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

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

PROJECT TITLE: **WARREN E&P INC. WTU CENTRAL FACILITY NEW EQUIPMENT PROJECT**

In accordance with the California Environmental Quality Act (CEQA), the South Coast Air Quality Management District (SCAQMD) is the Lead Agency and has prepared a Draft Negative Declaration (ND) for the project identified above. The purpose of this Notice of Intent (NOI) is to solicit comments on the environmental analysis contained in the ND.

This letter, Notice of Intent (NOI) and attached Draft ND do not require any action or response from you. The purpose of these documents is simply to provide information to you on the above project. If the proposed project has no bearing on you or your organization, no action on your part is necessary.

Comments focusing on your area of expertise, your agency's area of jurisdiction, or issues relative to the environmental analysis should be addressed to Mr. Michael Krause (c/o Planning/CEQA) at the address shown above, or sent by FAX to (909) 396-3324 or by e-mail to mkrause@aqmd.gov. Comments must be received no later than 5:00 PM on May 15, 2009. Please include the name and phone number of the contact person for your agency.

Date: April 15, 2009

Signature: Steve Smith

Title: Steve Smith, Ph.D.
Program Supervisor

Telephone: (909) 396-3054

Reference: California Code of Regulations, Title 14, §§15072, 15073, 15105, and 15371

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

NOTICE OF INTENT TO ADOPT A DRAFT NEGATIVE DECLARATION (ND)

Project Title:
Warren E&P, Inc. WTU Central Facility New Equipment Project

Project Location:
WTU Central Facility is located at 625 E. Anaheim St., Wilmington, California 90744

Description of Nature, Purpose, and Beneficiaries of Project:
At its oil production facility at the Wilmington Townlot Unit (WTU) Central Facility, Warren E&P is proposing to remove the existing permitted Flare King flare and replace it with an ultra-low NO_x Bekaert Clean Enclosed Burner® (Bekaert CEB®), refurbish existing Heater-Treater No. 1 (HT#1) and add an additional heater-treater (HT#2) with ultra-low NO_x burners to meet oil-water separation needs, add up to nine Ingersoll-Rand MT-70 microturbines to generate electrical power for use on site, and remove a previously-operated water heater. In addition, Warren E&P is proposing to install gas re-injection equipment to reduce the need to combust excess gas production and, if warranted, gas sales equipment. The Bekaert CEB® and HT#2 meet the SCAQMD's best available control technology requirements. The proposed project does not include previous construction activities or previously permitted operations.

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

Draft ND and all supporting documentation are available at:	**or by calling**	**The Draft ND is available by accessing the SCAQMD's website at:**
SCAQMD Headquarters 21865 Copley Drive Diamond Bar, CA 91765	(909) 396-2039	http://www.aqmd.gov/ceqa/nonaqmd.html

The Public Notice of Intent is provided through the following:

☑ Los Angeles Times and the Daily Breeze (April 16, 2009) ☑ SCAQMD Website

☑ SCAQMD Public Information Center ☑ Interested Parties ☑ SCAQMD Mailing List

Draft ND Review Period:
April 16, 2009 through May 15, 2009

The proposed project will not have a statewide, regional or area-wide significance, therefore, a CEQA scoping meeting is not required (pursuant to Public Resources Code §21083.9(a)(2)) and, thus, will not be held for the proposed project.

Send CEQA Comments to:	**Phone:**	**Email:**	**Fax:**
Mr. Michael Krause	(909) 396-2706	mkrause@aqmd.gov	(909) 396-3324

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Negative Declaration for:
Warren E&P, Inc. WTU Central Facility,
New Equipment Project

State Clearinghouse No. TBD

April 2009

Executive Officer
Barry Wallerstein, D. Env.

Deputy Executive Officer, Planning
Rules, and Area Sources
Elaine Chang, DrPH

Assistant Deputy Executive Officer,
Planning, Rule Development, and Area Sources
Laki Tisopulos, Ph.D, P.E.

Planning and Rules Manager
CEQA and Socioeconomic Analyses
Susan Nakamura

Submitted to:
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Prepared by:
ENVIRON INTERNATIONAL CORPORATION

Reviewed by: Mike Krause – Air Quality Specialist
Steve Smith, Ph.D. – Program Supervisor
Marcel Saulis – Air Quality Engineer II
Barbara Baird – Principal District Counsel
Ruby Fernandez – Deputy District Counsel

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
GOVERNING BOARD

Chairman: WILLIAM A. BURKE, Ed.D.
Speaker of the Assembly Representative

Vice Chairman: S. ROY WILSON, Ed.D.
Supervisor, Fourth District
Riverside County Representative

MEMBERS

MICHAEL D. ANTONOVICH
Supervisor, Fifth District
Los Angeles County Representative

MICHAEL CACCIOTTI
Councilmember, City of South Pasadena
Cities Representative, Los Angeles County, Eastern Region

BILL CAMPBELL
Supervisor, Third District
Orange County Representative

JANE W. CARNEY
Senate Rules Committee Appointee

RONALD O. LOVERIDGE
Mayor, City of Riverside
Cities Representative, Riverside County

JOSEPH K. LYOU
Governor's Appointee

GARY OVITT
Supervisor, Fourth District
San Bernardino County Representative

JAN PERRY
Councilwoman, City of Los Angeles
Cities Representative, City of Los Angeles

MIGUEL PULIDO
Mayor, City of Santa Ana
Cities Representative, Orange County

TONIA REYES URANGA
Councilmember, City of Long Beach
Cities Representative, Los Angeles County, Western Region

DENNIS YATES
Mayor, City of Chino
Cities Representative, San Bernardino County

EXECUTIVE OFFICER

BARRY WALLERSTEIN, D. Env.

TABLE OF CONTENTS

Page No.

CHAPTER 1 – PROJECT DESCRIPTION

1.1 Introduction 1-1
1.2 Agency Authority 1-1
1.3 Background 1-2
1.4 Project Location 1-3
1.5 Overview of Current Operations 1-7
1.6 Project Description 1-9
1.7 Required Permits 1-14
1.8 Construction Schedule 1-14
1.9 Project Implementation 1-15

CHAPTER 2 – ENVIRONMENTAL CHECKLIST

Introduction 2-1
General Information 2-1
Potentially Significant Impact Areas 2-2
Determination 2-3
Environmental Checklist and Discussion 2-4
Aesthetics 2-4
Agriculture Resources 2-5
Air Quality 2-6
Biological Resources 2-23
Cultural Resources 2-24
Energy 2-25
Geology and Soils 2-27
Hazards and Hazardous Materials 2-31
Hydrology and Water Quality 2-34
Land Use and Planning 2-37
Mineral Resources 2-38
Noise 2-39
Population and Housing 2-43
Public Services 2-44
Recreation 2-46
Solid/Hazardous Waste 2-47
Transportation/Traffic 2-48
Mandatory Findings of Significance 2-50
References 2-61
Acronyms 2-63
Glossary 2-65

FIGURES:

Figure 1: Site Location Map 1-5
Figure 2: Site Plan 1-6
Figure 3: Site Plan with Locations of Sources and Receptors 1-11

TABLES:

Table 1: Summary of Pre-Project Potential to Emit Criteria Pollutants 1-8
Table 2: Project Operation Schedule 1-14
Table 3: Proposed Construction Schedule 1-15
Table 4: Proposed Project Implementation 1-16
Table III-1: Air Quality Significance Thresholds 2-8
Table III-2: Project-Related Peak Daily Construction Emissions 2-10
Table III-3: Project Operational Emissions Compared to Baseline Emissions (Final Project) 2-11
Table III-4: Summary Of Post-Project Potential To Emit Criteria Pollutants (Proposed Project With Nine Microturbines – Proposed Project) 2-12
Table III-5: Summary Of Post-Project Potential To Emit Criteria Pollutants (PTE With Six Microturbines, Currently Submitted Permit Applications – Interim V) 2-12
Table III-6: Total Peak Construction And Operational Emissions During Project Implementation 2-13
Table III-7: Peak Project-related Phase Air Quality Impacts for Pollutants 2-14
Table III-8: Proposed Project Health Impacts 2-21
Table III-9: Construction Noise Sources 2-42
Table III-10: California GHG Emissions and Sinks Summary 2-56
Table III-11: Estimated GHG Emissions (CO_2eq) During Project Implementation And Final Proposed Project 2-58
Table XII-1: Estimate Percent Reduction In GHG Emissions (CO_2eq) Between Business As Usual Scenario and Proposed Final Full-Scale Project 2-59

APPENDICES:

Appendix A: Emissions from Proposed Project
Appendix B: Air Dispersion Modeling
Appendix C: Health Risk Evaluation
Appendix D: Evaluation of Greenhouse Gas Emissions

CHAPTER 1

PROJECT DESCRIPTION

Introduction
Agency Authority
Background
Project Location
Overview of Current Operations
Project Description
Required Permits
Construction Schedule
Project Implementation

CHAPTER 1

PROJECT DESCRIPTION

1.1 INTRODUCTION

Warren E&P, Inc. (Warren) proposes modifications to its Wilmington Townlot Unit (WTU) oil and gas extraction, production and separation facilities (Central Facility) located at 625 E. Anaheim St. in Wilmington, California (collectively called the WTU Central Facility). The proposed modifications are considered both desirable and necessary to replace older, previously permitted combustion equipment with newer, more efficient equipment, which must meet best available control technology (BACT) requirements, and to install new equipment to allow gas re-injection and/or off-site gas sales (proposed project). The purpose of the proposed project is also to bring the facility into compliance with existing South Coast Air Quality Management District (SCAQMD) rules and regulations in accordance with the settlement agreement between Warren and the SCAQMD. The proposed project will result in reducing criteria pollutants emitted per unit of crude oil produced and allow Warren to increase crude oil production while complying with applicable federal, state and SCAQMD regulations that limit emissions of air pollutants.

Warren's proposed project will comply with Regulation XIII, which specifies requirements for modified facilities, and with all applicable SCAQMD Rules, including Rules 1146 (Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters), 1146.1 (Emissions of Oxides of Nitrogen from Small Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters), 1148.1 (Oil and Gas Production Wells), and 1401 (New Source Review of Toxic Air Contaminants). Specifically, Warren's proposed project will comply with the amendments to SCAQMD Rule 1146.1, which limits the carbon monoxide (CO) and oxides of nitrogen (NO_x) emissions from small heaters and boilers. The proposed project will also comply with SCAQMD Rule 1148.1, which requires that emissions be controlled from oil wellheads and well cellars. The proposed project will also comply with SCAQMD Rule 1401 and will not increase the maximum individual cancer risk (MICR), the cancer burden, or the acute and chronic hazard index (HI) above regulatory limits. The proposed project does not emit actual or potential emissions above the significance threshold values outlined in the California Environmental Quality Act (CEQA), and does not trigger inclusion of the WTU Central Facility in either the Regional Clean Air Incentives Market (RECLAIM) or Title V programs.

