SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

FINAL ENVIRONMENTAL IMPACT REPORT FOR:

AES ALAMITOS, L.L.C. – SELECTIVE CATALYTIC REDUCTION (SCR) INSTALLATION AT ALAMITOS GENERATING STATION (UNITS 1, 2, 3 AND 4)

March 9, 2001

SCH No. 2000111039

Executive Officer
Barry R. Wallerstein, D. Env.

Deputy Executive Officer
Planning, Rule Development, and Area Sources
Jack Broadbent

Assistant Deputy Executive Officer
Planning, Rule Development, and Area Sources
Elaine Chang, Dr.Ph.

Planning and Rules Manager
CEQA, Socioeconomic Analysis, PM/AQMP Control Strategy
Alene Taber, A.I.C.P.

Authors:	URS Corporation - Consultant
Reviewed by:	Steve Smith, Ph.D. – Program Supervisor Michael Krause - Air Quality Specialists Jeri Voge - Senior Deputy District Counsel

PREFACE

This document constitutes the Final Environmental Impact Report (EIR) for AES Alamitos, L.L.C. - Selective Catalytic Reduction (SCR) Installation at Alamitos Generating Station (Units 1, 2, 3, 4). The Draft EIR was released for a shortened 30-day public review and comment period from January 23, 2001 to February 21, 2001. Three comment letters were received from the public and responses to the comments were included in the Final EIR. Minor modifications have been made to the Draft such that it is now a Final EIR. Deletions and additions to the text of the EIR are denoted using ~~strikethrough~~ and *italics*, respectively.

TABLE OF CONTENTS

TABLE OF CONTENTS

Tables

Figures

Appendices

CHAPTER 1

EXECUTIVE SUMMARY

1.1 INTRODUCTION

AES Southland L.L.C. (AES) is a supplier of electricity to Southern California. AES generates electrical service at three existing facilities within the South Coast Air Basin (Basin). The proposed project, which is designed to reduce AES' emissions of oxides of nitrogen (NO_x) in the Basin, would be constructed at AES' Alamitos Generating Station, located on the eastern side of the City of Long Beach in the County of Los Angeles.

Utility boilers at the Alamitos Generating Station use natural gas as the primary combustion fuel and fuel oil as a backup fuel to produce steam. The steam produced in the utility boiler is vented to steam turbine generators to produce electricity. As part of the combustion process, NO_x is produced and emitted to the atmosphere with the other flue gas constituents (mostly nitrogen, carbon dioxide, and water vapor). Control of NO_x emissions is important for at least three reasons: 1) NO_x contributes to atmospheric nitrogen dioxide (NO_2); 2) NO_x is a precursor to ozone formation; and 3) NO_x is a precursor to the formation of suspended particulate matter (PM_{10}).

Selective Catalytic Reduction (SCR) is a proven air pollution control technology that uses a reducing agent (typically ammonia) to reduce NO_x to nitrogen (N_2) and water in the presence of a catalyst. In an SCR system, ammonia is injected into the boiler flue gas. The ammonia/flue gas mixture flows through a catalyst that accelerates the reaction between the ammonia and the NO_x. Ammonia used for SCR systems typically is stored in one or more storage tanks. The ammonia is piped from the tank to the boiler where it is mixed with flue gas before passing through the catalyst. AES is proposing to use aqueous (dilute) ammonia (approximately 29 percent by weight) for this project.

AES proposes to install SCR at the Alamitos Generating Station's Units 1, 2, 3 and 4. SCR will be used to reduce NO_x emissions to comply with the declining facility-wide NO_x emission limits imposed under South Coast Air Quality Management District's (SCAQMD) Regulation XX – Regional Clean Air Incentives Market (RECLAIM) Program.

To accomplish AES' goal at the earliest possible time, meet the needs of California energy customers during the peak summer demand, and allow for continuing operation within their RECLAIM annual allocations, AES hopes to begin equipment installation and modifications at the Alamitos facility starting early in 2001, such that affected power generating units can be put into use by summer 2001.

1.2 LEGISLATIVE AUTHORITY

The California Legislature created the SCAQMD in 1977 (The Lewis-Presley Air Quality Management Act, Health and Safety Code Sections 40400-40540) as the agency responsible for developing and enforcing air pollution control rules and regulations in the Basin. By statute, the SCAQMD is required to adopt an Air Quality Management Plan (AQMP), which ensures compliance with all state and national Ambient Air Quality Standards (AAQS) within the area of its jurisdiction (Health and Safety Code Section 40460(a)). Furthermore, the SCAQMD must adopt rules and regulations that carry out the AQMP (Health and Safety Code Section 40440(a)).

The California Environmental Quality Act (CEQA), Public Resources Code §21000 et seq., requires that potential environmental impacts of proposed projects be evaluated and that methods to reduce, avoid or eliminate significant adverse impacts of these projects be identified and implemented where feasible. To fulfill the purpose and intent of CEQA, SCAQMD is the lead agency for this project.

The lead agency is the public agency that has the principal responsibility for carrying out or approving a project that may have a significant effect upon the environment (Public Resources Code §21067). It was determined that the SCAQMD has the primary responsibility for supervising or approving the project and is the most appropriate public agency to act as lead agency (CEQA Guidelines §15051(b)). The proposed project requires discretionary approval from the SCAQMD. SCAQMD has prepared this *Final* ~~Draft~~ Environmental Impact Report (DEIR) to assess the potential environmental impacts associated with the AES Alamitos SCR Project for Units 1, 2, 3 and 4.

1.3 CALIFORNIA ENVIRONMENTAL QUALITY ACT

The Final Environmental Assessment (FEA) for the RECLAIM program (October 1993) analyzed, in a level of detail commensurate with the detail of the proposed project, the impacts associated with the use of various add-on pollution controls to comply with RECLAIM. In particular, the FEA for the RECLAIM program incorporated by reference environmental analyses conducted for specific add-on pollution controls, including SCR, that could be used by power generating facilities to comply with RECLAIM. To the extent that these analyses adequately address the potential environmental impacts associated with this project, no further analysis is required for such impacts (CEQA Guidelines §15152(d)).

1.3.1 Previous Relevant Projects and CEQA Documentation

In 1993, the SCAQMD prepared a Final Supplemental Environmental Impact Report (EIR) for the SCR system on Unit 5. The Final Supplemental EIR was prepared as a supplement to the Final Subsequent EIR for the storage of aqueous ammonia and associated SCR system for Unit 6, which, in turn, was prepared subsequent to and as a complement of the 1988 Program EIR for Proposed Rule 1135[1] – Emissions of Oxides of Nitrogen from Power Generating Steam Boilers (SCAQMD, 1993b). These documents, summarized in the following paragraphs, are available for review at the SCAQMD's Public Information Center or at its Diamond Bar headquarters, or by calling (909) 396-2039.

Final Subsequent EIR (3/22/93) for Alamitos Unit 6: The Final Subsequent EIR for Unit 6 contained a detailed project description of the underground storage tank (UST) and the SCR system for Unit 6, environmental setting for each potential impact area, analysis of potential environmental impacts (including cumulative impacts), analysis of project alternatives, and other environmental topics as required by CEQA. The discussion of environmental impacts included a detailed analysis of each of the following potential impact areas: air quality, water resources, noise, risk of upset/human health, transportation/circulation, public services, energy/natural resources, and utilities (solid waste). This document was certified by the SCAQMD on March 31, 1993. A mitigation monitoring plan was developed and implemented by Southern California Edison (SCE), the owner of the Alamitos Generating Station at that time, for this project.

Final Supplemental EIR (8/16/93) for Alamitos Unit 5: The Supplemental EIR contained a detailed project description, the environmental setting for each potential impact area, and analysis of potential environmental impacts (including cumulative impacts), as required by CEQA. The discussion of environmental impacts included a detailed analysis of each of the

[1] Since that time Rule 1135 has been superceded by the RECLAIM program, Regulation XX.

following potential impact areas: air quality, water resources, noise, risk of upset/human health, transportation/circulation, public services, energy/natural resources, and utilities (solid waste).

1.3.2 Notice of Preparation and Initial Study (NOP/IS)

A NOP/IS for this *Final EIR and the* DEIR (Appendix A) were distributed to responsible agencies and interested parties for a 30-day review and comment period ending December 7, 2000. The NOP/IS identified potential adverse impacts for the following two environmental topic areas: air quality and hazards and hazardous materials. During the public comment period for the NOP/IS, the SCAQMD received 7 comment letters, as well as 1 map that was followed up with a phone call to the submitter. The SCAQMD's responses to comments submitted on the NOP/IS are presented in Appendix B of this *Final EIR* ~~DEIR~~.

1.4 INTENDED USES OF THIS EIR

Information regarding some of the potential environmental impacts associated with potential construction-related impacts was difficult to ascertain or not available for inclusion in this *Final EIR* ~~DEIR~~. As a result, the analyses of such impacts, though "worst-case," nonetheless are general or qualitative in nature. In the instances where specific information is available, the environmental impacts are quantified to the level of detail warranted by the information available.

Additionally, CEQA Guidelines §15124(d)(1) require a public agency to identify the following specific types of intended uses:

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

See Section 2.4.12 for a discussion of public agencies' approvals and permits that may be required.

1.5 SCOPE OF EIR

CEQA requires that the environmental impacts of a proposed project be evaluated and feasible methods to reduce, avoid or eliminate identified potentially significant adverse impacts of the project be considered. To fulfill the purpose and intent of CEQA, the SCAQMD, as the lead agency, directed the preparation of *a* ~~this~~ DEIR, which addresses the potential environmental impacts associated with modifications at the AES generating station.

It should be noted that the Final Environmental Assessment for the RECLAIM program (October 1993) analyzed potential adverse environmental impacts associated with various add-on pollution controls expected to be used to comply with RECLAIM. In particular, the Final Environmental Assessment for the RECLAIM program incorporated by reference previously prepared environmental analyses conducted for specific add-on pollution controls (e.g., selective catalytic reduction) that could be used by power generating facilities to comply with NO_x control requirements. To the extent that these analyses adequately address the potential environmental impacts associated with this project, no further analysis will be required (CEQA Guidelines §15152(d)).

1.6 EIR SUMMARY

CEQA Guidelines, Section 15123 requires an EIR to include a brief summary of the proposed actions and their consequences. In addition, areas of controversy including issues raised by the public must also be included in the executive summary. This *Final EIR* ~~DEIR~~ consists of the following chapters: Chapter 1 - Executive Summary; Chapter 2 - Project Description; Chapter 3 - Existing Setting, Chapter 4 - Environmental Impacts and Mitigation; Chapter 5 - Project Alternatives; and two appendices. The following subsections briefly summarize the contents of each chapter.

1.6.1 Summary of Chapter 1 - Executive Summary

Chapter 1 includes a discussion of the legislative authority that requires or provides for the SCAQMD to act as Lead Agency for this project and also identifies general CEQA requirements. Chapter 1 presents summaries of the remaining chapters that comprise this *Final EIR* ~~DEIR~~.

1.6.2 Summary of Chapter 2 - Project Description

Chapter 2 describes the SCR units to be installed and it provides details regarding the operation and monitoring of these units. Chapter 2 also describes the construction activities that would occur and discusses the project's objectives, which include:

- To comply with RECLAIM Program or requirements imposed on the Alamitos Generating Station;
- To reduce NO_x emissions from Units 1, 2, 3, and 4;
- To minimize operational impacts by limiting changes to existing systems or technologies at the facility; and
- Provides for the terms of a settlement agreement with the SCAQMD, which provides for AES to begin installation of pollution control equipment at the Alamitos facility starting early in 2001, such that affected power generating units can be put into use by summer 2001.

1.6.3 Summary of Chapter 3 - Existing Setting

Pursuant to the CEQA Guidelines §15125, Chapter 3 - Existing Setting, includes descriptions of those environmental areas that could be adversely affected as a result of the implementation of the proposed SCR project as they existed at the time the NOP/IS was released for public review. The Initial Study identified two areas where adverse impacts potentially could occur as a result of the proposed project: Hazards and Hazardous Materials and Air Quality. The following subsections briefly highlight the existing settings for these two environmental areas. Other environmental topic areas where no adverse impacts are anticipated are presented in Section 1.6.4.4.

1.6.3.1 Air Quality

Over the last decade and a half, there has been significant improvement in air quality in the SCAQMD's jurisdiction. Nevertheless, several air quality standards are still exceeded frequently and by a wide margin. Of the national Ambient Air Quality Standards (AAQS) established for six criteria pollutants (ozone, lead, sulfur dioxide, nitrogen dioxide, carbon monoxide, and PM_{10}), the area within the SCAQMD's jurisdiction is in attainment for the lead, nitrogen dioxide, and sulfur dioxide standards. Chapter 3 provides a brief description of the existing air quality setting for each criteria pollutant, as well as the human health effects resulting from each pollutant.

As stated previously, stationary source equipment, including combustion equipment, is regulated by the SCAQMD. Accordingly, the proposed project is being developed by AES to reduce emissions of NO_x from its operations for the purpose of achieving regulatory compliance with the RECLAIM Program. NO_x emissions are produced as part of the combustion process and, absent appropriate controls, would be vented into the atmosphere with other flue gas constituents. NO_x is formed by the oxidation of atmospheric nitrogen during combustion and from the oxidation of bound nitrogen in organic fuels. The amount of NO_x formed depends, in part, upon the available oxygen supply and combustion temperature.

1.6.3.2 Hazards and Hazardous Materials

The Alamitos facility currently has two units (Units 5 and 6) with SCR and associated aqueous ammonia storage. The proposed project would add SCR to the remaining four units and increase the onsite storage of 29 percent aqueous ammonia by adding three aboveground storage tanks and ancillary piping, pumps and secondary containment.

The transportation of aqueous ammonia would occur along major interstates on a currently-approved route, and would be regulated by the U.S. Department of Transportation (DOT) and the California Highway Patrol (CHP).

1.6.4 Summary of Chapter 4 - Environmental Impacts and Mitigation

CEQA Guidelines Section 15126.2(a) requires the following: "An EIR shall identify and focus on the significant environmental effects of the proposed project... Direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects."

The following subsections briefly summarize the analysis of potential adverse environmental impacts from the adoption and implementation of the proposed project.

1.6.4.1 Air Quality

Implementation of the proposed SCR project would reduce NO_x emissions from Units 1, 2, 3, and 4 by at least 90 percent. Construction emissions would occur from demolition of existing equipment, preparation of the site for the installation of the ammonia tanks, and installation of the SCR systems and related equipment. None of the criteria pollutant would exceed significance thresholds during construction. It is anticipated that the construction activities for the project would occur for approximately three months.

The environmental review also revealed that there would be no significant adverse direct or cumulative air quality impacts associated with operational activities once the proposed project has been implemented. The proposed SCR project is expected to achieve direct and cumulative air quality benefits from a significant reduction (at least 90 percent) of NO_x emissions from Units 1, 2, 3, and 4.

1.6.4.2 Hazards and Hazardous Materials

The hazards impacts analysis in Chapter 4 examines the construction and operational hazards of implementing the SCR project. Hazard impacts associated with the construction of the SCR project would be insignificant. The analysis of hazards associated with the transportation and storage of aqueous ammonia for operation of the SCR project concluded that the potential hazard impacts, though low, would remain significant after mitigation.

1.6.4.3 Mitigation

Although there are no significant construction emission impacts, AES anticipates the application of the mitigation measures listed in Table 1-1 to further reduce emissions during construction. The implementation of the proposed project would result in certain unmitigable hazards impacts during operation. Table 1-1 summarizes the impacts and mitigation measures associated with the environmental impact areas analyzed for the proposed project.

1.6.4.4 Environmental Impacts Found Not To Be Significant

The Initial Study for the proposed project includes an environmental checklist of approximately 15 categories of potential environmental impacts. As discussed above, review of the current proposed project identified two categories for further review in the *Final EIR* ~~DEIR~~. The Initial Study concluded that the project would have no significant direct or indirect adverse effects on the remaining environmental categories. Therefore, the SCAQMD has determined that there will be no significant impacts to the following environmental areas as a result of implementing the proposed project:

- Aesthetics
- Agriculture Resources
- Biological Resources
- Cultural Resources
- Energy
- Geology/Soils
- Hydrology/Water Quality
- Land Use and Planning
- Mineral Resources
- Noise
- Population and Housing
- Public Services
- Recreation
- Solid/Hazardous Waste
- Transportation/Traffic.

Table 1-1
Environmental Impacts from the Project

Environmental Impact Area	Significance Determination	Mitigation Measures	Significance After Mitigation
Air Quality			
Construction:			
Direct/Indirect	Not Significant	AQ-1 Utilize existing power poles rather than temporary internal combustion engine power generators. AQ-2 Use low sulfur fuel for stationary construction equipment. AQ-3 Maintain construction equipment engines by keeping them properly tuned. AQ-4 Minimize vehicle idling time, where applicable.	Not Significant
Operational*:			
Direct	Not Significant	None Required	Not Significant
Indirect	Not Significant	None Required	Not Significant
Hazards			
Construction:	Not Significant	None Required	Not Significant
Operational:			
Direct/Indirect	Significant	H-1 No transport of aqueous ammonia during school hours or between 7 a.m. – 9 a.m. and 4 p.m. – 6 p.m.	Significant

* Air Quality benefits associated with the implementation of the proposed fleet vehicle rules and related amendments are discussed in Chapter 4 of this *Final EIR* ~~DEIR~~.

1.6.5 Summary of Chapter 5 – Project Alternatives

Chapter 5 provides a discussion of alternatives to the proposed project as required by the CEQA Guidelines. The alternatives analyzed include measures for attaining the objectives of the proposed project and provide a means for evaluating the comparative merits of each alternative. Table 1-2 lists the alternatives considered by the SCAQMD and how they compare to the proposed project.

Alternative A - No Project

Section 15126.6(e)(1) of the CEQA Guidelines requires that "(t)he specific alternative of 'no project' shall be also be evaluated..." The No Project Alternative would consist of continued operation of Units 1, 2, 3, and 4 under existing conditions. In other words, the proposed aqueous ammonia storage tanks would not be constructed and associated SCR systems would not be retrofitted onto Alamitos Generating Station Units 1, 2, 3, and 4.

Table 1-2
Comparison of Adverse Environmental Impacts
Associated with Project Alternatives

Environmental Topic	Alternative A (No Project)	Alternative B (19 Percent Aqueous Ammonia)	Proposed Project (29 Percent Aqueous Ammonia)
Air Quality Pollutants[a] - NO_x			
Construction	Not Significant	Not Significant	Not Significant
Operational	Not Significant; However, NO_x emission reduction would be foregone	Not Significant	Not Significant
Hazards	Not Significant	Significant, due to additional 50% increase in tanker truck deliveries; impacts would be greater than proposed project	Significant

a Emission benefits and increases associated with the proposed project.

Installation of the SCR systems on the existing Units 1, 2, 3, and 4 are required in order for the facility to comply with future RECLAIM Program requirements and, in turn, to continue supplying reliable in-Basin power. More specifically, the No Project alternative would likely result in exceedances of the Alamitos facility's Annual Allocation of NO_x emissions, which could subject AES to substantial fines, penalties and closures, and reduce its ability to meet peak energy demands in the Basin and in California.

Alternative B - 19 Percent Aqueous Ammonia

This alternative would be similar to the proposed project, i.e., aqueous ammonia would be utilized with SCR units to reduce NO_x emissions. The lower percentage of aqueous ammonia would require a redesign of piping from the storage tanks to the stacks. The storage tanks would be located in approximately the same location and would be aboveground, double-walled, carbon steel, individually-bermed storage tanks.

Ammonia truck deliveries to the facility would increase by approximately 50 percent over the number that would occur with the proposed project. Also, two types of aqueous ammonia (19 and 29 percent) would be delivered to the facility because Units 5 and 6 currently operate with 29 percent aqueous ammonia.

Additionally, due to larger flow volumes going into the gas path, the possibility of a visible plume occurring at the stack exit would increase by using 19 percent aqueous ammonia.

Table 1-3 presents a matrix that again lists potential impacts associated with the proposed project and the project alternatives for the specific environmental topics analyzed in this *Final EIR* ~~DEIR~~. The table also provides a ranking of the proposed project and the project alternatives based on the level of potential impacts and the ability to meet project objectives.

Table 1-3
Ranking of Alternatives[a]

	Air Quality	Hazards	Project Objectives Met[b]	Ranking[c]
Proposed Project (29 Percent Aqueous Ammonia)	• No construction impacts. • Net beneficial effect on long-term operational emissions as a result of NO_x emission reduction. • No cumulative impacts. (Refer to Section 4.2)	• No construction impacts. • Unmitigable, significant impact related to aqueous ammonia. • No cumulative impacts. (Refer to Section 4.3)	4 out of 4	**1**
Alternative A (No Project)	• No construction impacts. • Continuation of existing operation would not realize the NO_x reduction benefits of SCR. (Refer to Section 5.4.1.1)	• No new impacts. (refer to Section 5.4.1.1)	1 out of 4	**3**
Alternative B (19 Percent Aqueous Ammonia)	• Same air quality impacts as Proposed Project (see description above). • 50% increase in tanker truck deliveries (greater, but not significant, operational impacts) (Refer to Section 5.4.1.2)	• Same hazard impacts as Proposed Project (see description above). • 50% increase in tanker truck deliveries increases probability of tanker truck failure. (Refer to Section 5.4.2.2)	3 out of 4	**2**

a Air Quality and Hazards are the only topics analyzed because, as discussed in the EIR, the proposed project and two alternatives would not result in significant impacts in other environmental topic areas. Refer to Section 4.4 for a detailed discussion of environmental impacts found not to be significant.

b The number of project objectives met by the proposed project or alternative. (Refer to Section 2.3 of EIR)

c The ranking is based on which action will meet the most project objectives with the least significant impacts. “1” is the highest ranking and “3” is the lowest ranking.

CHAPTER 2

PROJECT DESCRIPTION

Project Location

Background

Project Objectives

Project Description

2.1 PROJECT LOCATION

The City of Long Beach is situated along the Pacific Ocean, to the southeast of the Palos Verdes peninsula in Los Angeles County. Within the city limits are residential areas, a power generating station (AES Alamitos Generating Station), oil production facilities, light industry, and the Long Beach Harbor. Several commercial corridors serve the needs of the community.

As of 1990, the population of Long Beach was approximately 440,000, which is distributed throughout 49.7 square miles. The terrain generally slopes toward the ocean. The Long Beach Harbor extends for approximately five miles to the south and west of the city, and the Long Beach Marina is situated on the east side of the city, just south of the proposed project location. The City of Seal Beach, which is adjacent to the proposed project location on the eastern side, has a population of approximately 25,000 (10.7 square miles) and Los Alamitos to the northeast has a population of approximately 12,000 (2.25 square miles).

The project is proposed to be constructed at the Alamitos Generating Station, which is located at 690 North Studebaker Road in the City of Long Beach, California. Figure 2-1 shows the vicinity and the project site location. The Alamitos Generating Station is located on the eastern side of the City of Long Beach, and is bounded by 7th Street to the north, the San Gabriel River to the east, Westminster Avenue to the south, and North Studebaker Road to the west. The City of Seal Beach is adjacent to the eastern edge of the facility across the San Gabriel River. The Alamitos Generating Station occupies about 165 acres and is surrounded by industrial and some residential properties. Figure 2-2 shows the location of all three proposed aqueous ammonia storage tanks, which would be located approximately 500 feet from Units 1 through 4, in the central portion of the 165-acre site.

2.2 BACKGROUND

Regulation XX - Regional Clean Air Incentives Market (RECLAIM) is a regulatory program designed and adopted by the SCAQMD to reduce oxides of nitrogen (NO_x) and sulfur dioxides (SO_2) emissions from stationary sources in the areas within the jurisdiction of the SCAQMD, while lowering the cost of attaining clean air through the use of market incentives. The goals of RECLAIM are to assist SCAQMD in its efforts to attain and maintain state and national ambient air quality standards, and to give affected facilities added flexibility in meeting their emission reduction requirements, to lower the cost of compliance. The emission reduction goals are established in the form of declining Annual Allocations. Facilities comply with RECLAIM by installing control equipment that limits their annual NO_x and/or SO_x emissions to below or equal to their Annual Allocations or by purchasing additional RECLAIM Trading Credits (RTCs) to account for any exceedances above their Annual Allocations. AES Southland, L.L.C. is proposing to install SCR on the Alamitos Units 1, 2, 3, and 4 as part of their plan to meet the declining facility-wide NO_x emission limits required by the RECLAIM Program.

Insert Figure 2-1

Insert Figure 2-2

2.3 PROJECT OBJECTIVES

CEQA Guidelines §15124(b) requires a CEQA document to include a statement of objectives, which describes the underlying purpose of a proposed project. The purpose of the statement of objectives is to aid the decision-makers in evaluating the benefits of the project, in preparing findings regarding the project and, if necessary, issuing a statement of overriding considerations, concerning the need for the project. The objectives of the proposed project are:

- To comply with Regulation XX, specifically the declining annual RECLAIM Allocations for the Alamitos Generating Station;
- To reduce NO_x emissions from Units 1, 2, 3, and 4;
- To minimize operational impacts by limiting changes to existing systems or technologies at the facility; and
- Provides for the terms of a settlement agreement with the SCAQMD, which provides for AES to begin installation of pollution control equipment at the Alamitos facility starting early in 2001, such that affected power generating units can be put into use by summer 2001.

