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

SUBJECT: **NOTICE OF INTENT TO ADOPT NEGATIVE DECLARATION**

PROJECT TITLE: **CONOCOPHILLIPS LOS ANGELES REFINERY CARSON PLANT SCR 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 Negative Declaration for the project identified above. The purpose of this Notice of Intent (NOI) is to solicit comments on the environmental analysis contained in the Negative Declaration.

The Negative Declaration has been prepared for the ConocoPhillips Los Angeles Refinery Selective Catalytic Reduction Unit (SCR) Project which will allow ConocoPhillips to install and operate an aqueous ammonia tank and an SCR unit to control nitrogen oxide emissions from an existing boiler at the ConocoPhillips Carson Plant.

This Notice is not an SCAQMD application or form requiring a response from you. Its purpose is simply to provide information to you on the above project. If the proposed project has no bearing on you or your organization, no action on your part is necessary. If you wish to receive the Negative Declaration, please call the SCAQMD Public Information Center at (909) 396-3600. The Negative Declaration can also be downloaded by contacting the SCAQMD's CEQA web pages at http://www.aqmd.gov/ceqa/nonaqmd.html.

Comments relative to the environmental analysis should be addressed to Mr. Michael Krause at the address shown above, e-mailed to mkrause@aqmd.gov, or sent by FAX to (909) 396-3324. Comments must be received no later than 5:00 p.m. on ~~Friday February 13, 2004~~ Wednesday, February 25, 2004. Please include the name and phone number of the contact person for your organization.

Project Applicant: ConocoPhillips

Date: January 14, 2004

Signature_____
Steve Smith, Ph.D.

Title: Program Supervisor

Telephone: (909) 396-3054

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

NOTICE OF INTENT TO ADOPT A NEGATIVE DECLARATION

Project Title:
Negative Declaration: ConocoPhillips Los Angeles Refinery Carson Plant SCR Project

Project Locations:
The ConcoPhillips Los Angeles Refinery, Carson Plant, is located at 1520 East Sepulveda Boulevard, Carson, California.

Description of Nature, Purpose, and Beneficiaries of Project:
The proposed project includes the installation and operation of an aqueous ammonia storage tank and a selective catalytic reduction (SCR) unit, to control nitrogen oxide emissions from an existing boiler at the ConocoPhillips Carson Plant.

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

Draft Negative Declaration and all Supporting Documentation are Available at:

SCAQMD Headquarters
21865 Copley Drive
Diamond Bar, CA 91765

Or by Calling:
(909) 396-2039

Or by Accessing:
http://aqmd.gov/ceqa/nonaqmd.html

The Public Notice of Completion is provided through the following:
☑ Los Angeles Times (01/15/04) ☑ AQMD Website ☑ AQMD Mailing List

Review Period:

January 15, 2004 through ~~February 13, 2004~~ February 25, 2004

CEQA Contact Person:	**Phone Number:**	**E-Mail Address**
Michael Krause	(909)396-2706	mkrause@aqmd.gov

DABWORD:2252:NOI Forrm. notice

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Negative Declaration for:
ConocoPhillips Los Angeles Refinery
Carson Plant SCR Unit Project

January 14, 2004

Submitted to:
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Prepared by:
ENVIRONMENTAL AUDIT, INC.

Reviewed by: Mike Krause - Air Quality Specialist
Steve Smith, Ph.D. - Program Supervisor
Frances Keeler – Senior Deputy District Counsel
Norman Ng – Air Quality Specialist

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EXECUTIVE OFFICER

BARRY WALLERSTEIN, D. Env.

TABLE OF CONTENTS

TABLES:

APPENDICES:

M:\\DBS\2252\2252TOC.doc

CHAPTER 1

PROJECT DESCRIPTION

CHAPTER 1.0

PROJECT DESCRIPTION

1.1 INTRODUCTION

The ConocoPhillips Los Angeles Refinery is proposing to install a selective catalytic reduction unit (SCR) and new aqueous ammonia tank at its Los Angeles Refinery Carson Plant to reduce emissions of nitrogen oxide (NO_x) from an existing boiler.

1.2 AGENCY AUTHORITY

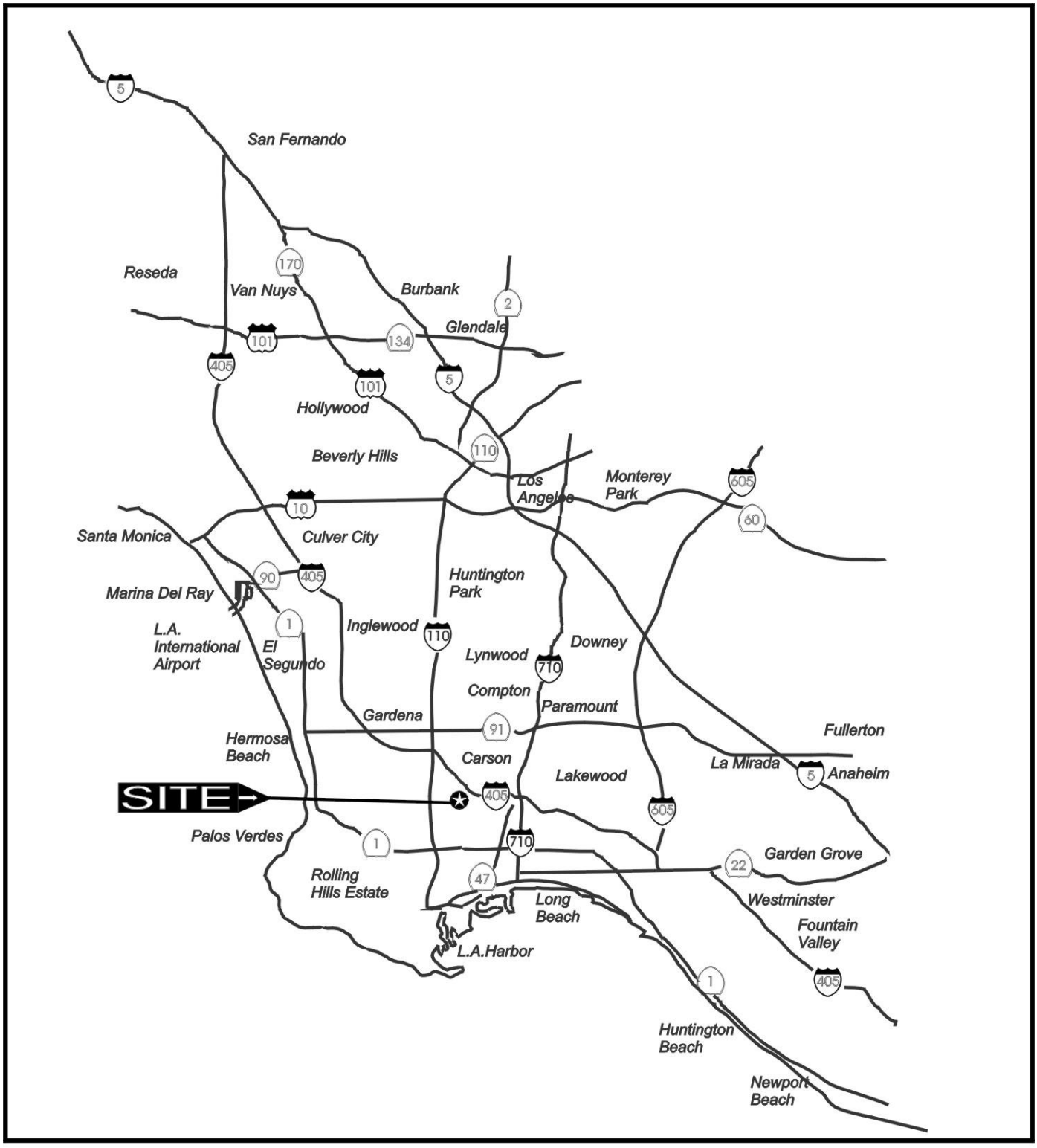
The California Environmental Quality Act (CEQA), Public Resources Code Section 21000 et seq., requires that the environmental impacts of proposed "projects" be evaluated and that feasible methods to reduce, avoid or eliminate significant adverse impacts of these projects be identified and implemented. The proposed modifications constitute a "project" as defined by CEQA. To fulfill the purpose and intent of CEQA, the SCAQMD is the "lead agency" for this project and has prepared this Negative Declaration to address the potential adverse environmental impacts associated with the proposed project at the ConocoPhillips Carson Plant.

The lead agency is the public agency that has the principal responsibility for carrying out or approving a project that may have a significant adverse effect upon the environment (Public Resources Code §21067). Since the proposed project requires discretionary approval from the SCAQMD and the SCAQMD has the greatest responsibility for supervising or approving the project as a whole, it was determined that the SCAQMD would be the most appropriate public agency to act as lead agency (CEQA Guidelines §15051(b)).

To fulfill the purpose and intent of CEQA, the SCAQMD has prepared this Negative Declaration to address the potential adverse environmental impacts associated with the proposed project. A Negative Declaration for a project subject to CEQA is prepared when an environmental analysis of the project shows that there is no substantial evidence that the project may have a significant effect on the environment (CEQA Guidelines §15070(a)).

1.3 PROJECT LOCATION

ConocoPhillips Los Angeles Refinery operates at two different sites in the South Coast Air Basin which is a sub-area of the SCAQMD's area of jurisdiciton. 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 proposed project includes physical modifications primarily to process facilities at the Carson Plant. The ConocoPhillips Carson Plant is located at 1520 East Sepulveda Boulevard, Carson, California (see Figures 1 and 2). The Carson Plant is bounded on the north by Sepulveda Boulevard, on the west by Wilmington Avenue; on the south by a branch of the Atchison, Topeka and Santa Fe Railroad; and on the east by Alameda Boulevard.



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REGIONAL MAP
ConocoPhillips Carson Plant

Figure 1

Project No. 2252
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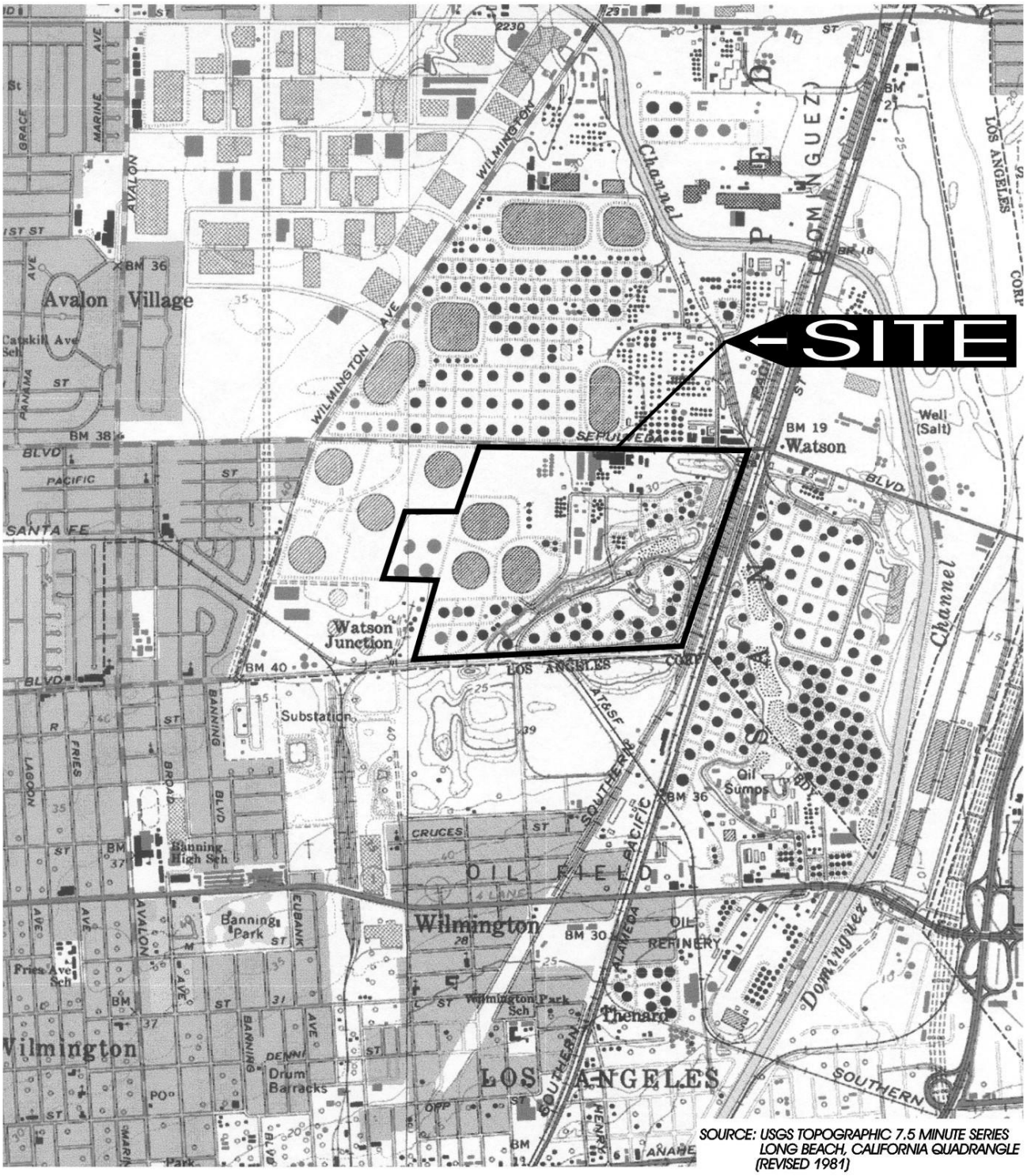

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SITE LOCATION MAP
CARSON PLANT
Carson, CA

Project No. 2252

Figure 2

N:\2252\Site Location Map .CDR

Property to the north of the Carson Plant is occupied by the British Petroleum (former ARCO) Los Angeles Refinery. The western boundary of the plant borders a shipping and container storage facility; further south is the Wilmington Boulevard property. 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 Shell (formerly Equilon/Texaco) Refinery.

1.4 OVERVIEW OF CURRENT OPERATIONS

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, 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) chemically combining two or more hydrocarbons to produce high-grade gasoline.

The ConocoPhillips Los Angeles Refinery (which includes both the Carson and Wilmington Plants), produces a variety of products including gasoline, jet fuel, diesel fuel, petroleum gases, sulfuric acid, and sulfur.

1.5 PROPOSED PROJECT

The ConocoPhillips Refinery Carson Plant currently operates Boiler 10, which is used to supply steam to refinery process units. ConocoPhillips is proposing to install an SCR Unit on Boiler 10 to reduce emissions of NO_x from the Boiler. Additional NO_x emission reductions are necessary to comply with ConocoPhillip's SCAQMD Rule 2009.1 Compliance Plan to meet NOx RECLAIM allocation levels. Under the RECLAIM program, the SCAQMD issues facility-wide permits to sources which specify annual emission allocations for NO_x and sulfur oxide (SO_x). The allocations decline each year. RECLAIM sources must reduce their emissions each year to remain within their declining annual allocations, or must purchase emission credits (called RECLAIM Trading Credits) generated by other facilities in the RECLAIM program which have reduced emissions to levels below their required allocations. Each facility is given the flexibility to determine the best means of compliance through reducing emissions at the facility to remain within its declining allocations, or purchasing RECLAIM Trading Credits on the market to cover any emissions in excess of the annual allocation.