1.2 AGENCY AUTHORITY

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

The lead agency is the public agency that has the principal responsibility for carrying out or approving a project that may have a significant adverse affect upon the environment (Public Resources Code §21067). Because the proposed project requires discretionary approval from the SCAQMD for modifications to existing stationary source equipment and for installation of new stationary source equipment, the SCAQMD has the greatest responsibility for supervising or approving the project as a whole. Therefore the SCAQMD would be the most appropriate public agency to act as the lead agency (CEQA Guidelines §15051(b)).

1.3 BACKGROUND

A previous Mitigated Negative Declaration (MND) was approved by the City of Los Angeles Planning Department in May 2006 (2006 project) for another project at the same WTU Central Facility. The 2006 project involved the construction of five multiple well drilling cellars at the WTU Central Facility, thereby enabling the drilling of up to 540 wells whose surface pumping equipment would be located below ground level. By drilling the additional wells from the centralized well cellars at the WTU Central Facility, Warren will be able to remove existing wells from the surrounding residential areas. Because Warren needed discretionary approval from the City of Los Angeles (the City), the City served as the lead agency for the 2006 project.

Since the California energy crisis of 2000, the California Air Resources Board (CARB) and SCAQMD have encouraged the installation of microturbines as a means to generate electricity, often by utilizing stranded, non-marketable gas. Microturbines have gained wide usage at landfills, sewage treatment plants, hospitals, and in oil fields. In October 2006, Warren sought guidance from SCAQMD to determine if six Ingersoll Rand microturbines, each with a heat input rating of less than 2,975,000 BTU per hour, would require SCAQMD permits. Warren was advised that the microturbines would be exempt from SCAQMD permit requirements pursuant to SCAQMD Rule 219. Warren then purchased the six microturbines later that month, and they were shipped to the WTU Central Facility in December 2006. Prior to Warren's planned initiation of operation of the turbines, the SCAQMD informed Warren that, according to Health and Safety Code Section 41514.9 and 17 Cal. Code Regs §94201, the microturbines are required either to be certified by CARB or to obtain a permit to operate from the SCAQMD. The microturbines are also subject to Regulation XVII, Prevention of Significant Deterioration (PSD). Subsequently, Warren was required to obtain permits to operate from the SCAQMD for the microturbines, although PSD permitting was not triggered.

In view of the fact that not operating the microturbines curtailed and limited the production of crude oil, and since the microturbines are BACT equipment, Warren agreed to submit permit applications. Because burning the oilfield gas in the microturbines was a beneficial use of the gas, Warren and the SCAQMD entered into a settlement agreement ("Settlement Agreement") and commenced proceedings for a stipulated order for abatement governing operation of the microturbines prior to receiving the permits. Following execution of the settlement agreement in October 2007, Warren commenced operating the microturbines.

On September 28, 2007, Warren received Notice of Violation P50039 ("Flare Allegation") from the SCAQMD alleging that Warren operated the Flare King flare in violation of permit conditions contained in Permit No. F77109. Although Permit No. F77109 does not include a specific gas throughput condition, the equipment is described as a "4,000,000 Btu/hr" flare, which the

SCAQMD determined limited flare throughput to no more than 94,285 scf of gas per day. The Settlement Agreement resolved the Flare Allegation, and Warren has maintained gas flow to the Flare King flare at less than 94,285 scf per day since that settlement.

Warren and the SCAQMD have now agreed on an Order for Abatement. A public hearing on the Stipulated Order of Abatement was held by the SCAQMD Hearing Board, and, on August 14, 2008, the Hearing Board approved and issued an Order for Abatement covering operations of the microturbines and Flare King flare The Order limits flaring of natural gas in the Flare King flare to 94,285 scf per day until a new Bekaert Clean Enclosed burner is installed, and requires that Warren maximize use of the microturbines for combustion of oilfield gas. It also requires Warren to install a gas re-injection system for use in lieu of flaring of oilfield gas (except when necessary due to breakdowns of or maintenance on the gas re-injection system)

In May 2008, the City of Los Angeles Zoning Administrator conducted a public hearing to review compliance with and the adequacy of conditions in its July 2006 Zoning Order, which allows the Company to drill up to 540 wells from the subsurface well cellars at the WTU Central Facility. Community members, employees, contractors, and royalty owners attended and testified at the hearing. The Company anticipates that, by the end of the third quarter of 2008, the Zoning Administrator will render a decision as to what, if any, additional conditions may be applied to the existing July 2006 Zoning Order.

1.4 PROJECT LOCATION

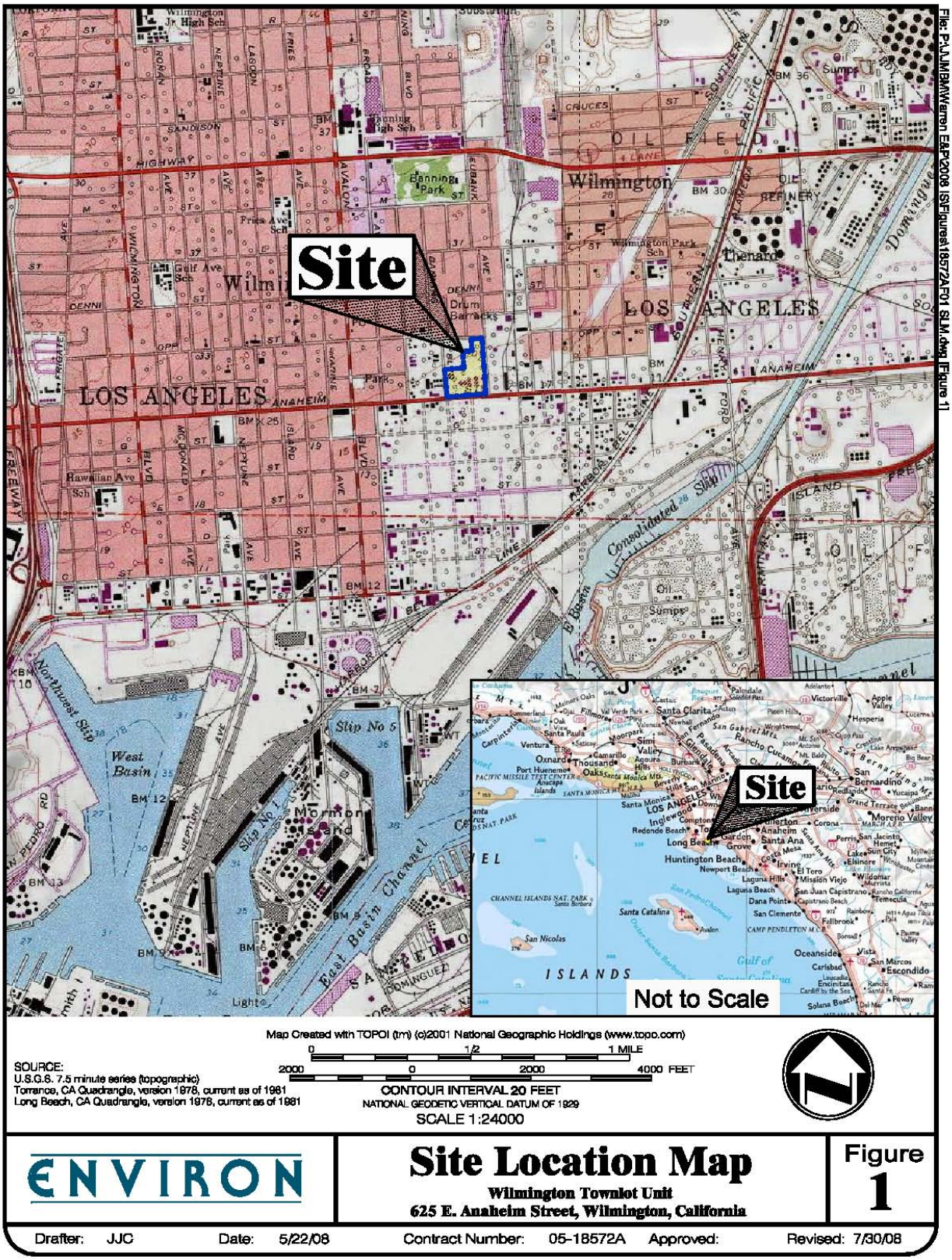
The proposed project will be located within Warren's WTU Central Facility located at 625 East Anaheim St. in the Wilmington district of Los Angeles, California. As shown in Figure 1, the WTU Central Facility is located on the eastern side of the Wilmington area of the South Coast Air Basin (Basin), which is a sub-area of the SCAQMD's area of jurisdiction. The WTU Central Facility provides oil, water and natural gas separation, storage, and injection services for this area of the Wilmington Oil Field (Figure 2). In general, the Wilmington area has a long history of oil and gas production that began with the discovery of the Wilmington Oil Field in 1932. This oil field is the largest in California and the fourth largest in the United States. Through the years, the oil field was developed simultaneously with residential, commercial, and industrial uses in and around Wilmington, with most of the older exploration and production wells, separation facilities, storage tanks and other equipment located within residential areas on small residential lots. In 1972, oil separation facilities, storage tanks and other equipment on the individual residential lots were consolidated at the WTU Central Facility. This project includes the installation and operation of new and replacement equipment at the WTU Central Facility.

The WTU Central Facility is located at the northeast corner of Anaheim Street and Banning Boulevard in the Wilmington district of the City of Los Angeles (Figure 2). The Wilmington district encompasses and covers an area of mixed land uses, with industrial, recreation, residential and commercially zoned areas nearby. The northern portion of the WTU Central Facility borders John Mendez Baseball Park and Opp Street, with a multi-family residence, a vacant parcel, and the remnants of the Civil War era powder magazine for Camp Drum nearby. The eastern portion of the WTU Central Facility borders Eubank Avenue, with industrial trucking and salvage yards nearby. The southern portion borders Anaheim Street, with the Wilmington Industrial Park and industrial and commercial uses (e.g., restaurant) nearby. The western portion borders Banning Boulevard,

including the above-mentioned baseball diamond, and a corner strip commercial development, a converted motor court, and two vacant parcels are nearby. The project covers 11 parcels of land with an area of 437,723 square feet (10.05 acres). Zoning designations include M2-1 VL-O (Light Industrial Zone) and RD3-1XL-0 (Restricted Multiple Dwelling Zone), with some parcels sharing the two designations. The "O" at the end of each designation indicates that the parcels are located in an Oil Drilling District and that such activities are permitted in the zone.