2.4 PROJECT FEATURES

The proposed SCR project consists of the installation of: 1) four SCR reactor units within the existing boilers of Units 1, 2, 3 and 4; 2) carbon steel assembly comprised of four reactors; 3) three 20,000-gallon double-walled, aboveground, and separately contained carbon steel ammonia storage tanks; and 4) control equipment that would be incorporated into the existing generating station distribution control system with new interface hardware. Aqueous ammonia would be transported to the facility via tanker truck along the existing approved route, which was established prior to and in conjunction with the installation of SCR on Units 5 and 6.

All new equipment would be located within the existing fenceline of the Alamitos Generating Station. The SCR reactor units would be encased in the existing boiler duct works and would not be visible off-site. All other new components would be installed close to the existing boiler structure and would not be visible off-site. A temporary construction area would be located at the rear of the units.

2.4.1 Selective Catalytic Reduction (SCR) Units

As part of the combustion process, NO_x is produced and, if not controlled properly, is emitted to the atmosphere along with the other flue gas constituents (mostly nitrogen, carbon dioxide, and water vapor). SCR is a proven air pollution control technology that uses a reducing agent (ammonia) to reduce NO_x to nitrogen and water in the presence of a catalyst. In an SCR system, ammonia is injected into the boiler flue gas. The ammonia/flue gas mixture flows through a catalyst that accelerates the reaction between the ammonia and the NO_x. Ammonia used for SCR systems typically is stored in one or more storage tanks. The ammonia is piped from the tank to the boiler where it is mixed with flue gas before passing through the catalyst. The catalyst is composed of individually extruded homogenous honeycomb ceramic elements of approximately six inches by six inches to 38 inches in diameter packed into steel support modules of 105 inches by 75 inches by 49 inches. The catalyst's active elements are formulated from a proprietary mixture of titanium dioxide and vanadium pentoxide. At the end of the catalyst's useful life (three years or more), the catalyst modules would be recycled by the catalyst manufacturer, MHIA, or disposed according to federal, state and local regulations, offsite and in an appropriate disposal facility.

The SCR reactor would be installed in the existing boiler footprint. There would be no modifications to the boilers or burners except for the addition of ductwork to the gas path. The reactor housing is a steel fabricated assembly with structural supports, ladders and platforms, catalyst removal doors, and catalyst removal hardware. The reactor would be provided in multiple sections for erection at the site. The reactor includes an internal framework to support the catalyst. There is no NO_x limit established in the draft Title X permit, however, an allowable ammonia slip limit is 10 parts per million (ppm).

2.4.2 Aqueous Ammonia Storage Tanks

AES proposes to use a 29.4 percent aqueous ammonia solution for the SCR systems serving Units 1 – 4 at the Alamitos Generating Station. The proposed project consists of storing aqueous ammonia in three new, 20,000-gallon, double-walled, aboveground, and separately contained carbon steel ammonia storage tanks. The storage tanks are ASME-registered U-stamped pressure vessels designed for ammonia service. To minimize potential ammonia leakage, the tanks would utilize a double-wall design. The inter-wall space is isolated from the main storage space and is independently drainable. The ammonia supply of the boiler SCR units would be taken from these storage tanks.

Units 1 and 2 would utilize one tank (located south of Unit 1) and Units 3 and 4 would utilize two tanks (located south of Unit 3). Please refer to Figure 2-2 for tank locations. The proposed tanks are horizontal, and have a nominal capacity of 20,000 U.S. gallons. The tanks will be capable of withstanding pressures of 25 pounds per square inch gage (psig), which is designed for the worst-case ambient temperature condition of 125 degrees Fahrenheit.

Each storage tank would be placed within a concrete berm that would be 595.5 square feet. The berms have design capacities of 110 percent and account for the 6.4 inches (over 24 hours) of cumulative rainfall for a 25-year frequency storm.

There are no NO_x limits on the units, per the draft Title X permit, and the allowable ammonia slip limit is 10 parts per million (ppm).

2.4.3 Vaporization and Injection of Ammonia for SCR Operations

Two 100-percent capacity hot air fans, one operating and one spare, will provide preheated dilution air to convey the ammonia to the injection grids upstream of the SCR catalyst, downstream of the boiler economizer. The dilution air is taken from the air pre-heater air outlet to provide the flow and pressure requirements to ensure that the ammonia vaporizer outlet temperature remains above 300°F, assuring complete vaporization of ammonia and preventing localized condensation.

Hot air from the fans flows through a common plenum into a vaporizer at a constant flow. Flow of NH_3 solution into the vaporizer is regulated primarily by NO_x concentration in the flue gas upstream of the SCR. The vaporized NH_3 solution is injected into the vaporizer using a supersonic atomizing nozzle. The small droplet size of the ammonia allows the ammonia to quickly vaporize and thoroughly mix with hot air before the gas stream exits the vaporizer.

The injection grid is divided into multiple regions. Valves for each region permit the NH_3 flow rate to be individually adjusted during initial commissioning to optimize NO_x reduction and to account for duct NO_x stratification.

2.4.4 Aqueous Ammonia Flow Control

The flow control of the NH_3 solution into the vaporizers is established by an algorithm that uses several parameters, including SCR inlet NO_x concentration, to determine the amount of NH_3 needed to maintain compliance with a specific emission limit. The measured SCR outlet NO_x concentration is used to modify the NH_3 flow rate and optimize performance. Standard control valves are provided to control NH_3 flow.

The existing emissions monitoring system on the boiler will be used to assess of SCR outlet NO_x concentration. No physical modification to the emission reporting system will be necessary. However, the SCAQMD will require that the existing Continuous Emissions Monitoring Systems (CEMS) be re-certified for lower level reading accuracy.

2.4.5 Aqueous Ammonia Storage Tank Refilling Operations

The ammonia storage tanks are filled via vendor tanker trucks deliveries scheduled at regular intervals based upon ammonia consumption. Truck supply hoses are connected to a loading bulkhead. Transfer pumps, hose purge equipment, and loading controls are provided on the tanker truck itself. To retain a closed system and minimize potential leakage, the loading system design incorporates both liquid fill hoses and vapor return hoses. Upon completion of filling operations, all lines are purged with compressed air prior to being disconnected.

2.4.6 Aqueous Ammonia Transport

The aqueous ammonia for this project would be trucked in 6,000-gallon tanker trucks to the Alamitos Generating Station by a local distributor within the Basin. The distributor receives the ammonia as anhydrous ammonia, delivered by rail from manufacturing facilities outside the Basin, before converting it to aqueous ammonia.

AES anticipates purchasing its aqueous ammonia from Pacific Diazo Products. This primary supplier will ship the aqueous ammonia from Fontana on Interstates I- 15, I- 10, and I-605 to the Alamitos Generating Station in Long Beach, a distance of approximately 63 miles. Currently, AES receives about 170 aqueous ammonia deliveries per year. The proposed project will add approximately 240 new trips per year.

As stated in the EIR for Unit 6 (1993) the only practical mitigation to an ammonia spill during transport is the application of emergency response procedures as currently utilized by hazardous materials units, police, and other appropriate personnel. Emergency response to a hazardous materials release typically includes stopping, containing, and diluting or covering the spill and/or collecting and removing the material from the environment. The transport of aqueous ammonia for the proposed project will adhere to these existing mitigation measures.

2.4.7 Criteria Pollutant and Ammonia Monitoring

Monitoring would be performed as required by the current Title V application. Additional monitoring for ammonia would be implemented as a result of the proposed modification. Continued adherence to the current Title V monitoring requirements and the proposed ammonia monitoring would result in on-going compliance with applicable air quality rules and regulations. The application for Compliance Certification held for the facility verifies current compliance with such regulations. On-going monitoring is performed in accordance with Regulation XX – RECLAIM.

2.4.8 Compliance Monitoring

Ammonia flow would be monitored on a continuous basis. The proposed monitoring is based on the monitoring requirements previously established for the SCR systems on Unit 5 and 6 at the Alamitos Generating Station. AES proposes to install and maintain a flow meter to accurately indicate the flowrate of the total hourly throughput of the injected ammonia. The meter would be equipped with a device to continuously record the ammonia flow rate. The measuring device or gauge would be accurate to within plus or minus five percent. It would be calibrated once every twelve months.

Further, AES would conduct a source test on each boiler every year to determine the ammonia emissions at the outlet. AES would test each boiler every other year provided both boilers are in operation. The test would be conducted using District Method 207.1 (or other SCAQMD approved method) over a 60-minute averaging time, in order to demonstrate compliance with the BACT ammonia limit established under SCAQMD Rule 1303.

Any compliance monitoring required by the facility Risk Management Plan (RMP) also would be implemented. Consistent with recent California Energy Commission and EPA Prevention of Significant Deterioration (PSD) permit monitoring requirements, standard industry practice for calculating the concentration of ammonia slip would be utilized by AES. More specifically, slip concentrations will be calculated using ammonia flow and source test data and based on concentration of NO_x removed versus measured ammonia flow. Compliance with the ammonia slip limit would be demonstrated using the following calculation:

Ammonia slip ppmv @ x % O_2 = ((a - (b*c/1,000,000)) * 1,000,000 / b) * d

Where:

a = ammonia injection rate (lb/hr)/17(lb/lb. mol)
b = dry exhaust gas flow rate (lb/hr)/29(lb/lb. mol)
c = change in measured NO_x concentration ppmv at x % O_x across catalyst
d = correction factor (derived by comparing the measured and calculated ammonia slip during annual [or other agreed upon frequency] compliance testing).

2.4.9 Safety Features

A number of safety features would be incorporated into the design of the system to minimize the likelihood of an accidental ammonia release. Because of the comprehensive regulations in place regarding the use and transportation of ammonia, the design of systems utilizing ammonia in conjunction with strict ammonia handling procedures have significantly reduced the potential for accidental releases. Regarding the safety systems incorporated into the proposed project, the system design will adhere to all appropriate codes and standards including Occupational Safety and Health Association (OSHA), American Society of Mechanical Engineers (ASME), and American National Standards Institute (ANSI). AES Alamitos Generating Station's *Hazardous Material Release Contingency Plan* would be updated to reflect the proposed additional storage of aqueous ammonia at the facility.

To further reduce potential safety risks, ammonia leakage detectors would be installed at the storage tank-loading bulkhead and in the immediate vicinity of the storage tank, pump skid, and flow control/vaporizer skid is a leak is detected. The leakage detector triggers an alarm in the control room and sets off a local flashing light and horn. In response to an ammonia vapor alarm, the generating station operators would shut down the ammonia feed supply to prevent excessive ammonia from being spilled.

2.4.10 Construction

Construction activities are anticipated to take place five days per week, Monday through Friday, from 6:00 a.m. to 5:00 p.m. for approximately four months. However, night and/or weekend shifts may be required to maintain the proposed construction schedule. The construction shift size is expected to be approximately 50 people of a variety of trades, including mechanics and boiler makers. Construction equipment will include a fork lift, backhoe or bobcat, wackers, welding machines, and cranes.

To minimize potential construction noise impacts, AES will require contractors to use electric tools and welding machines (approximately 70 to 75 decibels) versus air or diesel tools (90 to 100 decibels). The use of electric equipment will keep construction noise below the City's noise limit of 75 decibels.

2.4.11 Operation

The proposed project would not require any additional workers for operations. The project would operate whenever Units 1, 2, 3, and 4 generate electric power, up to 24 hours per day for 365 days per year.

Noise generated by AES' current operations has been minimized by the use of sound enclosures on existing equipment. For example, Units 5 and 6 have blower equipment that is enclosed in custom designed insulation shields. AES would incorporate similar effective noise control methods for the proposed project. For example, the hot gas blowers (four 100 hp/3,600 rpm) used to move the dilution media would be externally insulated for thermal and audible protection. Also, SCR equipment for Units 1 and 2 would be housed within a building, acting as a noise suppression measure. SCR equipment on Units 3 and 4 would be installed on the exterior.

2.4.12 Permits and Approvals

The proposed project will not require any local discretionary actions (e.g., Conditional Use Permit or Coastal Development Permit). Building Permits will be required by the City of Long Beach, Building Department. The Long Beach Fire Department must approve the project prior to final approval for the Building Permits. The generating station will be required to update the California Accidental Release Prevention (CalARP) Program and Emergency Response Business Plan to reflect the addition of the new SCR units. Also, an Authority to Construct and a Permit to Operate must be obtained from the SCAQMD. Lastly, the Continuous Emissions Monitoring System must be recertified by SCAQMD and USEPA.

CHAPTER 3

EXISTING SETTING

Introduction

Air Quality

Hazards and Hazardous Materials

3.1 INTRODUCTION

In order to determine the significance of the impacts associated with a proposed project, it is necessary to evaluate the project's impacts against the backdrop of the environment as it exists at the time the NOP/IS is published. The CEQA Guidelines define "environment" as "the physical conditions that exist within the area which will be affected by a proposed project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historical or aesthetic significance" (CEQA Guidelines §15360; see also Public Resources Code §21060.5). Furthermore, a CEQA document must include a description of the physical environment in the vicinity of the project, as it exists at the time the notice of preparation is published, from both a local and regional perspective (CEQA Guidelines §15125). Therefore, the "environment" or "existing setting" against which a project's impacts are compared consists of the immediate, contemporaneous physical conditions at and around the project site (Remy, et al; 1996).

3.1.1 Existing Generating Station Configuration and Operation

The Alamitos Generating Station has six units actively generating power. Utility boilers at the Generating Station use natural gas as the primary combustion fuel to produce steam. The steam produced in the utility boiler is vented to steam turbine generators to produce electricity. SCR technology, including a 20,000-gallon aqueous ammonia storage tank, was installed at the Generating Station in 1994 on Units 5 and 6. Noise suppression equipment is installed on the forced draft fans for Units 5 and 6.

The following sections describe the existing setting for each environmental topic analyzed in this report, i.e., air quality and hazards and hazardous materials. In Chapter 4, potential adverse impacts from these identified environmental areas are then compared to the existing setting to determine whether the effects of the implementation of the proposed project are significant.

3.2 AIR QUALITY

3.2.1 Regional Climate

The regional climate significantly influences the air quality in the Basin; temperature, wind, humidity, precipitation and even the amount of sunshine influences the quality of the air. In addition, the Basin is frequently subjected to an inversion layer that traps air pollutants.

Annual average temperatures throughout the Basin vary from the low to middle 60º F. Due to decreased marine influence, however, the eastern portion of the Basin shows greater variability in average annual minimum and maximum temperatures. January is the coldest month throughout the Basin, with average minimum temperatures of 47° F in downtown Los Angeles and 36 °F in San Bernardino. All portions of the Basin have recorded maximum temperatures above 100 °F. Temperature has an important influence on Basin wind flow, pollutant dispersion, vertical mixing, and photochemistry.

Although the climate of the Basin can be characterized as semi-arid, the air near the land surface is quite moist on most days because of the presence of a marine layer. This shallow layer of sea air is an important modifier of Basin climate. Humidity restricts visibility in the Basin, and the conversion of sulfur dioxide to sulfates is heightened in air with high relative humidity. The marine layer is an excellent environment for that conversion process, especially during the spring and summer months. The annual average relative humidity is 71 percent along the coast, and 59 percent inland. Because the ocean effect is dominant, periods of heavy early morning fog are frequent, and low stratus clouds are a characteristic feature. These effects decrease with distance from the coast.

More than 90 percent of the Basin's rainfall occurs from November through April. Annual average rainfall varies from about nine inches in Riverside to 14 inches in downtown Los Angeles. Monthly and yearly rainfall totals are extremely variable. Summer rainfall usually consists of widely scattered thundershowers near the coast and slightly heavier shower activity in the eastern portion of the region and near the mountains. Rainy days comprise five to 10 percent of all days in the Basin with the frequency being higher near the coast. The influence of rainfall on the contaminant levels in the Basin is minimal. Although some wash-out of pollution would be expected with winter rains, air masses that bring precipitation of consequence are very unstable and provide excellent dispersion that masks wash-out effects. Summer thunderstorm activity affects pollution only to a limited degree. If the inversion is not broken by a major weather system, high contaminant levels can persist even in areas of light showers. However, heavy clouds associated with summer storms minimize ozone production because of reduced sunshine and cooler temperatures.

Due to the generally clear weather, about three-quarters of possible sunshine is received in the Basin (the remaining one-quarter is absorbed by clouds). The ultraviolet portion of this abundant radiation is a key factor in photochemical reactions. On the shortest day of the year there are about 10 hours of possible sunshine, and about 14-½ hours on the longest day of the year. The percentage of cloud cover during daylight hours varies from forty-seven percent at Los Angeles International Airport (LAX) to thirty-five percent at Sanberg, a mountain location. The number of clear days also increases with distance from the coast; 145 days at LAX and 186 days at Burbank (Local Climatological Data, 1999). The Basin typically receives much less sunshine during the first six months of the year than the last six months. This difference is attributed to the greater frequency of deep marine layers and the subsequent increase in stratus clouds during the spring and to the fact that the rainy season begins late in the year, November, and continues through early spring.

The importance of wind to air pollution is considerable. The direction and speed of the wind determines the horizontal dispersion and transport of air pollutants. During the late autumn to early spring rainy season, the Basin is subjected to wind flows associated with traveling storms moving through the region from the northwest. This period also brings five to 10 periods of strong, dry offshore winds, locally termed "Santa Anas" each year. During the dry season that coincides with the months of maximum photochemical smog concentrations, the wind flow is bimodal, typified by a daytime onshore sea breeze and a nighttime offshore drainage wind. Summer wind flows are created by the pressure differences between the relatively cold ocean and the unevenly heated and cooled land surfaces that modify the general northwesterly wind circulation over southern California. Nighttime drainage begins with the radiational cooling of the mountain slopes; heavy, cool air descends the slopes and goes through the mountain passes and canyons as it follows the lowering terrain toward the ocean. Another characteristic wind regime in the Basin is the "Catalina Eddy," a low level cyclonic (counterclockwise) flow centered over Santa Catalina Island which results in an offshore flow to the southwest. On most spring and summer days, some indication of an eddy is apparent in coastal sections.

The vertical dispersion of air pollutants in the Basin is frequently restricted by the presence of a persistent temperature inversion in the atmospheric layers near the earth's surface. Normally, the temperature of the atmosphere decreases with altitude. However, when the temperature of the atmosphere increases with altitude, the phenomenon is termed an inversion. An inversion condition can exist at the surface or at any height above the ground. The bottom of the inversion, known as the mixing height, is the height of the base of the inversion.

In the Basin, there are two distinct temperature inversion structures that control vertical mixing of air pollution. During the summer, warm, high-pressure descending (subsiding) air is undercut by a shallow layer of cool marine air. The boundary between these two layers of air is a persistent marine subsidence/inversion. This boundary prevents vertical mixing which effectively acts as an impervious lid to pollutants over the entire Basin. The mixing height is normally situated 1,000 to 1,500 feet above mean sea level.

A second inversion-type forms in conjunction with the drainage of cool air off the surrounding mountains at night followed by the seaward drift of this pool of cool air. The top of this layer forms a sharp boundary with the warmer air aloft and creates nocturnal radiation inversions. These inversions occur mostly in the winter, when nights are longer and onshore flow is weakest. They are typically only a few hundred feet above mean sea level. They very effectively trap pollutants near ground level, such as NO_x and carbon monoxide (CO) from vehicles, as the pool of cool air drifts seaward. Winter is therefore a period of high levels of primary pollutants along the coastline.

In general, inversions in the Basin are lower before sunrise than during the daylight hours. As the day progresses, the mixing height normally increases as the warming of the ground heats the surface air layer. As this heating continues, the temperature of the surface layer approaches the temperature of the base of the inversion layer. When these temperatures become equal, the inversion layer's lower edge begins to erode and if enough warming occurs, the layer breaks up. The surface layers are gradually mixed upward, diluting the previously trapped pollutants. The breakup of inversion layers frequently occurs during mid- to late-afternoon on hot summer days. Winter inversions usually break up by mid-morning.

3.2.2 Meteorology in the Vicinity of the Project

The coastal area in the vicinity of the Alamitos Generating Station is dominated by a semi-permanent, subtropical, Pacific high-pressure system. Generally mild, the climate is tempered by cool sea breezes, but may be infrequently interrupted by periods of extremely hot weather, passing winter storms, or Santa Ana winds.

The Alamitos Generating Station is located along the coast to the south and east of LAX in an area where the topography is relatively flat with the Long Beach Harbor to the south. The most characteristic feature of the climate in the area is the night and morning low cloudiness and sunny afternoons that prevail during the spring and summer months, and occur often during the remainder of the year. Daily temperature range is usually less than 15°F in the spring and summer, and 20°F in the fall and winter. Rainfall averages about 12 inches a year, falling almost entirely from late October to early April. Average normal high temperatures are slightly higher than LAX, and average normal low temperatures are slightly lower. Precipitation and humidity levels are very similar to LAX. The meteorological data (temperature and precipitation) from the Los Angeles International Airport are detailed in Table 3-1.

Typical winter and summer season wind patterns for morning and afternoon for the Basin are shown in Figure 3-1. An annual wind rose for Long Beach, representative of the Alamitos Generating Station is shown in Figure 3-2.

Table 3-1
Average Monthly Temperatures and Precipitation for Los Angeles International Airport, CA, 1961-1990

Month	Los Angeles International Airport		
	Mean Daily Temperatures		Mean Monthly Precipitation (inches)
	Maximum (°F)	Minimum (°F)	
January	65	47	2.40
February	66	49	2.51
March	65	50	1.98
April	68	53	0.72
May	69	56	0.14
June	72	60	0.03
July	75	63	0.01
August	76	64	0.15
September	76	63	0.31
October	74	59	0.34
November	71	52	1.76
December	66	48	1.66
Absolute extreme temperatures	110	23	12.01 (total)

Reference: 1999 Local Climatological Data, Annual Summary with Comparative Data, Los Angeles, California, International Airport

Insert Figure 3-1

Insert Figure 3-2

3.2.3 Setting

Over the last decade and a half, there has been significant improvement in air quality in the Basin, which includes Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino counties. Nonetheless, some air quality standards are still frequently exceeded by a wide margin. Of the National Ambient Air Quality Standards (NAAQS) established for six criteria pollutants (ozone, lead, sulfur dioxide [SO_2] nitrogen dioxide [NO_2] carbon monoxide [CO], and fine particulate matter [PM_{10}]), the Basin is in compliance with the lead, nitrogen dioxide and sulfur dioxide standards. Moreover, the Basin is the only area in the United States that is classified as extreme nonattainment for ozone.

The SCAQMD monitors concentrations of various criteria pollutants at 33 air quality monitoring stations within its jurisdiction. Air quality monitoring data from the North Long Beach Monitoring Station is most representative of the ambient air quality at the proposed project site. The following summarizes the concentration levels of criteria air pollutants monitored over the past three years at the North Long Beach Monitoring Station:

Carbon Monoxide (CO): Concentrations of CO at North Long Beach for the years 1997 through 1999 did not exceed the eight-hour state standard of 9.0 ppm or the eight-hour federal standard of 9.0 ppm.

Ozone (O_3): Concentrations of O_3 recorded at North Long Beach showed that there was one day in 1997 when the one-hour state standard of 0.09 ppm was exceeded; two days in 1998, and three days in 1999. During 1997 and 1998 no exceedances of the national one-hour standard of 0.12 ppm were recorded; there was one day in 1999 on which an exceedance of the national one-hour standard was recorded. For the period 1997 through 1999, no exceedances of the national eight-hour standard were recorded.

Nitrogen Dioxide (NO_2): At the North Long Beach Monitoring Station, there were no exceedances of the state NO_2 standard of 0.25 ppm for the years 1997 through 1999.

Sulfur Dioxide (SO_2): There were no exceedances of the state or federal SO_2 one-hour, eight-hour, or 24-hour standards for the years 1997 through 1999.

Suspended Particulates (PM_{10}): Concentrations of PM_{10} exceeded the twenty-four hour state standard of 50 micrograms per cubic meter of air ($\mu g/m^3$) on ten days in 1997, six days in 1998 and 13 days in 1999.

The number of days that state criteria air pollutant standards were exceeded for the years 1997 through 1999 at the North Long Beach Monitoring Station are presented in Table 3-2. The state and federal ambient air quality standards and the potential health effects are listed in Table 3-3.

As stated previously, stationary source equipment, including combustion equipment, is regulated by the SCAQMD. Accordingly, the proposed project is being developed by AES to reduce emissions of NO_x from its operations as required by SCAQMD Rule 1135 and for the purpose of achieving regulatory compliance with the RECLAIM Program. NO_x emissions are produced as part of the combustion process and, if not properly controlled, are vented into the atmosphere with other flue gas constituents. NO_x is formed by the oxidation of atmospheric nitrogen during combustion and from the oxidation of bound nitrogen in organic fuels. The amount of NO_x formed depends, in part, upon the available oxygen supply and combustion temperature. Control of NO_x emissions is important for at least three reasons: 1) NO_x contributes to atmospheric NO_2; 2) NO_x is a precursor to ozone formation; and 3) NO_x is a precursor to PM_{10} formation.