SCR Units are considered to be best available retrofit control technology (BARCT) for the control of NO_x from existing combustion sources. NO_x emissions are controlled by injecting aqueous ammonia into the exhaust gas stream upstream of a catalyst. The aqueous ammonia to be used in the SCR Unit will consist of 19 percent ammonia. NO_x, ammonia, and oxygen react on the surface of the catalyst to form nitrogen and water. The catalyst will be made from a noble metal with

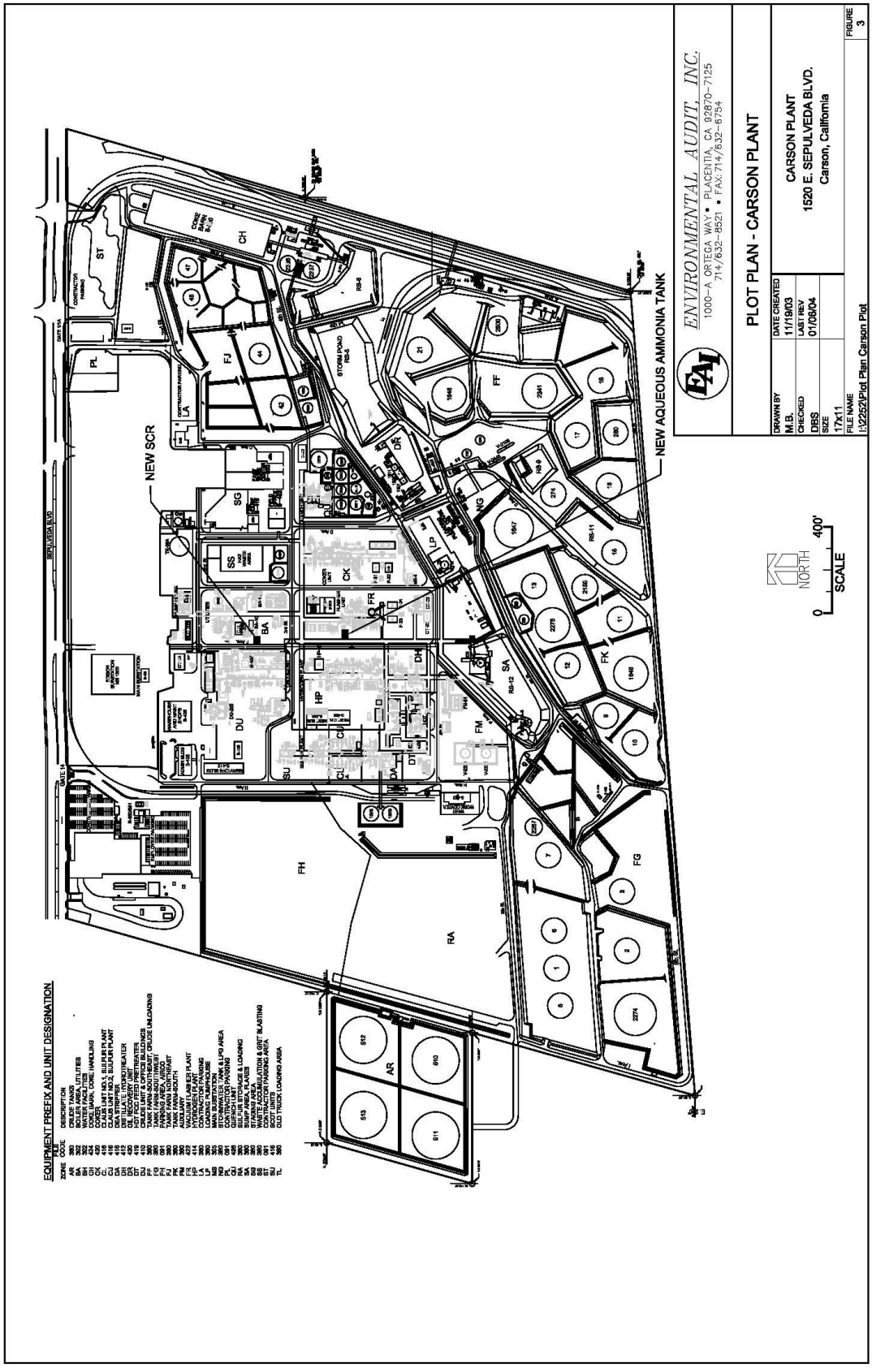
control efficiencies expected to be approximately 90 percent or more. The NO_x concentration downstream from the SCR Unit is expected to be approximately nine parts per million.

The project also includes the installation of a 10,000 gallon pressurized ammonia storage tank to store aqueous ammonia. The location of the new ammonia storage tank and the new SCR Unit are shown in Figure 3. Aqueous ammonia will be supplied from a local vendor in the Los Angeles area, delivered to the Carson Plant for storage and use.

1.6 REQUIRED PERMITS

The proposed project will require Permits to Construct/Operate from the SCAQMD and will require building permits from the City of Carson. No other permits are expected to be required.

~~1.6 REQUIRED PERMITS~~


NEW SCR
NEW AQUEOUS AMMONIA TANK
SEPULVEDA BLVD
EQUIPMENT PREFIX AND UNIT DESIGNATION
ZONE CODE DESCRIPTION
AR 380 CRUDE TANKS
BA 3922 BOILER AND UTILITIES
BU 3922 WATER FACILITIES
CH 424 CORE BARN, CORE HANDLING
CK 424 CORE LAB
CU 416 CLAUS UNIT NO.1, SULFUR PLANT
DA 416 CLAUS UNIT NO.2, SULFUR PLANT
DH 416 SEA STRIPPER
DR 410 DEMINERALIZER UNIT
DT 410 DW RECOVERY UNIT/TREATER
DU 410 SOUR WATER STRIPPER
FF 3980 HOT FOG FIRES PRETREATER
FG 3980 TANK FARM-SOUTHEAST, CRUDE UNLOADING
FH 3980 TANK FARM-SOUTHEAST
FJ 0991 PARKING AREA, AIRCO
FK 0991 TANK FARM-NORTHEAST
FM 3980 TANK FARM-SOUTH
FR 4500 AUXILIARY
HP 414 HYDROGEN PLANT
LP 3980 LOADING PUMPHOUSE
MB 3980 MAINTENANCE BUILDING
NG 3980 STORMWATER TANK & LPG AREA
PL 0991 CONTRACTOR PARKING
RA 3980 SULFUR STORAGE & LOADING
SA 3980 SULFUR PIT AREA
SG 3980 STAGING AREA
SS 0991 SCRUBBER INSTALLATION & DIRT BLASTING
ST 0991 CONTRACTOR PARKING AREA
SU 3980 SCOT UNITS
TL 3980 SULFUR LOADING AREA
ENVIRONMENTAL AUDIT, INC.
1000-A ORTEGA WAY • PLACENTIA, CA 92870-7125
714/632-8521 • FAX: 714/632-6754
PLOT PLAN - CARSON PLANT
DRAWN BY M.B.
DATE CREATED 11/19/03
CHECKED DBS
LAST REV 01/06/04
SIZE 17x11
FILE NAME I:\2252\Plot Plan Carson Plot
CARSON PLANT
1520 E. SEPULVEDA BLVD.
Carson, California
FIGURE 3
NORTH
0 400'
SCALE

~~The proposed project will require Permits to Construct/Operate from the SCAQMD and will require building permits from the City of Carson. No other permits are expected to be required.~~

CHAPTER 2

ENVIRONMENTAL CHECKLIST FORM

INTRODUCTION

The environmental checklist provides a standard evaluation tool to identify a project's adverse environmental impacts. This checklist identifies and evaluates potential adverse environmental impacts that may be created by the proposed project.

GENERAL INFORMATION

Project Title:	Proposed Boiler 10 SCR Project
Lead Agency Name:	South Coast Air Quality Management District
Lead Agency Address:	21865 Copley Drive Diamond Bar, CA 91765
Contact Person:	Michael Krause
Contact Phone Number:	(909) 396-2706
Project Sponsor's Name:	ConocoPhillips
Project Sponsor's Address:	1520 East Sepulveda Boulevard Carson, CA 90745
General Plan Designation:	Heavy Industrial
Zoning:	M-3 Heavy Industrial
Description of Project:	The proposed project includes the installation of an aqueous ammonia storage tank and selective catalytic reduction (SCR) unit to control nitrogen oxide emissions from an existing boiler at the ConocoPhillips Carson Plant.
Surrounding Land Uses and Setting:	The Carson Plant is bounded by Sepulveda Boulevard to the north, Wilmington Avenue to the west, Alameda Boulevard to the east, and by a branch of the Atchison, Topeka and Santa Fe Railroads to the south. The Carson Plant is designated as heavy industrial land use and all the surrounding land uses are heavy industrial, including other refinery facilities, tank farms, and transportation corridors.
Other Public Agencies Whose Approval is Required:	City of Carson

POTENTIALLY SIGNIFICANT IMPACT AREAS

The following environmental impact areas have been assessed to determine their potential to be affected by the proposed project. As indicated by the checklist on the following pages, environmental topics marked with an "✓" may be adversely affected by the proposed project. An explanation relative to the determination of impacts can be found following the checklist for each area.

☐ Aesthetics	☐ Agriculture Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Energy
☐ Geology/Soils	☐ Hazards & Hazardous Materials	☐ Hydrology/ Water Quality
☐ Land Use/Planning	☐ Mineral Resources	☐ Noise
☐ Population/Housing	☐ Public Services	☐ Recreation
☐ Solid/Hazardous Waste	☐ Transportation/ Traffic	☐ Mandatory Findings of Significance

DETERMINATION

On the basis of this initial evaluation:

- ☑ I find the proposed project COULD NOT have a significant effect on the environment, and that a NEGATIVE DECLARATION will be prepared.

- ☐ I find that although the proposed project could have a significant effect on the environment, there will not be significant effects in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

- ☐ I find that the proposed project MAY have a significant effect(s) on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

- ☐ I find that the proposed project MAY have a "potentially significant impact" on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

- ☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Date: January 14, 2004 Signature: Steve Smith

Steve Smith, Ph.D.
Program Supervisor

ENVIRONMENTAL CHECKLIST AND DISCUSSION

		Potentially Significant Impact	Less Than Significant Impact	No Impact
1.	**AESTHETICS.** Would the project:			
a)	Have a substantial adverse effect on a scenic vista?	☐	☐	☑
b)	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☑
c)	Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☑	☐
d)	Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☑

1.1 Significance Criteria

The proposed project impacts on aesthetics will be considered significant if:

The project will block views from a scenic highway or corridor.

The project will adversely affect the visual continuity of the surrounding area.

The impacts on light and glare will be considered significant if the project adds lighting which would add glare to residential areas or sensitive receptors.

1.2 Environmental Setting and Impacts

1. a), b) and c). Project construction consists of adding a new SCR unit, installation of a storage tank, and the installation of new piping. Therefore, the proposed project will introduce minor visual changes to the Carson Plant. The new SCR Unit will be about 20 feet high, which is lower than many surrounding structures. The existing boiler is 30 feet high and there are vessels and stacks at the Carson Plant that are over 100 feet high. Therefore, no visual impacts are expected from this equipment. The storage tank will be smaller than most of the surrounding structures. The views of the Plant from adjacent properties are not expected to change

substantially because of the proposed project. The new SCR unit will have similar structures as the existing equipment so that a significant change in the visual characteristics of the Carson Plant is not expected. No significant adverse impacts to aesthetics are expected.

No scenic highways or corridors are located in the vicinity of the Carson Plant. No significant adverse aesthetic impacts are expected.

1. d). Construction activities are not anticipated to require additional lighting because they are scheduled to take place during daylight hours. However, if the construction schedule requires nighttime activities, temporary lighting may be required. Since the project location is completely located within the boundaries of the existing Carson Plant, additional temporary lighting is not expected to be discernible from the existing permanent lighting.

The proposed project components will be located within existing industrial facilities, which are already lighted at night for nighttime operations, so no overall increase in lighting associated with the proposed project at the Carson Plant is expected. Therefore, no significant impacts to light and glare are anticipated from the proposed project.

1.3 Mitigation Measures

No significant adverse impacts to aesthetics are expected to occur as a result of the proposed project. Therefore, no mitigation is necessary or proposed.

		Potentially Significant Impact	Less Than Significant Impact	No Impact
2.	**AGRICULTURE RESOURCES.** Would the project:			
a)	Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☑
b)	Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☑
c)	Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	☐	☐	☑

2.1 Significance Criteria

Project-related impacts on agricultural resources will be considered significant if any of the following conditions are met:

The proposed project conflicts with existing zoning or agricultural use or Williamson Act contracts.

The proposed project will convert prime farmland, unique farmland or farmland of statewide importance as shown on the maps prepared pursuant to the farmland mapping and monitoring program of the California Resources Agency, to non-agricultural use.

The proposed project would involve changes in the existing environment, which due to their location or nature, could result in conversion of farmland to non-agricultural uses.

2.2 Environmental Setting and Impacts

2. a), b), and c). There are no agricultural resources, (i.e., food crops grown for commercial purposes), located in or near the vicinity of the Carson Plant. The proposed project will not involve construction outside of the existing boundaries of the Carson Plant and no agricultural resources are located within the Carson Plant. The zoning of the Carson Plant will remain heavy industrial, and refinery uses are allowed within this zone. No existing agricultural land will be converted to non-agricultural land uses. Further, the project will not conflict with a Williamson Act contract. Therefore, the proposed project will have no significant adverse impacts on agricultural resources.

2.3 Mitigation Measures

The impacts of the proposed project on agricultural resources are less than significant so no mitigation measures are required.

		Potentially Significant Impact	Less Than Significant Impact	No Impact
3.	**AIR QUALITY.** Would the project:			
a)	Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☑
b)	Violate any air quality standard or contribute to an existing or projected air quality violation?	☐	☐	☑
c)	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable	☐	☑	☐

	federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?			
d)	Expose sensitive receptors to substantial pollutant concentrations?	☐	☑	☐
e)	Create objectionable odors affecting a substantial number of people?	☐	☑	☐
f)	Diminish an existing air quality rule or future compliance requirement resulting in a significant increase in air pollutant(s)?	☐	☐	☑

3.1 Significance Criteria

Impacts will be evaluated and compared to the significance criteria in Table 1. If impacts equal or exceed any of the following criteria, they will be considered significant.

3.2 Environmental Setting and Impacts

3. a) An inventory of existing emissions from the industrial facilities is included in the baseline inventory in the SCAQMD's Air Quality Management Plan (AQMP). The AQMP identifies emission reductions from existing sources and air pollution control measures that are necessary in order to comply with the state and federal ambient air quality standards (SCAQMD, 2003). The control strategies in the AQMP are based on projections from the local general plans provided by the cities in the district. Projects that are consistent with the local General Plans are consistent with the air quality related regional plans. The proposed project is considered to be consistent with the air quality related regional plans since it is consistent with the City of Carson's General Plan.

The 2003 AQMP demonstrates that applicable ambient air quality standards can be achieved within the timeframes required under federal law. This proposed project must comply with applicable SCAQMD rules and regulations for new or modified sources. For example, new emission sources associated with the proposed project are required to comply with the SCAQMD's Regulation XIII - New Source Review requirements that include the use of BACT. The project proponent must also comply with prohibitory rules, such as Rule 403, for the control of fugitive dust. By meeting these requirements, the project will be consistent with the goals and objectives of the AQMP to improve air quality in the basin. In addition, the project will result in a reduction in NO_x emissions associated with the operation of Boiler 10.
New emission sources associated with the proposed project (e.g., ammonia storage tank) are required to comply with the SCAQMD's Regulation XIII – New Source Review requirements that include the use of BACT.

TABLE 1

AIR QUALITY SIGNIFICANCE THRESHOLDS

Mass Daily Thresholds		
Pollutant	Construction	Operation
NOx	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM10	150 lbs/day	150 lbs/day
SOx	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Lead	3 lbs/day	3 lbs/day
TAC, AHM, and Odor Thresholds		
Toxic Air Contaminants (TACs)	Maximum Incremental Cancer Risk $\geq$ 10 in 1 million Hazard Index $\geq$ 1.0 (project increment) Hazard Index $\geq$ 3.0 (facility-wide)	
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402	
Ambient Air Quality for Criteria Pollutants		
NO_2 1-hour average annual average	 20 ug/m^3 (= 1.0 pphm) 1 ug/m^3 (= 0.05 pphm)	
PM10 24-hour annual geometric mean	 2.5 ug/m^3 1.0 ug/m^3	
Sulfate 24-hour average	 1 ug/m^3	
CO (Carbon Monoxide) 1-hour average 8-hour average	 1.1 mg/m^3 (= 1.0 ppm) 0.50 mg/m^3 (= 0.45 ppm)	

PM10 = particulate matter less than 10 microns in size, ug/m3 = microgram per cubic meter; pphm = parts per hundred million; mg/m3 = milligram per cubic meter; ppm = parts per million; TAC = toxic air contaminant; AHM = Acutely Hazardous Material

3. b), c), and f) Emissions Estimates

Construction Emissions: Construction activities associated with the proposed project would result in emissions of carbon monoxide (CO), particulate matter less than 10 microns in diameter (PM10), volatile organic compounds (VOCs), NOx and sulfur dioxide (SO_x)**.** Construction activities include construction of new foundations, and installation of NO_x control equipment and new ammonia tank. The site is already graded, so no major grading activities are expected.