The current use includes and encompasses the WTU Central Facility, which consists of well cellars, an oil and water separation yard, a water management yard, an oil production and storage yard, a personnel yard, a gas and solids management and oil test yard, and material storage and welding (Figure 2[1]). A total of approximately 88 oil wells and approximately 40 water injection wells are currently in operation within the newly constructed drilling cellars at the WTU Central Facility. The well cellars, which were analyzed in a previous CEQA project, consolidate the drilling of wells into a central location at the WTU Central Facility. Through the use of the well cellars and directional drilling, the existing oil wells and drilling rigs can be removed from the surrounding community, lessening the impact on residents. Approximately two new wells are being drilled, completed, and put into operation at the WTU Central Facility each month.

[1] This picture was taken prior to November 2007. Since November 2007, the majority of the site has been paved, landscaped, or stabilized. As of the time of this analysis, paving, landscaping, gravel, and soil stabilization cover more than 90 percent of the ground area at the site.


Site
Site
Not to Scale
Wilmington
LOS ANGELES
Slip No 5
West Basin
East Basin Channel
Mormon Island
Map Created with TOPO! (tm) (c)2001 National Geographic Holdings (www.topo.com)
0 1/2 1 MILE
2000 0 2000 4000 FEET
SOURCE:
U.S.G.S. 7.5 minute series (topographic)
Torrance, CA Quadrangle, version 1978, current as of 1981
Long Beach, CA Quadrangle, version 1978, current as of 1981
CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
SCALE 1:24000
ENVIRON
Site Location Map
Wilmington Townlot Unit
625 E. Anaheim Street, Wilmington, California
Figure 1
Drafter: JJC
Date: 5/22/08
Contract Number: 05-18572A
Approved:
Revised: 7/30/08
File: P:\JJM\BM\Warren E&P\2008 ISF\figures\18572A F01 SLM.dwg [Figure 1]

OPP STREET
NEW WELL CELLARS
MATERIAL STORAGE AND WELDING
BANNING BOULEVARD
EUBANK AVENUE
NEW WELL CELLARS
GAS AND SOLIDS MANAGEMENT AND OIL TEST YARD
PERSONNEL YARD
OIL STORAGE YARD
OIL/WATER SEPARATION YARD
WATER MANAGEMENT YARD
ANAHEIM STREET
LEGEND
Property Boundary
Source: Aerial from Google Earth Pro, 2008.
© 2008 Tele Atlas
0
150
Scale in Feet
ENVIRON
Site Plan
Wilmington Townlot Unit
625 E. Anaheim Street, Wilmington, California
Figure
2
Drafter: JRC
Date: 5/22/08
Contract Number: 05-18572A
Approved:
Revised: 7/30/08
File: P:\J\JMBM\Warren E&P\2008_IS\Figures\18572AF02_SP.dwg [Figure 2]

1.5 OVERVIEW OF CURRENT OPERATIONS

Crude oil, or petroleum, is a natural resource comprised of a mixture of hydrocarbons, related compounds, and small amounts of other materials such as oxygen, nitrogen, sulfur, salt, and saltwater. Before crude oil can be shipped to refineries where it is manufactured and refined into a variety of petroleum products (e.g., such as lube oil, gasoline, diesel, jet fuel, asphalt and other products), the oil must be separated from the saltwater and natural gas produced concurrently with the oil. The primary function of the WTU Central Facility in this process is to extract oil and gas bearing fluids from underground formations; separate the crude oil, natural gas, and water; store, meter, and ship the crude oil for sale by pipeline (or trucks in the event of pipeline maintenance); and, after treatment to remove solids, pump the clarified produced water back into dedicated wells (i.e., water injection wells) to the underground oil production formation in order to maintain pressure and enhance the further production of oil.

The fluid from the production wells is typically comprised of 90 to 95 percent salt water, 5 to 10 percent crude oil, a small volume of natural gas, and trace amounts of sand and clay. The produced fluids are first routed to one of two Free Water Knock-Out (FWKO) separation vessels, where the bulk of the water and some natural gas and solids are separated from the crude oil. The separated crude oil then flows to a heater-treater separation vessel where any water emulsified in the oil is separated by heating the oil. A small amount of natural gas also evolves from solution within the crude oil in the heater-treater. This natural gas is combined with the natural gas separated in the FWKO and is used primarily as fuel in the heater-treater furnace and the microturbines, with the remainder routed to a flare. At all times, a minimum amount of fuel must be sent to the flare to maintain the pilot light (i.e., ready-standby mode). Water from the FWKO and heater-treater is routed to the produced water system where solids and remaining traces of oil are removed prior to subsurface re-injection. The separated oil from the heater-treater is directed to shipping tanks where it is stored and pumped intermittently for sale by a pipeline or vapor controlled trucks if a pipeline disruption occurs. The WTU Central Facility pumps oil through a connection and meter into the Cardinal Pipeline which travels underground to the nearby Conoco Philips refinery. Since the opening of the Cardinal Pipeline on March 17, 2008, the transfer of crude oil from the WTU Central Facility through the pipeline has averaged about 3,000 barrels per day, thereby eliminating an average of 40 diesel truck trips per day into and out of the WTU Central Facility.

The current SCAQMD-permitted equipment used to process the crude oil includes: (A) an oil and water separation system (Permit #F86179); (B) a water processing system (Permit #F77108); (C) a Flare King flare (Permit #F77109); (D) a heater-treater (HT #1; Permit #F81666); and (E) a vapor recovery system (Permit #F77107). Produced water is pumped from the oil zones along with crude oil and is treated within the water management yard for injection back into the oil zones. Thirty-six wells within the WTU Central Facility are currently being used for water injection purposes. The oil storage yard accommodates two primary and two emergency oil storage tanks. The water management yard accommodates a filter flush pit, a clarifier pit, three water clarifier tanks, three water tanks, a 600 square-foot switchgear building, and a 2,300 square-foot electrical substation. Equipment currently permitted for use at the WTU Central Facility has the permitted potential to emit (PTE) summarized in Table 1 below.

TABLE 1.

SUMMARY OF PRE-PROJECT POTENTIAL TO EMIT CRITERIA POLLUTANTS

Device/Process	Potential to emit (lb/day)				
	VOC	NO_x	SO_x	CO	PM, PM_{10}, $PM_{2.5}$
Tankage	1.38	--	--	--	--
Bulkloading	3.16	--	--	--	--
General Fugitives	2.43	--	--	--	--
Flare King flare	7.07	6.89	0.39	37.99	1.94
Heater Treater #1	0.40	2.18	0.09	2.00	0.43
Total	**14.44**	**9.08**	**0.49**	**39.99**	**2.37**

Although oil is currently being transported by pipeline, oil can be transported by truck, as allowed by Permit #F86179, in the event of a pipeline disruption. However, because more oil can be transferred by pipeline as compared to by truck, Warren prefers transport by pipeline. This method is safer because there are fewer chances of spills, it reduces traffic (i.e., fewer large trucks), and it causes less pollutant emissions. The pipeline operator, Cardinal, loses substantial tariff revenue during any pipeline disruption; therefore, any repairs will likely be made promptly in the case of disruption.

The combustion equipment is fueled by produced natural gas, along with natural gas purchased from a utility if needed as a back-up fuel. The combustion equipment currently operating at the site include HT #1, a Flare King flare, and six microturbines (heater treaters heat oil and water to enhance separation, microturbines produce electricity for on-site use, and a flare is used to safely dispose of excess gas).

Heater Treater

Currently, a heater treater is permitted for operation at the site. HT #1 treats an oil-water emulsion by heating the stream in order to separate the oil and water. The heater treater is fueled by the gas produced on site.

Flare

A Flare King flare is currently permitted for use at the WTU Central Facility. The flare is approximately 16 feet in height and produces a luminous flame. The flare is used to dispose of natural gas and methane produced in association with oil that is not used to fuel the heater treater or microturbines. No sales outlet currently exists to sell the natural gas, and, due to the small amount of produced gas, the installation of gas sales equipment is not viable at this time.

Microturbines

Six CARB-certified Ingersoll-Rand MT-70 microturbines are currently operating in the gas and solids management yard at the WTU Central Facility under a settlement agreement with SCAQMD. The microturbines use and burn the unconditioned produced natural gas to generate

approximately 420 kW of electrical power for use at the WTU Central Facility. Warren applied for a SCAQMD permit to operate the microturbines in October 2007. They are included in this CEQA evaluation as part of the project, rather than in the baseline calculations, even though they are currently operating. This is a very conservative approach because the impact of on-going microturbine emissions will be considered project impacts.

In addition, a 1,350 square-foot office building and a 1,250 square-foot building with lockers and restrooms are located within the personnel yard. The gas and solids management yard also accommodates a 430 square-foot pump storage shed, a 550 square-foot maintenance building, a flare stack, and a slurry injection system. Approximately 437,235 square feet (i.e., 92 percent) of the WTU Central Facility is currently covered with paved concrete or asphalt surfaces, and the remainder is covered with gravel or permanent landscaping.

Routine oil production operations are conducted 24 hours per day. Approximately 16 full-time employees work in two shifts for Warren at the WTU Central Facility. Between 6 and 12 vendors travel to or work at the WTU Central Facility on a daily basis. All motor vehicles access the WTU Central Facility through the primary entrance located on Banning Boulevard. A secondary access from Opp Street is used only in emergency situations or for intermittent construction activities (e.g., bringing in asphalt, etc.). Pedestrian traffic outside the WTU Central Facility is along paved sidewalks on each of the four surrounding streets. Adequate parking spaces are or will be provided within the WTU Central Facility to accommodate all workers, vendors and visitors.

The perimeter of the facility is landscaped and protected from public access by an eight-foot block wall set back at least five feet from the sidewalk. Interior block walls separate the various yards. Please see Figure 2 for a view of the site (note: the only satellite image available was taken prior to the installation of paving at the site). Paving, landscaping and other soil stabilization treatments cover more than 90% of the site area.