Table 3-2
Exceedances of State Ambient Air Quality Standards at the North Long Beach Monitoring Station 1997-1999

Pollutant	Year	Number of Days Standard Exceeded	
		State	National
CO	1997	0[a]	
	1998	0[a]	
	1999	0[a]	
Ozone	1997	1[c]	0[b]0[d]
	1998	2[c]	0[b]0[d]
	1999	3[c]	0[b]1[d]
$N0_2$	1997	0	
	1998	0	
	1999	0	
$S0_2$	1997	0	
	1998	0	
	1999	0	
PM_{10}	1997	10	
	1998	6	
	1999	13	

[a] State 9.0 ppm eight hour standard and national 9 ppm eight hour standard
[b] National 0.08 ppm eight hour standard
[c] State 0.09 ppm hourly standard
[d] National 0.12 ppm hourly standard

Table 3-3
Ambient Air Quality Standards

Air Pollutant	State Standard	Federal Primary Standard	Most Relevant Effects
	Concentration/ Averaging Time	Concentration/ Averaging Time	
Ozone	0.09 ppm, 1-hr. avg.	0.12 ppm, 1-hr avg., 0.08 ppm, 8-hr avg.	(a) Short-term exposures: (1) Pulmonary function decrements and localized lung edema in humans and animals (2) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (b) Long-term exposures: Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (c) Vegetation damage; (d) Property damage
Carbon Monoxide	9.0 ppm, 8-hr avg. 20 ppm, 1-hr avg.	9 ppm, 8-hr avg. 35 ppm, 1-hr avg.	(a) Aggravation of angina pectoris and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Impairment of central nervous system functions; (d) Possible increased risk to fetuses
Nitrogen Dioxide	0.25 ppm, 1-hr avg.	0.053 ppm, annual arithmetic mean	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (b) Risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; (c) Contribution to atmospheric discoloration
Sulfur Dioxide	0.04 ppm, 24-hr avg. 0.25 ppm, 1-hr. avg.	0.030 ppm, annual arithmetic mean 0.14 ppm, 24-hr avg.	(a) Bronchoconstriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma
Suspended Particulate Matter (PM_{10})	30 µg/m3, annual geometric mean 50 µg/m3, 24-hr avg.	50 µg/m^3, annual arithmetic mean 150 µg/m3, 24-hr avg.	(a) Excess deaths from short-term exposures and exacerbation of symptoms in sensitive patients with respiratory disease; (b) Excess seasonal declines in pulmonary function, especially in children
Sulfates	25 µg/m^3, 24-hr avg.	None	(a) Decrease in ventilatory function; (b) Aggravation of asthmatic symptoms; (c) Aggravation of cardio-pulmonary disease; (d) Vegetation damage; (e) Degradation of visibility; (f) Property damage
Lead	1.5 µg/m3, 30-day avg.	1.5 µg/m3, calendar quarter	(a) Increased body burden; (b) Impairment of blood formation and nerve conduction
Visibility-Reducing Particles	In sufficient amount to reduce the visual range to less than 10 miles at relative humidity less than 70%, 8-hour average (10am - 6pm)	None	Visibility impairment on days when relative humidity is less than 70 percent

µg/m3 = microgram per meter cubed
ppm = parts per million

3.3 HAZARDS AND HAZARDOUS MATERIALS

The Generating Station is in a highly urbanized area near major transportation corridors. As a result, hazardous and hazardous materials typical in urban and highway settings are present. The transportation, delivery, storage and use of aqueous ammonia for reduction of NO_x is a hazardous materials condition unique to power plants and other operations that combust larger quantities of fuel. The Alamitos facility already has two units with SCR and associated aqueous ammonia storage. The proposed project would add SCR to the remaining four units and also includes increasing the onsite storage of aqueous ammonia by adding three aboveground storage tanks and ancillary piping, pumps and secondary containment.

Currently, approximately 170 truck trips of aqueous ammonia per year are delivered to the AES Alamitos Generating Station. It is transported by a licensed transportation company using equipment that meets U.S. Department of Transportation (DOT) regulations for transportation of hazardous materials. The trucks must comply with DOT and California Highway Patrol regulations for the transportation of hazardous materials and are subject to inspection by those agencies to check compliance with the applicable regulations.

The delivery truck drivers for the existing and proposed 29 percent aqueous ammonia are trained in delivery, spill response and spill reporting. AES employees are trained in safe handling of aqueous ammonia and are present whenever aqueous ammonia is delivered. AES maintains spill containment kits (include absorbent materials, booms, etc.) onsite for use in small spills of aqueous ammonia.

The Alamitos facility maintains Material Safety Data Sheets (MSDSs) for aqueous ammonia onsite for the existing aqueous ammonia storage and use. Should spills occur they would be cleaned up using onsite personnel with onsite materials. If spills cannot be cleaned up with onsite materials and personnel, sub-contractors would be called in to handle the spill. Wastes would be properly characterized and manifested for offsite disposal in compliance with the applicable regulations. Existing facility plans for aqueous ammonia and other hazardous materials used on site have been developed.

C H A P T E R 4

E N V I R O N M E N T A L I M P A C T S A N D M I T I G A T I O N

4.1 INTRODUCTION

The CEQA Guidelines require environmental documents to identify significant environmental effects that may result from a proposed project (CEQA Guidelines §15126.2(a)). Direct and indirect significant effects of a project on the environment shall be clearly identified and described, with consideration given to both short- and long-term impacts. The discussion of environmental impacts may include, but is not limited to, the resources involved; physical changes; alterations of ecological systems; health and safety problems caused by physical changes; and other aspects of the resource base, including water, scenic quality, and public services. If significant environmental impacts are identified, the CEQA Guidelines require a discussion of measures that could either avoid or substantially reduce any adverse environmental impacts to the greatest extent feasible (CEQA Guidelines §15126.4).

CEQA (Public Resources Code, §21000 et seq.), and the CEQA Guidelines as promulgated by the State of California Secretary of Resources, establish the categories of environmental impacts to be analyzed in a CEQA document. Under the CEQA Guidelines, there are approximately 17 environmental categories in which potential adverse impacts from a project are evaluated. Projects are evaluated against the environmental categories in an environmental checklist and those environmental categories where adverse effects may be caused by the project are further analyzed in the appropriate CEQA document.

In accordance with CEQA, an Initial Study, including an environmental checklist, was prepared for this project (see Appendix A). Of the 17 potential environmental impact categories two, air quality and hazards and hazardous materials, were identified as being potentially adversely affected by the proposed project.

It should be noted that for the two environmental impact areas that were identified as potentially significant in the NOP/IS and then are further evaluated in detail here, the impacts analysis utilizes a conservative, "worst-case" approach. In other words, the impact analysis assumes that Units 1, 2, 3, and 4 are operating at full-load (e.g., during summer months when energy consumption is greatest).

4.2 AIR QUALITY

As noted above, the proposed project is being pursued to improve air quality in the Basin, nonetheless, smaller secondary air quality impacts may result from the project. The emissions associated with the proposed project can be classified as construction emissions (temporary, short-term emissions associated with site preparation and installation of the SCR systems) and operational emissions (emissions generated as a result of the operation of the SCR systems, such as NO_x, ammonia slip, particulate emissions, and mobile source emissions from the transport of ammonia).

4.2.1 Construction and Operation Emissions Thresholds/Significance Criteria

Emissions that can adversely affect air quality originate from various activities. A project generates emissions both during the period of its construction and, through ongoing daily operations. Project-related air quality impacts calculated in this environmental analysis will be considered significant if any of the applicable significance thresholds in Table 4-1 are exceeded. This table includes both emissions and related significance thresholds. Construction and non-

RECLAIM source emissions (i.e., indirect source emissions) are compared with pollutant-specific emissions thresholds to determine if the project impacts will be significant.

Additionally, operational NO_x or SO_x emissions from stationary sources regulated under the RECLAIM program (Regulation XX) will be considered significant if they exceed a facility-specific RECLAIM threshold. However, since electric utilities are exempt from the SO_x RECLAIM program (ref: Rule 2001 (I)(2)(A)), this criterion applies only to NO_x emissions from this project. This RECLAIM threshold is calculated based on the project's Initial RECLAIM allocation plus nontradeable credits (NTCs), as listed in the RECLAIM Facility Permit, plus the maximum daily operation NO_x emissions significance thresholds of 55 pounds per day. A project is considered significant if the project's operational emissions, plus the facility's Annual Allocation for the year the project becomes operational (including purchased RECLAIM trading credits (RTCs) for that year) are greater than this RECLAIM significance threshold. Since the NOx emissions significance threshold in Table 4-1 is expressed in pounds per day, the facility's Initial RECLAIM Allocation plus NTCs and the facility's Annual Allocation for the year the project becomes operational, including purchased RTCs, have been converted to pounds per day by dividing by 365 days per year.

As discussed in Section 3.2 of Chapter 3, the Basin is currently designated as a nonattainment area for both CO and PM_{10}. As a result, localized impacts for CO and PM_{10} will be considered significant if they exceed the localized significance thresholds listed in Table 4-1. The localized significance thresholds for these nonattainment pollutants are based on a significant change in air quality concentration levels as defined in Rule 1303, Table A-2.

Although the Basin is currently in attainment for both the CAAQS and NAAQS for NO_2, NO_2 is a precursor pollutant to both ozone and PM_{10}. For this reason, localized NO_2 air quality impacts will be significant if the project's RECLAIM NO_x emissions exceed the significant change in air quality concentration level identified in SCAQMD Rule 2005, Table A-2, which is also listed in Table 4-1.

Because the Basin has been in designated attainment for both the CAAQS and NAAQS for SO_2 since the early 1980s, no significance in air quality concentration has ever been identified for this pollutant for the purposes of permitting new or modified equipment. Therefore, consistent with the SCAQMD's CEQA Air Quality Handbook (1993), localized SO_2 air quality impacts will be considered significant if the incremental increase in SO_2 emission from the project, when added to existing background air quality concentrations, cause or contribute to an exceedence of any ambient air quality standard for SO_2 at any sensitive receptor location.

4.2.2 Construction Emissions

Construction emissions from the proposed project include those associated with the demolition of existing equipment, preparation of the site for the installation of the ammonia tanks, and installation of the SCR systems and related equipment.

Table 4-1
Air Quality Significance Thresholds

Criteria Pollutants Mass Daily Thresholds			
Pollutant	**Construction**	**Operation**	**RECLAIM Sources**
NO_x	100 lb/day	55 lb/day	2,665 lb/day[c]
VOC	75 lb/day	55 lb/day	
PM_{10}	150 lb/day	150 lb/day	
SO_x	150 lb/day	150 lb/day	Exempt
CO	550 lb/day	550 lb/day	
Lead	3 lb/day	3 lb/day	
TAC, AHM, and Odor Thresholds			
Toxic Air Contaminants (TACs)	Maximum Incremental Cancer Risk ≥10 in 1 million Hazard Index ≥ 1.0 (project increment) Hazard Index ≥ 3.0 (facility-wide)		
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402		
NO_2 1 hour average NO_2 annual average	20 $\mu g/m^3$ (= 1.0 pphm)[a] 1 $\mu g/m^3$ (= 0.05 pphm)[b]		
PM_{10} 24 hour PM_{10} annual geometric mean Sulphate 24 hour average	2.5 $\mu g/m^3$ 1.0 $\mu g/m^3$ 1.0 $\mu g/m^3$		
CO 1 hour average CO 8 hour average	1.1 mg/m^3 (= 1.0 ppm) 0.5 mg/m^3 (=0.45 ppm)		

$\mu g/m^3$ = microgram per cubic meter; pphm = parts per hundred million; mg/m^3 = milligrams per cubic meter; ppm = parts per million; TAC = toxic air contaminant; AHM = Acutely Hazardous Material

[a] California 1 hour ambient air quality standard, includes project impact plus background

[b] PSD Annual Class II increment for NO_2

[c] NO_x RTC Holding as at 01/2000, per Title V Permit January 01, 1999.

The aqueous ammonia storage facility would consist of three above-ground storage tanks of 20,000 gallon nominal capacity, with associated lines, valves and control equipment. The ammonia tanks would be installed within a walled area designed for complete tank spillage containment. The construction activities associated with installation of the tanks would include demolition and removal of existing equipment, leveling of the surface of the site, surface preparation for tank foundations, and tank construction. As the installation of the ammonia tanks is at ground level (as opposed to below ground, where significant excavation would be required), no significant earth works or excavation would be required. The only earth works that will take place will involve minor leveling of the site and preparation of foundations prior to installation of the ammonia tanks.

The construction activities associated with the installation of the SCR systems would include demolition and removal of existing equipment, preparation for foundations (formation and pouring of concrete), installation of the SCR structure, followed by installation of electrical equipment, instrumentation, piping, ammonia system, and finally insulation of the SCR ductwork. Again, because the SCR systems will be installed at ground level on existing hard paved areas, no excavation or significant earth works will be required.

4.2.2.1 Criteria Pollutants

Impacts

The construction necessary for this project, primarily associated with placing and securing the above-ground ammonia storage tanks onsite and assembling the SCR systems, would primarily involve light-duty construction equipment and structural lifting equipment. Assuming the requisite approvals are granted, site preparation and construction would take place between February and May 2001, which is timed to coincide with the planned outages at the Generating Station. Table 4-2 shows a list of the construction and associated equipment to be used on site during the proposed project.

The criteria pollutant emissions associated with the above ground construction activities were estimated using the guidelines and emission factors in the CEQA Air Quality Handbook (SCAQMD, 1993). The total emissions (in pounds per day) then were compared with the CEQA significance thresholds. This information is presented in Table 4-2.

The estimated total pollutant emissions for the construction phase of the project are "worst-case," in that they assume that all of the construction equipment operates at the same time continuously, which is not expected to be the case. In reality, although some equipment would operate concurrently, due to the nature of the project not all of the equipment can operate simultaneously but would operate sequentially. For example, the machinery involved in the demolition and removal of existing equipment during site preparation would be used before the crane and other structural machinery is used to install the SCR housing. This means that the emission levels calculated for the project construction phase are a conservative overestimate of the impacts that are likely to occur. The calculation methodology used to derive the quantities in Table 4-2 is contained in full in Appendix C.

As shown in Table 4-2, the total emissions of NO_x for the project are below the Air Quality Significance Thresholds for all pollutants. The NO_x Air Quality Significance Threshold of 100 pounds per day is approached but not exceeded, and due to the stepwise manner in which construction will take place, even the NO_x emission level presented here is unlikely to be reached. The calculated emissions for CO, VOC, SO_x and PM_{10} associated with the proposed project do not approach the Air Quality Significance Thresholds for these pollutants.

Therefore, the impacts of the emissions from construction associated with site preparation, installation of the ammonia tanks and installation of the SCR systems, are not significant. Nonetheless, AES anticipates applying the mitigation measures to further minimize construction-related emissions listed below.

Table 4-2
Construction Emissions[a]

Equipment	Total Pollutant Emissions (lb/day)				
	CO	VOC	NO_x	SO_x	PM_{10}
Crane, 350hp	15.75	5.25	40.25	3.5	2.63
Fork Lift, 15 ton	3.78	1.11	9.26	0.00	0.65
Backhoe or Bobcat	11.25	2.25	16.5	1.5	0.75
Pickup	7.2	1.44	10.56	0.0	0.48
Wackers	0.45	0.09	1.08	0.09	0.05
Welders	5.39	0.98	8.82	0.98	0.49
Gasoline vehicles (worker commute [b])	10.8	16.2	3.6	0	0.8
Total - all four boilers	**54.62**	**27.32**	**90.07**	**6.07**	**5.84**
CEQA Air Quality Significance Thresholds (lb/day)	**550**	**75**	**100**	**150**	**150**

a Using SCAQMD CEQA Air Quality Handbook, April 1993 Emission Factors, (Tables A9-8-A & A9-8-B)
b Worst case maximum miles per day is 1,200 (i.e. a round trip commute for a maximum of 40 workers)

Mitigation

Although construction emissions will not be significant, AES may further minimize construction-related emissions by implementing the following mitigation. Wherever feasible and practical, construction activities will be carried out sequentially, with not all of the equipment operating at the same time. In addition, construction management techniques to minimize emissions will be employed and may include the following: increasing the distance between the emission sources; reducing or changing the hours of construction; scheduling activity during off-peak traffic hours; and implementing a phased schedule for construction activities to even out emission peaks. Also, to further limit the air pollutant emissions, the following mitigation measures may be employed:

AQ-1 Utilize existing power poles rather than temporary internal combustion engine power generators.
AQ-2 Use low sulfur diesel fuel (less than or equal to 15 ppm) for stationary construction equipment.
AQ-3 Maintain construction equipment engines by keeping them properly tuned.
AQ-4 Minimize vehicle idling time, where applicable.

Though not required, the above mitigation measures are intended to help further reduce the emissions (i.e., air quality impacts) from construction equipment.

Table 4-3 lists mitigation measures for each emission source and identifies the estimated control efficiency of each mitigation measure. As shown in the table, no feasible mitigation measures have been identified for the emissions from on-road (off-site) vehicle trips. Additionally, no other feasible mitigation measures have been identified to further reduce emissions from this source or the sources for which mitigation measure have been identified[2].

Table 4-3
Construction Related Mitigation Measures and Control Efficiency

Mitigation Measure	Mitigation	Source	Pollutant(s)	Control Efficiency[a] (%)
AQ-1	Utilize existing power poles rather than temporary internal combustion engine power generators	Construction Equipment Exhaust	CO VOC NO_x SO_x PM_{10}	5 5 5 5 5
AQ-2	Use low sulfur fuel for stationary construction equipment.	Construction Equipment Exhaust	CO VOC NO_x SO_x PM_{10}	N/A N/A N/A 5 N/A
AQ-3	Maintain construction equipment engines by keeping them properly tuned	Construction Equipment Exhaust	CO VOC NO_x SO_x PM_{10}	5 5 5 5 5
AQ-4	Minimize vehicle idling time, where applicable	Construction Equipment Exhaust	CO VOC NO_x SO_x PM_{10}	5 5 5 5 5
	No feasible measures identified[b]	On road motor vehicles	CO VOC NO_x PM_{10}	N/A N/A N/A N/A

[a] The control efficiency of each mitigation option was conservatively estimated to approximate a 'worst case scenario.'

[b] Health and Safety Code § 40929 prohibits the air districts and other public agencies from requiring an employee trip reduction program making such mitigation infeasible. No feasible measures have been identified to reduce emissions from this source.

Cumulative Impacts

Other projects in the area that may contribute to pollutant emissions arising from construction activities include construction activities at other business or residential properties, and infrastructural development or redevelopment. Possible construction activities at other businesses in the area include

[2] CEQA Guidelines § 15364 defines feasible as '… capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, legal, social, and technological factors'.

the installation of an SCR system on Unit 6 at the Los Angeles Department of Water and Power (LADWP) Haynes Point Power Plant (Haynes Point) located east of and adjacent to the Alamitos Generating Station (LADWP, 2000). The installation of an SCR system on Unit 6 at Haynes Point is scheduled for early 2001, which may coincide with the construction activities associated with the installation of SCR systems on Units 1 through 4 at the Alamitos Generating Station. Construction emissions associated with the installation of one SCR system at Haynes Point would be substantially less in quantity than the construction emissions generated from the Alamitos Generating Station, as one SCR system will be installed at Haynes Point, as opposed to four SCR systems at the Alamitos Generating Station. The SCR system at the Haynes Point plant is not expected to generate significant pollutant emissions during the installation of the SCR system. Therefore, the construction emissions from the Alamitos Generating Station would not contribute to short-term cumulative impacts during the installation of the SCR systems.

Since the residential area surrounding the Alamitos Generating Station is well developed, no construction associated with residential land development is anticipated during construction of the proposed project.

Construction emissions associated with road works are planned for the area of Pacific Coast Highway (PCH) east to Studebaker Road, in the eastern portion of the City of Long Beach (LA County, 2000). The road works will comprise resurfacing of PCH, and this work is scheduled to take place in the Spring of 2001 (March through June inclusive). The emissions associated with these road works will be temporary in nature, and will be located at a distance of at least 600 feet from the Alamitos Facility site boundary.

Cumulative Mitigation

Please refer to Section 4.2.2.1, above.

4.2.2.2 Fugitive Dust Emissions

Fugitive dust emissions can arise during earthworks and construction projects. Particulate matter (dust) generated or disturbed during earthwork operations such as motor scraping, grading, excavation, soil transport and other earthworks operations can be picked up, transported and deposited off-site by the action of wind currents. If significant quantities of dust are generated (usually from major earthworks and excavation rather than minor operations) and are not mitigated, the dust can cause nuisance effects.

Impacts

Fugitive dust emissions associated with the proposed project were considered here. There are not expected to be any significant fugitive dust emissions associated with the project. As previously mentioned, the construction activities that will take place for the proposed project involve light duty construction equipment, therefore fugitive dust emissions are not expected to arise in significant quantities. The ammonia tanks and the SCR systems are to be installed above the ground, which will require only minor site leveling and foundation preparation, not earth removal. Similarly, no stockpiling will take place on site. Therefore, due to the lack of significant excavation and earthworks, fugitive dust emissions will be less than significant.

Mitigation

If deemed necessary by the construction supervisor, a water truck will be used to minimize any dust generation during construction. No further mitigation is necessary.

Cumulative Impacts

There is the potential for cumulative impacts associated with fugitive dust emissions associated with the proposed SCR installation at Haynes Point. However, as the fugitive dust emissions from the proposed project at the Alamitos Generating Station are insignificant, no cumulative impacts from fugitive emissions are anticipated to occur as a result of this project.

Cumulative Mitigation

No mitigation required.

Table 4-4 summarizes the overall peak daily mitigated construction-related emissions. As can be seen from Table 4-4, the total quantity of emissions of all pollutants associated with construction is further reduced following implementation of the mitigation measures. The control efficiency of each mitigation measure was applied to the total remaining emission (in pounds per day) in a stepwise manner because, in practice, all of the mitigation measures can be applied to each emission source. Thus, before the application of mitigation, the emission levels of all pollutants are below the Air Quality Significance Thresholds and therefore, are not considered to be significant.

4.2.3 Operations

4.2.3.1 NO_x Emissions

Stationary source equipment, including combustion equipment, is regulated by the SCAQMD. Accordingly, the proposed project is being developed by AES to reduce emissions of NO_x from its operations for the purpose of achieving regulatory compliance with SCAQMD's RECLAIM Program. NO_x emissions are produced as part of the utility boiler combustion process and, if not properly controlled, are vented into the atmosphere along with other flue gas constituents. NO_x is formed in two ways: by the oxidation of atmospheric nitrogen during combustion and from the oxidation of bound nitrogen in organic fuels. The amount of NO_x formed depends, in part, upon the available oxygen supply and combustion temperature. Control of NO_x emissions is important for at least three reasons: 1) NO_x contributes to atmospheric NO_2; 2) NO_x is a precursor to ozone formation; and 3) NO_x is a precursor to PM_{10} formation.

Table 4-4
Overall Peak Daily Emissions During Construction (Mitigated)

Source	CO (lb/day)	VOC (lb/day)	NO_x (lb/day)	SO_x (lb/day)	PM_{10} (lb/day)
Onsite Construction Equipment Exhaust Emissions	54.62	27.32	90.07	6.07	5.84
AQ-1 Mitigation reduction (%)	5	5	5	5	5
AQ-1 Mitigation Reduction (lb/day)	-2.73	-1.37	-4.5	-0.30	-0.29
Remaining Emissions	51.89	25.95	85.57	5.77	5.55
AQ-2 Mitigation reduction (%)	0	0	0	5	0
AQ-2 Mitigation Reduction (lb/day)	0	0	0	-0.29	0
Remaining Emissions	51.89	25.95	85.57	5.48	5.55
AQ-3 Mitigation reduction (%)	5	5	5	5	5
AQ-3 Mitigation Reduction (lb/day)	-2.59	-1.3	-4.28	-0.27	-0.28
Remaining Emissions	49.30	24.65	81.29	5.21	5.27
AQ-4 Mitigation reduction (%)	5	5	5	5	5
AQ-4 Mitigation Reduction (lb/day)	-2.46	-1.23	-4.06	-0.26	-0.26
Remaining Emissions	46.84	23.42	77.23	4.95	5.01
On Site Motor Vehicle Emissions	10.8	16.2	3.6	0	0.8
Mitigation reduction (%)	0	0	0	0	0
Mitigation reduction (lb/day)	0	0	0	0	0
Remaining emissions	10.8	16.2	3.6	0	0.8
TOTAL[a]	**57.64**	**39.62**	**80.83**	**4.95**	**5.81**
CEQA Significance Level	**550**	**75**	**100**	**150**	**150**
Significant? (yes/no)	**no**	**no**	**no**	**no**	**no**

Note: Totals may not match sum of individual values because of rounding

[a] The total emission level in pounds per day after mitigation was calculated by cumulatively applying each of the mitigation measures in a stepwise manner. In practice, all of the mitigation measures can be applied to the construction equipment.