Construction activities can generate emissions from heavy construction equipment, construction worker vehicles, truck deliveries, and fugitive dust. Daily construction emissions were calculated for the peak construction day activities based on activities at the Refinery. Peak day emissions are the sum of the highest daily emissions from employee vehicles, fugitive dust sources, construction equipment, and transport activities at the Carson Plant for the entire construction period. The peak day is based on the day in which the highest emissions occur for

each pollutant. The criteria pollutant emissions for that peak day were then compared to their respective significance thresholds. Peak construction emissions for the proposed project are summarized in Table 2. Detailed construction emissions calculations for the proposed project are provided in Appendix A.

The proposed project emissions during the construction phase are compared to the SCAQMD CEQA thresholds in Table 2. The peak construction emissions are expected to be less than the SCAQMD CEQA thresholds so that no significant impacts on air quality are expected during the construction phase.

TABLE 2

PEAK CONSTRUCTION EMISSIONS

Activity/Source	Peak Daily Emissions (lbs/day)				
	CO	VOC	NO_X	SO_X	PM10
Construction Equipment	15.8	1.7	9.0	0.8	0.5
Vehicle Emissions	15.0	1.7	4.6	< 0.1	0.1
Fugitive Construction	0.0	0.0	0.0	0.0	71.5
Fugitive Road Dust	0.0	0.0	0.0	0.0	4.3
Total Emissions	**30.8**	**3.4**	**13.6**	**0.8**	**76.4**
SCAQMD Threshold	*550*	*75*	*100*	*150*	*150*
Significant	NO	NO	NO	NO	NO

Notes: "On-Site Other Fugitive PM10" includes fugitive PM10 from storage pile wind erosion.
SCAQMD Threshold = threshold criteria for determining environmental significance of construction activities, as provided in the South Coast Air Quality Management District's 1993 Handbook for Air Quality Analysis.

Operational Emissions

The proposed project involves the installation of air pollution control equipment (i.e., SCR) and will result in a decrease in NO_x emissions from Boiler 10. Based on the most recent emissions, Boiler 10 emits about 101,000 lbs/yr (about 277 lbs/day) of NOx. The NOx emissions from Boiler 10 following installation of the SCR are expected to be about 35,000 lbs/year (96 lbs per day), resulting in a NOx emission reduction of about 181 lbs/day. The ammonia storage tank will be a pressurized tank, so no emissions are expected from the storage tank. The project will involve the transport of aqueous ammonia to the site. A maximum of one truck per day will be required to transport the aqueous ammonia to the site. The estimated emissions from the truck are as follows: (1) 2.6 lbs/day of CO; (2) 0.3 lb/day of VOC; (3) 3.1 lbs/day of NO_x; (4) <0.1 lb/day of SO_x; and (5) 2.1 lbs/day of PM10 (see Appendix A for detailed calculations). Catalyst in the SCR Unit will require replacement once every five to ten years. Only one truck per day would be expected during the infrequent removal and replacement of SCR Unit catalyst. Therefore, a maximum of one truck per day is expected associated with the proposed project (i.e., either ammonia or catalyst).

The estimated increase in emissions are below the SCAQMD thresholds, therefore no significant impacts on air quality are expected during operations. The project emission increases are limited to emissions from a maximum of one truck per day. Further, the proposed project is expected to result in a substantial NOx emission decrease of about 181 lbs/day providing an air quality benefit; therefore, no cumulative air quality impacts are expected. The proposed project is required to comply with ConocoPhillip's Rule 2009.1 Compliance Plan and, therefore, assists the Refinery is complying with applicable air quality rules and regulations. Thus, the proposed project will not diminish an existing air quality rule or future compliance requirement.

Toxic Air Contaminants Impacts

3. d) The proposed project will increase the use of ammonia at the Carson Plant and potentially generate ammonia emissions through ammonia slip in Boiler 10. Ammonia is regulated as a toxic air contaminant under SCAQMD Rule 1401, New Source Review for Toxic Air Contaminants. A Tier 1 screening health risk assessment was prepared for the proposed emissions increase using the SCAQMD Rule 1401 Risk Assessment Procedures (Version 6.0). The ammonia emission estimates were calculated using the SCAQMD default emission factor for ammonia slip [9.1 pounds per million standard cubic feet (lb/mmscf)] times the maximum rated heat capacity of Boiler 10 (352 mmBtu/hr) (see Appendix A). The annual estimated emissions of 23,900 lbs/year were compared to the chronic screening level (51,700 lbs/year). The chronic screening level of 51,700 lbs/year is the highest level of ammonia emissions that can be emitted before triggering a chronic hazard index of 1.0. The estimated ammonia emissions are below the yearly screening level for ammonia; therefore, the chronic hazard index for the proposed project is less than 1.0. Therefore, no significant adverse chronic health impacts are expected due to exposure to ammonia.

A screening health risk assessment was also prepared to evaluate the potential for acute health impacts. The one-hour ammonia emission estimates (2.72 lbs/hour) were compared to the acute screening level for ammonia (8.57 lbs/hour). The acute screening level of 8.57 lbs/hour is the highest level of ammonia emissions that can be emitted before triggering an acute hazard index of 1.0. The estimated hourly ammonia emission rate is below the hourly screening threshold for ammonia; therefore, the acute hazard index for the proposed project is less than 1.0. Therefore, no significant adverse acute health impacts are expected due to exposure to ammonia.

Odors

3. e) The proposed project is not expected to result in an increase in odors. Ammonia can have a strong odor; however, the proposed project is not expected to generate substantial ammonia emissions, since the project will use aqueous ammonia, and the ammonia will be stored in an enclosed pressurized tank. The Refinery maintains a 24-hour environmental surveillance effort, which helps to minimize the frequency and magnitude of odor events. No odors are expected from the new equipment. The use of BACT also reduces the emissions of compounds that could produce odor impacts. Potential odor impacts from the proposed project are not expected to be significant.

3.3 Mitigation Measures

No mitigation measures are required for the proposed project since no significant adverse impacts to air quality are expected.

		Potentially Significant Impact	Less Than Significant Impact	No Impact
4.	**BIOLOGICAL RESOURCES.** Would the project:			
a)	Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☑
b)	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☑
c)	Have a substantial adverse effect on federally protected wetlands as defined by §404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☑
d)	Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☑
e)	Conflicting with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☑
f)	Conflict with the provisions of an adopted Habitat Conservation plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.?	☐	☐	☑

4.1 Significance Criteria

The impacts on biological resources will be considered significant if any of the following criteria apply:

The project results in a loss of plant communities or animal habitat considered to be rare, threatened or endangered by federal, state or local agencies.

The project interferes substantially with the movement of any resident or migratory wildlife species.

The project adversely affects aquatic communities through construction or operation of the project.

4.2 Environmental Setting and Impacts

4. a), b), c), d), e), and f). The proposed project would be located entirely within the existing boundaries of the Carson Plant, which has already been developed, therefore, no conflict with local, regional or state Conservation Plans are expected. The area contains industrial activities and does not support riparian habitat, federally protected wetlands, or migratory corridors. Based on a review of California Natural Diversity Database maps for the project area, there are no sensitive, threatened, or endangered plant or animal species in the immediate vicinity of the Carson Plant. (SCAQMD, 2001).

4.3 Mitigation Measures

No mitigation measures are required since no significant adverse impacts to biological resources are expected.

		Potentially Significant Impact	Less Than Significant Impact	No Impact
5.	**CULTURAL RESOURCES.** Would the project:			
a)	Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☑
b)	Cause a substantial adverse change in the significance of an archaeological resource as defined in §15064.5?	☐	☐	☑

c)	Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☑
d)	Disturb any human remains, including those interred outside a formal cemeteries?	☐	☐	☑

5.1 Significance Criteria

Impacts to cultural resources will be considered significant if:

The project results in the disturbance of a significant prehistoric or historic archaeological site or a property of historic or cultural significance to a community or ethnic or social group.

Unique paleontological resources are present that could be disturbed by construction of the proposed project.

The project would disturb human remains.

5.2 Environmental Setting and Impacts

5. a), b), c), and d) The proposed project will result in minor ground-disturbing activities, but no significant adverse impacts to equipment and structures over 50 years of age, which may be culturally significant, are anticipated to occur. No existing structures at the Carson Plant are considered architecturally or historically significant, as defined under CEQA Guidelines §15064.5, i.e., no structures are eligible for listing in the California Register of Historical Resources or included in a local register of historic resources. The entire Carson Plant site has been previously graded and developed. The larger Carson Plant structures and equipment are supported on existing concrete foundations. The SCR Unit and storage tank will be constructed in the center of the plant and surrounded by operating units (see Figure 3). No adverse impacts to cultural resources are expected since no known cultural resources are located within the Plant where the proposed new units will be constructed.

5.3 Mitigation Measures

The impacts of the proposed project on cultural resources are less than significant so that no mitigation measures are required.

		Potentially Significant Impact	Less Than Significant Impact	No Impact
6.	**ENERGY.** Would the project:			
a)	Conflict with adopted energy conservation plans?	☐	☐	☑
b)	Result in the need for new or substantially altered power or natural gas utility systems?	☐	☐	☑
c)	Create any significant effects on local or regional energy supplies and on requirements for additional energy?	☐	☑	☐
d)	Create any significant effects on peak and base period demands for electricity and other forms of energy?	☐	☑	☐
e)	Comply with existing energy standards?	☐	☐	☑

6.1 Significance Criteria

The impacts to energy and mineral resources will be considered significant if any of the following criteria are met:

The project conflicts with adopted energy conservation plans or standards.

The project results in substantial depletion of existing energy resource supplies.

An increase in demand for utilities impacts the current capacities of the electric and natural gas utilities.

The project uses non-renewable resources in a wasteful and/or inefficient manner.

6.2 Environmental Setting and Impacts

6. a) The proposed project is not expected to conflict with an adopted energy conservation plan because there is no known energy conservation plan that would apply to this proposed project. Further, although there is a slight energy penalty for installing SCR equipment, the proposed project is not expected to substantially increase the Refinery's energy demand.

6. b), c), d), and e). The Carson plant is currently served by Southern California Edison (SCE) for electricity supply. No significant increase in electricity is expected during the two-month construction period because most of the equipment is powered by diesel fuel. The diesel fuel use will be minor during the short construction period. Therefore, no significant impacts on energy are expected during the construction period.

The SCR unit requires a minimal amount of energy to operate. The only equipment requiring additional energy will be a pump to supply liquid ammonia to the SCR, and a vaporization unit to supply ammonia vapor to the SCR unit. These have relatively small motors, and no additional electrical use over existing electrical use at the plant is expected. The electrical requirement can be met with existing electrical supply facilities. SCE supplies the electricity to the facility. SCE supplies more than 101,000 gigawatt hours of electricity a year to their service area. SCE will be able to annually increase its output, and projects over 121,000 megawatts will be available in 2012 (CEC, 2002). Sufficient electrical supplies are available from SCE to handle the electricity use from the proposed project.

The proposed installation of an SCR and ammonia tank is not expected to increase the demand for natural gas or refinery fuel gas at the Carson Plant.

6.3 Mitigation Measures

The impacts of the proposed project on energy resources are less than significant so that no mitigation measures are required.

		Potentially Significant Impact	Less Than Significant Impact	No Impact
7.	**GEOLOGY AND SOILS.** Would the project:			
a)	Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	☐	☐	☑
	• Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?	☐	☐	☑
	• Strong seismic ground shaking?	☐	☑	☐
	• Seismic–related ground failure, including liquefaction?	☐	☑	☐
	• Landslides?	☐	☐	☑
b)	Result in substantial soil erosion or the loss of topsoil?	☐	☑	☐
c)	Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☑

d)	Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☑
e)	Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☑

7.1 Significance Criteria

The impacts on the geological environment will be considered significant if any of the following criteria apply:

Topographic alterations would result in significant changes, disruptions, displacement, excavation, compaction or over covering of large amounts of soil.

Unique geological resources (paleontological resources or unique outcrops) are present that could be disturbed by the construction of the proposed project.

Exposure of people or structures to major geologic hazards such as earthquake surface rupture, ground shaking, liquefaction or landslides.

Secondary seismic effects could occur which could damage facility structures, e.g., liquefaction.

Other geological hazards exist which could adversely affect the facility, e.g., landslides, mudslides.

7.2 Environmental Setting and Impacts

7.a). The City of Carson is located within a seismically active region. The most significant potential geologic hazard at the Carson Plant is estimated to be seismic shaking from future earthquakes generated by active or potentially active faults in the region. Table 3 identifies those faults considered important to the project site in terms of potential for future activity. Seismic records have been available for the last 200 years, with improved instrumental seismic records available for the past 50 years. Based on a review of earthquake data, most of the earthquake epicenters occur along the Whittier-Elsinore, San Andreas, Newport-Inglewood, Malibu-Santa Monica-Raymond Hills, Palos Verdes, Sierra Madre, San Fernando, Elysian Park-Montebello, and Torrance- faults (Jones and Hauksson, 1986). All these faults are elements of the San Andreas Fault system. Past experience indicates that there has not been any substantial damage, structural or otherwise to the Refinery as a result of earthquakes. Table 4 identifies the historic earthquakes over magnitude 4.5 in southern California, between 1915 and the present, along various faults in the region.

TABLE 3

MAJOR ACTIVE OR POTENTIALLY ACTIVE FAULTS IN SOUTHERN CALIFORNIA

FAULT ZONE	FAULT LENGTH (Miles)	MAXIMUM CREDIBLE EARTHQUAKE	MAXIMUM ACCELERATION (G)
Malibu-Santa Monica-Raymond Hill	65	7.5	0.49
Newport-Inglewood	25	7.0	0.42
Northridge	12	6.7	0.16
Palos Verdes	20	7.0	0.24
San Andreas	200+	8.25	0.21
San Jacinto	112	7.5	0.11
San Fernando	8	6.8	0.17
Sierra Madre	55	7.3	0.23
Whittier-Elsinore	140	7.1	0.46
Elysian Park – Montebello	15	7.1	0.27

Notes: G = acceleration of gravity.

TABLE 4

SIGNIFICANT HISTORICAL EARTHQUAKES IN SOUTHERN CALIFORNIA

DATE	LOCATION (epicenter)	MAGNITUDE
1915	Imperial Valley	6.3
1925	Santa Barbara	6.3
1920	Inglewood	4.9
1933	Long Beach	6.3
1940	El Centro	6.7
1940	Santa Monica	4.7
1941	Gardena	4.9
1941	Torrance	5.4
1947	Mojave Desert	6.2
1951	Imperial Valley	5.6
1968	Borrego Mountain	6.5
1971	Sylmar	6.4
1975	Mojave Desert	5.2
1979	Imperial Valley	6.6
1987	Whittier	5.9
1992	Joshua Tree	6.3
1992	Landers	7.4
1992	Big Bear	6.5
1994	Northridge	6.7
1999	Hector Mine	7.1

Sources: Bolt (1988), Jennings (1985), Gere and Shah (1984), Source Fault Hazard Zones in California (1988), Yanev (1974), and personnel communication with the California Division of Mines and Geology.

Whittier-Elsinore Fault Zone: The Whittier-Elsinore Fault is located about 7.5 miles northeast of the site. The Whittier fault is one of the more prominent structural features in the Los Angeles Basin. It extends from Turnbull Canyon near Whittier, southeast to the Santa Ana River, where it merges with the Elsinore fault. Yerkes (1972) indicated that vertical separation on the fault in the upper Miocene strata increases from approximately 2,000 feet at the Santa Ana River northwestward to approximately 14,000 feet in the Brea-Olinda oil field. Farther to the northwest, the vertical separation decreases to approximately 3,000 feet in the Whittier Narrows of the San Gabriel River.

The fault also has a major right-lateral strike slip component. Yerkes (1972) indicates streams along the fault have been deflected in a right-lateral sense from 4,000 to 5,000 feet. The fault is capable of producing a maximum credible earthquake event of about magnitude 7.0 every 500 to 700 years.