1.6 PROJECT DESCRIPTION

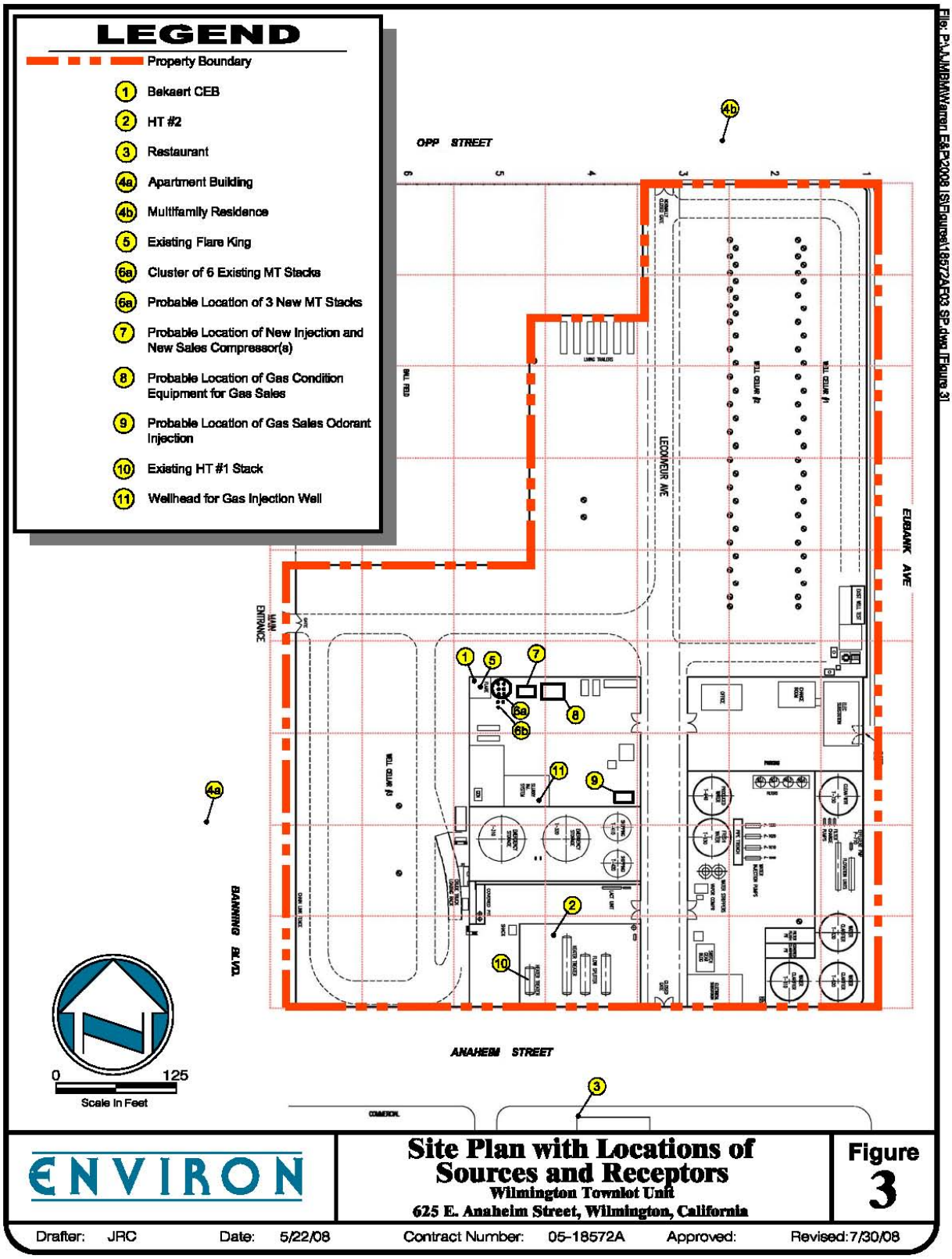
The intent and purpose of the proposed project is to bring Warren into compliance with applicable SCAQMD rules and regulations and to allow Warren to increase crude oil production. The proposed project will also be required to comply with applicable federal, state, and SCAQMD regulations that limit emissions of air pollutants, which is expected to achieve a reduction of criteria pollutants emitted per unit of crude oil produced. The proposed project will allow an expansion of current crude oil production by efficiently handling associated produced natural gas volumes with new state-of-the-art equipment, permitted as BACT, and ultimately re-injecting and/or selling the recovered gas. In order to conserve natural resources and maximize the benefit to be gained from the produced natural gas, Warren plans to: (1) utilize the gas to the extent possible on site for power generation and heat processing; (2) burn excess gas in new BACT combustion equipment until equipment is installed to sell and/or re-inject the excess volume of gas into subsurface oil reservoirs for pressure maintenance or possible future sale; and (3) as gas production rates warrant, ultimately sell the natural gas to an end user via the Southern California Gas Co. transmission line that traverses the WTU Central Facility or through another existing pipeline. Warren expects oil production at the WTU Central Facility to rise slowly over time from a current rate of 3,000 barrels per day to approximately 8,000 barrels per day in the future.

Specifically, Warren proposes to remove the existing permitted Flare King flare, refurbish HT#1, remove a previously operated water heater, and replace or upgrade these pieces of equipment with the most efficient equipment available, including: an ultra-low NO_x burner equipped Heater-Treater No. 2 (HT#2) to meet oil-water separation needs, three additional Ingersoll-Rand MT-70 microturbines to generate electrical power for use on site, and an ultra-low NO_x Bekaert Clean Enclosed Burner® (Bekaert CEB®) to combust any remaining natural gas (Figure 3). HT#1 will be re-furbished and brought back on-line first as a standby unit for HT#2 and then, as oil production levels warrant, as an operational unit. As soon as a four-stage electric compressor can be procured and installed, Warren will re-inject all excess natural gas not consumed as fuel in HT#2, the microturbines, and the Bekaert CEB® (operating in ready-standby mode in this scenario) into the subsurface oil reservoir for possible future sale.

As natural gas production grows with increased oil production, Warren will have the economic incentive to purchase and install costly additional equipment necessary to condition, odorize, and meter the gas for sale to a third party and to cease gas-reinjection. Adequate gas production rates are necessary to justify the investment. Fuel consumption in the microturbines, HT #2, and Bekaert CEB will be approximately 240 to 300 Mscf of gas per day. The compressor that will be purchased for gas re-injection will be able to re-inject a maximum of 850 Mscf of gas per day. The practical limits of gas production will need to be approximately 1090 to 1150 Mscf of gas per day for a continuous period of at least six months before gas sales to third parties becomes viable. Prior to reaching this level of natural gas production, Warren will submit applications for permits to install gas sales equipment. Due to long lead times on the equipment orders, applications for permits to install gas sales equipment will be made several months before gas production levels grow to the extent set forth above.

The California Energy Commission (CEC) report entitled *Transportation Fuels, Technologies, and Infrastructure Assessment* states: "… as California's population and economic output grow, demand for transportation services and fuel will grow. Petroleum will continue to be the energy resource of choice … total demand for gasoline and diesel fuels will increase by almost 35 percent over the next 20 years" (CEC, 2003). The proposed project assists meeting this demand by allowing the additional production of crude oil (the feedstock for petroleum based fuels) from the WTU Central Facility. As such, the proposed project is consistent with meeting the growing local demand for gasoline, low sulfur diesel, and other petroleum based fuels. Warren proposes to achieve this goal by using new BACT controlled equipment and ultimately re-injecting and/or selling the excess gas, thereby minimizing any potential air quality impacts.

The U.S. Environmental Protection Agency (USEPA) has designated nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), and particulate matter (PM) emissions as criteria air pollutants. Additionally, CARB has designated volatile organic compounds (VOCs), NO_x, oxides of sulfur (SO_x), CO, and PM emissions as criteria air pollutants or pollutant precursors. Stringent control of emissions of these substances is necessary to protect air quality in the Basin. Reducing emissions from oil production facilities while maintaining oil production will, therefore, have a beneficial impact on air quality, public health and the local economy.


LEGEND
Property Boundary
1 Bekaert CEB
2 HT #2
3 Restaurant
4a Apartment Building
4b Multifamily Residence
5 Existing Flare King
6a Cluster of 6 Existing MT Stacks
6a Probable Location of 3 New MT Stacks
7 Probable Location of New Injection and New Sales Compressor(s)
8 Probable Location of Gas Condition Equipment for Gas Sales
9 Probable Location of Gas Sales Odorant Injection
10 Existing HT #1 Stack
11 Wellhead for Gas Injection Well
OPP STREET
LECOMPTE AVE
EUBANK AVE
MAIN ENTRANCE
BANNING BLVD
ANAHEIM STREET
0
125
Scale In Feet
ENVIRON
Site Plan with Locations of Sources and Receptors
Wilmington Townlot Unit
625 E. Anaheim Street, Wilmington, California
Figure 3
Drafter: JRC
Date: 5/22/08
Contract Number: 05-18572A
Approved:
Revised: 7/30/08

The proposed project is comprised of two major stages or components: (1) installing and operating lower-emitting new and replacement equipment that complies with Regulation XIII BACT requirements; and (2) installing and operating a gas re-injection system to re-inject excess produced gas; and/or, if gas production levels are sufficiently high, installing and operating additional equipment necessary for sales of gas to other off-site gas users. Both stages of the proposed project will ultimately result in the use and operation of BACT-compliant equipment that minimizes emissions and provides for gas re-injection and/or gas sales systems that will essentially eliminate on-site emissions from the excess gas. By operating more efficient equipment, crude oil production can increase at the WTU Central Facility, and potential impacts on air quality will be reduced per unit of crude oil produced. The gas re-injection system will be installed as soon as a four-stage electrically driven compressor can be obtained to pump unused gas back into the oil reservoir under an industrial area to the southeast of the WTU Central Facility. Re-injection or sale of the gas will virtually eliminate all existing air quality impacts from flaring; in the case of re-injection, the gas will be conserved for possible future use or sale. Equipment operating at and permits held by Warren E&P will be affected by the proposed project, including those described below.

Heater-Treater

In the initial phase, the currently permitted HT#1 will be replaced with the new HT#2, which meets BACT requirements and emits less NO_x per unit of fuel than the burners in the existing HT#1. An application for a SCAQMD permit for HT#2 was submitted in November 2007. The existing HT#1 will then be reconditioned (i.e., update valves, insulate, etc.) and retained as a permitted unit for when oil and gas production increases to levels necessitating the use of the re-conditioned HT#1 as well as HT#2.