Impacts

NO_x emissions would be significantly reduced (a reduction of over 90 percent per unit when comparing historical to post-SCR emissions) as a result of the installation of SCR systems on Units 1 through 4. Thus, the proposed project will have a significant beneficial impact on air quality in the Basin.

As part of the design of the project, the operating range of the existing continuous emissions monitoring system (CEMS) would be modified (recalibrated) and recertified for the lower range of NO_x emissions achieved by the SCR system. AES is currently in the process of compiling the necessary information to recertify the existing CEMS in accordance with both the SCAQMD and Environmental Protection Agency (EPA) requirements.

The net effect on long-term operational emissions from the proposed project is an air quality benefit as a result of NO_x emissions reductions from installation of the SCRs. Therefore, operational air quality impacts from the proposed project are insignificant.

Mitigation

No mitigation is required.

Cumulative Impacts

Other sources of criteria pollutant emissions in the surrounding area, including those from the Haynes Point Power Plant, were analyzed for cumulative impacts. However, as noted, the proposed project and the Haynes Point Power Plant project would both provide a cumulatively beneficial impact in the Basin, due to the significant reduction in NO_x emissions at the Alamitos Generating Station as a result of installing SCR systems. Thus, there will be no cumulative operational impacts from NO_x emissions.

Cumulative Mitigation

No mitigation is required.

4.2.3.2 Ammonia Slip Emissions

Impacts

For SCR systems to operate most effectively, ammonia is injected into the flue gas at an ammonia to NO_x molar ratio slightly greater than 1:1 (i.e., one mole of ammonia to one mole of NO_x). Since some of the ammonia in the flue gas mixture may remain unreacted, this could be released into the atmosphere. These ammonia emissions are referred to as “ammonia slip”. As discussed in Chapter 2, the permit to operate will to specify an ammonia slip emission limit of 10 ppm over the entire boiler load range. This is well below the OSHA-recommended occupational exposure limit of 25 ppm. Furthermore, according to dispersion estimates (Eschenroeder et al., 1988), the buoyancy of ammonia and its dilution into the atmosphere (Benchley and Athey, 1981) would reduce the annual one hour maximum ground level concentrations to less than one ppm. This concentration is below the odor detection limit for ammonia.

As discussed in the project description in Chapter 2, the SCR system as planned would include extensive system monitoring devices, many of which relate to ammonia injection and SCR operation. For example, sensors and controls are included in the proposed system design so that when out-of-range ammonia slip levels occur, feedback signals to the ammonia injection system would regulate the rate of ammonia injection so that the ammonia slip level does not exceed permit conditions.

In order to assess the potential impacts associated with airborne emissions of ammonia slip due to the proposed project, a screening health risk assessment (HRA) was performed. The HRA estimated the ground level ammonia concentrations associated with the operation of all four SCR systems (Units 1 through 4).

Ammonia is a compound for which ambient air quality standards have not been established, but that is known or suspected to cause short-term (acute) and long-term (chronic) adverse human health effects. Ammonia is not considered a carcinogen, nor is it necessary to look at multiple pathways when estimating health effects due to the exposure to ammonia. Therefore, an inhalation human HRA was performed to calculate potential acute and chronic non-carcinogenic health effects.

To represent a "worst-case" scenario, conservative model input parameters were used. The results showed insignificant impacts to the surrounding area. The analysis is described in further detail below.

4.2.3.3 Ammonia Slip Modeling Analysis

The EPA-approved SCREEN3 dispersion model was used to calculate concentrations of ammonia from the proposed project. SCREEN3 is a Gaussian plume model and implements methodologies described in the "Screening Procedures for Estimating the Air Quality Impact of Stationary Sources" (EPA, 1992). The model uses source-specific data along with meteorological information to estimate pollutant concentrations from continuous sources.

The input files for the SCREEN3 modeling analysis for ammonia slip emissions are contained in Appendix B.

The dispersion modeling was performed for both simple terrain (terrain with elevations below stack height) and complex terrain (terrain with elevations greater than stack height). Elevations and distances were obtained from U.S. Geological Survey (USGS) digital elevation models (DEMs).

The SCREEN3 model uses various wind speed and stability class combinations to identify the "worst-case" meteorological conditions. The wind speed and stability combinations used by the SCREEN3 model are summarized in Table 4-5. For completeness, both urban and rural dispersion were analyzed. Rural dispersion showed the highest ammonia concentrations.

Both site-specific source data and building/structure data were used in the modeling analysis. The modeling analysis carried out for this project included all four boilers to estimate the total impacts from installation of SCR on Units 1 through 4. In order to represent "worst-case" conditions in the modeling analysis, it was assumed that the ammonia slip from all four boilers would be exhausted through one stack. (In reality, exhaust from the four boilers are exhausted through four separate individual stacks.) This assumed scenario therefore results in more conservative modeling estimates.

Ammonia emissions were estimated assuming a concentration of 10 ppmvd at three percent oxygen. As supplied by the design engineer, an emission rate of 8.6 pounds per hour (1.082 g/s) per unit was assumed for Units 1 and 2. An emission rate of 14.5 pounds per hour (1.827 g/s) per unit was assumed for Units 3 and 4. These emission rates represent 100 percent load conditions. The sum of the emission rates for the four boilers (5.818 g/s) was used as the emission rate in the model.

Table 4-5
Screening Meteorology Used in the ISCST3 Modeling Analysis

Stability Class	Wind Speed (meters per second)												
	1	1.5	2	2.5	3	3.5	4	4.5	5	8	10	15	20
A	*		*	*	*								
B	*	*	*	*	*	*	*	*	*				
C	*	*	*	*	*	*	*	*	*	*	*		
D	*	*	*	*	*	*	*	*	*	*	*	*	*
E	*	*	*	*	*	*	*						
F	*	*	*	*	*	*	*						

An asterisk in the above table indicates the presence of the relevant wind speed in each stability class; a blank represents an absence.

Stack parameters for modeling included a stack height of 215 feet (65.53 meters), an internal stack diameter of 12.42 feet (3.78 meters), an exhaust exit temperature of 135 degrees centigrade (408 degrees Kelvin), and an exhaust exit flow rate of 700,000 actual cubic feet per minute (acfm) for each boiler (this value was calculated based on 550,000 standard cubic feet per minute (scfm) at a standard temperature of 0 degrees centigrade (273.15 degrees Kelvin)).

The modeled stack exit velocity was 13.69 meters per second. This is the exhaust gas velocity into the main stack for both Units 3 and 4. To be conservative, this parameter was not increased to correct for the elevated exhaust temperature. The actual stack exit velocity for Units 1 and 2 is higher, but the lower value was used to represent the most conservative assumption. The modeling parameters were based on 100 percent load conditions.

The effects of aerodynamic downwash from nearby structures were accounted for in the modeling analysis. The SCREEN3 model allows for downwash effects from one rectangular building. The model then assumes that the stack is located in the center of the building/structure. At the Alamitos Generating Station, the boiler is the largest and closest structure to the stack, and was therefore used as the downwash structure in the model.

The SCREEN3 model outputs one-hour concentrations for simple terrain and 24-hour average concentrations for complex terrain. For this analysis, maximum hourly and annual concentrations were needed. The annual ammonia concentration was estimated for simple terrain by multiplying the maximum one-hour average concentration prediction by a persistence factor of 0.1 (CAPCOA, 1987). Maximum hourly ammonia concentrations for complex terrain were estimated by dividing the 24-hour average concentration by 0.4 (EPA, 1992). The annual average ammonia concentration in complex terrain was then estimated using the 0.1 persistence factor. Maximum concentrations of ammonia are summarized in Table 4-6 and were estimated to occur 6,300 meters from the stack.

Table 4-6
Ammonia Slip Health Risk Assessment Results

Maximum Hourly Concentrations (μg/m^3)	19.65
Acute Reference Exposure Level (μg/m^3)	3200
Acute Hazard Index	0.0061
Annual Average Concentrations (μg/m^3)	1.965
Chronic Reference Exposure Level (μg/m^3)	200
Chronic Hazard Index	0.0098

Non-cancer health effects can be either chronic or acute. In determining potential non-cancer health risks (chronic and acute) from ammonia, there is a "dose of concern" below which there would be no impacts on human health. In other words, there is a threshold below which no effects occur. The concentration corresponding to this dose is called the reference exposure level (REL). Non-cancer health risk is measured in terms of a hazard index, which is the calculated exposure of each contaminant divided by its REL. A hazard index of below 1.0 is deemed to be an acceptable exposure level for which there will be no health effect and is considered to be insignificant.

Chronic RELs are associated with specific target organs for each pollutant. For long-term exposures of ammonia, the target organs are respiratory and skin irritation. For short-term exposures, ammonia usually causes eye irritation and respiratory difficulties. RELs used in this analysis to calculate acute and chronic hazard indices were published by OEHHA (CalEPA, 1999). The acute REL was published in May of 1999 and the chronic REL was published in May of 2000. The acute hazard index was calculated by taking a ratio of the maximum hourly ammonia concentration and the acute REL. Similarly, the chronic hazard index was calculated by taking a ratio of the annual ammonia concentration and the chronic REL.

For the modeling analysis and HRA undertaken for the Alamitos Generating Station, the acute and chronic hazard indices estimated at the maximum point of impact were 0.0061 and 0.0098, respectively. Table 4-6 summarizes the RELs and analysis results. These values are substantially less than the project-specific significance threshold of 1.0 for the chronic and acute hazard indices. Therefore, there will be no significant adverse health effects associated with ammonia slip from operation of the SCR systems on Units 1, 2, 3 and 4. Therefore, the human health impacts of the ammonia slip from the proposed project would be insignificant. The cumulative analysis entails calculating the total hazard index from the generating station and if it is greater than or equal to 3.0, it is significant.

Mitigation

No mitigation is required.

Cumulative Impacts

Other emission sources of ammonia slip in the area include those from the existing and proposed SCR systems at Haynes Point (existing SCR systems on Units 1, 2 and 5 and the proposed SCR system on Unit 6). The slip concentrations from these units are less than 20 ppm per unit.

Due to the low concentration of ammonia slip from the Alamitos Generating Station, and the level of impact determined by the HRA previously described, the cumulative impacts of ammonia slip are insignificant.

Cumulative Mitigation

No mitigation is required.

4.2.3.4 Mobile Source Emissions (Ammonia Delivery)

Impacts

It is assumed that ammonia to supply the SCR system will be transported by rail (in the anhydrous form) to a distribution center within the jurisdiction of the SCAQMD, where conversion to the aqueous form is readily accomplished. From the distribution facility, aqueous ammonia will be transported by truck to the Alamitos Generating Station. Project-related mobile source emissions are dependent on the amount of ammonia required for the project, which is further dependent on the amount of NO_x reduction anticipated for the proposed SCR equipment, the pre-treatment NO_x level in the exhaust gas, and on the generating station capacity factor (the fraction of rated capacity at which the facility operates, i.e., about 25 percent).

Table 4-7 presents a summary of the transportation air quality impacts estimated for the supply of ammonia for the proposed SCR systems on Units 1 through 4. This table includes emissions from rail and truck transportation assuming the facility is operating at 100 percent of its rated capacity. The emission levels are based on a 170-mile round trip within the Basin for the rail transport of anhydrous ammonia, and a 140-mile round trip for the road transport of aqueous ammonia.

It is anticipated that there would be no more than a total of twenty (ten for Units 1 and 2 and ten for Units 3 and 4) road trips per month for the truck delivery of ammonia to the site. Table 4-7 shows that, in every instance, these emissions are far below threshold values. Further, as stated above, operations are expected to average approximately 25 percent of rated capacity, and potential impacts are anticipated to be only one-quarter of those listed in Tables 4-7 and 4-8. Also, there will be no increase in workers when the project becomes operational and therefore, there will not be any additional worker commute trips.

The calculation methodology for the mobile source emissions for the proposed project was based directly on the mobile source emissions calculated for the 1993 Alamitos EIR (Draft Subsequent Environmental Impact Report (SEIR): Aqueous Ammonia Storage Tank Installation at the Alamitos Generating Station', prepared by Arthur D Little, January 1993). Because the mobile source emissions in the 1993 EIR were so insignificant, it was expected that the mobile source

Table 4-7
Mobile Source Emissions [a, b]

Pollutant	Rail Emission Factor (lb/1000 gal fuel)	Apportioned Rail Emissions (lb/year)	Truck Emission Factor (lb/mile)	Total Truck Emissions (lb per 240 trips per year)	Mobile Source Total (lb/year)
ROC	22	28	0.0065	217	245
SO_2	38	52	0.0071	237	289
CO	66	80	0.0185	620	700
NO_x	500	608	0.0378	1274	1882
PM_{10}	11	8	0.0073	244	252

a Based on 480 MWH boiler continuously operating at 100 percent of rated capacity for an entire year.

Table 4-8
Total Daily Mobile Source Emissions
Compared to Significance Thresholds

Pollutant	Mobile Source Emissions, (lb/day)[a]	Significance Thresholds, (lb/day)[b]	Significance
ROC	1.02	55	Not Significant
SO_2	1.20	150	Not Significant
CO	2.92	550	Not Significant
NO_x	7.84	55	Not Significant
PM_{10}	1.05	150	Not Significant

a Based on 240 days per year.
b Data Source: SCAQMD, 1993.

emissions from the proposed project (effectively double those of the 1993 EIR emissions, i.e., four SCR units rather than two in 1993) also would be insignificant. Initial calculations were performed to assess the significance of the mobile source emissions from the proposed project. The emissions were consequently found to be insignificant when compared with Air Quality Significance Thresholds, therefore further assessment was unnecessary. The methodology and the assumptions used to calculate the mobile source emissions are contained in Appendix E.

Mitigation

No mitigation is required.

Cumulative Impacts

Other sources of mobile emissions associated with road and rail transport in the area are numerous; i.e., from the roads surrounding the generating station and the nearby railway system. However, transportation emissions associated with the road and rail delivery of ammonia for use in the SCR systems at the Alamitos Generating Station are at levels far below the SCAQMD significance thresholds prior to mitigation. According to CEQA Guidelines §15064(4), "A lead agency may determine that the incremental impacts of a project are not cumulatively considerable when they are so small that they make only a de minimis contribution to a significant cumulative impact caused by other projects that would exist in the absence of the proposed project." Therefore, since project-specific operational air quality impacts do not exceed any significance criteria, cumulative operational air quality impacts are not expected from the proposed project.

Cumulative Mitigation

No mitigation is required.

4.2.3.5 *SCR-Related Particulate* Emissions

Impacts

There is a potential for a slight increase in the secondary formation of particulates resulting from the use of ammonia in the SCR, in the presence of sulfur compounds. Sulfur compounds are contained in small quantities in natural gas. While most of the fuel sulfur is converted to sulfur dioxide (SO_2), approximately 1.5 percent is converted to sulfur trioxide (SO_3). In the presence of water in the exhaust SO_3 converts to sulfuric acid (H_2SO_4), which is defined as a condensable particulate. In addition, some of the ammonia injected for NO_x control combines with H_2SO_4 to form ammonium sulfate and ammonia bisulfate, which in turn form very fine solids that meet the definition of a noncondensable PM_{10}.

Public Utility Commission-grade low sulfur natural gas contains no more than 0.75 grains of sulfur/100 standard cubic feet of gas (roughly equivalent to 10 ppm). Since only a fraction of such sulfur would contribute to the formation of particulate, insignificant quantities of particulate would form as a result of the installation of the SCR system. The potential air quality impacts of SCR-related particulate emissions therefore are expected to be insignificant.

Mitigation

No mitigation required.

Cumulative Impacts

Other sources of particulate emissions in the area derived from the use of SCR systems include those at the neighboring Haynes Point Power Plant. The levels of particulates emitted from Haynes Point would be similar in quantity to those for the proposed SCR systems at the Alamitos Generating Station (i.e., significant levels). Therefore, cumulative secondary air quality impacts associated with particulate emissions would be insignificant.

Cumulative Mitigation

No mitigation is required.

4.3 HAZARDS AND HAZARDOUS MATERIALS

The owners of the Alamitos Generating Station are proposing to expand the use of SCR to reduce NO_x emissions from boiler stacks. The SCR system injects ammonia into the boiler exhaust stream in the presence of a catalyst, which chemically reacts with the NO_x to reduce emissions to the atmosphere. SCR already is installed in Units 5 and 6 at the Alamitos Generating Station. The proposal would expand the use of this emissions control technology to Units 1, 2, 3 and 4.

Ammonia would be delivered and stored at the facility in an aqueous solution of 29 percent concentration. Three new 20,000-gallon aboveground storage tanks would be used for ammonia storage: one tank each for Units 3 and 4, and a single tank shared by Units 1 and 2. The increased storage and use of ammonia at the facility presents a potential public health impact near the facility site, and the increased transportation of ammonia presents a potential public health impact to communities along the current ammonia delivery route.

4.3.1 Significance Criteria

Short-term exposures to airborne ammonia can cause skin, eye and upper respiratory irritation. At extremely high concentrations, ammonia can be life threatening. As a criterion for assessing potentially significant exposures, the SCAQMD uses a value of 200 parts per million by volume (ppmv) over a one-hour averaging period (SCAQMD, 2000). This is equivalent to the Emergency Response Planning Guideline Level 2 (ERPG-2) value used in Risk Management Plans (RMPs) under the California Accidental Release Prevention (CalARP) Program and U.S. Environmental Protection Agency (EPA) Risk Management Program requirements. The ERPG-2 value is the maximum airborne concentration at which it is believed that nearly all individuals could be exposed for up to one hour without experiencing any irreversible or other serious health effects or symptoms that could impair an individual's ability to take protective action. Concentrations below 200 ppmv are considered insignificant. The following analysis focuses on NH_3 because it is the only hazardous material associated with the project.

4.3.1.1 Construction

Although construction activities would be necessary to assemble ammonia storage tanks, ammonia delivery systems, and the SCR units, none of these activities have the potential for an accidental release of ammonia or any other acutely hazardous materials into the environment. Airborne emissions from construction activities include combustion exhaust and fugitive dust, and are covered in the Air Quality discussion, above.

4.3.1.2 Operation

Potential public health consequences due to the handling and use of aqueous ammonia could occur from accidental releases either at the facility or along the aqueous ammonia delivery route. Thus, an assessment was performed for one onsite and one offsite accidental release. Both scenarios are considered "worst-case":

- The *onsite release* assumes the complete failure of one 20,000-gallon aboveground storage tank.
- The *offsite transportation release* assumes that an aqueous ammonia tanker truck would empty its contents on the highway at a point of maximum population density along the transport route.

Other potential release scenarios would result in lower impacts.

Zones of vulnerability associated with the above release scenarios were assessed using a U.S. EPA-approved computer model that predicts the airborne migration of ammonia vapor from the spilled aqueous ammonia. Potential short-term health effects were evaluated from the estimated zones of vulnerability.

The assessment described below includes a detailed description of each of the hypothetical "worst-case" release scenarios (onsite and offsite), probability of occurrence, the extent of vulnerability zones, and potential offsite consequences.

Atmospheric dispersion modeling was performed to estimate downwind concentrations of ammonia for the hypothetical release scenarios. The dispersion modeling was performed to provide a conservative estimate of the zone of vulnerability (the maximum downwind distance to the significance criterion of 200 ppmv [ERPG2]). The RMP*COMP™ program (version 1.06) was used to estimate maximum distances where ammonia concentrations would be equal to or greater than 200 ppmv. The RMP*COMP™ program was developed by the U.S. EPA and the National Oceanic and Atmospheric Administration (NOAA). The RMP*COMP™ output files are provided in Appendix F.

Ambient temperatures in the vicinity of the facility and along the transportation route can range from 25°F to over 100°F. However, the U.S. EPA guidance document, Risk Management Program Guidance for Offsite Consequence Analysis (EPA, 1999), states that if the RMP*COMP™ model is used, an ambient temperature 77°F can be used as the default temperature, along with a wind speed of 1.5 meters per second and a stability class of F (very stable). This is appropriate given the inherent conservatism of the overall modeling approach employed by RMP*COMP™. In both release scenarios, buildings and structures would be in the vicinity of the release, thus urban dispersion characteristics were assumed.

Sensitive receptors were identified within the site vicinity and along the aqueous ammonia transport route. The closest schools to the facility are located approximately 0.27 mile to the west and 0.44 miles to the north-northwest. Sensitive receptors identified within one kilometer of the 63-mile aqueous ammonia transport route include 134 schools and 11 hospitals (including convalescent homes and sanitariums).

Census tract information along the transportation route also was reviewed. Areas with greater population densities were analyzed more closely. This information was utilized to estimate the number of people potentially exposed to ammonia concentrations above the level of concern after an accidental transport release. The highest population density of approximately 4,000 persons per square kilometer was estimated in the Baldwin Park area along Interstate 10 (I-10), east of the I-605 Interchange. Similar population densities were also estimated along I-605 in the Cerritos and Downey areas.

4.3.1.3 Impacts

As part of the proposed project, there would be three new double-walled 20,000-gallon aboveground aqueous ammonia tanks. Potential onsite accidental release scenarios from aqueous ammonia handling and use include losses from the storage tanks, losses during unloading from the tanker trucks, losses in the aqueous ammonia delivery system from storage tanks to SCR vaporizers, and losses of vaporized ammonia during application to the SCR catalyst beds. All of these aspects of the ammonia storage and handling systems were evaluated. Because of the safety shut-off systems associated with delivery of aqueous ammonia from storage tanks to vaporizers, and of ammonia vapor to the SCR catalysts, potential onsite ammonia release quantities from these system components in the event of an upset condition are small compared to potential losses from the storage tanks or from truck unloading. The severity of a tank rupture would be much greater than that of an unloading spill. Therefore, the storage tank rupture was identified as the "worst-case" scenario.

An additional scenario was analyzed to estimate impacts of an accident during ammonia transportation. The aqueous ammonia will be purchased from Pacific Diazo Products located in Fontana, California. The transportation route is approximately 63 miles long and is described in the following bullet points:

- Begin at Pacific Diazo Products at 6183 Sierra Ave, Fontana, travel for two miles;
- Turn left onto I-15 and continue south for 10 miles;
- Take I-10 west toward Los Angeles for 27 miles;
- Take I-605 south toward Long Beach for 22.9 miles;
- Take the 7th Street exit to Studebaker;
- Follow Studebaker 1.1 miles to the plant.

The probability or likelihood of an occurrence can be expressed as “Frequent,” “Periodic,” “Occasional,” “Improbable,” and “Remote.” In qualitative terms, a “Frequent” likelihood is an event that would occur more than once per year. A “Periodic” likelihood is defined as an event that is likely to occur during the lifetime of a project (once in 10 to 100 years). An “Improbable” likelihood is considered to occur every 100 to 10,000 years (e.g., a major earthquake capable of rupturing pipelines and storage tanks would fall into this category). A “Remote” likelihood represents an event that is not likely to occur at all.

The following discussion summarizes the evaluated “worst-case” release scenarios involving an onsite tank rupture and an offsite transportation spill.

Onsite Release

This scenario involves a hypothetical onsite accidental release during the catastrophic rupture of one of the aboveground 20,000-gallon aqueous ammonia storage tanks. In this analysis, this rupture was assumed to occur at the ammonia tank for Units 1 and 2, which is the tank that would be located closest to the populated areas to the west of the facility. The scenario assumes that the entire contents of the tank are released into the bermed containment area surrounding the tank by proposed facility design, thereby forming an evaporating pool. The bermed area surrounding the tank would be designed to hold the entire contents of the tank plus 6.5 inches of rain (equal to a 25-year storm). The RMP*COMP™ model (described below) was used to estimate the distance to the ammonia concentration of concern. Additional release parameters are as follows.

Weight composition of liquid spill	= 30 percent ammonia (NH_3)[3], 70 percent water (H_2O)
Evaporating pool area	= 595.47 square feet
Release elevation	= ground level
Bermed height	= 5.02 feet

[3] Closest concentration choice in the RMP*COMP™ model to the planned 29% concentration.

Release rate = 21.7 pounds per minute (calculated by RMP*COMP™)

A catastrophic tank failure rate has been estimated at approximately one per 2,500 years (AIChE, 1989). Failures are primarily due to cracks. Not all of these failures would necessarily lead to a total loss of contents unless accompanied by an explosion or fire. Ammonia vapor presents a moderate fire or explosion hazard when exposed to flame or heat. Catastrophic failures that result in explosions are estimated to be one in 40 for a combined risk with a rupture event of one per 100,000 years (Lees, 1992). Fires would be of higher probability but less than one per rupture. Thus, the failure rate that could lead to a complete loss of tank contents could range one per 2,500 years to one per 100,000 years, an "improbable" to "remote" probability.