San Andreas Fault Zone: The San Andreas fault is located on the north side of the San Gabriel Mountains trending east-southeast as it passes the Los Angeles Basin. This fault is recognized as the longest and most active fault in California. It is generally characterized as a right-lateral strike-slip fault which is comprised of numerous sub-parallel faults in a zone over two miles wide. There is a high probability that southern California will experience a magnitude 7.0 or greater earthquake along the San Andreas or San Jacinto fault zones, which could generate strong ground motion in the project area. There is a five to twelve percent probability of such an event occurring in southern California during any one of the next five years and a cumulative 47 percent chance of such an event occurring over a five year period (Reich, 1992).

The Newport-Inglewood Fault Zone: The Newport-Inglewood fault is a major tectonic structure within the Los Angeles Basin. This fault is best described as a structural zone comprising a series of echelon and sub-parallel fault segments and folds. The faults of the Newport-Inglewood uplift in some cases exert considerable barrier influence upon the movement of subsurface water (DWR, 1961). Offsetting of sediments along this fault usually is greater in deeper, older formations. Sediment displacement is less in younger formations. The Alquist-Priolo Act has designated this fault as an earthquake fault zone. The purpose of designating this area as an earthquake fault zone is to mitigate the hazards of fault rupture by prohibiting building structures across the trace of the fault. This fault poses a seismic hazard to the Los Angeles area (Toppozada, et al., 1988, 1989), although no surface faulting has been associated with earthquakes along this structural zone during the past 200 years. Since this fault is located within the Los Angeles Metropolitan area, a major earthquake along this fault would produce more destruction than a magnitude 8.0 on the San Andreas fault. The largest instrumentally recorded event was the 1933 Long Beach earthquake, which occurred on the offshore portion of the Newport-Inglewood structural zone with a magnitude of 6.3. A maximum credible earthquake of magnitude 7.0 has been assigned to this fault zone (Yerkes, 1985).

Malibu-Santa Monica-Raymond Hills Fault Zone: The Raymond Hills fault is part of the fault system that extends from the base of the San Gabriel Mountains westward to beyond the Malibu coast line. The fault has been relatively quiet, with no recorded seismic events in historic time; however, recent studies have found evidence of ground rupture within the last 11,000 years (Triad, 1995).

The Palos Verdes Fault Zone: The Palos Verdes fault extends for about 50 miles from the Redondo submarine canyon in Santa Monica Bay to south of Lausen Knoll and is responsible for the uplift of the Palos Verdes Peninsula. This fault is both a right-lateral strike-slip and reverse separation fault. The Gaffey anticline and syncline are reported to extend along the northwestern portion of the Palos Verdes hills. These folds plunge southeast and extend beneath recent alluvium east of the hills and into the San Pedro Harbor, where they may affect movement of ground water (DWR, 1961). The probability of a moderate or major earthquake along the Palos Verdes fault is low compared to movements on either the Newport-Inglewood or San Andreas faults (Los Angeles Harbor Department, 1980). However, this fault is capable of producing strong to intense ground motion and ground surface rupture. This fault zone has not been placed by the California State Mining and Geology Board into an Alquist-Priolo special studies zone.

Sierra Madre Fault System: The Sierra Madre fault system extends for approximately 60 miles along the northern edge of the densely populated San Fernando and San Gabriel valleys (Dolan, et al., 1995) and includes all faults that have participated in the Quaternary uplift of the San Gabriel Mountains. The fault system is complex and appears to be broken into five or six segments each 10 to 15 miles in length (Ehlig, 1975). The fault system is divided into three major faults by Dolan, et al. (1995), including the Sierra Madre, the Cucamonga and the Clamshell-Sawpit faults. The Sierra Madre fault is further divided into three minor fault segments the Azusa, the Altadena and the San Fernando fault segments. The Sierra Madre fault is capable of producing a 7.3 magnitude fault every 805 years (Dolan, et al., 1995).

San Fernando Fault: The westernmost segment of the Sierra Madre fault system is the San Fernando segment. This segment extends for approximately 12 miles beginning at Big Tujunga Canyon on the east to the joint between the San Gabriel Mountains and the Santa Susana Mountains on the west (Ehlig, 1975). The 1971 Sylmar earthquake occurred along this segment of the Sierra Madre fault system, resulting in a 6.4 magnitude fault. Dolan, et al. (1995) indicates the San Fernando fault segment is capable of producing a 6.8 magnitude fault every 455 years.

Elysian Park-Montebello System: The Elysian Park fault is a blind thrust fault system, i.e., not exposed at the surface, whose existence has been inferred from seismic and geological studies. The system as defined by Dolan, et al. (1995) comprises two distinct thrust fault systems; 1) an east-west-trending thrust ramp located beneath the Santa Monica Mountains; and 2) a west-northwest-trending system that extends from Elysian Park Hills through downtown Los Angeles and southeastward beneath the Puente Hills. The Elysian Park thrust is capable of producing a magnitude 7.1 earthquake every 1,475 years.

Torrance-Fault Zone: The Torrance- fault has been reported to be a potentially destructive, deeply buried fault, which underlies the Los Angeles Basin. Kerr (1988) has reported this fault as a low-angle reverse or thrust fault. This proposed fault could be interacting with the Palos Verdes hills at depth. Little is known about this fault, and its existence is inferred from the study of deep earthquakes. Although information is still too preliminary to be able to quantify the specific characteristics of this fault system, this fault appears to be responsible for many of the small to moderate earthquakes within Santa Monica Bay and easterly into the Los Angeles area.

This fault itself should not cause surface rupture, only ground shaking in the event of an earthquake.

In addition to the known surface faults, shallow-dipping concealed "blind" thrust faults have been postulated to underlie portions of the Los Angeles Basin. Because there exist few data to define the potential extent of rupture planes associated with these concealed thrust faults, the maximum earthquake that they might generate is largely unknown.

No faults or fault-related features are known to exist at the project site. The site is not located in any Alquist-Priolo Earthquake fault zone and is not expected to be subject to significant surface fault displacement. Therefore, no significant impacts to the proposed project facilities are expected from seismically-induced ground rupture.

Based on the historical record, it is highly probable that earthquakes will affect the Los Angeles region in the future. Research shows that damaging earthquakes will occur on or near recognized faults which show evidence of recent geologic activity. The proximity of major faults to the Carson Plant increases the probability that an earthquake may impact the Carson Plant. There is the potential for damage in the event of an earthquake. Impacts of an earthquake could include structural failure, spill, etc. The hazards of a release during an earthquake are addressed in the "8. Hazards and Hazardous Materials" section below.

New structures must be designed to comply with the Uniform Building Code Zone 4 requirements since the proposed project is located in a seismically active area. The City of Carson is responsible for assuring that the proposed project complies with the Uniform Building Code as part of the issuance of the building permits and can conduct inspections to ensure compliance. The Uniform Building Code is considered to be a standard safeguard against major structural failures and loss of life. The goal of the code is to provide structures that will: (1) resist minor earthquakes without damage; (2) resist moderate earthquakes without structural damage, but with some non-structural damage; and (3) resist major earthquakes without collapse, but with some structural and non-structural damage. The Uniform Building Code bases seismic design on minimum lateral seismic forces ("ground shaking"). The Uniform Building Code requirements operate on the principle that providing appropriate foundations, among other aspects, helps to protect buildings from failure during earthquakes. The basic formulas used for the Uniform Building Code seismic design require determination of the seismic zone and site coefficient, which represent the foundation conditions at the site.

The Carson Plant will be required to obtain building permits, as applicable, for all new structures at the site. The Carson Plant shall submit building plans to the City of Carson for review. The Carson Plant must receive approval of all building plans and building permits to assure compliance with the latest Building Code adopted by the City prior to commencing construction activities. The issuance of building permits from the local agency will assure compliance with the Uniform Building Code requirements which include requirements for building within seismic hazard zones. No significant impacts from seismic hazards are expected since the project will be required to comply with the Uniform Building Codes.

7. b) Topography and Soils

The proposed project is located within the confines of the existing Carson Plant. Concrete pavement presently supports several of the refinery structures and equipment. Most of the Carson Plant roads, including all high traffic roads have been paved. Some portions of the site have also been landscaped. The site is relatively flat. No unstable earth conditions, changes in topography or changes in geologic substructures are anticipated to occur with the project because of the limited grading and excavation involved. No significant impacts on topography and soils are expected.

The proposed project involves the addition of new air pollution control equipment to existing facilities, so no major grading/trenching is expected to be required, and should be limited to minor foundation work, and minor trenching for piping. Since the proposed project will occur within already developed facilities, no significant impacts related to soil erosion are expected. No significant change in topography is expected because little grading/trenching is required that could substantially increase wind erosion or runoff from affected sites.

The proposed project will be required to comply with SCAQMD Rule 403 – Fugitive Dust, which imposes requirements to minimize dust emissions associated with wind erosion. Relative to operation, no change in surface runoff is expected because surface conditions will remain relatively unchanged. Further, surface runoff is minimized because surface runoff at all facilities is typically captured, treated, and released to the public sewerage system or storm drain system.

7. c) and d) Liquefaction.

Liquefaction would most likely occur in unconsolidated granular sediments that are water saturated less than 30 feet below ground surface (Tinsley et al., 1985). Based on the latest seismic hazards maps developed under the Seismic Hazards Mapping Act, small portions of the Carson Plant are located in an area of historic, or have the potential for, liquefaction (California Division of Mines and Geology, Map of Seismic Hazard Zones, Long Beach Quadrangle). A small section of the southwest portion of the Carson Plant has conditions conducive to liquifaction. The new SCR unit will not be located in the area identified for potential liquifaction. There is no evidence of expansive soils at the site. The issuance of building permits from the local agency will assure compliance with the Uniform Building Code requirements, which include requirements for building within potential liquefaction zones. No significant impacts from liquefaction are expected since the project will be required to comply with the Uniform Building Codes.

7. e) Waste Discharge The proposed project is expected to generate a minimal amount of additional wastewater discharged by the Carson Plant. The Carson Plant discharges wastewater to the local sewer system under an Industrial Wastewater Discharge Permit. The Carson Plant, or the proposed project, will not use septic tanks or alternative wastewater disposal systems, therefore, no significant impacts on soils from alternative wastewater disposal systems are expected

Mitigation Measures

No mitigation measures are required for the construction/operation of the project since no significant adverse impacts to geology or soils are expected.

		Potentially Significant Impact	Less Than Significant Impact	No Impact
8.	**HAZARDS AND HAZARDOUS MATERIALS.** Would the project:			
a)	Create a significant hazard to the public or the environment through the routine transport, use, disposal of hazardous materials?	☐	☑	☐
b)	Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☑	☐
c)	Emit hazardous emissions, or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☑
d)	Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5 and, as a result, would create a significant hazard to the public or the environment?	☐	☐	☑
e)	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☑
f)	For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☑

g)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☑
h)	Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☑
i)	Significantly increased fire hazard in areas with flammable materials?	☐	☐	☑

8.1 Significance Criteria

The impacts associated with hazards will be considered significant if any of the following occur:

Non-compliance with any applicable design code or regulation.

Non-conformance to National Fire Protection Association standards.

Non-conformance to regulations or generally accepted industry practices related to operating policy and procedures concerning the design, construction, security, leak detection, spill containment or fire protection.

Exposure to hazardous chemicals in concentrations equal to or greater than the Emergency Response Planning Guideline (ERPG) 2 levels.

8. a), and b) Potential Hazards

The ConocoPhillips Carson Plant uses a number of hazardous materials at the site to manufacture petroleum products. The major types of public safety risks consist of impacts from toxic substance releases, fires, and explosions. Toxic substances handled by the Carson Plant include hydrogen sulfide, ammonia, regulated flammables like propane and butane, and petroleum products like gasoline, fuel oils, and diesel. Shipping, handling, storing, and disposing of hazardous materials inherently poses a certain risk of a release to the environment.

Exposure to a toxic gas cloud is the potential hazard associated with the proposed project. Toxic gas clouds are releases of volatile chemicals (e.g., ammonia, chlorine, and hydrogen sulfide) that could form a cloud and migrate off-site, thus exposing individuals. "Worst-case" conditions tend to arise when very low wind speeds coincide with accidental release, which can allow the chemicals to accumulate rather than disperse.

The proposed SCR system requires ammonia to react with NOx emissions in the exhaust gases to reduce the NOx emissions. Therefore, the proposed project will result in the transport, storage

and handling of aqueous ammonia (19 percent ammonia). Along with the use and handling of aqueous ammonia come the hazards associated with its use. The hazards associated with the use of aqueous ammonia are reduced through design, operations, maintenance, regulatory, and administrative controls. Design standards are developed through industry groups, various independent institutes, and government agencies. Operational controls include automatic devices to control and monitor process variables and documented procedures for manual operations. Routine preventative maintenance and inspections of critical equipment help to prevent unscheduled process shutdowns and potential equipment failures. Administrative controls include operator training, documentation of equipment inspection and maintenance history, and procurement prequalification controls over contractors and vendors.

ConocoPhillips adheres to and will continue to adhere to the following safety design and process standards in the operations of the equipment for the existing facility:

- The California Code of Regulations, Title 8 – contains minimum requirements for equipment design.

- Industry Standards and Practices – codes for design of various equipment, including the American National Standards Institute (ANSI), American Society of Mechanical Engineers (ASME), and National Fire Protection Association (NFPA).

The standards noted above and other applicable design standards will govern the design of mechanical equipment such as pressure vessels, tanks, pumps, piping, and compressors. No further analysis of these standards is needed in this project hazard analysis. Adherence to codes will be verified by the City's building inspector before the proposed project's new or modified facilities and equipment become operational.

The proposed project includes the addition of one 10,000-gallon pressurized storage tank to service the new SCR unit. The aqueous ammonia at a concentration of 19 percent would be delivered to the facility and stored on-site. Nineteen percent ammonia is being used to reduce the inherent risk of handling ammonia. Use and transport of anhydrous ammonia involves greater risk than aqueous ammonia because it is stored and transported under pressure. In the event of a leak or rupture of a tank, anhydrous ammonia is released and vaporizes into the gaseous form, which is its normal state at atmospheric pressure and produces a toxic cloud. Aqueous ammonia is a liquid at ambient temperatures and gas is only produced when a liquid pool from a spill evaporates.

Aqueous ammonia at concentrations less than 20 percent is not considered a toxic substance under federal RMP requirements. However, under current California Office of Emergency Services regulations implementing the CalARP requirements, there is no threshold concentration of aqueous ammonia for exclusion from the program (California Health and Safety Code Section 2770.1)

Hazard Analysis

The onsite storage and handling of the ammonia creates the possibility of an accidental spill and release of aqueous ammonia, which would evaporate and present a potential offsite public exposure. To further evaluate the potential for significant adverse environmental impacts due to an accidental release of aqueous ammonia, various scenarios were evaluated that could occur during the onsite storage, transportation, and transfer of ammonia. These scenarios and their consequences are discussed in detail below.

Transportation Release Scenario

ConocoPhillips will receive ammonia from a local ammonia supplier located in the greater Los Angeles area. Deliveries of aqueous ammonia would be made to the facility by tanker truck via public roads. The maximum capacity of a tanker truck is 6,000 gallons. Based on the onsite storage capacity and consumption of ammonia, delivery frequency from the supplier to the facility would be six trucks per month (about 72 trucks per year). Regulations for the transport of hazardous materials by public highway are described in 49 Code of Federal Regulations 173 and 177.

Although trucking of aqueous ammonia and other hazardous materials is regulated for safety by the U.S. Department of Transportation, there is a possibility that a tanker truck could be involved in an accident spilling its contents. The factors that enter into accident statistics include distance traveled and type of vehicle or transportation system. Factors affecting automobiles and truck transportation accidents include the type of roadway, presence of road hazards, vehicle type, maintenance and physical condition, and driver training. A common reference frequently used in measuring risk of an accident is the number of accidents per million miles traveled. Complicating the assessment of risk is the fact that some accidents can cause significant damage without injury or fatality.

Every time hazardous materials are moved from the site of generation, opportunities are provided for accidental (unintentional) release. A study conducted by the U.S. EPA indicates that the expected number of hazardous materials spills per mile shipped ranges from one in 100 million to one in one million, depending on the type of road and transport vehicle used. The U.S. EPA analyzed accident and traffic volume data from New Jersey, California, and Texas, using the Resource Conservation and Recovery Act Risk/Cost Analysis Model and calculated the accident involvement rates presented in Table 5. This information was summarized from the Los Angeles County Hazardous Waste Management Plan (Los Angeles County, 1988).