Microturbines – Existing

Since the California energy crisis of 2000, CARB and SCAQMD have encouraged the installation of microturbines as a means to generate electricity, often by utilizing stranded, non-marketable gas. Microturbines have gained wide usage at landfills, sewage treatment plants, hospitals and in oil fields. Warren purchased and installed six CARB-certified Ingersoll-Rand MT-70 microturbines without valid permits to operate from the SCAQMD (see page 1-2). The microturbines use and burn the unconditioned produced natural gas to generate approximately 420 kW of electrical power for use at the WTU Central Facility. Although the microturbines are currently operating under a settlement agreement with SCAQMD, they have not undergone any type of CEQA evaluation. Warren applied for a SCAQMD permit to operate the microturbines in October 2007. They are included in this CEQA evaluation as part of the proposed project, rather than in the baseline calculations, even though they are currently operating. This is a very conservative approach since the impact of on-going microturbine emissions will be considered proposed project impacts. Although the microturbines are included in the proposed project, they are not included in the construction phases because they have already been constructed.

Flare

A Flare King flare is currently permitted for use at the WTU Central Facility. This flare will be replaced by a Bekaert CEB®, which is a state-of-the-art system that meets BACT requirements and emits less VOC, NO_x, and CO per unit of fuel than the existing flare. An application for an SCAQMD permit was submitted in August 2007. Once the Bekaert CEB® is operational, the Flare King flare will be shut down and removed from the WTU Central Facility. The Bekaert CEB® will

be placed in a ready-standby mode when the below-described gas re-injection equipment is operational. Until gas re-injection equipment can be installed and operated (as discussed below), excess gas that cannot be combusted in the microturbines or other beneficial use combustion equipment at the WTU Central Facility will be burned in the Bekaert CEB®.

Gas Re-Injection and Storage System

Warren proposes to use a previously drilled well in the WTU Central Facility, drilled to a depth greater than ½ mile, for re-injection of excess produced gas into an existing underground oil formation approximately ¾ mile below industrial areas located southeast of the WTU Central Facility. As oil production increases, additional natural gas, dissolved in the crude oil within the subsurface reservoir, will be produced along with the oil. Once separated from the oil, most of the natural gas will be beneficially used as fuel in the six microturbines and HT #2. A small amount will be needed to maintain the Bekaert CEB® in ready-standby mode, and the excess gas will be re-injected back into oil reservoirs approximately 4,000 feet below the surface. The re-injected gas may be returned to the surface in the future through the same well and subsequently put to beneficial use or sale. The gas re-injection system will involve the use of a four stage electric compressor, inter-stage coolers and scrubbers, and will require minor re-piping of existing flowlines and the use of temporary well servicing equipment to prepare the existing well for this use. The compressor will be installed as a short-term gas management system. Warren is evaluating other longer-term options as explained in the following subsections. If no other option becomes feasible, reinjection will remain the primary means of managing excess produced natural gas.

Gas Sales System

If total gas production increases to a sufficient level (e.g., 1,090 to 1,150 Mscf of gas per day for a continuous period of at least six months), Warren will install gas conditioning, metering, and odorizing (as required by the US Department of Transportation [DOT]) equipment necessary for the sale of the natural gas to end users or public utilities. The gas sales system will be comprised of a re-staged electric compressor (can also be used for gas re-injection), a molecular sieve to remove inert components (water vapor, nitrogen gas [N_2], and carbon dioxide [CO_2]) and larger hydrocarbon molecules, and gas metering and odorizing equipment required by Southern California Gas Co. and the US DOT. Sales will be through an existing pipeline that traverses the WTU Central Facility. Because of the possibility that it may be feasible to retrieve gas for sales at some time in the future, the gas sales systems has also been evaluated in the environmental analysis in Chapter 2.

New Microturbines and Gas Conditioning Equipment

If gas sales ultimately exceed one million standard cubic feet per day, additional microturbines and gas conditioning equipment may be required. Under this scenario, Warren may install up to three new microturbines in addition to the six already present on site. Because of the possibility that Warren may install additional microturbines, a total of nine microturbines (i.e., six existing plus three potential new) has been evaluated in the environmental analysis in Chapter 2.

As shown in Table 2, the proposed project will be implemented in multiple interim stages prior to achieving the final proposed project. These interim scenarios focus only on the equipment

operating during a given period. A discussion of the construction activities is found in a following section.

1.7 REQUIRED PERMITS

The proposed project will require Permits to Construct and Operate from the SCAQMD, a permit for subsurface gas re-injection from the California Division of Oil, Gas, and Geothermal Resources (DOGGR), and building permits from the City. No other permits are expected to be required.

1.8 CONSTRUCTION SCHEDULE

The proposed project consists primarily of the installation of pre-fabricated equipment. Construction in the WTU Central Facility will be limited to building equipment foundations (i.e., grading, paving), piping, wiring, and installing pre-fabricated skid-mounted equipment. The Bekaert CEB® and HT#2 are already in various stages of off-site fabrication by third parties and can be installed shortly after completion of the CEQA process when permits are issued. As shown in Table 3, the construction and installation schedules for the individual components of the proposed project are not expected to overlap. Construction activities for most aspects of the proposed project are expected to begin in the fourth quarter of 2008 and occur before mid-2011.

TABLE 2

PROJECT OPERATION SCHEDULE[1]

Project Activity	Operating Equipment
Project Baseline	Operation of HT #1 and Flare King flare
Project Interim I	Operation of HT #1, six existing microturbines, and Flare King flare
Project Interim II	Operation of HT #1, six existing microturbines, and Bekaert CEB ®
Project Interim III	Operation of HT #2, six existing microturbines, and Bekaert CEB ®
Project Interim IV	Operation of HT #2, six existing microturbines, and Bekaert CEB ®, with gas reinjection
Project Interim V	Operation of HT #2, six existing microturbines, and Bekaert CEB ®, with gas sales

[1] As noted in the text, some of these phases may not be necessary (e.g., direct gas sales if production warrants this approach; continuing re-injection, but not going to gas sales, if production is too low; not installing additional microturbines if production does not warrant it).

TABLE 3.

PROPOSED CONSTRUCTION SCHEDULE[1]
(ASSUMING PERMITS TO CONSTRUCT, INSTALL, AND OPERATE ARE ISSUED NO LATER THAN 1ST QUARTER, 2009).

Construction Activity	Approximate Completion Date
Construction I: Construction and installation of Bekaert CEB® and removal of Flare King flare and hot water heater	1st quarter – 2009
Construction II: Construction and installation of HT #2 and re-furbishment of HT #1	2nd quarter – 2009
Construction III: Grading for compressor pad[2]	2nd quarter – 2009
Construction IV: Construction and installation of the compressor	
IVa: Construction of compressor pad[3]	
IVb: Setting compressor[3]	
IVc: Pipe fabrication and installation[4]	
IVd: Electrical installation[3]	
Construction V: Conversion of well[2]	
Construction VI: Construction and installation of gas sales equipment (contingent)	Before 4th quarter – 2010 (contingent)
VIa: Grading for gas sales equipment pad[3]	
VIb: Construction of concrete pad[3]	
VIc: Setting gas sales equipment[3]	
VId: Pipe fabrication and installation[4]	
VIe: Electrical installation[3]	
Construction VII: Installation of three additional microturbines and conditioning equipment[5]	4th quarter – 2011 (contingent)
VIIa: Grading for microturbines pad[3]	
VIIb: Construction of concrete pad[3]	
VIIc: Setting microturbines[3]	
VIId: Pipe fabrication and installation[4]	
VIIe: Electrical installation[3]	
Final project	1st quarter - 2012

(1) This schedule is for analysis purposes only and is used for calculating proposed project emissions.
(2) If production rises quickly, Warren may go directly to gas sales. In this case, gas sales equipment would be installed by the 4th quarter of 2009.
(3) This activity occurs during the period of one day and does not overlap with another activity.
(4) This activity occurs during the period of ten days and does not overlap with another activity.
(5) Construction VII is the installation of three additional microturbines and does not include the existing six microturbines because they are already constructed.

1.9 PROJECT IMPLEMENTATION

Typically, construction occurs prior to project operation. However, because of the various interim operating stages in the proposed project, construction activities overlap with the operation of new equipment. As a result, proposed project phases incorporate both operating equipment and construction activities, and are based on the Interim operating scenarios and Construction Activities

described in Tables 2 and 3. Potential environmental impacts of both operation and construction will thus be analyzed together. The proposed project implementation schedule is found in Table 4.

TABLE 4.

PROPOSED PROJECT IMPLEMENTATION

Phase	Description
Phase 0	Baseline, no construction
Phase I	Interim I, Construction I
Phase II	Interim II, Construction II
Phase III	Interim III, Construction III
Phase IV	Interim III, Construction IV
Phase V	Interim III, Construction V
Phase VI	Interim IV, Construction VI
Phase VII	Interim V, Construction VII
Final project	Final proposed project

CHAPTER 2

ENVIRONMENTAL CHECKLIST FORM

Introduction
General Information
Potential Environmental Significant Impact Areas
Determination
Environmental Checklist and Discussion
- Aesthetics
- Agriculture Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Energy
- Geology and Soils
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use/Planning
- Mineral Resources
- Noise
- Population/Housing
- Public Services
- Recreation
- Solid/Hazardous Waste
- Transportation/Traffic
- Mandatory Findings of Significance

References
Acronyms
Glossary

CHAPTER 2

ENVIRONMENTAL CHECKLIST

INTRODUCTION

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

GENERAL INFORMATION

Project Title:	Warren E&P, Inc. Wilmington Townlot Unit (WTU) Central Facility, New Equipment Project
Lead Agency Name:	South Coast Air Quality Management District
Lead Agency Address:	21865 Copley Drive Diamond Bar, CA 91765
Contact Person:	Michael Krause
Contact Phone Number:	(909) 396-2706
Project Sponsor's Name:	Warren E&P, Inc.
Project Sponsor's Address:	625 East Anaheim Street Wilmington, CA 90744
General Plan Designation:	Light Industrial
Zoning:	M2-1VL-O (Light Industrial Zone); RD3-1XL-O (Restricted Multiple Dwelling Zone).
Description of Project:	The proposed project consists of installing and operating a new heater treater, a burner to replace an existing flare, and a gas re-injection/sales system at Warren's WTU Central Facility. The old flare will be removed. Gas sales equipment may also be installed and operated, depending on oil and gas production levels. The proposed project will bring the facility into compliance with existing applicable rules and regulations, and increases crude oil production, while complying with federal, state, and local proposed standards. Zoning designations at the site include M2-1 VL-O (Light Industrial Zone) and RD3-1XL-0 (Restricted Multiple Dwelling Zone), with some parcels sharing the two designations.
Surrounding Land Uses and Setting:	The WTU Central Facility is bordered on the north by Opp Street, the John Mendez Baseball Park, and a multi-family residence. Eubank Avenue borders the WTU Central Facility on the east. To the south, there is Anaheim Street, the Wilmington Industrial Park, and industrial and commercial uses. The western side is bordered by Banning Boulevard, with a commercial development, a converted motor court, and two vacant parcels nearby.