In earthquake-prone areas, there is also a likelihood of tank failure associated with an earthquake. The facility is near the Newport-Inglewood fault zone[4], where the frequency of a 6.3 Richter Magnitude earthquake is about one per 100 years (SCAQMD, 2000). In a 6.3 Richter earthquake, lateral accelerations >0.2 acceleration of gravity (g) can be generated (SCAQMD, 2000) which would result in about one in ten spherical vessels failing. Taken together, this provides a conservative probability estimate of one per 1,000 years for a tank failure associated with an earthquake. The cylindrical tank design at the facility is more stable than a spherical design, thus the failure rate is expected to be lower for the proposed tanks. With the above estimate of approximately one in 40 ruptures resulting in explosions, a catastrophic failure from an earthquake associated with an explosion is one per 40,000 years. Fires would be of higher probability but less than one per rupture. Thus, the failure rate that could lead to a complete loss of tank contents resulting from an earthquake could range from one per 1,000 years to one per 40,000 years, an "improbable" to "remote" probability.

For a tank rupture releasing 20,000 gallons of 29 percent aqueous ammonia (modeled as 30 percent ammonia), airborne concentrations modeled by RMP*COMP™ were found to exceed the

[4] Maximum probable magnitudes along the Newport-Inglewood fault zone are assessed at 6.5 to 7.4 Richter (USGS, 2000). There have been two significant earthquakes from 1900 through 2000 in this fault zone: the March 10, 1933 Long Beach Earthquake, Magnitude 6.4; and the April 7, 1989 Newport Beach Earthquake, Magnitude 4.7 (USGS, 2000).

significance criterion of 200 ppmv out to a distance of 0.1 mile (0.2 kilometer), see Figure 4-1. As discussed above, this is considered an "improbable" to "remote" event. Assuming the ammonia tank for Units 1 and 2 fails, the impact area is estimated to travel outside the facility property line approximately 314 feet (0.06 miles). This impact area is east of the nearest residential area, so residential receptors would not be exposed to ammonia concentrations of 200 ppmv or greater. Thus, no significant impact to the public is anticipated to occur from such an onsite accidental release, as long as the project employs the project design of a berm surrounding each aboveground storage tank. The berm is part of the project description and will be required by the SCAQMD.

In accordance with the 1997 Uniform Building Code, the storage tanks have been designed to improve safety and limit a possible offsite consequence. These tanks will be of double-walled construction, thus in the event of a failure of the inside tank wall, tank contents will be contained within the exterior tank wall. In the very unlikely event that both tank walls fail simultaneously, tank contents will be contained within the bermed area surrounding each tank. The berm decreases the surface area of the spill pool resulting in a lower ammonia evaporation rate than if the tank were not surrounded by a berm. Because of these design measures and the employment of emergency response activities, impacts due to a catastrophic tank failure are considered insignificant.

Offsite Release

The hypothetical offsite accidental release would occur during ammonia transportation by truck. The accident scenario assumes the entire contents of a 6,000-gallon tanker truck would be released at some point along the transportation route (which is described above). The RMP*COMP™ model was used to estimate the distance to the ammonia concentration of concern. Additional release parameters are as follows.

Weight composition of liquid spill	= 30 percent ammonia (NH_3)[5], 70 percent water (H_2O)
Evaporating pool area	= undiked[6]
Release elevation	= ground level
Release rate	= 885 pounds per minute (calculated by RMP*COMP™)

The probability of a complete tanker truck failure is estimated to be one per 3.6 million miles traveled (Arthur D. Little, 1992). The project will create an additional 288 ammonia deliveries per year along the 63-mile aqueous ammonia transport route. From the above probability estimate, the probability of a truck accident resulting from increased ammonia deliveries to the Alamitos Generating Station that lead to a complete loss of contents would be 5.0×10^{-3} per year (one per 200 years). This puts a truck accident release scenario in the "improbable" likelihood category. It should be noted that Pacific Diazo Products has not had any delivery accidents since the start of ammonia deliveries to the Alamitos Generating Station in 1994.

Potential ammonia concentrations associated with an accidental release during truck transport were estimated by RMP*COMP™ and found to exceed the significance criterion of 200 ppmv out to a distance of 0.6 mile (1 kilometer). As discussed above, this is considered an "improbable" event. The maximum population densities along the I-605/I-10 transport route were estimated from 1990

[5] Closest concentration choice in the RMP*COMP™ model to the planned 29 percent concentration.
[6] Model assumes the aqueous ammonia spreads until it reaches a depth of one cm.

census tract data at about 4,000 persons per square kilometer (Baldwin Park, Cerritos and Downey areas). Assuming this population density, the maximum number of people estimated to be exposed to ammonia concentrations of 200 ppmv or greater from a catastrophic truck accident is:

$$\text{Area} \times \text{Population Density} = \pi\ (1\ \text{km})^2 \times 4{,}000\ \text{persons/km}^2 = 12{,}566\ \text{persons}$$

This is considered a potentially significant impact. It should be noted that this estimate is based on a calculated ammonia vapor release rate of 885 pounds per minute. To achieve this rate, the entire ammonia content of a 6,000-gallon spill would have to evaporate within about 15 minutes. Thus, either the release scenario would not persist longer than 15 minutes assuming the RMP*COMP™ calculations, or the EPA*COMP™ evaporation rate is conservatively high, in which case the release would persist longer at a lower ammonia evaporation rate, thereby reducing the potential impact area under "worst-case" meteorology.

4.3.1.4 Mitigation

Onsite Release

No mitigation would be necessary.

Offsite Release

There are schools within one kilometer of the aqueous ammonia transport route. The potential impact on students and other occupants of these schools would be maintained at a less than significant level by limiting the delivery of ammonia to the facility to non-school hours.

With respect to others who might be exposed during an ammonia spill, the only practical response is implementation of the emergency response procedures currently practiced by hazardous materials units, police, and other appropriate personnel. Emergency response to a hazardous materials spill typically includes stopping, containing, and diluting or covering the spill and/or collecting and removing the material from the environment. The possibility of reducing the number of people potentially exposed to ammonia will vary with the specific release and emergency response time. It would be speculative to quantify the effectiveness of emergency response or delivery practices as mitigation. Potential impacts to other receptors such as residences and hospitals, however, remain potentially significant. The likelihood of a catastrophic truck accident releasing ammonia to the atmosphere is "improbable" and will be further reduced by a restriction on ammonia transportation during rush hour, but there still will be an unmitigable, potentially significant impact. To reduce offsite release risks, the following mitigation will be implemented:

H-1 transfer of aqueous ammonia would not occur during school hours or between 6 a.m. to 9 a.m. and 4 p.m. to 6 p.m.

4.3.1.5 Cumulative Impacts

Cumulative impacts from the potential onsite tank rupture and offsite transportation accidental releases associated with the proposed project are discussed below.

Onsite Release

The existing facility (for Units 5 and 6) utilizes one underground 20,000-gallon tank for ammonia storage. Because this storage tank is underground, there would be no catastrophic tank failure scenario. The "worst-case" release scenario (SCAQMD, 1993b) of the underground tank is based on an unmitigated 2-inch line shear. This analysis of the underground tank concluded that there would be no offsite population exposed to ammonia concentrations in excess of 100 ppmv (SCAQMD 1993b). Furthermore, the likelihood that this type of release would occur simultaneously with the catastrophic tank failure analyzed for the current project is very low. Finally, the distance of Units 5 and 6 (in the southern portion of the generating station) from Units 1 – 4 would not allow for a plume released from the tanks at Units 5 and 6 to merge with a simultaneous plume from one of the storage tanks for Units 1 – 4 in the northern portion of the generating station.

The storage tanks for the proposed project would be of double-walled construction, thus in the event of a failure of the inside tank wall, tank contents would be contained within the exterior tank wall. In the very unlikely event that both tank walls fail simultaneously, tank contents would be contained within the bermed area surrounding each tank. The berm decreases the surface area of the spill pool and therefore results in a lower ammonia evaporation rate than if the tanks were not surrounded by berms. Because of these tank and berm design measures, the distance between the underground storage tanks and the new aboveground storage tanks and, the employment of emergency response activities, cumulative impacts due to a catastrophic tank failure combined with a failure of the existing aqueous ammonia piping system are insignificant.

Offsite Release

Additional ammonia transport along the aqueous ammonia transport route does not change the magnitude of an impact from a potential complete tanker truck failure. Thus, there is no change from the estimated maximum number of people exposed to ammonia concentrations of 200 ppmv or greater described above, which was found to be a potentially significant impact. The increased transport activity, however, does increase the potential probability of an accident event. The facility currently receives about 170 ammonia deliveries per year. This represents a current probability of an accident leading to a complete loss of tanker contents at about 3.0×10^{-3} per year (or about one per 333 years), assuming the 63-mile transport route and an accident probability of one per 3.6 million miles traveled (Arthur D. Little, 1992). Adding the estimated 240 new trips, the probability of an accident leading to a complete loss of tanker contents from cumulative ammonia transport to the facility is about 8.0×10^{-3} per year (or about one per 125 years). This probability level still represents an "improbable" likelihood. Therefore, potential cumulative impacts from simultaneous accidental releases would be insignificant.

4.3.1.6 Cumulative Mitigation

Onsite Release

No mitigation would be necessary.

Offsite Release

Please refer to Section 4.3.1.4 above for mitigation of offsite release.

4.4 ENVIRONMENTAL IMPACTS FOUND NOT TO BE SIGNIFICANT

As previously mentioned, a NOP/IS (see Appendix A), which described the anticipated environmental impacts that may result from its implementation of the proposed project, was prepared. Based on the NOP/IS, it was concluded that the proposed project would not result in significant adverse impacts to the environmental areas identified in the following subsections. Accordingly, these environmental areas are not further analyzed in this *Final EIR* ~~DEIR~~. A brief discussion of why the proposed project would not result in significant adverse impacts in these environmental areas is provided below.

4.4.1 Aesthetics

Construction activities are not expected to adversely impact views and aesthetics since the heavy equipment and activities would occur in the center portion of the Generating Station and would not be visible to areas outside the Generating Station. The majority of construction equipment is low in height and would not be visible to the surrounding area due to the presence of fencing and structures that buffer views of the Generating Station.

The proposed project would introduce a minor visual change to the Generating Station. However, the appearance of the modified units would not differ substantially from the other SCR units at the Generating Station. Also, the facility has walls, fencing and landscaping that partially obstruct the view of the facility from its perimeter.

Lighting would be provided as necessary in accordance with applicable safety standards and would be consistent with existing lighting at the Generating Station. Additional lighting may be provided on new structures associated with the proposed project. The new lights would not be expected to create light and glare impacts to areas adjacent to the Generating Station due to their central location within the existing industrial facility, and because they would be partially obstructed by other units, equipment and the perimeter fence.

4.4.2 Agriculture Resources

All proposed modifications would occur within the existing Generating Station. The project would be consistent with the zoning for the Generating Station and there are no agricultural resources or operations on or near the project site. The proposed project does not conflict with a Williamson Act contract and, since the proposed project occurs entirely within the boundaries of the existing facility, would not involve conversion of farmland to non-agricultural use.

4.4.3 Biological Resources

The proposed project would be located within the boundaries of an existing and operating power generating station. Past development of the Generating Station has eliminated virtually all natural habitat within the Generating Station property boundaries. The project site is located on and surrounded by impervious surface within an operating generating station and, therefore, would not adversely affect species of rare, threatened, or endangered plants or animals located in the immediate vicinity. The project site is not located on or immediately adjacent to wetland habitat, would not create any barriers to the movements of animals, and would not conflict with any habitat conservation plan.

4.4.4 Cultural Resources

Cut and fill operations associated with large earthwork projects would not be necessary for installation of the proposed SCR project. The proposed project would not include excavation. All construction work would occur at an existing disturbed, graded and paved facility. No paleontological resources were uncovered during the installation of SCR on Units 5 and 6. There are no known human remains or cemeteries within the vicinity of the Generating Station.

4.4.5 Energy

The proposed project would not be subject to, nor conflict with, any existing energy conservation plans or energy standards. Additionally, project construction and operation activities would not utilize non-renewable resources in a wasteful or inefficient manner.

No additional natural gas is necessary for the construction or operation of the proposed SCR project. Therefore, there would be no need for the alteration or creation of natural gas utility systems.

Electrical power may be required for certain construction equipment for approximately four months. Due to the variation of equipment used and duration of use during that time, it is not feasible to quantify construction-related electrical use. Electric construction equipment operates at a more efficient and quieter level than comparable diesel equipment. The short duration of construction-related energy use would not require the existing power system to be altered.

The proposed project may increase energy demand because SCR has some level of fuel energy penalty, thus requiring more fuel for a given level of energy generated. SCR may also require small amounts of energy for its operation, including operation of NO_x emission monitors. As concluded in the two previous SCR installation EIRs for this site, the electrical requirements are not considered to be significant.

Incremental gasoline and diesel usage would occur during construction activities. The maximum consumption of diesel would be approximately 200 gallons per week for operation of a forklift and crane. The use of gasoline (approximately 50 gallons or less a week) and diesel in small quantities for a limited duration (approximately four months) would not create a significant effect on local or regional gasoline and diesel supplies.

The California Independent System Operation (Cal-ISO) manages the delivery of electricity throughout California and between neighboring states and Mexico (Cal-ISO, 2000). The power grid delivers 164 billion-kilowatt (kW) hours of electricity each year. The proposed SCR units would require approximately 46 kW/unit (for Units 1 and 2) and 76 kW/unit (for Units 3 and 4). This amount of energy used for the proposed SCR system would be insignificant compared to the energy available on the grid. Therefore, the proposed energy use for construction and operation of the proposed project would not have a significant effect on local or regional energy supplies or require additional energy.

Peak electricity demand measures the highest instantaneous consumption of electricity integrated over an hour of time during the calendar year. Coincident peak electricity demand estimates for the planning areas within the SCAQMD's jurisdiction are expected to increase approximately 1.2 percent per year, from 24,116 megawatt (MW) in 1997 to 27,109 MW in 2007 (1998 Baseline Energy Outlook; CEC, 1998). The construction of the proposed project would not significantly affect the peak and base demands for energy because of the facility's coordination of outage work with the Cal-ISO and the limited duration of construction (approximately four months).

The contribution of approximately 1,000 MW to the power grid by Units 1, 2, 3, and 4 during peak and base period demands for electricity outweigh the energy penalty associated with the operation of the SCR units. Also, due to SCAQMD regulations, NO_x emissions must be reduced on these units to continue operation.

Therefore, the construction and operation of the proposed project would not have a significant effect on peak and base period demands for electricity and other forms of energy.

4.4.6 Geology and Soils

The Los Angeles area is considered a seismically active region with a number of earthquake faults. However, faults identified by the State Geologist as being either active or potentially active are not known to be present onsite. In addition, the site is not located within a State of California designated Earthquake Fault Zone, where a site-specific fault investigation would be required. Construction of the proposed project at the site would subject these facilities to potentially damaging seismic ground shaking from earthquakes on nearby faults. However, the proposed storage tank foundations and piping have been designed by The Industrial Company (TIC) in accordance with the 1997 Uniform Building Code standards for seismic design.

Surface faulting at the site is considered unlikely, according to the *Report of Geotechnical Engineering Study, AES Alamitos Generation Plan Catalytic Converter Installation, Units 3 and 4* (Kleinfelder, 2000). Landslides do not impose a significant impact on the site because the site is basically flat.

During construction of the project, the possibility exists for temporary erosion resulting from excavation and grading activities. However, site grading would be extremely limited and soil erosion or the loss of topsoil will be relatively low due to the relatively flat site, and the fact that the site is paved with asphalt concrete. No unstable earth conditions or changes in geologic substructures are expected from the project.

Seismically-induced soil liquefaction is a phenomenon in which loose to medium dense saturated granular materials develop high pore water pressures and lose shear strength due to cyclic ground vibrations induced through earthquakes. Although the project site is located in an area previously mapped to have a significant liquefaction potential (City of Long Beach, 1988), a site-specific geotechnical investigation revealed that the soils underlying this site are not conducive to liquefaction. The exploratory borings performed at this site (Kleinfelder, 2000) indicate that the soils are silts and clays to depths of 20 to 25 feet below the existing ground surface. The underlying soils are dense to very dense silty sands and poorly graded sands. Silts and clays and dense sands are not subject to soil liquefaction. The potential for liquefaction at this site is low to moderate. The site is not in an area subject to subsidence or collapse, and lateral spreading and landslides impose no significant impact due to the nature of the relatively flat-lying site. No significant impacts are expected from the proposed project due to landslides, soil liquefaction, lateral spreading, or subsidence.

Expansive soils are earth materials with a high percentage of expandable clay materials. These soils can change their volume depending upon water content; they increase in volume when they absorb water and decrease in volume as they dry out. Expansive soils located beneath building foundations can experience volumetric changes and affect the integrity of support structures. Near surface soils at the site are reported to have a high potential for expansion, as defined in Table 18-1-B of the Uniform Building Code. However, the soils encountered in the borings performed at the site (Kleinfelder, 2000) did not appear to be highly expansive. Moreover, two of the three proposed storage tanks would be supported on existing cement pads with pile foundations. The impact of expansive soils supported by structures founded on piles is negligible. Likewise, the third storage tank would be supported on a mat foundation that has been designed for expansive soils. Therefore, the risks associated with expansive soils are less than significant.

The Alamitos Generating Station has existing wastewater management systems that would continue to handle wastewater produced at the generating station. The proposed project would not impact septic systems. Therefore, the proposed project would not adversely affect soils associated with a septic system or any other alternative wastewater disposal system.

4.4.7 Hydrology and Water Quality

The proposed project would not utilize groundwater supplies. Also, the project would not substantially reduce ground water recharge at the facility because the project would be located on existing impermeable surfaces. Therefore, the project would neither substantially deplete ground water supplies nor reduce ground water discharge.

The installation of the new exposed structure (containment wall for storage tanks) represents a small area at the existing, 165-acre Generating Station. This structure would not alter the existing drainage pattern nor create runoff or stormwater flows that would exceed existing capacity at the site.

The Generating Station is within a Federal Emergency Management Agency (FEMA) designated 100-year flood zone (Zone A) (Ortega, 2000). However, the proposed structures (three bermed storage tanks) are not residential and would not impede or redirect flow within the 100-year flood plain. The proposed project is within an existing Generating Station and would not require any new employees and, therefore, would not increase the risk of loss, injury or involving flooding.

The City of Long Beach Seismic Safety Element (1988) and the Los Angeles County Safety Element do not map the site within a tsunami or seiche influence area. Also, due to the fact that the facility is not located in close proximity to any large bodies of impounded water, seiches and tsunamis would not be considered a potential hazard at the facility (Kleinfelder, 2000).

No wastewater discharge would be associated with the proposed SCR systems. All byproducts of SCR operation go into the stack. Therefore, no increased wastewater demand would be placed on the Los Angeles County Sanitation District (wastewater treatment provider) for the proposed project. Also, no Regional Water Quality Control Board wastewater treatment requirements would be exceeded. The project would not require modifications to the existing wastewater discharge permit.

The construction of the SCR units would require approximately 150 gallons of water per week for 24 weeks. This temporary water use would be for construction workers to wash up in a temporary wash basin. No water would be used for dust suppression during construction because construction would occur on impervious surfaces and extremely limited to no grading would occur. No water consumption is necessary for the implementation and operation of SCR at this facility. The increased amount of water demand at the facility is less than the SCAQMD significance criteria of 5,000,000 gallons per day and would not require construction of new water conveyance infrastructure. Therefore, the proposed project would not have a significant impact on water supply or infrastructure and these impacts will not be further addressed in the *Final EIR* ~~DEIR~~.

Accidental spills of aqueous ammonia could occur either from the operation of the SCR system, from piping that transfers ammonia from the storage tanks to the vaporizers, from the unloading operation or from the truck during transport. In the event of such a spill, a pool of ammonia solution may form on the ground. Potential water quality impacts would occur if the ammonia were washed into the storm drains.

As part of the proposed project, AES would install ammonia vapor detectors with audible and visual (light) notification in the vicinity of the SCR systems and the storage tanks (refer to Subsection 2.4.9). Thus, any leak onsite would be detected quickly and signaled to the generating station operators in the control room. In response to an ammonia vapor alarm, the operators would shut down the ammonia feed supply to prevent excessive ammonia from being spilled.

Alamitos Generating Station's *Hazardous Materials Release Contingency Plan* would be updated to reflect the proposed additional storage of aqueous ammonia at the facility. The purpose of the plan is to specify how station personnel would respond to any unplanned release of hazardous materials into the air, soil or surface water. This response includes notifying the proper authorities of the release, controlling and cleaning up the release and restoring the environment as required. The plan identifies sources of hazardous material, responsibilities of employees during a response, a step-by-step plan of how to respond to a release, who to contact, how to contain and remove hazardous material released, restoration of the environment, and creation of an operating record of the incident. The plan also includes maps of the locations of all hazardous materials at the facility.

The probability of an ammonia release during transport is extremely small. However, in the unlikely event that aqueous ammonia enters a storm water drainage system it is anticipated that the solution would be further diluted and broken down prior to reaching the storm drain outfall. In the event of an accidental spill of hazardous material that enters into a storm drain, the Los Angeles County Department of Public Works notifies one of its vendors located throughout the county. The vendors are specialists in containment, neutralization/collection and disposal of hazardous materials. Spill response and clean-up procedures and detection systems should ensure that potential water quality impacts are insignificant.

4.4.8 Land Use and Planning

The project site is located in an existing power generation facility and would not disrupt or divide an established community. No new property would be acquired by the project proponent so no other potential adverse impacts to established communities are anticipated.

The project would be consistent with the zoning for the Generating Station (PD-1) and with the Mixed Uses (7) land use designation within the Long Beach General Plan (City of Long Beach, 1992). The Generating Station is located within the Southeast Area Development Improvement Plan (SEADIP) Planning Area (City of Long Beach), Subarea 19. This subarea is fully developed by the existing permitted industrial uses, i.e., Alamitos and adjacent Generation Stations (City of Long Beach, 1999). The City of Long Beach has determined that no discretionary permits (i.e. Conditional Use Permit) would be required for the proposed action (Bihn, 2000). The Alamitos Generating Station is not located within the Coastal Zone, as defined by the California Coastal Act (City of Long Beach, 1980).

4.4.9 Mineral Resources

The proposed project would be constructed and implemented within an existing, developed and paved Generating Station. Therefore, the availability of regionally or locally important mineral resources would not be altered by the proposed project.

4.4.10 Noise

Onsite noise energy and sound/vibration character is almost entirely determined by the equipment presently operating at the facility and, therefore, project-related construction activities are expected to be encompassed in the ambient noise levels (SCAQMD, 1993b). Though impulsive or short-period noise at higher levels may occur, the ambient noise characteristic of the facility would not further degrade as a result of the occasional noise peaks produced during construction. AES will reduce potential construction noise impacts by using electric tools and welding machines (approximately 70-75 decibels) versus air or diesel tools (90-100 decibels). The temporary construction equipment noise would not exceed 75 decibels and thus, would not create a significant impact, according to the criteria established in the Noise Element of the City of Long Beach, General Plan (1975). Therefore, construction-related noise activities are expected to be insignificant.

Noise from the proposed project would not affect the neighboring community because of the proposed project design and existing noise reduction equipment. For example, Units 5 and 6 currently have blower equipment that is enclosed within a custom designed insulation shield. Similarly, AES would incorporate the following effective noise control methods for the proposed project. For example, the hot gas dilution blowers (four 100-hp/3,600 rpm) used to move the dilution media would be externally insulated for thermal protection and audible reduction. Also, SCR equipment for Units 1 and 2 would be housed within a structure, acting as a noise suppression measure. Most of the SCR equipment on Units 3 and 4 would be installed on the interior. However, the vaporizer skid will be located immediately adjacent to the Units but sound levels would not be audible in relation to surrounding noise at the facility. These units are located in the central portion of the 165-acre generating station and approximately one-half mile from the street and potential noise receptors. The existing noise reduction measures within the generating station, proposed noise reduction measures, and proximity of the units to the property boundary and noise receptors reduce the potential noise impacts related to SCR operation to less than significant.

The proposed project is not located within an airport land use plan, in the vicinity of a private airstrip and therefore, would not expose people in the project area to excessive noise levels (City of Long Beach, 1975a).

4.4.11 Population and Housing

Construction activities at the Generating Station would not involve the relocation of individuals, impact housing or commercial facilities, or change the distribution of the population because the proposed project would occur within an existing industrial facility site. The construction work force, which is temporary, is expected to come from the existing labor pool in the Southern California area. Additionally, the project operation would not require any new permanent employees. Since any potential impacts would occur at an existing industrial facility, displacement of housing of any type is not anticipated. Therefore, construction and operation of the proposed project is not expected to have a significant impact on population or housing.

4.4.12 Public Services

The role of fire departments in relationship to the proposed project is focused on response to emergency situations. Construction activities are not expected to result in an increased need for fire response services, and compliance with state and local fire codes is expected to minimize the need for additional fire protection services. The proposed project would include requirements for fire protection services that are available from existing services.

The City of Long Beach provides fire and emergency services within its boundaries as a municipal service. Fire and emergency services are coordinated by the Long Beach Fire Department (Fire Department). The Fire Department has 24 stations within the city limits, with the closest to AES Alamitos Generating Station located at 6340 Atherton Street, within one mile of the Generating Station. Response time for an emergency at the facility would be very short.