In the study completed by the U.S. EPA, cylinders, cans, glass, plastic, fiber boxes, tanks, metal drum/parts, and open metal containers were identified as usual container types. For each container type, the expected fractional release en route was calculated. The study concluded that the release rate for tank trucks is much lower than for any other container type (Los Angeles County, 1988).

TABLE 5

TRUCK ACCIDENT RATES FOR CARGO ON HIGHWAYS

Highway Type	Accidents Per 1,000,000 miles
Interstate	0.13
U.S. and State Highways	0.45
Urban Roadways	0.73
Composite*	0.28

Source: U.S. Environmental Protection Agency, 1984.
* Average number for transport on interstates, highways, and urban roadways.

The accident rates developed based on transportation in California were used to predict the accident rate associated with trucks transporting aqueous ammonia to the facility. Assuming an average truck accident rate of 0.28 accidents per million miles traveled (Los Angeles County, 1988), the estimated accident rate associated with transporting aqueous ammonia for this project is 0.00101, or about one accident every 992 years.

The actual occurrence of an accidental release of a hazardous material cannot be predicted. The location of an accident or whether sensitive populations would be present in the immediate vicinity also cannot be identified. In general, the shortest and most direct route that takes the least amount of time would have the least risk of an accident. Hazardous material transporters do not routinely avoid populated areas along their routes, although they generally use approved truck routes that take population densities and sensitive populations into account.

The hazards associated with the transport of regulated (CCR Title 19, Division 2, Chapter 4.5 or the CalARP requirements) hazardous materials, including aqueous ammonia, would include the potential exposure of numerous individuals in the event of an accident that would lead to a spill. The major route for aqueous ammonia to reach the facility is from the 405 freeway to Alameda Boulevard to Sepulveda Boulevard which would generally avoid sensitive receptors. Factors such as amount transported, wind speed, ambient temperatures, route traveled, distance to sensitive receptors are considered when determining the consequence of a hazardous material spill.

In the unlikely event that the tanker truck would rupture and release the entire 6,000 gallons of aqueous ammonia, the ammonia solution would have to pool and spread out over a flat surface in order to create sufficient evaporation to produce a significant vapor cloud. For a road accident, the roads are usually graded and channeled to prevent water accumulation and a spill would be channeled to a low spot or drainage system, which would limit the surface area of the spill and the subsequent toxic emissions. Additionally, the roadside surfaces may not be paved and may absorb some of the spill. Without this pooling effect on an impervious surface, the spilled ammonia would not evaporate into a toxic cloud and impact residences or other sensitive receptors in the area of the spill.

Based on the improbability of an ammonia tanker truck accident with a major release, its potential severity if it did occur, the conclusion of this analysis is that potential impacts due to accidental release of ammonia during transportation are less than significant.

Ammonia Tank Rupture Scenario

Under this ammonia storage tank release scenario, impacts were calculated for an accidental release of 19 percent aqueous ammonia into a containment dike (see Appendix B for hazard analysis). A series of release and dispersion calculations were completed to quantify the dispersion of ammonia gas evolving from a pool of aqueous ammonia following a release from a storage tank on the premises of the ConocoPhillips Carson Plant. The dispersion calculations were performed until specific ammonia concentrations were reached in the downwind direction. Two ammonia concentrations were chosen for evaluation:

ERPG-2 (200 ppm): The maximum airborne concentration below which it is believed nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair their ability to take protective action.

ERPG –3 (1,000 ppm): The maximum airborne concentration below which it is believed nearly all individuals could be exposed for up to one hour without experiencing or developing life-threatening health effects.

The hazard zones resulting from liquid releases into the storage containment area were evaluated to determine the extent and location of the gas cloud containing ammonia. Note that the storage containment area is also referred to in Appendix B as the bund. Details on the accidental release modeling assumptions are included in Appendix B. The dispersion analysis was completed for a range of impoundment sizes ranging from 100 to 1,000 feet. The following conclusions were drawn from this analysis:

1. Under worst-case atmospheric conditions (e.g., low winds and stable air), the lowest ammonia concentration of interest (ERPG-2 level of 200 ppm), does not reach the closest property line. The liquid impounding area would have to be much larger than 1,000 square feet (ft^2) to exceed the ERPG-2 level.

2. Under all other atmospheric conditions (e.g., high winds, less stable atmospheres), the distances to the 200 ppm ammonia concentration level would be shorter.

3. Under no condition does the 1,000 ppm ammonia concentration level extend further than 45 feet from the tank. This distance is always well within the Carson Plant property boundaries.

Based on the above, as long as the containment area is no larger than 1,000 ft^2 a release of ammonia from the tank would remain within about 45 feet from the tank, which is well within the boundaries of the Carson Plant (see Figure 2). ConocoPhillips is proposing a concrete spill containment of 18 feet by 18 feet, for a total of 324 square feet. Therefore, the containment area

is less than 1,000 ft^2 and a release from the ammonia tank is not expected to result in a significant adverse hazard impact.

The modeling analysis completed above for the ammonia tank release would also apply to a release of ammonia when the tank truck is unloaded and transferred to the storage tank. Containment facilities are provided at the truck loading rack to contain ammonia in the event of a spill during transfer activities. The ammonia concentration will be less than the ERPG 2 level of 200 ppm at the facility boundaries, as long as the containment area is limited to 1,000 ft^2.

8. c) No existing or proposed schools are located within one-quarter mile of the existing Refinery, so that no significant adverse impacts are expected to a school.

Other Hazard Issues

8. d) The proposed project is not located on a site which is included on the list of hazardous materials sites compiled pursuant to Government Code Section 65962.5; therefore, no significant hazards related to hazardous materials at the site on the environment or to the public are expected.

8. e) and f) The proposed project site is not within an airport land use plan or within about five miles of a public or private airport. Therefore, no safety hazards are expected from the proposed project on any airports in the region.

8. g) The proposed project is not expected to interfere with an emergency response plan or emergency evacuation plan. The proposed project will result in modifications to the existing Carson Plant. All construction activities will occur within the confines of the existing Carson Plant so that no emergency response plans should be impacted. ConocoPhillips has implemented emergency response plans at its facility, but no modifications to the plans are expected as a result of the proposed project. The proposed project is not expected to alter the route that employees would take to evacuate the site, as the evacuation routes generally directs employees outside of the main operating portions of the Carson Plant. The proposed project is not expected to impact any emergency response plans.

8. h) and i) The proposed project will not increase the existing risk of fire hazards in areas with flammable brush, grass, or trees. The Refinery will continue to use and produce flammable materials. The proposed project will not increase the use of flammable materials at the site No substantial or native vegetation exists within the operational portions of the Refinery. Therefore, no significant increase in fire hazards is expected at the Refinery associated with the proposed project.

8.3 Mitigation Measures

No mitigation is required since no significant adverse hazard impacts have been identified.

A variety of safety laws and regulations have been in existence for many years to reduce the risk of accidental releases of chemicals at industrial facilities. The Occupational Safety and Health Administration (OSHA) passed the Process Safety Management of Highly Hazardous Chemicals

rule in 1992 (29 CFR 910.119). This rule was designed to address the prevention of catastrophic accidents at facilities handling hazardous substances, in excess of specific threshold amounts, through implementation of Process Safety Management (PSM) systems for protection of workers. A major PSM requirement is the performance of process hazard analyses to identify potential process deviations and implement of improve safeguards to prevent accidents.

A federal EPA Risk Management Program (RMP) and a more stringent state RMP, the California Accidental Release Program (CalARP), were developed for the Carson Plant and submitted to appropriate agencies in 1999. The RMP's contain hazard assessments of both worst-case and more credible accidental release scenarios, an accident prevention program, and an emergency response program. The Los Angeles County Fire Department administers the RMP for the Carson Plant. In addition, operators of the Carson Plant have prepared an emergency response manual, which describes the emergency response procedures that would be followed in the event of any of several release scenarios along with the responsibilities of key personnel.

The Carson Plant adheres to the following safety design and process standards:

- The California Health and Safety Code Fire Protection specifications.
- The design standards for petroleum refinery equipment established by American Petroleum Institute, American Society of Mechanical Engineers, the American Institute of Chemical Engineers, the American National Standards Institute, and the American Society of Testing and Materials.
- The applicable Cal-OSHA requirements.
- The Carson Plant maintains its own emergency response capabilities, including onsite equipment and trained emergency response personnel who are available to respond to emergencies anywhere within the Carson Plant.

		Potentially Significant Impact	Less Than Significant Impact	No Impact
9.	**HYDROLOGY AND WATER QUALITY.** Would the project:			
a)	Violate any water quality standards or waste discharge requirements?	☐	☐	☑

b)	Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g. the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☑
c)	Substantially alter the existing drainage pattern of the site or area, including through alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on- or off-site?	☐	☐	☑
d)	Substantially alter the existing drainage pattern of the site or area, including through alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site?	☐	☑	☐
e)	Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☑	☐
f)	Otherwise substantially degrade water quality?	☐	☐	☑
g)	Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☑
h)	Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☑
i)	Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☑
j)	Inundation by seiche, tsunami, or mudflow?	☐	☐	☑

k)	Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☑
l)	Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☑
m)	Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☑
n)	Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☑
o)	Require in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☑

9.1 Significance Criteria

Potential impacts on water resources will be considered significant if any of the following criteria apply:

Water Quality:

The project will cause degradation or depletion of ground water resources substantially affecting current or future uses.

The project will cause the degradation of surface water substantially affecting current or future uses.

The project will result in a violation of National Pollutant Discharge Elimination System (NPDES) permit requirements.

The capacities of existing or proposed wastewater treatment facilities and the sanitary sewer system are not sufficient to meet the needs of the project.

The project results in substantial increases in the area of impervious surfaces, such that interference with groundwater recharge efforts occurs.

The project results in alterations to the course or flow of floodwaters.

Water Demand:

The existing water supply does not have the capacity to meet the increased demands of the project, or the project would use a substantial amount of potable water.

The project increases demand for water by more than five million gallons per day.

9.2 Environmental Setting and Impacts

9. a), f), k), l) and o) Wastewater Generation.

The Carson Plant currently generates process wastewater, high salts water, treated sour water, and storm water. Wastewater is treated in the wastewater treatment system, which includes American Petroleum Institute (API) separators to remove oil and dissolved air floatation units for additional removal of oil and particulates. The treated process wastewater, high salts water and treated sour water are discharged to the Los Angeles County Sanitation Districts (LACSD) in accordance with the LACSD industrial wastewater permit discharge limits. The treated storm water and treated high salts water are discharged to the Dominguez Channel in accordance with a National Pollutant Discharge Elimination System (NPDES) permit discharge limits.

The SCR unit does not use water as part of the NO_x control process. Except for water used periodically to clean equipment, the proposed project will not result in an increase in wastewater generated or discharged from the Carson Plant. As a result, no significant adverse impacts associated with wastewater discharges are expected.

9. b) and n) Water Demand

Water is primarily provided by an onsite water well. Supplemental water is supplied to the Carson Plant by the Dominguez Water Corporation, who primarily receives water from the Metropolitan Water District and its own wells. As already noted, the SCR unit does not use water as part of the NO_x control process. Therefore, no increase in water use is associated with the proposed project so that no significant adverse impacts on water demand are expected.

A portion of the water used at the ConocoPhillips Carson Plant is supplied by onsite water wells; however, no increase in water demand is expected. Therefore, the proposed project is not expected to result in additional demand for ground water supplies. Consequently, no significant adverse impacts from the proposed project are anticipated for ground water supplies.

9. c), d), e) and m) Surface Water.

Most of the storm water runoff from the Carson Plant is collected in a drainage system, treated, as necessary, and discharged to the Dominguez Channel under the conditions of the existing NPDES permit.

The proposed project is not expected to increase the stormwater runoff from the Carson Plant. The Carson Plant modifications will occur within the existing refinery units and a negligible increase in paved areas is expected. The Stormwater Pollution Prevention Plan will be updated, as necessary, to reflect operational modifications and include additional Best Management Practices, if required. No new storm drainage facilities or expansion of existing storm facilities are expected to be required. Since stormwater discharge or runoff is not expected to change in either volume or water quality, no significant stormwater quality impacts are expected to result from the operation of the proposed project.

9. g), h), i) and j) Flood Hazards

Based on the topography and/or site elevations in relation to the ocean, the proposed project is not expected to result in an increased risk of flood, seiche, tsunami or mud flow hazards. The proposed project would not locate housing within a 100-year flood hazard area. The Carson Plant is not located within a 100-year flood hazard zone so no new equipment would be located within a 100-year flood hazard zone. Therefore, no significant impacts associated with flooding are expected.

9.3 Mitigation Measures

No significant adverse impacts to water quality and supply are expected as a result of the activities associated with the proposed project. Therefore, no mitigation measures are required.

		Potentially Significant Impact	Less Than Significant Impact	No Impact
10.	**LAND USE AND PLANNING.** Would the project:			
a)	Physically divide an established community?	☐	☐	☑
b)	Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☑

c)	Conflict with any applicable habitat conservation or natural community conservation plan?	☐	☐	☑

10.1 Significance Criteria

Land use and planning impacts will be considered significant if the project conflicts with the land use and zoning designations established by the City of Carson.

10.2 Environmental Setting and Impacts

10. a), b), and c) The proposed modifications to the Carson Plant will be developed entirely within the existing Carson Plant property boundaries. Land use on the Carson Plant property is designated as M3, which is heavy industrial zoning. The proposed project is consistent with the land use designation of heavy industry and manufacturing.

No new property will be acquired for the Carson Plant and there will be no impacts to established communities. Additionally, the proposed project is not expected to conflict with local habitat conservation plans, or natural community conservation plans, as the proposed project site is a previously developed industrial facility. The proposed project will not trigger changes in the current zoning designations at the project site. Based on these considerations, no significant adverse impacts to established residential or natural communities are expected.

The proposed project includes construction at an existing industrial facility. The activities and products produced at the facility for the proposed project are the same as existing activities and products produced. No new land would be required for the project, and no zoning and/or land use changes are required as part of the project.

Land use at the Carson Plant, and in the surrounding vicinity is consistent with the City of Carson General Plan land use designations. Therefore, no significant adverse impacts on land use are expected.

10.3 Mitigation Measures

No significant adverse impacts to land use are expected to occur as a result of construction or operation of the proposed project. Therefore, no mitigation is necessary or proposed.

		Potentially Significant Impact	Less Than Significant Impact	No Impact
11.	**MINERAL RESOURCES.** Would the project:			
a)	Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☑
b)	Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☑

11.1 Significance Criteria

Project-related impacts on mineral resources will be considered significant if any of the following conditions are met:

> The project would result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state.
>
> The proposed project results in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan.

11.2 Environmental Setting and Impacts

11. a) As the proposed project will be limited to modifications within the confines of the existing Carson Plant boundaries, no loss of availability of known mineral resource that would be of value to the region or the residents of the state is expected. No mineral extraction is anticipated to occur during the construction phase of the project.

11. b) The proposed project is not expected to result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan.

11.3 Mitigation Measures

No significant adverse impacts to mineral resources are expected to occur as a result of the proposed project so no mitigation measures are required.

	Significant Impact	Significant Impact	
12. NOISE. Would the project result in:			
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☑	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☑	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☑	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☑	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☑
f) For a project within the vicinity of a private airship, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☑

12.1 Significance Criteria

Impacts on noise will be considered significant if:

> Construction noise levels exceed the City of Carson's noise ordinance or, if the noise threshold is currently exceeded, project noise sources increase ambient noise levels by more than three decibels (dBA) at the site boundary. Construction noise levels will be considered significant if they exceed federal Occupational Safety and Health Administration (OSHA) noise standards for workers.

The proposed project operational noise levels exceed any of the local noise ordinances at the site boundary or, if the noise threshold is currently exceeded, project noise sources increase ambient noise levels by more than three dBA at the site boundary.

12.2 Environmental Setting and Impacts

12. a), b) c) and d) The Carson Plant is surrounded by other industrial land uses. Property to the north of the Carson Plant is occupied by the British Petroleum (former ARCO) Los Angeles Refinery. The western boundary of the plant borders vacant property, the northerly portion of which was a former tank farm; farther south is Wilmington Boulevard property. 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 Shell (formerly Equilon/Texaco) Refinery.