Other Public Agencies Whose Approval is Required:	City of Los Angeles California Division of Oil, Gas, and Geothermal Resources

POTENTIALLY SIGNIFICANT IMPACT AREAS

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

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

DETERMINATION

On the basis of this initial evaluation:

- ☑ I find the project COULD NOT have a significant effect on the environment, and that a NEGATIVE DECLARATION will be prepared.
- ☐ I find that although the project could have a significant effect on the environment, there will not be significant effects in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
- ☐ I find that the project MAY have a significant effect(s) on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
- ☐ I find that the project MAY have a "potentially significant impact" on the environment, but at least one effect: (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
- ☐ I find that although the project could have a significant effect on the environment, because all potentially significant effects: (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the project, nothing further is required.

Date: April 16, 2009 Signature: Steve Smith

Steve Smith, Ph.D.
Program Supervisor

ENVIRONMENTAL CHECKLIST AND DISCUSSION

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

1.1 Significance Criteria

The project impacts on aesthetics will be considered significant if:

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

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

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

1.2 Environmental Setting and Impacts

1.a), b) and **c).** The existing visual character of the surrounding locale is highly industrial and commercial, with some residential and recreational land uses nearby. The proposed project is not located within or along a designated scenic corridor. As discussed in the previous 2006 Negative Declaration, the facility does not contain any scenic resources such as trees, rock outcroppings, etc. The proposed Bekaert CEB® is 14.5 feet tall, approximately 1.5 feet shorter than the existing flare. Additionally, the Bekaert CEB does not produce a luminous flame that is visible above its stack, like the existing flare. In addition, the active portion of the Bekaert CEB® system which is approximately six to eight feet tall will be hidden by an existing interior wall. There are six 24-foot tall tanks nearby, two 40-foot tall oxygen stripper towers near the center of the facility, and drilling rigs and workover rigs on-site that are over 100 feet and 70 feet tall, respectively. Therefore, the overall impact of the Bekaert CEB® is less than that of the present flare and is not expected to change the visual landscape. Since the WTU Central Facility is currently an oil and gas facility, continued use of equipment to complete an existing well for gas re-injection purposes, as well as operation of the Bekaert CEB®, microturbines, and HT#2, would be similar in aesthetic appearance and characteristics to existing operations at the WTU

Central Facility. Therefore, no significant adverse aesthetic impacts are expected from the additional modifications.

1.d). Construction activities are not anticipated to require additional lighting because they are scheduled to take place during daylight hours. Each of the four new pieces of equipment may require a new light to operate safely during night operations. Although lighting details for these units are not available at this time, these lights will be located inside existing interior walls and will be placed so that the light will not shine into the surrounding neighborhoods. No increase in lighting associated with the project at the WTU Central Facility is expected. Therefore, no significant impacts to light and glare are anticipated from the project.

1.3 Mitigation Measures

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

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

2.1 Significance Criteria

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

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

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

2.2 Environmental Setting and Impacts

2.a), b), and **c).** There are no agricultural resources (i.e., food crops grown for commercial purposes) located in or near the vicinity of the WTU Central Facility. The proposed project will not involve construction outside of the existing boundaries of the WTU Central Facility and no agricultural resources are located within the WTU Central Facility. The zoning of the WTU Central Facility will remain Light Industrial (M2-1 VL-O) and Restricted Multiple Dwelling Zone (RD3-1XL-O). The "O" at the end of each zoning designation indicates that the parcels are located in an Oil Drilling District and that such activities are permitted in the zone. Therefore, the proposed project will have no significant adverse impacts on agricultural resources or conflict with zoning for agriculture.

2.3 Mitigation Measures

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

		Potentially Significant Impact	Less Than Significant Impact	No Impact
III.	**AIR QUALITY.** Would the project:			
a)	Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☑
b)	Violate any air quality standard or contribute to an existing or projected air quality violation?	☐	☑	☐
c)	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?	☐	☑	☐
d)	Expose sensitive receptors to substantial pollutant concentrations?	☐	☑	☐
e)	Create objectionable odors affecting a substantial number of people?	☐	☑	☐
f)	Diminish an existing air quality rule or future compliance requirement resulting in a significant increase in air pollutant(s)?	☐	☐	☑

3.1 Significance Criteria

Typically, construction and operation do not overlap, and emissions from these categories are evaluated separately. However, in the proposed project, construction activities and interim operational changes occur simultaneously before the final proposed project is implemented. As a result, rather than evaluating construction and operation emissions separately, the total emissions from each proposed phase will be evaluated and compared to the SCAQMD operational significance criteria in Table III-1 below. If impacts equal or exceed any of the following criteria, they will be considered significant. Additionally, emissions of both TACs and greenhouse gases will be analyzed for potential significance.

3.2 Environmental Setting and Impacts

3.a). The SCAQMD is directly responsible for reducing emissions from stationary (area and point) sources in most of southern California. As part of this responsibility, the SCAQMD has prepared a series of Air Quality Management Plans (AQMP), the most recent of which was adopted by the Governing Board of the SCAQMD on June 1, 2007 (2007 AQMP). An inventory of existing emissions from industrial facilities is included in the baseline inventory in the 2007 AQMP. The 2007 AQMP also identifies emission reductions from existing sources and air pollution control measures that are necessary in order to comply with applicable state and federal ambient air quality standards.

The 2007 AQMP demonstrates that applicable ambient air quality standards can be achieved within the timeframes required under federal law. This proposed project must comply with applicable SCAQMD rules and regulations for new or modified sources. For example, new emission sources associated with the proposed project are required to comply with the SCAQMD's Regulation XIII - New Source Review, including BACT, offset, and modeling requirements, if applicable. The proposed project proponent must also comply with prohibitory rules, such as Rule 403, for the control of fugitive dust. By meeting these requirements, the proposed project will be consistent with the goals and objectives of the 2007 AQMP to improve air quality in the Basin. The use of low NO_x burners, such as that in HT#2 and the state-of-the-art Bekaert CEB®, to burn excess gas, must meet SCAQMD requirements, including BACT. Further, Warren is required to comply with state and federal sulfur limits on diesel fuel, including the use of ultra-low sulfur diesel fuel as a control measure under the 2007 AQMP. Therefore, the proposed project is consistent with applicable AQMPs and is not expected to diminish an existing air quality rule or a future compliance requirement.

The Growth Management Chapter (GMC) of the Regional Comprehensive Plan and Guide (RCPG) forms the basis of the land use and transportation control portions of the AQMP. Projects that are consistent with the projections of the employment and population forecasts identified in the GMC are considered consistent with the 2007 AQMP growth projections. Approximately 16 full-time employees work in two shifts at the facility for the applicant, and approximately one dozen vendors travel to or from the facility on a daily basis. Up to two additional workers per shift may be added to operate the Bekaert CEB®, HT #2, microturbines, and gas re-injection or sales equipment. The number of vendors that travel to and work at the facility is not expected to change upon completion of the proposed project. Therefore, the proposed project will also be consistent with the 2007 AQMP population and employment

forecasts.

Based on the above information, the proposed project will be consistent with the goals and policies of the 2007 AQMP and, therefore, is not expected to conflict with or obstruct implementation of the 2007 AQMP.

TABLE III-1

AIR QUALITY SIGNIFICANCE THRESHOLDS

Operational Mass Daily Thresholds		
Pollutant	Construction	Operation
NO_x	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM_{10}	150 lbs/day	150 lbs/day
$PM_{2.5}$	55 lbs/day	55 lbs/day
SO_x	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Lead	3 lbs/day	3 lbs/day
TAC and Odor Thresholds		
Toxic Air Contaminants (TACs)	Maximum Incremental Cancer Risk $\geq$ 10 in 1 million Hazard Index $\geq$ 1.0 (project increment)	
Odor	Project creates a minimal odor nuisance pursuant to SCAQMD Rule 402	
Ambient Air Quality for Criteria Pollutants		
NO_2 1-hour average annual average	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 0.18 ppm (state) 0.03 ppm (state)	
PM_{10} 24-hour annual geometric mean	10.4 $\mu g/m^3$ (construction) & 2.5 $\mu g/m^3$ (operation) 1.0 $\mu g/m^3$	
$PM_{2.5}$ (24-hour average)	10.4 $\mu g/m^3$ (construction) & 2.5 $\mu g/m^3$ (operation)	
Sulfate (24-hour average)	1 $\mu g/m^3$	
CO 1-hour average 8-hour average	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following ambient standards: 20 ppm (state) 9.0 ppm (state/federal)	

PM_{10} = particulate matter less than 10 microns in size, $\mu g/m^3$ = microgram per cubic meter; ppm = parts per million; TAC = toxic air contaminant; AHM = Acutely Hazardous Material. NO_2 = Nitrogen Oxide, CO = Carbon Monoxide, VOC = Volatile Organic Compounds, SO_x = Sulfur Oxide.

3.b). The proposed project area is located in and is part of the Basin, which currently exceeds and is in violation of several of the National Ambient Air Quality Standards (NAAQS) and the California Ambient Air Quality Standards (CAAQS), specifically with respect to ozone (O_3), PM_{10} and $PM_{2.5}$.

To assess the impacts of project-related construction and operational emissions, the SCAQMD has established regional significance thresholds (SCAQMD 2003b) that are shown above in

Table III-1 and summarized in Table III-6 below. Construction and operational emissions from the proposed project that are below these thresholds will be considered less than significant.

In addition, the SCAQMD has developed Localized Significance Threshold (LST) Methodology to evaluate the potential localized impacts of criteria pollutants (SCAQMD, 2003c). Using the LST Methodology, construction and operational impacts are assessed separately. However, because the construction and operational phases of the proposed project overlap, an LST analysis is not included here. As discussed in more detail below, the modeling of emissions concentrations generated during the construction and operational phases serves the same purpose as comparing the same to the LST Methodology and provides results in which a significance determination can be made.