The Fire Department is well equipped and trained for responding to and dealing with fires, paramedic rescues, and certain limited types of hazardous materials incidents. In the event that an incident exceeds the scope of the Fire Department's capabilities, Long Beach typically contacts the Los Angeles County Hazardous Materials unit for emergency assistance. Backup is also provided by surrounding municipalities on the basis of reciprocal agreements.

The Fire Department serves a vital role in information transfer from one emergency response unit to others (e.g., fire, police, California Highway Patrol (CHP), private emergency service or equipment providers, etc.), both prior to and after an accidental release. Emergency response plans and evacuation routes are coordinated by the Fire Department, with development and review of such plans and routes supported by all of the public services involved.

Involvement of Fire Department personnel during a significant hazardous materials incident is typically kept to a minimum, unless abatement of the hazards can be accomplished without harmful exposure to fire personnel. Specialized emergency response functions would be made by properly equipped and trained private contractors and/or public agencies such as county or state hazardous materials units. As stated above, Long Beach requests assistance from the Los Angeles County Fire Department Hazardous Materials Unit for emergency response during hazardous materials incidents beyond the Fire Department's control. Since acquisition and maintenance of emergency equipment for hazardous materials would require considerable financial and administrative resources, the Fire Department is not expected or required to change its policy of contracting out additional control and cleanup services. Indeed, if given timely notification, many agencies with responsibilities associated with hazardous materials can respond, provide assistance, enforce laws, and provide funding.

The role of police departments in relationship to the proposed project is focused on response to emergency situations. The Long Beach Police Department (Police Department) is responsible for perimeter and entry control at the scene of a hazardous materials accident. The Police Department also shares responsibility with the Fire Department for security within the perimeter. In the event of a major hazardous materials incident (or any other major emergency), it is primarily the responsibility of the Police Department to implement evacuation procedures should they be necessary.

The Police Department has a designated person that works closely with the Fire Department, especially on hazardous materials incidents. Backup support, if it should prove necessary, would be supplied by the police departments of surrounding municipalities and the Los Angeles County Sheriff's Department.

Since aqueous ammonia already is transported to the Generating Station on a monthly basis (approximately 10 trips per month at peak capacity), the impacts associated with this project are those that may occur due to the incremental increase in the quantity of ammonia supplied to the site. The installation of the proposed storage tanks would require approximately 24 additional truck trips per month at peak capacity. Please refer to Section 4.3, "Hazards and Hazardous Materials" for a more complete discussion of the potential risks associated with aqueous ammonia transport and storage. However, a "worst-case" scenario (one storage tank or tanker truck instantaneously releasing all aqueous ammonia) would require the same level of emergency response as the current spill response plan created during the installation of SCR on Units 5 and 6 (SCAQMD, 1993b). Therefore, the proposed project would not result in significant impacts to police and fire services.

Construction activities at the Generating Station would not involve the relocation of individuals, impact housing or change the distribution of the population. No significant increase in the number of permanent workers is expected as part of the proposed project. Thus, the proposed project would not alter existing, or require additional schools.

There would be no increase in the number of AES employees due to implementation of the proposed project. Therefore, this project would not affect or increase the demand for additional parks or other public facilities, nor would it increase the need for maintenance of existing parks and public facilities.

4.4.13 Recreation

The proposed project would not increase the demand for neighborhood or regional parks, or other recreational facilities in the area since the project is not expected to increase the local population. The proposed project would be implemented within the existing Generating Station and thus would not adversely affect existing recreational opportunities. The proposed project would not include new recreational facilities or require expansion of existing recreational facilities, since no increase in local population is expected.

4.4.14 Solid/Hazardous Waste

Construction activities, such as demolition, may generate a short-term increase in additional solid waste generated at the site. In addition, for SCR to reduce NO_x to molecular nitrogen, the reduction reaction must occur in the presence of a catalyst. This catalyst must be replaced approximately every three years. The spent catalyst would be recycled by the manufacturer, Mitsubishi Heavy Industries America (MHIA). Therefore, the proposed project would not significantly contribute solid waste to a landfill.

The Generating Station currently complies, and the proposed project would continue to comply, with federal, state, and local regulations related to solid and hazardous wastes. No hazardous wastes would result from the normal operation of the SCR unit. However, at the end of the catalyst's useful life (three years), the catalyst modules themselves are considered hazardous waste due to the metal content of the ceramic substrate. After exhaustion of the catalyst, the modules would be disposed of by the catalyst manufacturer, MHIA according to federal, state and local regulations at an appropriate off-site disposal facility.

4.4.15 Transportation/Traffic

During the construction phase (approximately four months), the proposed project would temporarily increase the traffic in the area associated with construction workers, construction equipment, and the delivery of construction materials. Major arteries would be used to transport materials and construction workers to the site. The 24-hour traffic count for Studebaker Road, the major access road to the facility, is 39,220 (Armstrong, 2000). The maximum number of trips during peak construction, approximately 13 weeks, would be 140 trips per day. The remaining construction period would have an average construction flow of 67 trips per day, with a maximum of 107 trips per day. The temporary increase of construction traffic along Studebaker Road represents a 0.4 percent increase, significantly below the SCAQMD's significance criteria of an increase of the volume to capacity ratio of two percent or more. The additional aqueous ammonia deliveries (24 per month) during operation also would be a less than two percent increase of trips on Studebaker Road.

The proposed project is not within the vicinity of a public or private airport and would not alter the existing air traffic patterns.

The proposed project would be constructed and implemented within an existing Generating Station that utilizes aqueous ammonia and SCR technology. The proposed project would not substantially increase hazards due to a design feature or incompatible use nor conflict with adopted policies, plans or programs supporting alternative transportation.

The proposed project would be constructed and implemented within an existing Generating Station and would not alter the existing emergency access nor result in inadequate parking capacity.

4.5 OTHER CEQA TOPICS

Pursuant to CEQA requirements, the following sections consider the project's potential for irreversible environmental changes and growth inducement.

4.5.1 Irreversible Environmental Changes

CEQA Guidelines §15126.6(c) requires an environmental analysis to consider "significant irreversible environmental changes which would be involved in the proposed project should it be implemented." The NOP/IS identified air quality and hazards as potential impact areas. There will be no unavoidable, significant air quality impacts. The proposed SCR project would result in overall net air quality benefits (i.e., reduction of NO_x emissions). The hazards impacts associated with operation-related transportation and storage activities are unavoidable and significant. However, with the reduction of probability and risk associated with the mitigation of these risks, irreversible environmental changes would not result from the implementation of the proposed project.

Accordingly, as can be seen by the information presented in this *Final EIR* ~~DEIR~~, the proposed project would not result in irreversible environmental changes or the irretrievable commitment of resources.

4.5.2 Growth-Inducing Impacts

CEQA Guidelines §15126.6(d) requires an environmental analysis to consider the "growth-inducing impact of the proposed action." The proposed project, which is designed solely to reduce NO_x emissions, does not include any provisions which foster economic or population growth, or the construction of additional housing, either directly or indirectly.

CHAPTER 5

PROJECT ALTERNATIVES

5.1 INTRODUCTION

This *Final EIR* ~~DEIR~~ provides a discussion of alternatives to the proposed project as required by CEQA. The range of potential alternatives to the proposed project shall include those that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects (CEQA Guidelines §15126.6(c)). The EIR should briefly describe the rationale for selecting the alternatives to be discussed.

Additionally, the specific alternative of "No Project" shall also be evaluated along with its impact (CEQA Guidelines §15126.6(e)(1)). The purpose of describing and analyzing a no project alternative is to allow decision-makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project (Id.). This *Final EIR* ~~DEIR~~ includes an analysis of a "No Project" alternative.

5.2 ALTERNATIVES REJECTED AS INFEASIBLE

Pursuant to CEQA Guidelines §15126.6(c), a CEQA document should identify any alternatives that were considered by the lead agency, but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination. Among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are: (i) failure to meet most of the basic project objectives, (ii) infeasibility, or (iii) inability to avoid significant environmental impacts. (CEQA Guidelines §15126.6(c))

5.2.1 Alternative Location

The Alternative Location alternative was rejected as infeasible because NO_x emission reductions must occur at the AES Alamitos Generating Station in order for the facility to comply with the SCAQMD's RECLAIM program. Therefore, an alternative location was rejected from further analysis in the *Final EIR* ~~DEIR~~. It should be noted that SCRs also are proposed for installation at AES's Huntington Beach and Redondo Beach facilities. Environmental documents have been prepared and circulated for public review for both projects. Local cities have assumed the role of lead agency.

5.2.2 Alternative NO_x Controls

5.2.2.1 SCONOx ™

The Sunlaw carbon monoxide and nitrogen oxide (SCONOx ™) system uses a self- regenerating proprietary catalyst to reduce NO_x emissions. It also reduces emissions of carbon monoxide and eliminates ammonia emissions normally associated with SCR equipment.

However, SCONOx™ is an unproven technology for the type of large-scale utility boilers in place at AES. Current technological concerns include mechanical system reliability, scale-up design specifications, maintenance, increased back pressure, and associated warranty/financial lender issues.

Therefore, SCONOx™ was reviewed and rejected from further analysis due to the infeasibility of using this technology with the existing facility operations.

5.2.2.2 XONON ™

XONON™ technology, developed by Catalytica Combustion Systems, is an in-combustor control designed to avoid the high temperatures created in conventional combustors. XONON™ uses a proprietary flameless process in which fuel and air react on the surface of a catalyst in the turbine combustor to produce energy in the form of hot gases, which drive the turbine. While this technology has been applied to small turbines, it is not yet commercially available for use in large-scale utility boilers.

Therefore, XONON™ was reviewed and rejected from further analysis due to the infeasibility of using this technology at the existing facility operations.

5.2.2.3 Steam Injection or Water Injection

NO_x emissions in utility boilers can be reduced by either steam or water injection. This type of control includes injecting water or steam into the primary combustion zone with the fuel. The water or steam serves to reduce thermal NO_x formation by reducing peak flame temperature. The degree of reduction in NO_x formation is proportional to the amount of water injected. A limit exists, however, to the amount of water that can be injected before system reliability is affected. This type of control can also be counterproductive with regard to carbon monoxide (CO) and volatile organic compound (VOC) emissions that are formed as a result of incomplete combustion. Since NO_x reductions using water or steam injection alone would not be sufficient to meet the requirements of the RECLAIM program, and because an increase in CO and VOCs would occur, further analysis of this technology was not conducted.

5.2.3 Alternatives to Aqueous Ammonia Transport and Storage

The proposed SCR air pollution control system requires ammonia to react with NO_x in the exhaust gases to reduce NO_x emissions. Rather than having aqueous ammonia transported to and stored at the site, the facility could potentially utilize an ammonia processing plant on-site to provide the ammonia to the SCR in the boiler, via the Urea to Ammonia (U_2A™) process. In this process, solid dry urea is dissolved in deionized water to produce an aqueous solution of urea. This solution is then converted to a gaseous mixture of ammonia, carbon dioxide and water for use in the SCR catalyst. The only two chemicals required for this process are urea and water. The U_2A™ equipment would require a footprint of approximately 50 x 40 feet.

The solid urea would be delivered by truck in quantities of 25 tons, then pneumatically transferred from the delivery truck to a dry urea storage bin from which the urea is discharged to a continuous dissolver. The pneumatic transfer would be completely enclosed.

To work properly, the U_2A™ system would require 50 to 250 gallons per hour of deionized water for the solid urea to liquid ammonia conversion process, and 4,600,000 Btu per hour of auxiliary steam to create the liquid urea solution. However, Alamitos Generating Station has a very limited supply of deionized water that is solely enough to cover existing facility requirements. It would be cost and time prohibitive to provide a significantly increased quantity of deionized water to operate the U_2A™ system because:

- There is a limited flow of service water from the City. An expansion of flow rate would potentially require a major re-piping project with its own set of potential environmental impacts.
- The reverse osmosis system, which supplies deionized water for plant operations, is currently at capacity. In order to add an additional 30 percent capacity to the system, a costly overhaul would potentially be required.
- It is most likely infeasible to complete either of these two modifications in time for the planned spring outage and summer operation of the SCR systems.

Therefore, further analysis of the U_2A™ technology was not considered.

5.3 DESCRIPTION OF ALTERNATIVES

CEQA Guidelines §15126.6(a) require that an EIR describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation.

As discussed above, the nature of this project precludes consideration of alternative locations. Furthermore, alternative approaches to NOx reduction, such as SCONOx™, XONON™, and steam/water injection, are not compatible with the existing configurations and constraints at the Alamitos facility.

Beyond this, AES has entered into a settlement agreement with SCAQMD, which requires AES to further reduce NO_x emissions at all of its generating stations, including the Alamitos facility, in order to meet the requirements of SCAQMD's RECLAIM program. These reductions must occur by Summer 2001.

As a result, only two feasible project alternatives have been identified, including the No Project Alternative. The project alternatives were developed by modifying one or more components of the proposed project taking into consideration the project's limitations as to space, permitting requirements, and compliance agreement stipulations. Unless otherwise stated, all other components of each project alternative are identical to the proposed project.

5.3.1 Alternative A - No Project

Section 15126.6(e)(1) of the CEQA Guidelines requires that "(t)he specific alternative of 'no project' shall be also be evaluated..." The No Project Alternative would consist of continued operation of Units 1, 2, 3, and 4 under existing conditions. The proposed aqueous ammonia storage tanks would not be constructed and associated SCR systems would not be retrofitted onto Alamitos Generating Station Units 1, 2, 3, and 4.

Installation of the SCR systems on the existing Units 1, 2, 3, and 4 are required for the facility to comply with future RECLAIM Annual Allocation requirements, which would allow the facility to continue to supply reliable in-Basin power. Thus, the No Project Alternative would likely result in exceedances of the Alamitos facility's Annual Allocation of NO_x emissions, which could subject AES to substantial fines and penalties, and a reduced ability to meet peak energy demands in-Basin and in California.

5.3.2 Alternative B - 19 Percent Aqueous Ammonia

This alternative would be similar to the proposed project, i.e., aqueous ammonia would be utilized with SCR units to reduce NO_x emissions. The lower percentage of aqueous ammonia would require a redesign of piping from the storage tanks to the stacks. The storage tanks would be located in approximately the same location as that proposed for the project, and would be aboveground, double-walled, carbon steel, individually-bermed storage tanks.

Ammonia truck deliveries to the facility would increase by approximately 50 percent. Also, two types of aqueous ammonia (19 and 29 percent) would be delivered to the facility because Units 5 and 6 currently operate with 29 percent aqueous ammonia.

Additionally, due to larger flow volumes going into the gas path, the possibility of a visible plume occurring at the stack exit increases by using 19 percent aqueous ammonia.

5.4 COMPARISON OF THE ALTERNATIVES

The NOP/IS (see Appendix A) identified those environmental topics where the proposed project could cause significant adverse environmental impacts. Further analysis of these environmental topics in Chapter 4 of this *Final EIR* ~~DEIR~~ revealed that operation-related hazard impacts remain significant even after mitigation. However, no other significant adverse project-specific environmental impacts were identified.

The following subsections briefly describe potential environmental impacts that may be generated by each project alternative. Each environmental topic summary contains a brief description of the environmental impacts for each project alternative compared to impacts resulting from implementing the proposed project. Where sufficient data are available, potential impacts for the environmental topics are quantified.

5.4.1 Air Quality

5.4.1.1 Alternative A- No Project

The No Project Alternative assumes that the proposed project will not be undertaken, i.e., the proposed SCR systems would not be installed on Units 1 through 4, and the proposed ammonia storage tanks would not be installed on site. Therefore continued emission of uncontrolled NO_x would occur from all four units.

Construction

The No Project Alternative would mean that there would be no impact on the air quality, as no construction would take place.

Operation

The No Project Alternative would result in uncontrolled NO_x emissions from the operation of Units 1 through 4. In other words, the NO_x emission reductions that would be achieved for these four units by installation of SCR would be foregone. As a result, the adverse air quality and human health impacts associated with NO_x emissions from the Alamitos Facility would continue unabated without the implementation of the proposed project. In addition, the Alamitos Facility would exceed its RECLAIM NO_x credit allocation, which subject AES to substantial fines, penalties and closures and reduce its ability to meet peak energy demands in the Basin and in California.

With the No Project Alternative, there would be no secondary particulate formation, ammonia slip emissions, or mobile source emissions as a result of ammonia transport.

Cumulative

With the continuation of existing operations the NO_x reduction benefits of SCR would not be realized.

5.4.1.2 Alternative B- 19 Percent Aqueous Ammonia

The alternative use of 19 percent aqueous ammonia in the SCR units would result in additional mobile source emission impacts on the air quality of the Basin. Use of a weaker solution of ammonia would result in higher ammonia injection rates into the SCR system; hence larger quantities of this aqueous material will be used than if a 29 percent solution is used. The use of 19 percent ammonia also would include construction of three 20,000-gallon aboveground storage tanks onsite.

Construction

There would be no difference in the construction emissions associated with the utilization of 19 percent aqueous ammonia - the ammonia tanks and SCR systems would still have to be constructed on the site as for the proposed project. Therefore, there would not be any adverse impacts as a result of construction emissions (refer to Section 4.2).

Operation

Onsite operational emissions associated with the utilization of 19 percent aqueous ammonia would be the same for ammonia slip and secondary particulate formation (the ammonia slip concentration and reaction chemistry would not change) compared to the proposed project.

Offsite or transportation emissions for Alternative B would increase as a result of additional road and possibly rail transport of ammonia, as the two different ammonia concentrations would probably have to be transported separately. The existing SCR systems on Units 5 and 6 at the Alamitos Facility utilize 29 percent aqueous ammonia. The use of 29 percent aqueous ammonia, which is included as part of the proposed project, would mean that the existing ammonia rail and road transport system for Units 5 an 6 can be used to service Units 1 though 4. If 19 percent aqueous ammonia were used (Alternative B), a more frequent road and possibly the rail transport regime would have to be developed specifically for Units 1 through 4. This would result in additional transportation emissions if Alternative B is implemented.

It is estimated that these emissions would increase to approximately twice the estimated emissions for the proposed project as two separate road transport regimes would have to be utilized (one for the 19 percent ammonia and one for the 29 percent ammonia) (refer to Table 4-8 "Total Daily Mobile Source Emissions Compared To Significance Thresholds"). In effect this would double the emissions associated with road transport. Similarly, it is possible that a separate rail transport system would have to be utilized (one for each 19 percent ammonia and 29 percent ammonia). In order to estimate the "worst case" scenario it was assumed that a separate road and rail system would be needed for Alternative B. The emissions for Alternative B compared with the emissions for the proposed project are shown in Table 5-1 below. The emissions are compared with the Significance Thresholds. As indicated in Table 5-1, Alternative B would result in greater, but not significant, operational air quality impacts than the proposed project.

Cumulative

Because the increase in transport emissions associated with using Alternative B are below SCAQMD significance threshold levels, the cumulative impacts as a result of Alternative B would be less than significant, but slightly greater than the proposed project.

Table 5-1
Comparison of Emissions Between The Proposed Project And Alternative B (lb/day)

	CO	VOC	NOx	SOx	PM10
Proposed project on site emissions	54.62	27.32	90.07	6.07	5.84
Offsite emissions (mobile sources)[b]	6.34	0.33	4.26	0.76	2.55
TOTAL	**60.96**	**27.65**	**94.33**	**6.83**	**8.39**
Alternative B Onsite Emissions[a]	54.62	27.32	90.07	6.07	5.84
Offsite Emissions (Mobile Sources)[b]	12.68	0.66	8.52	1.52	5.10
TOTAL	**67.3**	**27.98**	**98.59**	**7.59**	**10.94**
Significance Thresholds	550	75	100	150	150

a the onsite emissions for Alternative B are identical to those for the proposed project, as there are no changes to the SCR construction or installation, only to the concentration of ammonia used on site.

b to get the pounds per day value for the mobile source emissions, the total emissions calculated were divided by 120 days, which is the total duration of construction.

5.4.2 Hazards and Hazardous Materials

5.4.2.1 Alternative A- No Project

Without the project, SCR controls would not be placed in Units 1, 2, 3, and 4. Thus, there would be no additional ammonia storage and transport at the Alamitos Generating Station.

Construction

No new construction would occur at the Alamitos Generating Station, therefore, no new hazard-related impacts would be generated.

Operation

Without the project, there would be no expanded ammonia use or transport at the Alamitos Generating Station. Thus, there would be no new hazard impacts.

Cumulative

Without the project, no cumulative impacts would occur with existing operations.

5.4.2.2 Alternative B – 19 Percent Aqueous Ammonia

Aqueous ammonia in 19 percent concentration, instead of 29 percent concentration, could be utilized in the proposed SCR controls for Units 1, 2, 3, and 4. However, the use of 19 percent ammonia still would require construction of three 20,000-gallon aboveground storage tanks onsite. In addition, use of 19 percent ammonia but would require design changes to the SCRs for Units 1, 2, 3, and 4, result in the delivery of two types of aqueous ammonia to the facility (19 percent and 29 percent), and cause more aqueous ammonia tanker truck traffic to the facility due to the use of a less concentrated ammonia solution for Units 1, 2, 3, and 4.

Construction

New construction activity at the Alamitos Generating Station associated with the 19 percent aqueous ammonia alternative would be the same as with 29 percent aqueous ammonia. No public health hazards impact was found for this construction.

Operation

Potential hazard impacts from the use of 19 percent aqueous ammonia would be lower compared to those resulting from the use of 29 percent aqueous ammonia. The same "worst-case" release scenarios were evaluated for Alternative B as were evaluated for the proposed project:

- The complete onsite failure of one 20,000-gallon aboveground storage tank.
- An offsite aqueous ammonia tanker truck release at a point of maximum population density along the transport route.

Onsite Release

This onsite release scenario involves the aboveground 20,000-gallon aqueous ammonia storage tank for Units 1 and 2, which is closest to populated areas to the west of the facility. The scenario assumes that the entire contents of the storage tank are released into the bermed containment area surrounding the tank by proposed facility design, thereby forming an evaporating pool. The RMP*COMP™ model was used to estimate the distance to the ammonia concentration of concern. Additional release parameters are as follows.

Weight composition of liquid spill	= 20 percent ammonia (NH_3)[7], 80 percent water (H_2O)
Evaporating pool area	= 595.47 square feet
Release elevation	= ground level
Bermed height	= 5.02 feet
Release rate	= 12.5 pounds per minute (calculated by RMP*COMP™)

RMP*COMP™ estimates the airborne ammonia concentrations that would exceed the significance criterion of 200 ppmv out to a distance of 0.1 mile (0.2 kilometer), the same distance analyzed for the proposed project using 29 percent ammonia. However, the predicted ammonia evaporation rate is 12.5 pounds per minute (lb/min) for 19 percent ammonia versus 21.5 lb/min for 29 percent ammonia. Therefore, the actual extent of the impact area should be less for 19 percent ammonia. The same distance reported by RMP*COMP™ for both cases is the result of rounding effects in the model, i.e.; the model does not calculate results less than 0.1 mile. The finding for 29 percent ammonia was an insignificant offsite impact, thus the RMP*COMP™ result for 19 percent ammonia confirmed there also would be an insignificant offsite impact.

Offsite Release

The tanker truck accident scenario assumes the entire contents of a 6,000-gallon tanker truck would be released at some point along the transportation route. The RMP*COMP™ model was used to estimate the distance to the ammonia concentration of concern. Additional release parameters are as follows.

Weight composition of liquid spill	= 20 percent ammonia (NH_3)[8], 80 percent water (H_2O)
Evaporating pool area	= undiked[9]
Release elevation	= ground level
Release rate	= 510 pounds per minute (calculated by RMP*COMP™)

Potential ammonia concentrations associated with an accidental release during truck transport were estimated by RMP*COMP™ to exceed the significance criterion of 200 ppmv out to a distance of 0.4 mile (0.64 kilometer). This is a smaller impact area than the 1-kilometer radius impact area modeled for 29 percent ammonia. The maximum population densities along the I-605/I-10 transport route were estimated from 1990 census tract data at about 4,000 persons per square kilometer (Baldwin Park, Cerritos and Downey areas). Assuming this population density, the maximum number of people estimated to be exposed to ammonia concentrations of 200 ppmv or greater from a catastrophic truck accident releasing 19 percent aqueous ammonia is:

$$\text{Area} \times \text{Population Density} = \pi\ (0.64\ \text{km})^2 \times 4{,}000\ \text{persons/km}^2 = 5{,}147\ \text{persons}$$

This is less than the number of people potentially exposed with the release of 29 percent aqueous ammonia, but is still considered a potentially significant impact. It should be noted that this estimate is based on a calculated ammonia vapor release rate of 510 pounds per minute. At this rate, the entire ammonia content of a 6,000-gallon spill would evaporate within about 18 minutes. Thus, either the release scenario would not persist longer than 18 minutes assuming the RMP*COMP™ calculations, or the EPA*COMP™ evaporation rate is conservatively high, in

[7] Closest concentration choice in the RMP*COMP™ model to the alternative 19 percent concentration.
[8] Closest concentration choice in the RMP*COMP™ model to the planned 19 percent concentration.
[9] Model assumes the aqueous ammonia spreads until it reaches a depth of one cm.

which case the release would persist longer at a lower ammonia evaporation rate, thereby reducing the potential impact area under "worst-case" meteorology.