Construction activity for the proposed project will produce noise as a result of operation of construction equipment. The equipment necessary for construction will comply with ConocoPhillips SP-100-1 Noise Limits for Equipment and Piping which generally limits continuous noise levels to 85 dBA (decibels). Typical sound levels for typical construction equipment are presented in Table 6. The construction equipment associated with the proposed project will be minimal. The construction equipment at the Carson Plant will include an air compressor, backhoe, plate compactor, dump truck and forklifts. The estimated noise level during equipment installation is expected to be an average of about 80 dBA at 50 feet from the center of construction activity. The SCR unit is located near the center portion of the Plant, about 1,000 feet from the property boundaries. The aqueous ammonia tank is located about 1,300 feet from the property boundaries. Using an estimated six dBA reduction for every doubling distance, the noise levels at the property boundaries is estimated to be 55 dBA. Most of the construction noise sources will be located near ground level, so the noise levels are expected to attenuate further than analyzed herein. Noise attenuation due to existing structures and equipment has not been included in the analysis. The closest resident is about 1,800 feet west of the Carson Plant. Noise levels at the residential area are expected to be about 49 dBA, which is below ambient noise levels.

The construction activities that generate noise will be carried out during daytime from Monday to Friday, or as permitted by the local cities or county. Because of the nature of the construction activities, the types, number, operation time and loudness of construction equipment will vary throughout the construction period. As a result, the sound level associated with construction will change as construction progresses. Construction noise sources will be temporary and will cease following construction activities. Noise levels at the closest residential area are not expected to increase during construction activities, i.e., background noise levels in residential areas generally are in the range of 55-65 dBA. The noise levels from the construction equipment are expected to be within the allowable noise levels established by the local noise ordinance for industrial areas which are about 70 dBA. Noise impacts associated with the proposed project construction activities are expected to be less than significant.

TABLE 6

CONSTRUCTION NOISE SOURCES

EQUIPMENT	TYPICAL RANGE (decibels)(1)	ANALYSIS VALUE (decibels)(2)
Truck	82-92	82
Air compressor	85-91	85
Flatbed Truck	84-87	85
Pickup	70-85	70
Tractor Trailer	75-92	85
Cranes	85-90	85
Pumps	68-72	70
Welding Machines	72-77	72

1. Data are modified from U.S. Environmental Protection Agency NTID 300.1, 1972, and City of Long Beach, 1975. Levels are in dBA at 50-foot reference distance. These values are based on a range of equipment and operating conditions.
2. Analysis values are intended to reflect noise levels from equipment in good conditions, with appropriate mufflers, air intake silencers, etc. In addition, these values assume averaging of sound level over all directions from the listed piece of equipment.

Workers exposed to noise sources in excess of 85 dBA are required to participate in a hearing conservation program. Workers exposed to noise sources in excess of 90 dBA for an eight-hour period will be required to wear hearing protection devices that conform to Occupational Safety and Health Administration/National Institute for Occupational Safety and Health (NIOSH) standards. Since the maximum noise levels during construction activities are expected to be 85 decibels or less, no significant impacts to workers during construction activities are expected.

The new equipment being installed as part of the proposed project does not generate noise beyond what currently exists at the facility. Only small pumps are included as part of the proposed project. The project will include installing an SCR Unit and storage tank. No increase in noise is expected from these sources. The new equipment will be located within existing industrial areas where noise is generated by adjacent operational equipment. Therefore, significant noise impacts from the proposed project are not expected.

12. e) and f) The proposed project site is not located within an airport land use plan or within the vicinity of a private airstrip. Further, the Carson Plant is not located within the normal flight pattern of an airport. Thus, the proposed project would not increase the noise levels to people residing or working in the area.

12.3 Mitigation Measures

No significant adverse noise impacts are expected to occur as a result of construction or operation of the proposed project. Therefore, no mitigation is necessary or proposed.

		Potentially Significant Impact	Less Than Significant Impact	No Impact
13.	**POPULATION AND HOUSING.** Would the project:			
a)	Induce substantial growth in an area either directly (for example, by proposing new homes and businesses) or indirectly (e.g. through extension of roads or other infrastructure)?	☐	☐	☑
b)	Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☑
c)	Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☑

13.1 Significance Criteria

The impacts of the proposed project on population and housing will be considered significant if the following criteria are exceeded:

The demand for temporary or permanent housing exceeds the existing supply.

The proposed project produces additional population, housing or employment inconsistent with adopted plans either in terms of overall amount or location.

13.2 Environmental Setting and Impacts

13. a), b) and c) The proposed project would require modifications to the existing Carson Plant and will not involve an increase, decrease or relocation of population. Labor (an estimated 20 employees) for construction is expected to come from the existing labor pool in southern California. Operation of the proposed project is not expected to require any new permanent employees at the Carson Plant. Therefore, construction and operation of the proposed project are not expected to have significant adverse impacts on population or housing, induce substantial population growth, or exceed the growth projections contained in any adopted plans.

13.3 Mitigation Measures

No mitigation measures are required for the construction/operation of the project since no significant adverse impacts to population and housing are expected.

	Potentially Significant Impact	Less Than Significant Impact	No Impact
14. PUBLIC SERVICES. Would the proposal result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the following public services:			
a) Fire protection?	☐	☐	☑
b) Police protection?	☐	☐	☑
c) Schools?	☐	☐	☑
d) Parks?	☐	☐	☑
e) Other public facilities?	☐	☐	☑

14.1 Significance Criteria

Impacts on public services will be considered significant if the project results in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response time or other performance objectives.

14.2 Environmental Setting and Impacts

14. a) ConocoPhillips maintains its own onsite emergency response department at the Carson Plant. Compliance with state and local fire codes is expected to minimize the need for additional fire protection services. The Carson Plant has its own emergency response team, which is supplemented by the County of Los Angeles, to respond to emergency requirements. The Carson Plant maintains a fully trained 24-hour emergency response team; fire-fighting equipment including fire engines and foam pumper trucks or trailers; and maintains manual and automatic fire suppression systems for flammable and combustible materials. Carson Plant staff is trained in accordance with industry standards, and on-site fire training exercises with the County Fire Department staff are conducted.

The proposed project will not increase the requirements for additional or altered fire protection. Fire-fighting and emergency response personnel and equipment will continue to be maintained and operated at the Carson Plant. Close coordination with local fire departments and emergency services also will be continued.

14. b) The City of Carson Police Department is the responding agency for law enforcement needs at the Carson Plant. The Carson Plant is fenced and entry is restricted to authorized individuals. Entry and exit are currently monitored and no additional or altered police protection is expected. The operation of the proposed project will not require additional workers. The Carson Plant is an existing facility with a 24-hour security force for people and property currently in place. All modifications will occur within the confines of the existing Carson Plant. Therefore, no impacts to the local police department are expected related to the proposed project.

14. c), d) and e) The local workforce is expected to fill the short-term construction positions required for this project. No increase in the number of permanent workers is expected at the Carson Plant, therefore, there will be no increase in the local population and thus no impacts are expected to schools, parks, or other public facilities.

14.3 Mitigation Measures

Because no significant adverse impacts to public services are expected as a result of the proposed project, no mitigation is necessary or proposed.

		Potentially Significant Impact	Less Than Significant Impact	No Impact
15.	**RECREATION.**			
a)	Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☑
b)	Does the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	☑

15.1 Significance Criteria

The impacts to recreation will be considered significant if:

The project results in an increased demand for neighborhood or regional parks or other recreational facilities.

The project adversely effects existing recreational opportunities.

15.2 Environmental Setting and Impacts

15. a) and b) During the construction phase of the proposed project, there would be no significant changes in population densities resulting from the project since construction workers are expected to draw from the existing labor pool in southern California. Additionally, the operation of the new SCR Unit will not require additional workers. Thus, there will be no increase in the use of existing neighborhood and regional parks or other recreational facilities.

The project does not include recreational facilities or require the construction or expansion of existing recreational facilities. No significant adverse impacts to recreational facilities are expected.

15.3 Mitigation Measures

No significant adverse impacts to recreational resources are expected to occur as a result of construction or operation of the proposed project. Therefore, no mitigation is necessary or proposed.

		Potentially Significant Impact	Less Than Significant Impact	No Impact
16.	**SOLID/HAZARDOUS WASTE.** Would the project:			
a)	Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☑
b)	Comply with federal, state, and local statutes and regulations related to solid and hazardous waste?	☐	☐	☑

16.1 Significance Criteria

The proposed project impacts on solid/hazardous waste will be considered significant if the following occur:

> The generation and disposal of hazardous and non-hazardous waste exceeds the capacity of designated landfills.

16.2 Environmental Setting and Impacts

16. a) Non-Hazardous Waste

Construction activities could uncover hydrocarbon-contaminated soils, given the fact that refining, storage and distribution of petroleum products have been conducted at the site over a number of years. Where appropriate, the soil will be recycled if it is considered or classified as a non-hazardous waste. Otherwise the material will need to be disposed of at a hazardous waste facility (see below discussion under hazardous waste).

During operation, the proposed project is not expected to generate significant quantities of solid waste, which are primarily generated from administrative or office activities. The proposed project would not result in an increase in permanent employees at the Carson Plant, so no significant increase in solid waste is expected.

16. b) Hazardous Waste

There are no hazardous waste disposal sites within the southern California area. Hazardous waste generated at the Carson Plant which is not reused on-site, or recycled off-site, is disposed of at a licensed in-state hazardous waste disposal facility. Contaminated soil that was determined to be hazardous waste would need to be disposed of at a hazardous waste disposal facility (either in-state or out-of-state). Two such facilities are the Chemical Waste Management Inc. (CWMI) Kettleman Hills facility in King's County, and the Safety-Kleen facility in Buttonwillow (Kern County). Kettleman Hills has an estimated 6.5 million cubic yard capacity and expects to continue receiving wastes for approximately 18 years under its current permit, or for approximately another 24 years with an approved permit modification (Personal Communication, Terry Yarbough, Chemical Waste Management Inc., June 2000). Buttonwillow receives approximately 960 tons of hazardous waste per day and has a remaining capacity of approximately 10.3 million tons. The expected life of the Buttonwillow Landfill is approximately 35 years (Personal Communication, Marianna Buoni, Safety-Kleen (Buttonwillow), Inc., July 2000).

Hazardous waste also can be transported to permitted facilities outside of California. The nearest out-of-state landfills are U.S. Ecology, Inc., located in Beatty, Nevada; USPCI, Inc., in Murray, Utah; and Envirosafe Services of Idaho, Inc., in Mountain Home, Idaho. Incineration is provided at the following out-of-state facilities: Aptus, located in Aragonite, Utah and Coffeyville, Kansas; Rollins Environmental Services, Inc., located in Deer Park, Texas and Baton Rouge, Louisiana; Chemical Waste Management, Inc., in Port Arthur, Texas; and Waste Research & Reclamation Co., Eau Claire, Wisconsin.

The proposed project will generate hazardous waste from spent catalyst in the SCR unit. The catalysts have a life expectancy ranging from about five to ten years, depending on the type of catalyst and reaction rate. Spent catalysts (about 13,000 pounds every five to ten years) are expected to be removed or recycled offsite for their heavy metal content. Therefore, no significant impacts to hazardous waste disposal facilities are expected due to the operation of the

proposed project. The facility is expected to continue to comply with federal, state, and local statutes and regulations related to solid and hazardous wastes.

16.3 Mitigation Measures

No significant adverse impacts from waste generated or disposed of are expected and thus no mitigation measures are required.

		Potentially Significant Impact	Less Than Significant Impact	No Impact
17.	**TRANSPORTATION/TRAFFIC.** Would the project:			
a)	Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	☐	☑	☐
b)	Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	☐	☑	☐
c)	Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☑
d)	Substantially increase hazards due to a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)?	☐	☐	☑
e)	Result in inadequate emergency access or access to nearby uses?	☐	☐	☑
f)	Result in inadequate parking capacity?	☐	☐	☑
g)	Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g. bus turnouts, bicycle racks)?	☐	☐	☑

17.1 Significance Criteria

The impacts on transportation/traffic will be considered significant if any of the following criteria apply:

Peak period levels on major arterials are disrupted to a point where level of service (LOS) is reduced to D or F for more than one month.

An intersection's volume to capacity ratio increase by 0.02 (two percent) or more when the LOS is already D, E or F.

A major roadway is closed to all through traffic, and no alternate route is available.

There is an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system.

The demand for parking facilities is substantially increased.

Water borne, rail car or air traffic is substantially altered.

Traffic hazards to motor vehicles, bicyclists or pedestrians are substantially increased.

17.2 Environmental Setting and Impacts

The Carson Plant site is located on Sepulveda Boulevard between Wilmington Avenue and Alameda Street, south of the San Diego (I-405) freeway. Sepulveda Boulevard was reconstructed recently to provide a fly-over bypass of Alameda Street so that truck and rail traffic can move between the Ports of Long Beach and Los Angeles and the central railyards in downtown Los Angeles.

17 a) and b) Traffic and Circulation

About 20 construction workers will be commuting to the Carson Plant, during peak construction activities. All construction workers will park at the Carson Plant since sufficient parking is available onsite. Construction workers are expected to arrive at the work sites between 6:30 – 7:00 a.m. and depart about 5:30 – 6:00 p.m., which would generally avoid peak hour traffic conditions. The construction activities are expected to avoid peak hour traffic during morning hours, between 7-9 a.m but could impact the evening peak hour (between 4-6 p.m.). Construction activities also are expected to be limited to about a two to three month period. Therefore, the increase in traffic in the area is temporary and will cease following the completion of construction activities. The baseline traffic estimates near the Carson Plant indicate that the local streets carry between 17,500 and 27,000 vehicles per day (SCAQMD, 1993). The projected increase in traffic during the construction phase of the proposed project is well below a one percent increase in traffic on the local streets and at the local intersections. Therefore, the

proposed project's impact on traffic during the construction phase is expected to be less than significant.

Construction will require contractor parking areas, equipment laydown and materials stockpiling areas. Parking for project construction will be in areas within the Carson Plant currently used for contractor parking and sufficient parking is expected to be available so no significant adverse impacts on parking are expected.

The operation of the proposed project will not result in an increase in permanent workers. Truck traffic will increase by six trucks per month (maximum of one truck per day) to deliver aqueous ammonia to the Plant. Based on the above analysis, the additional truck trips would not result in significant adverse traffic impacts. The proposed project impacts on traffic during the operational phase would be considered less than significant.

17 c) The proposed project includes modifications to existing facilities. The project will not involve the delivery of materials via air so no increase in air traffic is expected.

17. d) and e) The proposed project is not expected to increase traffic hazards or create incompatible uses at or adjacent to the site. The proposed project will result in an increase in traffic of about one truck trip per day. The truck will access the Carson Plant using existing streets and access points. No new streets or entrances/exits to the Carson Plant are required. Emergency access at the Carson Plant will not be adversely affected by the proposed project and ConocoPhillips will continue to maintain the existing emergency access gates to the Carson Plant.

17. f) Parking for the construction workers will be provided within the confines of the existing site. No increase in permanent workers is expected. Therefore, the proposed project will not result in significant impacts on parking.

17. g) The proposed project will be constructed within the confines of an existing refinery and is not expected to conflict with adopted policies, plans, or programs supporting alternative transportation modes (e.g., bus turnouts, bicycle racks).

17.3 Mitigation Measures

No significant impacts to transportation/traffic are expected and thus mitigation measures are not required.

		Potentially Significant Impact	Less Than Significant Impact	No Impact
18.	**MANDATORY FINDINGS OF SIGNIFICANCE.**			
a)	Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☑
b)	Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)	☐	☑	☐
c)	Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☑	☐

18. MANDATORY FINDINGS OF SIGNIFICANCE

18. a) The proposed project does not have the potential to adversely affect the environment, reduce or eliminate any plant or animal species or destroy prehistoric records of the past. The proposed project is located at a site that is part of an existing industrial facility, which has been previously disturbed, graded and developed, and this project will not extend into environmentally sensitive areas but will remain within the confines of an existing, operating refinery. For additional information, see Section 4.0 – Biological Resources (page 2-15) and Section 5.0 – Cultural Resources (page 2-18).

