1 | 0 | 2.23E-01 | 6.96E-08 |
| 75070 | Acetaldehyde | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 1016 | As cmpd(inorg) | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 71432 | Benzene | 1 | 0 | 3.02E-01 | 9.45E-08 |
| 7440417 | Beryllium | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 7440439 | Cadmium | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 218019 | Chrysene | 1 | 0 | 6.68E-02 | 2.09E-08 |
| 18540299 | Cr(VI) | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 1319773 | Cresols | 1 | 0 | 2.00E-01 | 6.26E-08 |
| 100414 | Ethyl Benzene | 1 | 0 | 9.59E-01 | 3.00E-07 |
| 50000 | Formaldehyde | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 7783064 | H2S | 1 | 0 | 1.48E-02 | 4.64E-09 |
| 110543 | Hexane | 1 | 0 | 4.01E+00 | 1.25E-06 |
| 193395 | In[1,2,3-cd]pyr | 1 | 0 | 3.34E-01 | 1.04E-07 |
| 7439965 | Manganese | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 7439976 | Mercury | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 91203 | Naphthalene | 1 | 0 | 3.22E+00 | 1.01E-06 |
| 7664417 | NH3 | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 1150 | PAHs-w/ | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 108952 | Phenol | 1 | 0 | 6.68E-02 | 2.09E-08 |
| 115071 | Propylene | 1 | 0 | 2.23E-01 | 6.96E-08 |
| 7782492 | Selenium | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 7440224 | Silver | 1 | 0 | 0.00E+00 | 0.00E+00 |
| 100425 | Styrene | 1 | 0 | 2.50E-01 | 7.83E-08 |
| 108883 | Toluene | 1 | 0 | 1.21E+00 | 3.79E-07 |
| 1330207 | Xylenes | 1 | 0 | 4.33E+00 | 1.35E-06 |

ACUTE HI REPORT

ACUTE HI, RECEPTOR 1933

| CHEM | CV | CNS | BONE | DEVEL | ENDO | EYE | GILV | IMMUN | KIDN | REPRO | RESP | SKIN | BLOOD | MAX | UTME | UTMN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0001 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0002 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.56E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.56E-07 | 0.00E+00 | 0.00E+00 | 5.56E-07 | | |
| 0003 | 1.31E-04 | 1.31E-04 | 0.00E+00 | 1.31E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.31E-04 | | |
| 0004 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.66E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.66E-07 | 0.00E+00 | 2.66E-07 | 0.00E+00 | 0.00E+00 | 2.66E-07 | 2.66E-07 | | |
| 0005 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0006 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0007 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0008 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0009 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0010 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0011 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.89E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.89E-08 | | |
| 0012 | 0.00E+00 | 8.97E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.97E-06 | | |
| 0013 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0014 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0015 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0016 | 0.00E+00 | 4.37E-06 | 0.00E+00 | 4.37E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.37E-06 | | |
| 0017 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0018 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.17E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.17E-05 | 0.00E+00 | 0.00E+00 | 3.17E-05 | | |
| 0019 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0020 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.51E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.51E-09 | 0.00E+00 | 0.00E+00 | 3.51E-09 | | |
| 0021 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0022 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0023 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | |
| 0024 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.23E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.23E-11 | 0.00E+00 | 0.00E+00 | 1.23E-11 | | |
| 0025 | 0.00E+00 | 1.11E-08 | 0.00E+00 | 1.11E-08 | 0.00E+00 | 1.11E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.11E-08 | 1.11E-08 | 0.00E+00 | 0.00E+00 | 1.11E-08 | | |
| 0026 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.03E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.03E-10 | 0.00E+00 | 0.00E+00 | 2.03E-10 | | |
| SUM | 1.31E-04 | 1.45E-04 | 0.00E+00 | 1.36E-04 | 0.00E+00 | 3.23E-05 | 0.00E+00 | 2.66E-07 | 0.00E+00 | 2.77E-07 | 3.22E-05 | 0.00E+00 | 2.66E-07 | 1.45E-04 | 380641 | 3738324 |