The use of 19 percent aqueous ammonia would require more tanker truck deliveries to the facility. The same amount of ammonia available for the SCR units with 19 percent aqueous ammonia would require approximately 50 percent more tanker truck deliveries. Thus, instead of 240 additional ammonia deliveries per year with 29 percent ammonia, about 440 additional deliveries would be needed. The resulting probability of a complete loss of contents due to a tanker truck accident would be 7.7×10^{-3} per year (one per 130 years), assuming the 63-mile transport route and an accident probability of one per 3.6 million miles traveled (Arthur D. Little, 1992). This is a higher probability than the estimate of one-per-200-years calculated for the delivery of 29 percent ammonia.

Cumulative Impact

Cumulative impacts from the potential onsite tank rupture and offsite transport accidental releases associated with the 19 percent ammonia alternative are discussed below.

Onsite Release

Existing Units 5 and 6 at the Alamitos Generating Station utilize one underground 20,000-gallon tank for ammonia storage. Because this storage tank is underground, there would be no catastrophic tank failure scenario. The "worst-case" release scenario (SCAQMD 1993b) is based on an unmitigated 2-inch line shear. This analysis concluded that there would be no offsite population exposed to ammonia concentrations as low as 100 ppmv (SCAQMD 1993b). The likelihood that this type of release would occur simultaneously with the catastrophic tank failure analyzed above for the 19 percent ammonia alternative is very low. Furthermore, the distance of Units 5 and 6 (in the southern portion of the generating station) from Units 1 – 4 would not allow for a plume released from the tanks at Units 5 and 6 to merge with a simultaneous plume from one of the storage tanks for Units 1 – 4 in the northern portion of the generating station. Therefore, potential cumulative impacts from simultaneous accidental releases would be insignificant.

Offsite Release

An increase in the number of aqueous ammonia deliveries does not change the potential result of a complete tanker truck failure. Thus, there is no change from the estimated maximum number of people exposed to ammonia concentrations of 200 ppmv or greater described above for either the 29 percent or 19 percent ammonia alternatives, which were both found to be potentially significant impacts.

The increased transport activity under Alternative B, however, does increase the potential probability of an accident event. The current facility has about 170 ammonia deliveries per year. This represents a current probability of an accident leading to a complete loss of tanker contents at about 3.0×10^{-3} per year (or about one per 333 years), assuming the 63-mile transport route and an accident probability of one per 3.6 million miles traveled (Arthur D. Little, 1992). Adding the estimated 440 new trips associated with 19 percent ammonia, the probability of an accident leading to a complete loss of tanker contents due to cumulative ammonia transport to the facility is about 1.1×10^{-2} per year (or about one per 91 years). This is still a low probability event, similar to the one-in-125-years calculated for cumulative impacts with the delivery of 29 percent ammonia

("Improbable" likelihood), but the cumulative probability estimate for the 19 percent ammonia alternative does fall within the one per 100 years range, which places it into the "Periodic" likelihood category. Thus, the probability of an accident under Alternative B is higher than for the proposed project.

5.5 CONCLUSION

CEQA Guidelines §15126.6 (d) requires that CEQA documents include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project. A matrix displaying the major characteristics and significant environmental effects of each alternative may be used to summarize the comparison.

Table 5-2 lists the alternatives considered by the SCAQMD and how they compare to the proposed SCR project. Table 5-3 presents a matrix that lists the significant adverse impacts as well as the cumulative impacts associated with the proposed project and the project alternatives for the environmental topics analyzed. The table also ranks each impact section as to whether the proposed project or a project alternative would result in greater or lesser impacts relative to one another.

Pursuant to CEQA Guidelines §15126.6(e)(2), if the environmentally superior alternative is the "no project" alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives. Since the No Project alternative (Alternative A) would not achieve the long-term air quality benefits of the proposed project, it is not the environmentally superior alternative. As shown in Table 5-3, the proposed project is the environmentally superior alternative.

Table 5-2
Comparison of Adverse Environmental Impacts
Associated with Project Alternatives

Environmental Topic	Alternative A (No Project)	Alternative B (19 Percent Aqueous Ammonia)	Proposed Project (29 Percent Aqueous Ammonia)
Air Quality Pollutants[a] - NO_x			
Construction	Not Significant	Not Significant	Not Significant
Operational	Not Significant; However, NO_x emission reduction would be foregone	Not Significant	Not Significant
Hazards	Not Significant	Significant, due to additional 50% increase in tanker truck deliveries; impacts would be greater than proposed project	Significant

a Emission benefits and increases associated with the proposed project.

Table 5-3
Ranking of Alternatives[a]

	Air Quality	Hazards	Project Objectives Met[b]	Ranking[c]
Proposed Project (29 Percent Aqueous Ammonia)	• No construction impacts. • Net beneficial effect on long-term operational emissions as a result of NO_x emission reduction. • No cumulative impacts. (Refer to Section 4.2)	• No construction impacts. • Unmitigable, significant impact related to aqueous ammonia. • No cumulative impacts. (Refer to Section 4.3)	4 out of 4	**1**
Alternative A (No Project)	• No construction impacts. • Continuation of existing operation would not realize the NO_x reduction benefits of SCR. (Refer to Section 5.4.1.1)	• No new impacts. (refer to Section 5.4.1.1)	1 out of 4	**3**
Alternative B (19 Percent Aqueous Ammonia)	• Same air quality impacts as Proposed Project (see description above). • 50% increase in tanker truck deliveries (greater, but not significant, operational impacts) (Refer to Section 5.4.1.2)	• Same hazard impacts as Proposed Project (see description above). • 50% increase in tanker truck deliveries increases probability of tanker truck failure. (Refer to Section 5.4.2.2)	3 out of 4	**2**

a Air Quality and Hazards are the only topics analyzed because, as discussed in the EIR, the proposed project and two alternatives would not result in significant impacts in other environmental topic areas. Refer to Section 4.4 for a detailed discussion of environmental impacts found not to be significant.

b The number of project objectives met by the proposed project or alternative. (Refer to Section 2.3 of EIR)

c The ranking is based on which action will meet the most project objectives with the least significant impacts. “1” is the highest ranking and “3” is the lowest ranking.

REFERENCES

References Cited and Consulted

American Institute of Chemical Engineers (AIChE). 1989. Process Equipment Reliability Data.

American Institute of Chemical Engineers (AIChE). Chemical Process Quantitative Risk Analysis.

Armstrong, Mark (Traffic and Transportation Department, City of Long Beach). 2000. Personal correspondence with K. Bartsch (URS Corp.). October 19.

Arthur D. Little. 1992. Hazards Analysis for Proposed Southern California Edison SCR Ammonia Systems. Arthur D. Little, Inc. January.

Benchley, D.L., and G.F. Athey. 1981. Assessment of Research and Development (R&D) Needs in Ammonia Safety and Environmental Control. Pacific Northwest Laboratories, Richland, WA. September.

Bihn, Caroline (Planning Department, City of Long Beach). 2000. Personal correspondence with K. Bartsch (URS Corp.). June 30 and September 14.

Cal-ISO. 2000. Frequently Asked Questions- The California ISO. http://www.caiso.com/aboutus./infokit/FAQ.html.

California Air Pollution Control Officers Association (CAPCOA). 1987. Air Toxics Assessment Manual. October.

California Environmental Protection Agency (CalEPA). 1999. Air Toxics Hot Spots Risk Assessment Guidelines, Part 111, The Determination of Acute Reference Exposure Levels for Airborne Toxicants. Office of Environmental Health Hazard Assessment, and California Environmental Protection Agency (CalEPA). 2000. Air Toxics Hot Spots Risk Assessment Guidelines, Part 111. The Determination of Chronic Reference Exposure Levels for Airborne Toxicants. Office of Environmental Health Hazard Assessment, May.

City of Long Beach. 1975a. Noise Element, Long Beach General Plan, City of Long Beach, Planning Department. March 25.

City of Long Beach. 1975b. Long Beach General Plan Program, Public Safety Element. Long Beach City Planning Department. May.

City of Long Beach. 1980. Local Coastal Program. City of Long Beach, certified July 22, 1980.

City of Long Beach. 1988. City of Long Beach General Plan, Seismic Safety Element. Department of Planning and Building. October.

City of Long Beach. 1992. Land Use Element of the Long Beach General. City of Long Beach Department of Planning and Building, revised and reprinted September 1992.

City of Long Beach. 1999. Ordinance No. C-7625: An Ordinance of the City Council of the City of Long Beach Amending Ordinance No. C-7528 Relating to the Southeast Area Development and Improvement Plan (SEADIP) PD-1). June.

Environmental Protection Agency (EPA). 1999. Risk Management Program Guidance for Offsite Consequence Analysis. Chemical Emergency Preparedness and Prevention Office. EPA 550-B-99-009. April.

Environmental Protection Agency, 1992. Supplemented 1995. Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised. EPA-450/R-92-019. U.S. Environmental Protection Agency, Research Triangle Park, NC.

Eschenroeder, A., C. Petitio, S. Wolff, and A. Lloyd. 1988. A Preliminary Screening Study of Potential Health Risks of Selective Catalytic Reduction Systems Applied to Gas Turbine Cogeneration Plants. Alanova, Inc., Lincoln, Massachusetts. August.

Kleinfelder, Inc. 2000. *Report of Geotechnical Engineering Study, AES Alamitos Generation Plant, Catalytic Converter Installation, Units 3 and 4*. July 17.

LADWP. 2000. Personal Communication with Paula Bradshaw (URS). October.

L.A. County, Department of Public Works (Marged Elrabaa). 2000. Personal Communication with Paula Bradshaw (URS). December.

Lees, F. 1992. Loss Prevention in Process Industries, Volume 1.

Local Climate Data. 1999. Annual Summary with Comparative Data, Los Angeles, California, Los Angeles International Airport. National Oceanic and Atmospheric Administration.

Ortega, Lisa (Public Works, City of Long Beach). 2000. Personal correspondence to K. Bartsch (URS Corp.). October 19, 2000.

SCAQMD. 1993a. *Final Subsequent Environmental Impact Report: Aqueous Ammonia Storage Tank Installation at the Alamitos Generating Station,* SCH 88032315, South Coast Air Quality Management District. March.

SCAQMD. 1993b. *Final Supplemental Environmental Impact Report: SCR System for Alamitos Generating Station Unit,* SCH 88032315, South Coast Air Quality Management District. September.

SCAQMD. 1993c. CEQA Air Quality Handbook (April 1993).

SCAQMD. 1998. *Final Environmental Impact Report for: California Steel, Inc.- Construction and Operation of the No. 2 Continuous Galvanizing Line (CGL),* SCH 98011062, South Coast Air Quality Management District. May.

SCAQMD. 2000. *Draft EIR: ARCO California Air Resources Board Phase 3/MTBE Phaseout Project,* SCH No. 2000061074. November.

South Coast Air Quality Management District (SCAQMD). 1993b. Draft Subsequent Environmental Impact Report (SEIR): Aqueous Ammonia Storage Tank Installation at the Alamitos Generating Station. March.

South Coast Air Quality Management District (SCAQMD). 2000. Telephone conversation between Steve Smith, Ph.D., of the SCAQMD and David Marx of URS Corporation. November 17.

Spracklen, Robert W. (Structural Engineer, S.B. Barnes Associates) 2000. Transmittal Letter to Mitsubishi Heavy Industries America, Inc.: Proposed Ammonia Tank Installation at AES Alamitos, 690 N. Studebaker Road, Long Beach California.

United States Geological Survey (USGS). 2000. USGS Website (http://www.usgs.gov). Page on southern California historical earthquake activity (http://pasadena.wr.usgs.gov/ppf.html#past, updated as of October 20, 2000.

APPENDIX A

NOTICE OF PREPARATION/INITIAL STUDY

APPENDIX B

COMMENT LETTERS AND RESPONSE TO COMMENTS (NOP/IS)