18. b) and c) The proposed project is not expected to result in cumulative adverse environmental impacts. The proposed project will result in a decrease in NOx emissions due to the installation of an SCR unit on an existing boiler, providing a local and regional environmental benefit to air quality. The proposed project increases the potential hazards at the Carson Plant by increasing the amount of aqueous ammonia transported to and stored at the Plant. Based on modeling results, an onsite release of ammonia from the proposed storage tank would remain within about 45 feet from the tank, which is well within the boundaries of the

Carson Plant. ConocoPhillips is proposing a concrete spill containment of 18 feet by 18 feet, for a total area of 324 square feet. Therefore, the containment area is less than 1,000 ft^2 and a release from the ammonia tank is not expected to result in a significant adverse hazard impact. Therefore, no significant adverse air quality impacts are expected, either individually or cumulatively. Therefore, the proposed project is not expected to result in significant adverse cumulative impacts pursuant to CEQA Guidelines Section 15130(a)(2).

M:Dbs\2252\NegDec Chap 2

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ACRONYMS

ABBREVIATION	DESCRIPTION
AB1807	California Toxic Air Contaminants Program (Tanner Bill)
AB2728	Revised Tanner Bill
AB2588	Air Toxic "Hot Spots" Information and Assessment Act
AB2595	California Clean Air Act
ACE2588	Assessment of Chemical Exposure for AB2588
API	American Petroleum Institute
ADT	Average Daily Traffic
AEL	Acute Exposure Limit
AHI	Acute Hazard Index
AHM	Acutely Hazardous Material
AQMD	Air Quality Management District
AQMP	Air Quality Management Plan
ARB	Air Resources Board
ATIR	Air Toxics Inventory Report
AVR	Average Vehicle Ridership
BACT	Best Available Control Technology
Basin	South Coast Air Basin
BLEVE	Boiling Liquid Expanding Vapor Explosion
BTU	British Thermal Units
BTU/hr	British Thermal Units per hour
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CAAQS	California Ambient Air Quality Standards
CalARP	California Accidental Release Prevention Program
Caltrans	California Department of Transportation
CalOSHA	California Occupational Safety and Health Administration
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CCR	California Code of Regulations
CEC	California Energy Commission
CEMS	Continuous Emissions Monitoring System
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CHI	Chronic Hazard Index
CMP	Congestion Management Plan
CNEL	Community noise equivalent level
CNS	Central nervous system
CO	Carbon monoxide
CO_2	Carbon dioxide
CPUC	California Public Utilities Commission
CUP	Conditional Use Permit
C4	Butane

DAF	Dissolved Air Flotation
dBA	A-weighted noise level measurement in decibels
DOT	Department of Transportation
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
DWR	California Department of Water Resources
EHS	Extremely Hazardous Substance
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPCRA	USEPA's Emergency Planning and Community Right-to-Know
ERPG	Emergency Response Planning Guideline
^{o}F	Degrees Fahrenheit
FCCU	Fluid Catalytic Cracking Unit
FEMA	Federal Emergency Management Agency
FT-BGS	feet below ground surface
FHWA	Federal Highway Administration
FIP	Federal Implementation Plan
G	acceleration of gravity
GWh	Gigawatts per hour
H_2	Hydrogen
HAZOP	Hazardous operation process analysis
HI	Hazard Index
HMBP	Hazardous Materials Business Plan
HRA	Health Risk Assessment
IAF	Induced Air Flotation
ICU	Intersection Capacity Utilization
ID #	Identification number
ISCST3	Industrial Source Complex Model Short Term Version 3
^{o}K	degrees Kelvin
LACFD	Los Angeles County Fire Department
LACSD	Los Angeles County Sanitation Districts
LADPW	Los Angeles Department of Public Works
LAER	lowest achievable emission reduction
LARWQCB	Los Angeles Regional Water Quality Control Board
LEL	Lower explosive limit
lbs	pounds
lbs/hr	pounds per hour
L_{dn}	day-night average sound level
L_{eq}	energy equivalent sound level
LFL	Lower Flammable Limit
Lmax	Maximum sound level
Lmin	Minimum sound level
LOS	Level of Service
LPG	liquefied petroleum gas
Lpk	Peak sound level
MACT	Maximum Achieved Control Technologies

m/s	meters per second
MATES	Multiple Air Toxic Exposure Study
MEIR	maximum exposed individual resident
MEIW	maximum exposed individual worker
MTBE	methyl tertiary butyl ether
mw	megawatts
MMscf	Million Standard Cubic Feet
MICR	Maximum Incremental Cancer Risk
MWD	Metropolitan Water District of Southern California
N_2	nitrogen
NH_3	Ammonia
NAAQS	National Ambient Air Quality Standards
nanograms/m^3	nanograms per cubic meter
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Agency
NIOSH	National Institute of Occupational Safety and Health
NOP	Notice of Preparation
NOx	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NSPS	New Source Performance Standards
NSR	New Source Review
OSHA	Occupational Safety and Health Administration
PAH's	Polynuclear Aromatic Hydrocarbons
PCE	passenger car equivalents
pH	potential hydrogen ion concentration
PM10	particulate matter less than 10 microns in diameter
ppbv	parts per billion by volume
ppm	parts per million
ppmv	parts per million by volume
PRD	pressure relief devices
PRC	Public Resources Code
PSD	Prevention of Significant Deterioration
PSI	Pollutant Screening Index
psi	pounds per square inch
psia	pounds per square inch absolute
psig	pounds per square inch (gauge)
PSM	Process Safety Management Program
RCRA	Resource Conservation and Recovery Act
RECLAIM	Regional Clean Air Incentives Market
REL	Reference exposure level
RFG	reformulated fuels gasoline
RMP	Risk Management Program
RMPP	Risk Management and Prevention Program
RVP	Reid Vapor Pressure
RWQCB	Regional Water Quality Control Board, Los Angeles Region
S	Significant impacts even after mitigation

SB	South Bound
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison Company
SCR	Selective Catalytic Reduction
SCS	Soil Conservation Service
SO_2	sulfur dioxide
SOx	sulfur oxide
SPCC	Spill Prevention, Control and Countermeasure
SRU	Sulfur Recovery Unit
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
T-BACT	Toxics Best Available Control Technology
TACs	toxic air contaminants
TDM	transportation demand management
TDS	total dissolved solids
TPH	total petroleum hydrocarbons
USDOT	United States Department of Transportation
U.S. EPA	United States Environmental Protection Agency
USC	United States Code
USDA	United States Department of Agriculture
USGS	United States Geological Society
ug/l	micrograms per liter
ug/m^3	micrograms per cubic meter
UVCE	Unconfined Vapor Cloud Explosion
V/C	volume to capacity ratio
VOC	volatile organic compounds

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.
Ambient Noise	The background sound of an environment in relation to which all additional sounds are heard
Anhydrous	Free from water.
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.
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.
dBA	The decibel (dDB) is one tenth of a *bel* where one bel represents a difference in noise level between two intensities I_1, I_0 where

	one is ten times greater than the other. (A) indicates the measurement is weighted to the human ear.
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.
L_{50}	Sound level exceeded 50 percent of the time (average or mean level)
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.
Paleontological	Prehistoric life.
Peak Hour	This typically refers to the hour during the morning (typically 7 AM to 9 AM) or the evening (typically 4 PM to 6 PM) in which the greatest number of vehicles trips are generated by a given land use or are traveling on a given roadway.
Pentane	Colorless, flammable isomeric hydrocarbon, derived from petroleum and used as a solvent.
Reactor	Vessels in which desired reactions take place.
Refinery gas	Gas produced from refinery operations used primarily for fuel gas 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.

Seiches	A vibration of the surface of a lake or landlocked sea that varies in period from a few minutes to several hours and which many change in intensity.
Selective Catalyst Reduction	An air pollution control technology that uses a catalyst to remove nitrogen oxides from the flue gas.
Stripper or Splitter	Refinery equipment used to separate two components in a feed stream; examples include sour water strippers and naphtha splitters.

M:Dbs\2252\NegDec Chap 2

APPENDIX A

EMISSION CALCULATIONS

Construction Equipment Emissions for the SCR Unit Project

Construction Equipment

Equipment Type	Hp[1]	Load[2]	Emission Factors lb/hp-hr[3]					Emission Factors lb/hr				
			CO	VOC	NOx	SOx	PM10	CO	VOC	NOx	SOx	PM10
Air Compressor 185 CFM	37	0.48	0.011	0.002	0.018	0.002	0.001	0.195	0.036	0.320	0.036	0.018
Backhoe[5]	119	0.465	0.015	0.003	0.022	0.002	0.001	0.830	0.166	1.217	0.111	0.055
Plate Compactor (Gasoline)	8	0.43	0.830	0.043	0.004	0.001	0.000	2.855	0.148	0.014	0.002	0.001
Dump Trucks	23	0.38	0.006	0.002	0.021	0.002	0.002	0.052	0.017	0.184	0.017	0.013
Forklift 4000 lb.[4]	--	--	0.520	0.170	1.540	0.143	0.093	0.520	0.170	1.540	0.143	0.093

(1) Default Horsepower from SCAQMD CEQA Air Quality Handbook, Table 9-8-C.

(2) Default load factors from SCAQMD CEQA Air Quality Handbook, Table 9-8-D.

(3) Emission factors from SCAQMD CEQA Air Quality Handbook, Table 9-8-B, unless otherwise noted.

(4) Emissions factors from SCAQMD CEQA Air Quality Handbook, Table 9-8-A. Units are in lbs/hr.

(5) HP data provided by ConocoPhillips

Construction Equipment Emissions for the SCR Unit Project

Construction Equipment

Equipment Type	Number	Hours Per Day	Emission Factors lb/hr					Daily Emissions (lbs/day)				
			CO	VOC	NOx	SOx	PM10	CO	VOC	NOx	SOx	PM10
Air Compressor 185 CFM	1	1	0.195	0.036	0.320	0.036	0.018	0.20	0.04	0.32	0.04	0.02
Backhoe	1	3	0.830	0.166	1.217	0.111	0.055	2.49	0.50	3.65	0.33	0.17
Plate Compactor (Gasoline)	1	4	2.855	0.148	0.014	0.002	0.001	11.42	0.59	0.06	0.01	0.00
Dump Trucks	1	2	0.052	0.017	0.184	0.017	0.013	0.10	0.03	0.37	0.03	0.03
Forklift 4000 lb.	1	3	0.520	0.170	1.540	0.143	0.093	1.56	0.51	4.62	0.43	0.28
Total Emission Totals								15.77	1.67	9.01	0.84	0.49

* Emissions factors from SCAQMD CEQA Air Quality Handbook, Table 9-8-A.
* Emissions factors from SCAQMD CEQA Air Quality Handbook, Table 9-8-C. Table 9-8-C, *Pounds/hour calculated from load factor and hp rating.*
* Trucks Emissions factors from SCAQMD CEQA Air Quality Handbook Table 9-8-A, *Trucks:off highway diesel used for truck:pickup/stake bed.*
* Emissions factors from SCAQMD CEQA Air Quality Handbook, Table 9-8-A, *Emissions for equipment not specifically listed can be found under miscellaneous.*

Construction Vehicle Emissions

On Road Mobile Emission Factors from California ARB EMFAC2002 Scenario Year 2003 (Model Years 1965 to 2003)

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)
Construction Workers Commuting	0.01815	0.001935	0.002014	0.00001	0.000078
Light Duty Trucks	0.01815	0.001935	0.002014	0.00001	0.000078
Bus	0.025508	0.003362	0.031208	0.000241	0.00054
Heavy Diesel Trucks	0.025508	0.003362	0.031208	0.000241	0.00054

	Parameters			Peak Day Emissions, lbs/day				
Source	Number of Vehicles	Total Number of Trips	Distance Traveled	CO Emissions	VOC Emissions	NOx Emissions	SOx Emissions	PM10 Emissions
Construction Workers Commuting	20	40	16.2	11.76	1.25	1.31	0.01	0.05
On-site Cars	0	0	10	0.00	0.00	0.00	0.00	0.00
Light Duty Trucks	1	2	16.2	0.59	0.06	0.07	0.00	0.00
Buses	0	0	1.5	0.00	0.00	0.00	0.00	0.00
Daily Delivery Trucks	1	2	50	2.55	0.34	3.12	0.02	0.05
Heavy Diesel Trucks	1	1	4	0.10	0.01	0.12	0.00	0.00

Source	Parameters		CO	VOC	NOx	SOx	PM10
Total Emissions for Construction Workers	20	40	11.76	1.25	1.31	0.01	0.05
Total Emissions for Buses	0	0	0.00	0.00	0.00	0.00	0.00
Total Emissions for Light Duty Trucks	1	2	0.59	0.06	0.07	0.00	0.00
Total Emissions for Heavy Diesel Trucks	1	1	2.65	0.35	3.25	0.00	0.06
			15.00	1.67	4.62	0.01	0.11

Fugitive Construction
Emission Estimates

REFINERY CONSTRUCTION

Grading Operations	Average Pieces of Equipment Operating	Peak Pieces of Equipment Operating	Hours of Operation	PM10 Emission Factor (lb/hour)	Water Control Factor	Controlled Emissions: Average PM10 Emissions (lbs/day)	Controlled Emissions: Peak PM10 Emissions (lbs/day)	Uncontrolled Emissions: Average PM10 Emissions (lbs/day)	Uncontrolled Emissions: Peak PM10 Emissions (lbs/day)	SCAQMD Emission Factor Source
Construction Activities[1]	1	2	8	7.7	0.5	30.80	61.60	61.6	123.2	Table A9-9-F

TRENCHING OPERATIONS (Backhoe) TEMPORARY STOCKPILES	Average Tons of Materials Handled Per Day	Peak Tons of Materials Handled Per Day	PM10 Emission Factor (lb/ton)	Water Control Factor	Controlled Emissions: Average PM10 Emissions Pounds/day	Controlled Emissions: Peak PM10 Emissions Pounds/day	Uncontrolled Emissions: Average PM10 Emissions Pounds/day	Uncontrolled Emissions: Peak PM10 Emissions Pounds/day	SCAQMD Emission Factor Source
Construction Activities[2]	1	10	0.0035	0.5	0.00175	0.0119	0.0035	0.035	Table A9-9-G
Assumptions: 1cubic yard trench spoils = 1 ton									

WIND EROSION Disturbed Area and Temporary Stockpiles	Days of Construction	Average Acreage Disturbed Per Day	Peak Acreage Disturbed Per Day	PM10 Emission Factor (lb/day/acre)	Average PM10 Emissions Pounds/day	Peak PM10 Emissions Pounds/day	Average PM10 Emissions Tons/Year	Peak PM10 Emissions Tons/Year	SCAQMD Emission Factor Source
Construction Activities	60	0.25	0.5	19.800	4.950	9.900	0.149	0.297	Table A9-9-E

TRUCK FILLING/DUMPING	Estimated Materials Handled Per Day (tons)	Peak Tons of Materials Handled Per Day	PM10 Emission Factor (lb/ton)	Water Control Factor	Controlled Emissions: Average PM10 Emissions Pounds/day	Controlled Emissions: Peak PM10 Emissions Pounds/day	Uncontrolled Emissions: Average PM10 Emissions Pounds/day	Uncontrolled Emissions: Peak PM10 Emissions Pounds/day	SCAQMD Emission Factor Source
Truck Filling[4]	1	1	0.02205	0.5	0.011025	0.011025	0.02205	0.02205	Table A9-9
Truck Dumping	1	1	0.009075	0.5	0.0045375	0.0045375	0.009075	0.009075	Table A9-9

TOTAL PM10 Pounds/day		Average	Peak
(Controlled Emissions)	Construction	35.7673	71.52746
(Uncontrolled Emissions)		66.585	133.166
Mitigated Emissions (assumes water 3 times/day)		22.639	45.276

(1) Emissions (lbs/hr) = [0.45 x ($G^{1.5}$)/($H^{1.4}$) x 2.2046 x J; where G = silt content (7.5%), H = moisture content (2.0%) and J = hrs of operation.
(2) Emissions (lbs/ton) = 0.00112 x [(G/5)$^{1.3}$/(H/2)$^{1.4}$] x I/J; where G=mean wind speed (12 mph), H=moisture content of surface material (2%); I= lbs of dirt handled per day (100,000 lbs); and J=2,000 lbs/ton
(3) Emissions (lbs/day/acre) = 1.7 x [(G/1.5)/(365-H/235)] x I/15 x J; where G = silt content (7.5%); H = days with >0.01 inch of rain (34); I = percentage of time wind speed exceeds 12 mph (50%) and J= fraction of TSP (0.5)
(4) Used SCAQMD Table 9-9 Default emission factors.