To assess local ambient air quality impacts, the SCAQMD has established emission thresholds for one-hour average (NO_2, CO), eight-hour average (CO), 24-hour average ($PM_{2.5}$, PM_{10}), and annual average (NO_2, PM_{10}) emissions. Proposed project emissions are compared to concentration standards (i.e., background + incremental) for pollutants for which the Basin is in attainment (i.e., NO_2, CO) and to incremental standards (i.e., incremental increase) for pollutants for which the Basin is in nonattainment (i.e., PM_{10}, $PM_{2.5}$).

Construction Emissions Calculations

Construction typically occurs in phases, consisting of demolition, site preparation, construction of structures, and final site work. Construction activities required to implement the final proposed project include: (1) excavation, concrete work, erection, and/or installation of the individual combustion units (Bekaert CEB®, HT #2, and three microturbines in addition to those already constructed); (2) mobile source emissions from construction equipment, delivery trucks, and employees' automobiles; and (3) reopening of an existing well for re-injection of gas into subsurface oil reservoirs for pressure maintenance or possible future sales. Some offsite fabrication of equipment will be necessary, but emissions associated with those activities are not included in this report because they occur outside of California, or because insufficient information is available to characterize these emissions. Minimal excavation is anticipated since only a few, small foundations are necessary to provide support for the new proposed equipment. The areas around these new foundations were paved during the previous project. The construction activities will be conducted during distinct time periods and will disturb substantially less than one acre of land within the facility, which covers approximately 10 acres. Actual construction will generally take place in the area of the gas and solids management and oil/water separation yards.

The peak daily unmitigated construction emissions from each activity (described in Chapter 1) were calculated using the SCAQMD-approved OFFROAD model and are shown in Table III-2. Only emissions are shown in Table III-2; the comparison of construction and operational emissions to significance thresholds is found in the Summary section (However, all construction emissions for all pollutants during all phases are less than the construction significance thresholds). Details of the calculations are presented in Appendix A.

TABLE III-2.

PROJECT-RELATED PEAK DAILY CONSTRUCTION EMISSIONS

Construction Activity	Estimated Emissions (lbs/day)					
	CO	NO_x	PM_{10} (1)	$PM_{2.5}$ (1)	VOC	SO_x
Construction I	0.67	1.71	0.07	0.07	0.17	0.00
Construction II	0.56	1.47	0.06	0.06	0.15	0.00
Construction III	0.03	0.06	0.10	0.10	0.01	0.00
Construction IV						
IVa	4.03	3.02	0.25	0.25	0.48	0.00
IVb	0.67	1.71	0.07	0.07	0.17	0.00
IVc	3.58	6.06	0.39	0.39	1.16	0.01
IVd	0.00	0.00	0.00	0.00	0.00	0.00
Construction V	4.00	10.27	0.40	0.40	1.04	0.01
Construction VI						
VIa	0.03	0.06	0.10 (2)	0.10 (2)	0.01	0.00
VIb	4.03	3.02	0.25	0.25	0.48	0.00
VIc	0.67	1.71	0.07	0.07	0.17	0.00
VId	3.58	6.06	0.39	0.39	1.16	0.01
VIe	0.00	0.00	0.00	0.00	0.00	0.00
Construction VII						
VIIa	0.03	0.06	0.10 (2)	0.10 (2)	0.01	0.00
VIIb	4.03	3.02	0.25	0.25	0.48	0.00
VIIc	0.67	1.71	0.07	0.07	0.17	0.00
VIId	3.58	6.06	0.39	0.39	1.16	0.01
VIIe	0.00	0.00	0.00	0.00	0.00	0.00

(1) Emissions of PM_{10} and $PM_{2.5}$ are from exhaust except as noted.
(2) Emissions of PM_{10} and $PM_{2.5}$ are from exhaust (0.03 lbs/day) and fugitive dust (0.092 lbs/day).

Operational Emissions Calculations

Calculation of the operational emissions was done for each interim operating scenario (Table III-3), as well as for the final proposed project. Emissions from commuting and heavy duty vehicle trips were also calculated. To obtain the incremental impact of the proposed Project, operational emissions from the final proposed project were compared to baseline emissions, or emissions from the equipment currently permitted at the site. The baseline thus encompassed the emissions from HT#1 and the Flare King flare. The baseline does not include the six existing microturbines because they are operating under a settlement agreement, and currently do not have a valid permit to operate. Appendix A contains the detailed emissions calculations for the fully operational phase of the proposed project, as well as all other interim operating scenarios. A CO hotspot analysis was not conducted because the proposed project will not generate enough traffic (e.g., less than six trips per day at full operations) to change the level of service (LOS) at nearby affected intersections from C to D, or to increase the volume to capacity ratio by 2% or more. Therefore, such an analysis was not warranted.

The daily unmitigated operational emissions from each interim scenario (described in Chapter 1) were calculated and shown in Table III-3. Only interim scenario emissions, final emissions, and incremental increase of the final proposed project emissions as compared to the baseline are shown in Table III-3; the comparison of construction and operational emissions to significance thresholds is found in the Summary section below. Details of the calculations are presented in

Appendix A. As can be seen from the emissions in Table III-3, the greatest emissions for all criteria pollutants occur under the final proposed project, and these emissions are all less than the SCAQMD regional CEQA significance thresholds for operations. The combined construction and operation emissions can be found in Table III-6.

TABLE III-3.

PROJECT OPERATIONAL EMISSIONS COMPARED TO BASELINE EMISSIONS (FINAL PROJECT)

Operating Scenario	Estimated Emissions (lbs/day)					
	CO	NO_X	PM_{10}	$PM_{2.5}$	VOC	SO_X
Baseline	21.5	4.6	1.2	1.2	4.0	0.3
Interim I	46.1	15.1	3.3	3.3	18.7	0.7
Interim II	11.1	15.6	2.3	2.3	13.3	1.0
Interim III	18.7	18.7	3.9	3.9	14.8	1.3
Interim IV	16.0	11.9	3.0	3.0	13.3	0.7
Interim V	18.0	14.1	3.5	3.5	13.7	0.8
Final proposed project	23.8	23.9	4.8	4.8	19.6	1.5
Incremental difference (Final – baseline)	2.3	19.3	3.6	3.6	15.6	1.3

As noted above, the emissions from the existing microturbines have not been included in the CEQA baseline, but are included in the operational emissions.

For permitting purposes only, the potential to emit (PTE) of the final proposed project was determined and can be found in Table III-4. As noted in Chapter 1, several of the interim scenarios will only be completed if gas production is great enough to warrant it. If the facility's gas production only requires six microturbines (i.e., the number of permit applications currently submitted), the PTE will not subject Warren to offset requirements for any criteria pollutants (Table III-5). The scenario shown in Table III-5 is the same as interim operating condition Interim V above. However, if three additional microturbines are installed (i.e., final proposed project), Warren will exceed the offset threshold (as shown in Table III-5). The need for offsets or related permit conditions will be addressed at this future date.

TABLE III-4

SUMMARY OF POST-PROJECT POTENTIAL TO EMIT CRITERIA POLLUTANTS (PROPOSED PROJECT WITH NINE MICROTURBINES – PROPOSED PROJECT)

Device/Process	Potential to Emit (lb/day)				
	VOC	NO_x	SO_x	CO	PM, PM_{10}, $PM_{2.5}$
Tankage	1.38	--	--	--	--
Bulkloading	3.16	--	--	--	--
General Fugitives	2.46	--	--	--	--
Bekaert CEB®	1.72	7.43	0.59	3.01	0.97
Heater Treater #1	0.40	2.18	0.09	2.00	0.43
Heater Treater #2	1.92	5.24	0.41	9.60	2.06
Microturbines (9)	13.12	9.05	0.29	9.18	1.35
Total:	**24.17**	**23.91**	**1.38**	**23.80**	**4.81**

TABLE III-5

SUMMARY OF POST-PROJECT POTENTIAL TO EMIT CRITERIA POLLUTANTS (PTE WITH SIX MICROTURBINES, CURRENTLY SUBMITTED PERMIT APPLICATIONS – INTERIM V)

Device/Process	Potential to Emit (lb/day)				
	VOC	NO_x	SO_x	CO	PM, PM_{10}, $PM_{2.5}$
Tankage	1.38	--	--	--	--
Bulkloading	3.16	--	--	--	--
General Fugitives	2.46	--	--	--	--
Bekaert CEB®	1.72	7.43	0.65	3.01	0.97
Heater Treater #1	0.40	2.18	0.09	2.00	0.43
Heater Treater #2	1.92	5.24	0.46	9.60	2.06
Microturbines (6)	8.76	6.04	0.22	6.12	0.90
Total:	**19.79**	**20.89**	**1.41**	**20.74**	**4.36**

Summary of Emissions Analyses

Peak construction emissions and incremental peak operating emissions (i.e., operating emissions minus baseline) during each phase of the proposed project implementation (Table III-6) were compared to the operational regional significance thresholds (Table III-1).

TABLE III-6.

TOTAL PEAK CONSTRUCTION AND OPERATIONAL EMISSIONS DURING PROJECT IMPLEMENTATION

Implementation Phase	Estimated Emissions (lbs/day)[(1), (2)]					
	CO	NO_x	PM_{10}	$PM_{2.5}$	VOC	SO_x
Phase 0 (Baseline)	21.5	4.6	1.2	1.2	4.0	0.3
Phase I (Construction I, Interim I)	25.6*	12.1	2.1	2.1	14.8	0.5
Phase II (Construction II, Interim II)	9.8	12.5	1.1	1.1	9.4	0.7
Phase III (Construction III, Interim III)	-2.8	14.2	2.8	2.8	11.2	1.1
Phase IV (Construction IV, Interim III)[(3)]	5.2	20.5	3.1	3.1	12.3	1.1
Phase V (Construction V, Interim III)	5.5	25.6*	3.1	3.1	12.3	1.1
Phase VI (Construction VI, Interim IV)[(3)]	2.8	14.6	2.3	2.3	10.8	0.5
Phase VII (Construction VII, Interim V)[(3)]	4.8	16.8	2.7	2.7	11.2	0.6
Final project	6.6	20.5	3.6*	3.6*	16.0*	1.3*
Significance Threshold	550	55	150	55	55	150
Significant?	No	No	No	No	No	No

(1) Estimated emissions represent the incremental interim emissions (i.e., Interim operational emissions – baseline emissions) plus construction emissions.
(2) Maximum daily emissions are indicated with an *. These maximum daily emissions are compared to the Significance Thresholds.
(3) Daily emissions from construction activities with multiple sub-activities were assumed to be the maximum emission of each pollutant from each sub-activity.