APPENDIX C

CALCULATION METHODOLOGY FOR CONSTRUCTION EMISSIONS

Insert Appendix C Excel Tables Here

APPENDIX D

AMMONIA SLIP MODELING ANALYSIS
(SCREEN3 MODEL INPUT AND OUTPUT FILES)

```
AES Alamitos HRA Screening for SCR on Units 1 & 2
P       5.81800
   65.5300
   3.78000
   13.6900
   408.590
   293.000
   .000000
R
y
   41.5000
   95.2500
   104.775
y
       72.000000     6300.000000
       80.000000     6400.000000
       90.000000     6500.000000
      100.000000     6680.000000
      130.000000    18500.000000
      160.000000    18900.000000
      190.000000    20400.000000
      186.000000    20400.000000
    0.000000E+00    0.000000E+00
y
y
           1
y
    0.000000E+00
     1.00,  824.00
y
       10.000000
   825.00, 1200.00
y
       20.000000
  1201.00, 4800.00
y
       30.000000
  4801.00, 5000.00
y
       40.000000
  5001.00, 5170.00
y
       50.000000
  5171.00, 6200.00
y
       60.000000
  6201.00, 6300.00
n
n
y
y
      300.000000
n
```

```
AES Alamitos HRA Screening for SCR on Units 1 & 2
P       5.81800
   65.5300
   3.78000
   13.6900
   408.590
   293.000
   .000000
U
y
   41.5000
   95.2500
   104.775
y
       72.000000     6300.000000
       80.000000     6400.000000
       90.000000     6500.000000
      100.000000     6680.000000
      130.000000    18500.000000
      160.000000    18900.000000
      190.000000    20400.000000
      186.000000    20400.000000
    0.000000E+00    0.000000E+00
y
y
           1
y
    0.000000E+00
     1.00,  824.00
y
       10.000000
   825.00, 1200.00
y
       20.000000
  1201.00, 4800.00
y
       30.000000
  4801.00, 5000.00
y
       40.000000
  5001.00, 5170.00
y
       50.000000
  5171.00, 6200.00
y
       60.000000
  6201.00, 6300.00
n
n
n
```

```
10/02/00

14:32:01
  ***  SCREEN3 MODEL RUN  ***
  *** VERSION DATED 96043 ***

AES Alamitos HRA Screening for SCR on Units 1 & 2

COMPLEX TERRAIN INPUTS:
    SOURCE TYPE            =        POINT
    EMISSION RATE (G/S)    =      5.81800
    STACK HT (M)           =      65.5300
    STACK DIAMETER (M)     =       3.7800
    STACK VELOCITY (M/S)   =      13.6900
    STACK GAS TEMP (K)     =     408.5900
    AMBIENT AIR TEMP (K)   =     293.0000
    RECEPTOR HEIGHT (M)    =        .0000
    URBAN/RURAL OPTION     =        URBAN

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.


BUOY. FLUX =  135.662 M**4/S**3;  MOM. FLUX =  480.076 M**4/S**2.


FINAL STABLE PLUME HEIGHT (M) =  178.1
DISTANCE TO FINAL RISE (M)    =  200.2

                         *VALLEY 24-HR CALCS*   **SIMPLE TERRAIN 24-HR
CALCS**
  TERR         MAX 24-HR             PLUME HT            PLUME HT
   HT    DIST    CONC        CONC    ABOVE STK    CONC    ABOVE STK    U10M
USTK
   (M)    (M)   (UG/M**3)   (UG/M**3)  BASE (M)  (UG/M**3)  HGT (M)  SC
(M/S)
----- ------- ----------  ----------  ------   ----------  ------  -- ----
----
    72.   6300.  5.756       .9442       178.1    5.756       105.0   6  1.0
1.8
    80.   6400.  5.671       .9549       178.1    5.671       105.0   6  1.0
1.8
    90.   6500.  5.590       .9693       178.1    5.590       105.0   6  1.0
1.8
   100.   6680.  5.448       .9628       178.1    5.448       105.0   6  1.0
1.8
   130.  18500.  2.011       .2265       178.1    2.011       105.0   6  1.0
1.8
   160.  18900.  1.968       .2222       178.1    1.968       105.0   6  1.0
1.8
   190.  20400.  .1983       .1983       178.1    .0000          .0   0   .0
  .0
   186.  20400.  .1983       .1983       178.1    .0000          .0   0   .0
  .0
```

```
10/02/00

14:32:01
  ***  SCREEN3 MODEL RUN  ***
  *** VERSION DATED 96043 ***

AES Alamitos HRA Screening for SCR on Units 1 & 2

SIMPLE TERRAIN INPUTS:
    SOURCE TYPE            =        POINT
    EMISSION RATE (G/S)    =      5.81800
    STACK HEIGHT (M)       =      65.5300
    STK INSIDE DIAM (M)    =       3.7800
    STK EXIT VELOCITY (M/S)=      13.6900
    STK GAS EXIT TEMP (K)  =     408.5900
    AMBIENT AIR TEMP (K)   =     293.0000
    RECEPTOR HEIGHT (M)    =        .0000
    URBAN/RURAL OPTION     =        URBAN
    BUILDING HEIGHT (M)    =      41.5000
    MIN HORIZ BLDG DIM (M) =      95.2500
    MAX HORIZ BLDG DIM (M) =     104.7750

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.


BUOY. FLUX =  135.662 M**4/S**3;  MOM. FLUX =  480.076 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES
***

   DIST     CONC             U10M   USTK  MIX HT   PLUME   SIGMA   SIGMA
    (M)   (UG/M**3)   STAB  (M/S)  (M/S)    (M)   HT (M)   Y (M)   Z (M)
DWASH
-------  ----------  ----  -----  -----  ------  ------  ------  ------
-----
      1.   .0000        1     1.0    1.3   622.2  621.22    4.70    4.70
NO
    100.   .8357E-04    6     1.0    1.8 10000.0  170.54   30.75   29.74
NO
    200.   11.15        2     5.0    6.6  1600.0  107.95   62.77   53.96
HS
    300.   12.71        2     5.0    6.6  1600.0  121.11   92.09   83.61
HS
    400.   11.20        3     5.0    7.3  1600.0  126.82   83.56   81.89
HS
    500.   9.923        3     5.0    7.3  1600.0  136.65  102.45  102.04
```

```
HS
    600.   8.572        3     4.5    6.6  1440.0  154.77  121.25  122.68
HS
    700.   7.880        6     1.5    2.6 10000.0  157.27   72.93   64.91
HS
    800.   8.660        6     1.5    2.6 10000.0  157.27   80.95   67.76
HS

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND     1. M:
    265.   13.02        2     5.0    6.6  1600.0  116.83   82.24   73.31
HS

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF   10. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES
***

   DIST     CONC             U10M   USTK  MIX HT   PLUME   SIGMA   SIGMA
    (M)   (UG/M**3)   STAB  (M/S)  (M/S)    (M)   HT (M)   Y (M)   Z (M)
DWASH
-------  ----------  ----  -----  -----  ------  ------  ------  ------
-----
    825.   12.23        6     1.5    2.6 10000.0  147.27   82.94   68.46
HS
    900.   12.67        6     1.5    2.6 10000.0  147.27   88.85   70.52
HS
   1000.   13.14        6     1.5    2.6 10000.0  147.27   96.59   73.21
HS
   1100.   13.49        6     1.5    2.6 10000.0  147.27  104.18   75.83
HS
   1200.   13.74        6     1.5    2.6 10000.0  147.27  111.62   78.38
HS

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND   825. M:
   1544.   14.06        6     1.5    2.6 10000.0  147.27  136.02   86.66
HS

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF   20. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES
***

   DIST     CONC             U10M   USTK  MIX HT   PLUME   SIGMA   SIGMA
    (M)   (UG/M**3)   STAB  (M/S)  (M/S)    (M)   HT (M)   Y (M)   Z (M)
DWASH
-------  ----------  ----  -----  -----  ------  ------  ------  ------
-----
   1201.   17.32        6     1.5    2.6 10000.0  137.27  111.70   78.41
HS
   1300.   17.30        6     1.5    2.6 10000.0  137.27  118.91   80.87
```

```
HS
   1400.   17.21        6     1.5    2.6 10000.0  137.27  126.05   83.29
HS
   1500.   17.07        6     1.5    2.6 10000.0  137.27  133.05   85.66
HS
   1600.   16.89        6     1.5    2.6 10000.0  137.27  139.91   87.98
HS
   1700.   16.69        6     1.5    2.6 10000.0  137.27  146.64   90.24
HS
   1800.   16.47        6     1.5    2.6 10000.0  137.27  153.23   92.46
HS
   1900.   16.23        6     1.5    2.6 10000.0  137.27  159.71   94.63
HS
   2000.   15.98        6     1.5    2.6 10000.0  137.27  166.06   96.77
HS
   2100.   15.94        6     1.0    1.8 10000.0  150.54  172.92   87.76
NO
   2200.   16.15        6     1.0    1.8 10000.0  150.54  179.03   90.02
NO
   2300.   16.30        6     1.0    1.8 10000.0  150.54  185.04   92.24
NO
   2400.   16.39        6     1.0    1.8 10000.0  150.54  190.94   94.41
NO
   2500.   16.45        6     1.0    1.8 10000.0  150.54  196.76   96.55
NO
   2600.   16.46        6     1.0    1.8 10000.0  150.54  202.48   98.64
NO
   2700.   16.44        6     1.0    1.8 10000.0  150.54  208.11  100.69
NO
   2800.   16.40        6     1.0    1.8 10000.0  150.54  213.65  102.71
NO
   2900.   16.33        6     1.0    1.8 10000.0  150.54  219.12  104.69
NO
   3000.   16.25        6     1.0    1.8 10000.0  150.54  224.50  106.64
NO
   3500.   15.63        6     1.0    1.8 10000.0  150.54  250.32  115.95
NO
   4000.   14.85        6     1.0    1.8 10000.0  150.54  274.52  124.61
NO
   4500.   14.03        6     1.0    1.8 10000.0  150.54  297.34  132.75
NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND  1201. M:
   1210.   17.32        6     1.5    2.6 10000.0  137.27  112.43   78.66
HS

*********************************
*** SCREEN AUTOMATED DISTANCES ***
*********************************

*** TERRAIN HEIGHT OF   30. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES
***

   DIST     CONC             U10M   USTK  MIX HT   PLUME   SIGMA   SIGMA
```

```
    (M)    (UG/M**3)   STAB  (M/S)  (M/S)     (M)   HT (M)   Y (M)   Z (M)
DWASH
-------  ----------  ----  -----  -----  ------  ------  ------  ------
-----
   4801.   14.64        6     1.0    1.8 10000.0  140.54  310.48  137.43
NO
   5000.   14.26        6     1.0    1.8 10000.0  140.54  318.96  140.44
NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND  4801. M:
   4801.   14.64        6     1.0    1.8 10000.0  140.54  310.48  137.43
NO

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF   40. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES
***

   DIST     CONC             U10M   USTK  MIX HT   PLUME   SIGMA   SIGMA
    (M)    (UG/M**3)   STAB  (M/S)  (M/S)     (M)   HT (M)   Y (M)   Z (M)
DWASH
-------  ----------  ----  -----  -----  ------  ------  ------  ------
-----
   5001.   15.27        6     1.0    1.8 10000.0  130.54  319.00  140.46
NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND  5001. M:
   5001.   15.27        6     1.0    1.8 10000.0  130.54  319.00  140.46
NO

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF   50. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES
***

   DIST     CONC             U10M   USTK  MIX HT   PLUME   SIGMA   SIGMA
    (M)    (UG/M**3)   STAB  (M/S)  (M/S)     (M)   HT (M)   Y (M)   Z (M)
DWASH
-------  ----------  ----  -----  -----  ------  ------  ------  ------
-----
   5171.   15.84        6     1.0    1.8 10000.0  120.54  326.10  142.98
NO
   5500.   15.06        6     1.0    1.8 10000.0  120.54  339.53  147.75
NO
   6000.   14.00        6     1.0    1.8 10000.0  120.54  359.19  154.73
NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND  5171. M:
   5171.   15.84        6     1.0    1.8 10000.0  120.54  326.10  142.98
NO
```

```
**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF   60. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES
***

   DIST     CONC              U10M   USTK  MIX HT   PLUME   SIGMA   SIGMA
    (M)   (UG/M**3)   STAB  (M/S)  (M/S)    (M)   HT (M)   Y (M)   Z (M)
DWASH
-------  ----------  ----  -----  -----  ------  ------  ------  ------
-----
   6201.   14.26        6     1.0    1.8 10000.0  110.54  366.86  157.45
NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND  6201. M:
   6201.   14.26        6     1.0    1.8 10000.0  110.54  366.86  157.45
NO

  DWASH=   MEANS NO CALC MADE (CONC = 0.0)
  DWASH=NO MEANS NO BUILDING DOWNWASH USED
  DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
  DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
  DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

  *******************************************
  *  SUMMARY OF TERRAIN HEIGHTS ENTERED FOR  *
  *    SIMPLE ELEVATED TERRAIN PROCEDURE     *
  *******************************************

       TERRAIN        DISTANCE RANGE (M)
        HT (M)       MINIMUM     MAXIMUM
       -------      --------    --------
            0.            1.        824.
           10.          825.       1200.
           20.         1201.       4800.
           30.         4801.       5000.
           40.         5001.       5170.
           50.         5171.       6200.
           60.         6201.       6300.

****************************************
      *** REGULATORY (Default) ***
     PERFORMING CAVITY CALCULATIONS
   WITH ORIGINAL SCREEN CAVITY MODEL
           (BRODE, 1988)
****************************************


  *** CAVITY CALCULATION - 1 ***       *** CAVITY CALCULATION - 2 ***
   CONC (UG/M**3)     =    .0000        CONC (UG/M**3)     =    .0000
   CRIT WS @10M (M/S) =    99.99        CRIT WS @10M (M/S) =    99.99
   CRIT WS @ HS (M/S) =    99.99        CRIT WS @ HS (M/S) =    99.99
```

```
   DILUTION WS (M/S)  =    99.99        DILUTION WS (M/S)  =    99.99
   CAVITY HT (M)      =    44.86        CAVITY HT (M)      =    43.99
   CAVITY LENGTH (M)  =   112.41        CAVITY LENGTH (M)  =   105.91
   ALONGWIND DIM (M)  =    95.25        ALONGWIND DIM (M)  =   104.78

CAVITY CONC NOT CALCULATED FOR CRIT WS > 20.0 M/S.  CONC SET = 0.0

****************************************
       END OF CAVITY CALCULATIONS
****************************************


      ***************************************
      *** SUMMARY OF SCREEN MODEL RESULTS ***
      ***************************************

  CALCULATION         MAX CONC    DIST TO   TERRAIN
   PROCEDURE         (UG/M**3)    MAX (M)    HT (M)
--------------    -----------   -------    -------
SIMPLE TERRAIN      17.32          1210.       20.

COMPLEX TERRAIN     5.756          6300.       72. (24-HR CONC)


***************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
***************************************************
```

```
10/02/00

14:39:17
  ***  SCREEN3 MODEL RUN  ***
  *** VERSION DATED 96043 ***

AES Alamitos HRA Screening for SCR on Units 1 & 2

COMPLEX TERRAIN INPUTS:
    SOURCE TYPE            =        POINT
    EMISSION RATE (G/S)    =      5.81800
    STACK HT (M)           =      65.5300
    STACK DIAMETER (M)     =       3.7800
    STACK VELOCITY (M/S)   =      13.6900
    STACK GAS TEMP (K)     =     408.5900
    AMBIENT AIR TEMP (K)   =     293.0000
    RECEPTOR HEIGHT (M)    =        .0000
    URBAN/RURAL OPTION     =        RURAL

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.


BUOY. FLUX =  135.662 M**4/S**3;  MOM. FLUX =  480.076 M**4/S**2.


FINAL STABLE PLUME HEIGHT (M) =  158.9
DISTANCE TO FINAL RISE (M)    =  151.3

                          *VALLEY 24-HR CALCS*   **SIMPLE TERRAIN 24-HR
CALCS**
  TERR         MAX 24-HR              PLUME HT             PLUME HT
   HT    DIST    CONC        CONC    ABOVE STK    CONC    ABOVE STK    U10M
USTK
  (M)    (M)   (UG/M**3)   (UG/M**3)  BASE (M)  (UG/M**3)  HGT (M)  SC
(M/S)
----- ------- ----------  ----------  ------   ----------  ------  -- ----
----
   72.   6300.  4.684       .7038       158.9    4.684        89.8   6  1.0
2.8
   80.   6400.  4.686       .9501       158.9    4.686        89.8   6  1.0
2.8
   90.   6500.  4.686       1.320       158.9    4.686        89.8   6  1.0
2.8
  100.   6680.  4.686       1.724       158.9    4.686        89.8   6  1.0
2.8
  130.  18500.  3.291       .8955       158.9    3.291        89.8   6  1.0
2.8
  160.  18900.  .9521       .9521       158.9    .0000          .0   0   .0
  .0
  190.  20400.  .8643       .8643       158.9    .0000          .0   0   .0
  .0
  186.  20400.  .8643       .8643       158.9    .0000          .0   0   .0
  .0
```

```
10/02/00

14:39:17
  ***  SCREEN3 MODEL RUN  ***
  *** VERSION DATED 96043 ***

AES Alamitos HRA Screening for SCR on Units 1 & 2

SIMPLE TERRAIN INPUTS:
    SOURCE TYPE            =        POINT
    EMISSION RATE (G/S)    =      5.81800
    STACK HEIGHT (M)       =      65.5300
    STK INSIDE DIAM (M)    =       3.7800
    STK EXIT VELOCITY (M/S)=      13.6900
    STK GAS EXIT TEMP (K)  =     408.5900
    AMBIENT AIR TEMP (K)   =     293.0000
    RECEPTOR HEIGHT (M)    =        .0000
    URBAN/RURAL OPTION     =        RURAL
    BUILDING HEIGHT (M)    =      41.5000
    MIN HORIZ BLDG DIM (M) =      95.2500
    MAX HORIZ BLDG DIM (M) =     104.7750

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.


BUOY. FLUX =  135.662 M**4/S**3;  MOM. FLUX =  480.076 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES
***

   DIST     CONC             U10M   USTK  MIX HT   PLUME   SIGMA   SIGMA
    (M)   (UG/M**3)   STAB  (M/S)  (M/S)    (M)   HT (M)   Y (M)   Z (M)
DWASH
-------  ----------  ----  -----  -----  ------  ------  ------  ------
-----
      1.   .0000        1     1.0    1.1   712.4  711.40    5.31    5.30
NO
    100.   .1366E-07    5     1.0    1.9 10000.0  188.18   26.91   26.45
NO
    200.   18.00        6     4.0   11.2 10000.0   88.39   10.52   34.85
HS
    300.   19.26        6     4.0   11.2 10000.0   96.14   14.62   41.87
HS
    400.   19.65        6     4.0   11.2 10000.0  103.07   18.51   48.84
HS
    500.   15.17        6     4.0   11.2 10000.0  109.43   22.27   51.65
```

```
HS
    600.   10.64        6     4.0   11.2 10000.0  115.38   25.92   52.28
HS
    700.   8.380        4    15.0   19.9  4800.0   91.99   50.06   55.10
HS
    800.   9.114        1     1.5    1.7   497.1  496.11  208.26  306.74
NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND     1. M:
    400.   19.65        6     4.0   11.2 10000.0  103.07   18.51   48.84
HS

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF   10. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES
***

   DIST     CONC             U10M   USTK  MIX HT   PLUME   SIGMA   SIGMA
    (M)   (UG/M**3)   STAB  (M/S)  (M/S)     (M)   HT (M)   Y (M)   Z (M)
DWASH
-------  ----------  ----  -----  -----  ------  ------  ------  ------
-----
    825.   11.62        6     1.5    4.2 10000.0  133.97   36.20   55.26
HS
    900.   11.16        6     1.5    4.2 10000.0  133.97   38.07   55.37
HS
   1000.   11.26        1     1.5    1.7   487.1  486.11  242.27  470.23
NO
   1100.   10.76        1     1.5    1.7   487.1  486.11  258.19  568.76
NO
   1200.   10.15        1     1.5    1.7   487.1  486.11  274.21  678.83
NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND   825. M:
    825.   11.62        6     1.5    4.2 10000.0  133.97   36.20   55.26
HS

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF   20. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES
***

   DIST     CONC             U10M   USTK  MIX HT   PLUME   SIGMA   SIGMA
    (M)   (UG/M**3)   STAB  (M/S)  (M/S)     (M)   HT (M)   Y (M)   Z (M)
DWASH
-------  ----------  ----  -----  -----  ------  ------  ------  ------
-----
   1201.   14.77        6     1.0    2.8 10000.0  135.32   47.56   57.22
HS
   1300.   14.18        6     1.0    2.8 10000.0  135.32   50.11   57.36
```

```
HS
   1400.   13.64         6     1.0    2.8 10000.0  135.32   52.71   57.51
HS
   1500.   13.15         6     1.0    2.8 10000.0  135.32   55.34   57.66
HS
   1600.   12.69         6     1.0    2.8 10000.0  135.32   57.98   57.81
HS
   1700.   12.28         6     1.0    2.8 10000.0  135.32   60.63   57.96
HS
   1800.   11.89         6     1.0    2.8 10000.0  135.32   63.30   58.10
HS
   1900.   11.54         6     1.0    2.8 10000.0  135.32   65.97   58.25
HS
   2000.   11.21         6     1.0    2.8 10000.0  135.32   68.65   58.40
HS
   2100.   10.91         6     1.0    2.8 10000.0  135.32   71.33   58.54
HS
   2200.   10.62         6     1.0    2.8 10000.0  135.32   74.01   58.69
HS
   2300.   10.36         6     1.0    2.8 10000.0  135.32   76.70   58.83
HS
   2400.   10.12         6     1.0    2.8 10000.0  135.32   79.38   58.97
HS
   2500.   9.886         6     1.0    2.8 10000.0  135.32   82.06   59.12
HS
   2600.   9.671         6     1.0    2.8 10000.0  135.32   84.74   59.26
HS
   2700.   9.470         6     1.0    2.8 10000.0  135.32   87.42   59.40
HS
   2800.   9.280         6     1.0    2.8 10000.0  135.32   90.09   59.54
HS
   2900.   9.102         6     1.0    2.8 10000.0  135.32   92.77   59.68
HS
   3000.   8.934         6     1.0    2.8 10000.0  135.32   95.44   59.82
HS
   3500.   8.218         6     1.0    2.8 10000.0  135.32  108.72   60.52
HS
   4000.   7.178         6     1.0    2.8 10000.0  135.32  121.90   60.21
HS
   4500.   6.755         6     1.0    2.8 10000.0  135.32  134.96   60.83
HS

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND  1201. M:
   1201.   14.77         6     1.0    2.8 10000.0  135.32   47.56   57.22
HS

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF   30. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES
***

   DIST     CONC             U10M   USTK  MIX HT   PLUME   SIGMA   SIGMA
```

```
    (M)    (UG/M**3)    STAB   (M/S)   (M/S)     (M)    HT (M)    Y (M)    Z (M)
DWASH
-------  ----------  ----  -----  -----  ------  ------  ------  ------
-----
   4801.   9.237         6     1.0    2.8 10000.0  125.32  142.77   61.15
HS
   5000.   9.014         6     1.0    2.8 10000.0  125.32  147.91   61.36
HS

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND  4801. M:
   4801.   9.237         6     1.0    2.8 10000.0  125.32  142.77   61.15
HS

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF   40. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES
***

   DIST     CONC             U10M   USTK  MIX HT   PLUME   SIGMA   SIGMA
    (M)    (UG/M**3)    STAB   (M/S)   (M/S)     (M)    HT (M)    Y (M)    Z (M)
DWASH
-------  ----------  ----  -----  -----  ------  ------  ------  ------
-----
   5001.   12.41         6     1.0    2.8 10000.0  115.32  147.94   61.36
HS

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND  5001. M:
   5001.   12.41         6     1.0    2.8 10000.0  115.32  147.94   61.36
HS

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF   50. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES
***

   DIST     CONC             U10M   USTK  MIX HT   PLUME   SIGMA   SIGMA
    (M)    (UG/M**3)    STAB   (M/S)   (M/S)     (M)    HT (M)    Y (M)    Z (M)
DWASH
-------  ----------  ----  -----  -----  ------  ------  ------  ------
-----
   5171.   16.24         6     1.0    2.8 10000.0  105.32  152.32   61.54
HS
   5500.   15.56         6     1.0    2.8 10000.0  105.32  160.75   61.88
HS
   6000.   14.64         6     1.0    2.8 10000.0  105.32  173.49   62.39
HS

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND  5171. M:
   5171.   16.24         6     1.0    2.8 10000.0  105.32  152.32   61.54
HS
```

```
**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF   60. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES
***

   DIST     CONC             U10M   USTK  MIX HT   PLUME   SIGMA   SIGMA
    (M)   (UG/M**3)   STAB  (M/S)  (M/S)    (M)   HT (M)   Y (M)   Z (M)
DWASH
-------  ----------  ----  -----  -----  ------  ------  ------  ------
-----
   6201.   18.48        6     1.0    2.8 10000.0   95.32  178.58   62.59
HS

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND  6201. M:
   6201.   18.48        6     1.0    2.8 10000.0   95.32  178.58   62.59
HS

  DWASH=   MEANS NO CALC MADE (CONC = 0.0)
  DWASH=NO MEANS NO BUILDING DOWNWASH USED
  DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
  DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
  DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

  ********************************************
  *  SUMMARY OF TERRAIN HEIGHTS ENTERED FOR  *
  *    SIMPLE ELEVATED TERRAIN PROCEDURE     *
  ********************************************

       TERRAIN        DISTANCE RANGE (M)
        HT (M)       MINIMUM     MAXIMUM
       -------      --------    --------
            0.            1.        824.
           10.          825.       1200.
           20.         1201.       4800.
           30.         4801.       5000.
           40.         5001.       5170.
           50.         5171.       6200.
           60.         6201.       6300.

****************************************
      *** REGULATORY (Default) ***
     PERFORMING CAVITY CALCULATIONS
   WITH ORIGINAL SCREEN CAVITY MODEL
           (BRODE, 1988)
****************************************


  *** CAVITY CALCULATION - 1 ***       *** CAVITY CALCULATION - 2 ***
   CONC (UG/M**3)     =    .0000        CONC (UG/M**3)     =    .0000
   CRIT WS @10M (M/S) =    99.99        CRIT WS @10M (M/S) =    99.99
   CRIT WS @ HS (M/S) =    99.99        CRIT WS @ HS (M/S) =    99.99
```

```
   DILUTION WS (M/S)  =    99.99        DILUTION WS (M/S)  =    99.99
   CAVITY HT (M)      =    44.86        CAVITY HT (M)      =    43.99
   CAVITY LENGTH (M)  =   112.41        CAVITY LENGTH (M)  =   105.91
   ALONGWIND DIM (M)  =    95.25        ALONGWIND DIM (M)  =   104.78

CAVITY CONC NOT CALCULATED FOR CRIT WS > 20.0 M/S.  CONC SET = 0.0

****************************************
       END OF CAVITY CALCULATIONS
****************************************


  *** INVERSION BREAK-UP FUMIGATION CALC. ***
   CONC (UG/M**3)    =    8.814
   DIST TO MAX (M)   = 13719.69

  *** SHORELINE FUMIGATION CALC. ***
   CONC (UG/M**3)    =    66.23
   DIST TO MAX (M)   =  1036.84
   DIST TO SHORE (M)=   300.00

      ***************************************
      *** SUMMARY OF SCREEN MODEL RESULTS ***
      ***************************************

  CALCULATION         MAX CONC    DIST TO   TERRAIN
   PROCEDURE         (UG/M**3)    MAX (M)    HT (M)
--------------    -----------   -------   -------
SIMPLE TERRAIN      19.65          400.        0.

COMPLEX TERRAIN     4.686         6500.       90. (24-HR CONC)

INV BREAKUP FUMI    8.814        13720.       --

SHORELINE FUMI      66.23         1037.       --

***************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
***************************************************
```

APPENDIX E

CALCULATION METHODOLOGY: MOBILE SOURCE EMISSIONS

Insert Appendix E Excel Tables Here

APPENDIX F

RMP*COMP™ OUTPUT FILES

```
RMP*Comp Ver. 1.06
Results of Consequence Analysis

Chemical: Ammonia (water solution)   20%
CAS #: 7664-41-7
Category: Toxic Liquid
Scenario: Worst-case
Quantity Released: 20000 gallons
Liquid Temperature: 77 F

Mitigation Measures:
Diked area: 595.47 square feet
Dike height: 5.02 feet

Release Rate to Outside Air: 12.5 pounds per minute
Topography: Urban surroundings (many obstacles in the immediate area)
Toxic Endpoint: 0.14 mg/L; basis: ERPG-2
Estimated Distance to Toxic Endpoint: 0.1 miles (0.2 kilometers)

--------Assumptions About This Scenario---------
Wind Speed: 1.5 meters/second (3.4 miles/hour)
Stability Class: F
Air Temperature: 77 degrees F (25 degrees C)
------------------------------------------------
```

```
RMP*Comp Ver. 1.06
Results of Consequence Analysis

Chemical: Ammonia (water solution)   20%
CAS #: 7664-41-7
Category: Toxic Liquid
Scenario: Worst-case
Quantity Released: 6000 gallons
Liquid Temperature: 77 F

Mitigation Measures: NONE
Release Rate to Outside Air: 510 pounds per minute
Topography: Urban surroundings (many obstacles in the immediate area)
Toxic Endpoint: 0.14 mg/L; basis: ERPG-2
Estimated Distance to Toxic Endpoint: 0.4  miles (0.64 kilometers)

--------Assumptions About This Scenario---------
Wind Speed: 1.5 meters/second (3.4 miles/hour)
Stability Class: F
Air Temperature: 77 degrees F (25 degrees C)
------------------------------------------------
```

```
RMP*Comp Ver. 1.06
Results of Consequence Analysis

Chemical: Ammonia (water solution)  30%
CAS #: 7664-41-7
Category: Toxic Liquid
Scenario: Worst-case
Quantity Released: 20000 gallons
Liquid Temperature: 77 F

Mitigation Measures:
Diked area: 595.47 square feet
Dike height: 5.02 feet

Release Rate to Outside Air: 21.7 pounds per minute
Topography: Urban surroundings (many obstacles in the immediate area)
Toxic Endpoint: 0.14 mg/L; basis: ERPG-2
Estimated Distance to Toxic Endpoint: 0.1 miles (0.2 kilometers)

--------Assumptions About This Scenario---------
Wind Speed: 1.5 meters/second (3.4 miles/hour)
Stability Class: F
Air Temperature: 77 degrees F (25 degrees C)
------------------------------------------------
```

RMP*Comp Ver. 1.06
Results of Consequence Analysis

Chemical: Ammonia (water solution) 30%
CAS #: 7664-41-7
Category: Toxic Liquid
Scenario: Worst-case
Quantity Released: 6000 gallons
Liquid Temperature: 77 F

Mitigation Measures: NONE
Release Rate to Outside Air: 885 pounds per minute
Topography: Urban surroundings (many obstacles in the immediate area)
Toxic Endpoint: 0.14 mg/L; basis: ERPG-2
Estimated Distance to Toxic Endpoint: 0.6 miles (1.0 kilometers)

--------Assumptions About This Scenario---------
Wind Speed: 1.5 meters/second (3.4 miles/hour)
Stability Class: F
Air Temperature: 77 degrees F (25 degrees C)

APPENDIX G

COMMENT LETTERS TO THE DRAFT EIR AND RESPONSES TO THE COMMENTS

Insert comment letters 1,2, and 3 here
(see letter1_f.doc, letter2a_f.doc, letter2b_f.doc and letter3_f.doc)

Comment Letter #1
CITY OF ANAHEIM

1-1 The City of Anaheim indicated that it has no further comments to provide regarding the Draft Environmental Impact Report (DEIR). Further, the City requests that future notices and documents related to the proposed project be provided to it, which the South Coast Air Quality Management District (SCAQMD) will do.

Comment Letter #2
CITY OF SEAL BEACH

2-1 Specific responses to each issue raised by the City of Seal Beach are provided in response to comments #2-2 through #2-11.

2-2 This comment indicates that the City supports one of the objectives of the project, to improve air quality by reducing NOx emissions, which is ultimately beneficial to the citizens of the Leisure World community.

2-3 The text of the Final EIR (Section 4.2.3.1) will reflect the reduction of NOx emissions, from 6,132 tons per year to 478 tons per year, as presented in the Notice of Preparation response to comment number #4-4.

2-4 This comment indicates that the City had two concerns regarding the "cumulative impacts" analysis. These concerns are addressed in the responses #2-5 and #2-6.

2-5 The settlement agreement between SCAQMD and AES addressed the inability of the Alamitos Generating Station to reconcile its annual NOx RECLAIM emission with sufficient credits, thus exceeding the annual NOx allocation pursuant to Regulation XX. The agreement also ensures the timely installation of equipment to assure emissions are reduced in the future. The unusual energy demand in 2000, and a requirement to continue operation by the California Independent Systems Operator (Cal-ISO), resulted in the Alamitos Generating Station operating more than initially anticipated and, as a result, the facility exceeded its annual NOx emissions allocations by an amount that could not be reconciled. SCAQMD did not assert, nor did the settlement agreement address, any alleged violations by AES of its RECLAIM Allocation contributing to exceedances of any state or federal ambient air quality standards in the vicinity of the Alamitos Generating Station.

It is because of these past violations of Regulation XX that the SCAQMD entered into a settlement agreement with AES Alamitos to make sure that such exceedances do not occur in the future. SCAQMD is committed to ensuring that all power generators located in the district comply with all applicable laws and regulations. To that end, SCAQMD intends to continue to vigorously monitor and enforce implementation of SCAQMD requirements and the settlement agreement with AES.

Installation of SCR systems at the Alamitos Generating Station will virtually eliminate the likelihood of the annual NOx emissions exceedances in the future. Furthermore, in conjunction with this project and pursuant to Regulation XX, AES will be required to upgrade the existing continuous emissions monitoring systems to incorporate the ranges of monitoring needed after SCR installation. The continuous emissions monitoring system on each unit is directly connected to the SCAQMD's emissions database. Therefore, SCAQMD has continuous records of the levels of NOx and other pollutants emitted from each unit at the Alamitos Generating Station. Also, per SCAQMD permit conditions, AES is required to report levels of all criteria pollutants and ammonia slip emitted from the facility on a regular basis. Thus, the permit conditions are specifically designed to ensure compliance with and enforcement of SCAQMD rules and regulations.

2-6 The project applicant will work with Cal-ISO to ensure that any cumulative impacts to the power grid are minimized while the units are off line during installation of the proposed project, thus minimizing any future adverse energy impacts. It is important to point out that, due to the power crisis in California, the power generating units at the Alamitos Generating Station are currently being allowed to operate, even though the facility has exceeded its annual NOx emissions limits. However, such operations have been and are being allowed based on AES' commitment to reduce NOx emissions, via installation of SCR on an expedited basis. Therefore, the proposed project is necessary to ensure that these units are allowed to continue operation in the long term.

2-7 This comment indicates the City concurs with the conclusion in the DEIR that ammonia slip from the proposed project will not generate significant adverse human health impacts.

2-8 The City requests clarification regarding the cumulative hazard index number discussed in the DEIR, Table 4-6 (shown below). The discussion below addresses this comment.

Table 4-6

Ammonia Slip Health Risk Assessment Results

Maximum Hourly Concentrations (μg/m^3)	19.65
Acute Reference Exposure Level (μg/m^3)	3200
Acute Hazard Index	0.0061
Annual Average Concentrations (μg/m^3)	1.965 *
Chronic Reference Exposure Level (μg/m^3)	200 **
Chronic Hazard Index	0.0098 ***

*This is a concentration, used with the **REL to determine the ***Hazard Index. If the ***Hazard Index is less than 1.0, then there is no risk to health.

The number 1.965 μg/m3 is the annual average concentration of ammonia predicted by the model to occur at ground level at a certain distance away from the source (in this case the stacks at the Alamitos facility). This concentration is used together with the Chronic and Acute Reference Exposure Levels to determine the Chronic and Acute Hazard Indices, respectively. If the Hazard Index level is greater than 1.0, then there is considered to be a potentially significant effect on human health from the release of that particular substance (in this case ammonia). As explained in more detail in the DEIR, the Hazard Indices for the proposed project are far less than 1.0. Therefore, there is no risk to human health as a result of the proposed project.

When the model was used to predict the ground level concentrations (the maximum hourly concentration and the annual average concentration as in the above table), the emissions from all four of the boiler units (post-SCR system installation) at the Alamitos Generating Station were included in the model input. Therefore, the impact of the operation of all four boiler units (post-SCR system installation) at the same time was assessed. The resultant Hazard Indices were found to be less than 1.0. Thus, the impact of all four boilers operating at once also does not pose a risk to human health.

The Cumulative Hazard Index is a facility-wide hazard index that takes into account the operation of other equipment on the site, including the existing SCR equipment on Units 5 and 6, as well as from the proposed equipment (i.e., the operation of the four boilers/SCR units). The text of the Final EIR will include a footnote stating that the acute and chronic hazard indices in Table 4-6, "Ammonia Slip Health Risk Assessment Results," serve as both the project-specific and the cumulative impacts. The operation of the proposed project is well below the Cumulative Hazard Index standard of 3.0.

2-9 The City of Seal Beach concurs with the SCAQMD's conclusion, as demonstrated in Figure 4-1, that the proposed project would not generate significant adverse health risk impacts in general, or health risks to residents of Leisure World.

Furthermore, the City supports mitigation measure H-1 regarding the hours ammonia can be transported. The City also concurs with the ammonia transport route identified in the DEIR.

Finally, the City concurs with the conclusion in the DEIR that noise and public services impacts from the proposed project will not be significant.

2-10 This comment indicates that the City Council considered the comment letter and authorized the letter's approval.

2-11 Thank you for your comments. A copy of the Final EIR will be provided as soon as it is completed.

Comment Letter #3
County of Orange

3-1 The County of Orange indicated that it has no comments to provide regarding the DEIR. Further, the County requests that future notices and documents related to the proposed project, which the SCAQMD will provide.