Fugitive Dust Construction Emission Estimates
From Trucks and Employee Vehicles

Source Type	Number	Fuel	Peak Daily Trips	One-way Distance	Emission Factor (lb/vmt)	Peak PM-10 (lbs/day)
Passenger Vehicle/ On Paved Roadways	20	Gasoline	2	16.2	0.000856	0.55
Pickup Trucks on Paved Roadways	1	Gasoline	2	16.2	0.0026	0.08
Trucks on Paved Roadways	1	Diesel	2	50	0.0206	2.06
Trucks on Unpaved Roads	1	Diesel	1	1	1.6	1.60
Total	23					4.30

* Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1

$E = k(sL/2)^{0.65} \times (W/3)^{1.5} - C$

Where: k = 0.016 lb/VMT for PM10, sL = road silt loading (gms/m2) from CARB Methodology 7.9 for paved roads (0.240 for local roads and 0.037 for major/collector roads), W = weight of vehicles (2.4 tons for cars; 5 for pickup trucks, and 20 for heavy trucks), and C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear. C is assumed to be zero in order to provide a conservative emissions estimate.

**Emission Calculations for travel on unpaved roads from EPA AP-42 Section 13.2.2

$E = 2.6(s/12)^{0.8} \times (W/3)^{0.4}/(M/0.2)^{0.3}$

Where: s = surface silt content (assumed to be 11%, AP-42 Table 13.2.2-1), W = vehicle weight (tons) same assumptions as above, and M = material moisture content (assumed to be 10 percent since these emissions would only come from a water truck watering the site).

CONSTRUCTION SUMMARY

Construction Period		Estimated Emissions				
		CO	VOC	NOx	SOx	PM10
Construction Equipment		15.77	1.67	9.01	0.84	0.49
Vehicle Emissions		15.00	1.67	4.62	0.01	0.11
Fugitive Construction		0	0	0	0	71.53
Fugitive Road Dust		0	0	0	0	4.30
TOTAL EMISSIONS		30.8	3.3	13.6	0.8	76.4
SCAQMD Thresholds		550	75	100	150	150
Significant		No	No	No	No	No

Vehicle Emissions

On Road Mobile Emission Factors from California ARB EMFAC2002 Scenario Year 2003 (Model Years 1965 to 2003)

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)
Workers Commuting	0.01815	0.001935	0.002014	0.00001	0.000078
Light Duty Trucks	0.01815	0.001935	0.002014	0.00001	0.000078
Bus	0.025508	0.003362	0.031208	0.000241	0.00054
Heavy Diesel Trucks	0.025508	0.003362	0.031208	0.000241	0.00054

Source	Parameters			Peak Day Emissions, lbs/day				
	Number of Vehicles	Total Number of Trips	Distance Traveled	CO Emissions	VOC Emissions	NOx Emissions	SOx Emissions	PM10 Emissions
Workers Commuting	0	0	16.2	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
Light Duty Trucks	0	0	16.2	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
Daily Delivery Trucks	1	2	50	2.55	0.34	3.12	0.02	0.05
Heavy Diesel Trucks	0	0	4	0.00	0.00	0.00	0.00	0.00

Source	Parameters		CO	VOC	NOx	SOx	PM10
Total Emissions for Workers	0	0	0.00	0.00	0.00	0.00	0.00
Total Emissions for Buses	0	0	0.00	0.00	0.00	0.00	0.00
Total Emissions for Light Duty Trucks	0	0	0.00	0.00	0.00	0.00	0.00
Total Emissions for Heavy Diesel Trucks	1	1	2.55	0.34	3.12	0.00	0.05
			2.55	0.34	3.12	0.00	0.05

Fugitive Dust Emission Estimates
From Trucks

Source Type	Number	Fuel	Peak Daily Trips	One-way Distance	Emission Factor (lb/vmt)	Peak PM-10 (lbs/day)
Passenger Vehicle/ On Paved Roadways	0	Gasoline	2	16.2	0.000856	0.00
Pickup Trucks on Paved Roadways	0	Gasoline	2	16.2	0.0026	0.00
Trucks on Paved Roadways	1	Diesel	2	50	0.0206	2.06
Trucks on Unpaved Roads	0	Diesel	1	1	1.6	0.00
Total	1					2.06

* Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1

$E = k(sL/2)^{0.65} \times (W/3)^{1.5} - C$

Where: k = 0.016 lb/VMT for PM10, sL = road silt loading (gms/m2) from CARB Methodology 7.9 for paved roads (0.240 for local roads and 0.037 for major/collector roads), W = weight of vehicles (2.4 tons for cars; 5 for pickup trucks, and 20 for heavy trucks), and C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear. C is assumed to be zero in order to provide a conservative emissions estimate.

**Emission Calculations for travel on unpaved roads from EPA AP-42 Section 13.2.2

$E = 2.6(s/12)^{0.8} \times (W/3)^{0.4}/(M/0.2)^{0.3}$

Where: s = surface silt content (assumed to be 11%, AP-42 Table 13.2.2-1), W = vehicle weight (tons) same assumptions as above, and M = material moisture content (assumed to be 10 percent since these emissions would only come from a water truck watering the site).

SCREENING HEALTH RISK ASSESSMENT

9.1	lbs/mmscf	(SCAQMD default emission factor for ammonia slip)
7.74E-03	lb/mmBtu	(SCAQMD default emission factor for ammonia slip)
352	mmBtu/hr	Maximum fired duty

SCREENING HRA FOR CARCINOGENS/CHRONIC HEALTH HAZARDS

CHEMICAL	Estimated Emissions (lbs/hr)	Estimated Emissions (lbs/day)	Estimated Emissions (lbs/year)	Screening level (lb/year)	EXCEEDS?
Ammonia	2.72E+00	6.54E+01	2.39E+04	5.17E+04	NO

SCREENING HRA FOR ACUTE HEALTH HAZARDS

CHEMICAL	Estimated Emissions (lbs/hr)	Screening level (lb/hr)	EXCEEDS?
Ammonia	2.72E+00	8.57E+00	NO

APPENDIX B

HAZARD ANALYSIS

Ammonia Dispersion Calculations

Introduction

A series of release and dispersion calculations have been performed in an effort to quantify the dispersion of ammonia gas evolving from a pool of aqueous ammonia following a release from a storage tank. The releases were designed to simulate what would happen if a release from the storage tank were to occur and the aqueous ammonia solution spilled into the bunded area surrounding the tank.

Site-Specific Information

Several of the parameters defined in the analysis are:

Liquid composition

Material	Weight Percent
Ammonia (NH_3)	19
Water	81

Tank capacity (nominal) = 10,000 gallons
Tank diameter = 12 feet
Distance from tank to nearest property line = 500 feet

Atmospheric Conditions

Wind speed = 1.5 m/s and 5 m/s
Relative humidity = 70%
Air temperature = 77 ^{o}F
Atmospheric stability = Pasquill-Gifford F (extremely stable) and Pasquill-Gifford D (neutral)

[Atmospheric stability is classified by the letters A through F. In general, the most unstable atmosphere is characterized by stability class A. Stability A would correspond to an atmospheric condition where there is strong solar radiation and moderate winds. This combination of radiation and winds allows for rapid fluctuations in the air and thus greater mixing of the released gas with time. Stability D is characterized by fully overcast or partial cloud cover during both daytime and nighttime. The atmospheric turbulence is not as great during D conditions as during A conditions; thus, the gas will not mix as quickly with the surrounding atmosphere. Stability F corresponds to the most "stable" atmospheric conditions. Stability F generally occurs during the early morning hours before sunrise (thus, no solar radiation) and under low winds. The combination of low winds and lack of solar heating allows for an atmosphere which appears calm or still and thus restricts the ability to actively mix with the released gas.]

Ammonia Gas Concentrations of Interest

Release/dispersion calculations were made in order to examine the effect of atmospheric conditions and pool size on the downwind travel of the ammonia gas evolving from the liquid pool. The dispersion calculations

were performed until specific ammonia concentrations were reached in the downwind direction. Two ammonia gas concentrations were chosen for evaluation. The definitions of the two levels evaluated are:

ERPG-2 for Ammonia = 200 ppm

Emergency Response Planning Guideline (ERPG) Level 2. The maximum airborne concentration below which it is believed nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair their ability to take protective action.

ERPG-3 for Ammonia = 1,000 ppm

Emergency Response Planning Guideline (ERPG) Level 3. The maximum airborne concentration below which it is believed nearly all individuals could be exposed for up to one hour without experiencing or developing life-threatening health effects.

Consequence Analysis

Vaporization from a Liquid Pool

The hazard zones resulting from the liquid releases into the bund were evaluated to determine the extent and location of the gas cloud containing NH_3. The Mackay and Matsugu model[1] is the basis of many of the current pool vaporization models published today. This model has been partially validated using the authors' experimental data.

The equation normally used to compute evaporation rates is shown in Equation 1.

$$N = k_m A (P - P_\infty)/ R T \quad (1)$$

where:
- N = evaporation rate, g-moles/hr
- k_m = mass transfer coefficient, m/hr
- A = area of pool, m^2
- P = partial pressure or vapor pressure of liquid, atm
- P_∞ = background pressure of evaporating liquid, atm
- R = gas constant, atm-m^3 /g-mole-K, 82.06 x 10^{-6}
- T = temperature, K

The equation given by Mackay and Matsugu[1] to compute the mass transfer coefficient is:

$$k_m = 0.0292 S_c^{2/3} U^{0.78} \rho^{-0.11} \quad (2)$$

where:
- U = wind speed at a height of 10 m, m/hr
- S_c = Schmidt Number, $\mu/\rho D$
- μ = air viscosity, kg/m·hr

[1] "Evaporation Rates of Liquid Hydrocarbon Spills on Land and Water," Donald Mackay and Ronald S. Matsugu. *The Canadian Journal of Chemical Engineering,* Vol. 51, August, 1973: pp. 434-439.

ρ = air density, kg/m^3
D = evaporating liquid diffusivity, m^2/hr

As can be seen from Equation 1, as the liquid pool diameter increases, the total evaporation rate also increases. A range of liquid pool sizes was evaluated. The vaporization results are presented in Table 1.

Dispersion of Ammonia Gas

The pool vaporization model provides one of the inputs to a dispersion model. The ammonia released from the pool can be treated as a neutrally buoyant gas. The ammonia/air mixture over the liquid pool surface is slowly swept from the pool surface by the ambient wind field. Since the ammonia/air mixture would not exhibit any dense gas effects (the molecular weight of the mixture is less than air), a form of a Gaussian dispersion model would be appropriate. For rectangular impoundment areas, the area source was approximated as a series of line sources. The line source model is taken from Dobbins[2]. For this analysis, urban dispersion coefficients[3] were used.

For these calculations the following parameters were used.

Liquid pool temperature	= 77 ^{o}F
Partial pressure of ammonia above liquid pool (at 77 ^{o}F)	= 5.1 psia
Surface roughness (representative of urban conditions)	= 0.04 m
Dispersion coefficient averaging time	= 60 minutes

The results of the dispersion analysis for a range of impoundment sizes are presented in Table 1 and Figure1. For the aqueous ammonia release scenarios, the distances listed would not change size as long as the liquid pool remained. In essence, the plumes reach steady state within minutes of a release, and will maintain their shape until the weather conditions change or the liquid pool is eliminated.

Conclusions

The conclusions drawn from this analysis are:

1. Under worst-case atmospheric conditions (e.g., low winds and stable air), the lowest ammonia concentration of interest, 200 ppm, does not reach the closest property line even if the liquid impounding area is larger than 1,000 ft^2 .
2. Under all other atmospheric conditions (e.g., higher winds, less stable atmospheres), the distances to the 200 ppm ammonia concentration level would be shorter.
3. Under no condition does the 1,000 ppm ammonia concentration level extend further than 45 feet from the tank. This distance is always well within the facility fence line.

[2] *Atmospheric Motion and Air Pollutio*n, Richard A. Dobbins. John Wiley & Sons, Inc., 1979.
[3] *Diffusion Estimation for Small Emission*s, G. A. Briggs. ATDL Report No. 79, ATDL, Post Office Box E, Oak Ridge, Tennessee 37830, 1973.

Table 1

Ammonia Vaporization and Dispersion Results

Pool Size (ft 2)	Atmospheric Conditions		Total Ammonia Vaporization Rate from Pool (kg/ sec) [lb/ sec]	Downwind Distance (ft) to NH 3 Concentration	
	Wind Speed (m/ s) [mph]	Stability		1,000 ppm	200 ppm
100	1.5 [3.35]	F	0.00344 [0.00758]	12	46
	5.0 [11.2]	D	0.0140 [0.0308]	9	34
300	1.5 [3.35]	F	0.0103 [0.0227]	25	92
	5.0 [11.2]	D	0.0420 [0.0925]	17	63
600	1.5 [3.35]	F	0.0206 [0.0454]	40	131
	5.0 [11.2]	D	0.0839 [0.1848]	30	91
1,000	1.5 [3.35]	F	0.0344 [0.0758]	59	170
	5.0 [11.2]	D	0.1400 [0.3083]	42	0118

Pool Size versus Distance at 200 ppmv and 1000 ppmv NH3

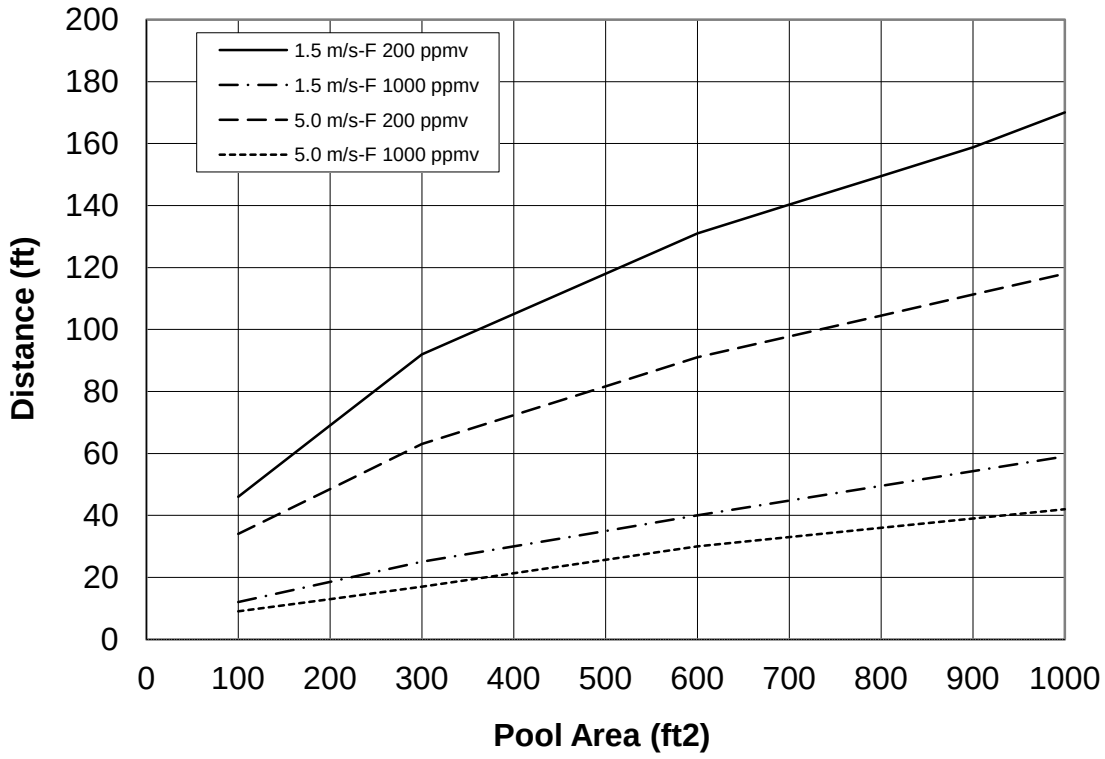

Figure 1

Note: This document was modified from the document originally prepared by Quest to remove site-specific information.