The previous section looked at emission impacts. In this section, these same emissions were assessed through air quality modeling (see Appendix B). As shown in Table III-7, combined operational and construction emissions from the proposed project will have a less than significant impact on air quality.

TABLE III-7.

PEAK PROJECT-RELATED PHASE AIR QUALITY IMPACTS FOR POLLUTANTS(1)

Emission Source	Attainment				Nonattainment		
	NO_2 (ppm)		CO (ppm)		PM_{10} ($\mu g/m^3$)		$PM_{2.5}$ ($\mu g/m^3$)
	1-hr	Annual	1-hr	8-hr	24-hr	Annual	24-hr
Background concentration (Station No. 70072)	0.11	0.0207	3	2.6	--	--	--
Incremental difference (project – baseline emissions)(2)	0.02	0.0005	0.08	0.05	2.23	0.27	2.23
Resulting concentration (Background + incremental)	0.13	0.021	3.08	2.65	--	--	--
SCAQMD Threshold (operational)(3)	0.18	0.03	20	9	2.5	1	2.5
Significant?	No	No	No	No	No	No	No

(1) The comparison assumes peak operational emissions year round, and maximum daily construction emissions (i.e., 24-hour average or less) or annual average construction emissions (i.e., annual average). The operational thresholds were used, even though the impacts from both peak construction and operation activities were analyzed.
(2) The incremental difference shown is the maximum incremental difference (i.e., greatest impact) obtained from all of the modeled scenarios. See Appendix B for further detail.
(3) The threshold for pollutants in attainment is the concentration resulting from the operational and construction emissions and background concentration (i.e., background plus incremental). The threshold for pollutants in nonattainment is the operational and construction emissions only (i.e., incremental).

The Basin is currently in attainment for all federal and state SO_2 standards. Air quality modeling shows that emissions of SO_2 are below the SCAQMD significance thresholds for SO_x (i.e., assuming 100% SO_2) and, thus, the proposed project will have no adverse impact related to SO_x.

Because the change in SO_x emissions is small and insignificant, the relative change in hydrogen sulfate (H_2SO_4) will also be insignificant. Therefore, additional analysis for H_2SO_4 emissions was not conducted. Also, Warren routinely measures H_2S in all of its produced gas streams, and the data indicate zero, non-detectable, or exceedingly low concentrations (i.e., 2 ppm H_2S). The monthly calculation of sulfur emissions indicates consistent compliance with the requirements of Rule 431.1, which prohibits burning gaseous fuels with a sulfur content greater than 40 ppm.

Summary of Criteria Pollutant Health Impacts

Health Effects from Criteria Pollutants

The construction and operation of the proposed project will generate an increase in criteria pollutants (e.g., CO, NO_x, SO_x and PM), although none of the increases in criteria pollutant emissions will meet or exceed the SCAQMD's significance thresholds for construction and operation, either on a mass or localized level. Localized significance thresholds (LSTs) for NO_x and CO are based on causing or exceeding health-based air quality ambient concentration standards. The PM LST is based on requirements of Rule 403, which is a health-based standard, and Rule 1303, which applies limits less than Rule 403 concentration limits, and therefore provides greater health-based protection. Because the criteria pollutant emissions from the proposed project are below each LST, the emissions are below a level at which health effects could occur.

The degree of a health effect depends on the level of exposure and the existing health of those exposed. For example, individuals with a deficient blood supply to the heart are the most susceptible to the adverse effects of CO exposure. Inhaled CO has no direct toxic effect on the lungs, but instead exerts its effect on tissues by interfering with oxygen transport through competition with oxygen to combine with hemoglobin present in the blood to form carboxyhemoglobin. Hence, conditions with an increased demand for oxygen supply can be adversely affected by exposure to CO. Individuals most at risk include patients with diseases involving heart and blood vessels, fetuses (unborn babies), and patients with chronic hypoxemia (oxygen deficiency) as seen in high altitudes.

Population-based studies suggest that an increase in acute respiratory illness, including infections and respiratory symptoms in children (not infants), is associated with long-term exposures to NO_2 at levels found in homes with gas stoves, which are higher than ambient levels found in southern California. Increase in resistance to air flow and airway contraction is observed after short-term exposure to NO_2 in healthy subjects. Larger decreases in lung functions are observed more in individuals with asthma and/or chronic obstructive pulmonary disease (e.g., chronic bronchitis, emphysema) than in healthy individuals, indicating a greater susceptibility of these sub-groups. More recent studies have found associations between NO_2 exposures and cardiopulmonary mortality, decreased lung function, respiratory symptoms, and emergency room asthma visits.

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

There is a consistent correlation between elevated ambient fine particulate matter levels and an increase in mortality rates, respiratory infections, and the number and severity of asthma attacks. Studies have reported an association between long term exposure to air pollution dominated by fine particles and increased mortality, reduction in life-span, and, specifically, an increased mortality from lung cancer.

Discussion of CARB's PM Mortality Quantification Methodologies

A recent CARB report (CARB, 2008) cited a series of epidemiological studies that show associations between increases in $PM_{2.5}$ (and diesel particulate matter (DPM)) and increases in the risk of premature death (mortality). CARB adopted a methodology for quantifying this relationship in order to prepare both large regional and statewide estimates of premature mortality related to elevated $PM_{2.5}$ and primary DPM levels. CARB also estimated premature deaths associated with exposure to specific large-scale DPM sources; however, the specific sources referred to were: 1) the combined ports of Los Angeles and Long Beach, and 2) all goods movement in California. As acknowledged by CARB, its extensive review of methods appropriate to quantify PM morbidity effects has not found an applicable quantification methodology for small oil recovery projects such as the Warren Project. As discussed below, CARB has not released (and is not planning on releasing in the near future) a methodology for quantifying health effects from small projects such as the Warren Project. In addition, key inputs to other quantification methodologies cannot be determined for projects with such small impact areas and low-level changes in criteria pollutants.

Relative to PM mortality, the following information is presented concerning methodologies for quantifying the increased risk of premature mortality associated with increases in $PM_{2.5}$. As noted above, health studies have shown that both short-term and long-term exposures to ambient PM concentrations are directly associated with increased mortality and morbidity rates. CARB has adopted a "Methodology for Estimating Premature Deaths Associated with Long-term Exposure to Fine Airborne Particulate Matter in California" (CARB, 2008) that was used to estimate statewide premature deaths associated with elevated $PM_{2.5}$ levels. In that study, a concentration-response equation[2] was used by CARB. In the CARB methodology, increased mortality was determined to be a function of county-level annual death rates (per person ages 30 and older from all causes), the change in annual mean $PM_{2.5}$ concentration, and population (ages 30 and older).

CARB applied this methodology to develop large regional and statewide estimates of $PM_{2.5}$ and DPM-related mortality estimates (CARB, 2008), particularly to estimate annual premature deaths avoided by attainment of national and state air quality standards and to estimate state and air basin-specific premature deaths associated with DPM. It also conducted analyses for the entire San Pedro Bay Port area (the Ports of Los Angeles and Long Beach) and all goods movement activities in California.

While CARB (2008) has reported that it plans to develop a method for quantifying premature deaths from specific sources affecting limited geographic areas, it has not yet developed an approved approach which could be applied to small projects such as the proposed Warren Project. CARB also reported that, as part of its methodology development process, it will make its recommended approach available for peer review and public review. In a recent telephone conversation, the primary author of the CARB (2008) report, Dr. Hien Tran, reiterated the

[2] $\Delta Mortality = y_o\left(e^{\beta \times \Delta PM} - 1\right) \times (population)$ where

y_0 = county level annual death rate per person for ages 30 and older from all causes;
β = $PM_{2.5}$ coefficient from health study;
ΔPM = change in annual mean $PM_{2.5}$ concentration; and
Population = population of ages 30 and older.

statement in the CARB 2008 report that CARB does not currently have an approved approach it considers valid for quantifying premature mortality from particulate emissions from small project sources affecting small geographic areas, and he also noted that CARB does not anticipate the release of a draft of such an approach in the near future (ENVIRON, 2008). As such, any application of the concentration response function to estimate premature mortality from small projects such as the Warren Project would have to rely on a number of uncertain parameters, which could result in a potentially unreliable determination. Until these technical issues are resolved, any attempt to apply the above methodology to such a small source would not result in meaningful information.

Quantifying Other Projects and the Uncertainties Involved

It should be noted that concentration-response functions have been used to quantitatively estimate premature mortality for some specific projects: SCAQMD Rule 1309.1/1315 analysis of a large power plant and two Port terminal expansions (TraPac and Middle Harbor). The TraPac and Middle Harbor analyses were conducted during the development of the CARB 2008 study and used the same concentration-response function, although different inputs were used and neither analysis was completely consistent with CARB's methodology. The December 2007 certified TraPac EIR/EIS states: "CARB staff have stated that it would neither be appropriate nor meaningful to apply the health effects model used in the CARB study to quantify the mortality and morbidity impacts of PM on a project of the proposed Project's size because values quantified for a specific location would fall within the margin of error for their methodology (CARB, 2007)." PM mortality was calculated, despite many caveats, and the increase in incidence of long-term mortality of this large port-expansion project was calculated to be 0.00068 deaths per year (Port of Los Angeles, December 2007). A similar (but not identical) approach was used in the Port of Long Beach Middle Harbor draft EIR/EIS. PM mortality was calculated, despite the many caveats, and the increase in incidence of long-term mortality of this large port-expansion project was calculated to be 0.001 deaths per year; and it was concluded that there would be no expected increase in mortality or morbidity due to that project (Port of Long Beach, May 2008).

For the 2007 SCAQMD Rule 1309.1/1315 analysis of a large power plant, the Program Environmental Assessment noted that "In addition, while the methodology is the best reasonably available under the circumstances, it has not been subject to peer review or approval, and thus may not be appropriate for analyzing future projects." The 2007 SCAQMD analysis was conducted before the recently released CARB 2008 study and used different inputs from different studies. The SCAQMD estimate of an annual increase in adult premature mortality was 3.8; the maximum increase in annual average $PM_{2.5}$ was 0.55 $\mu g/m^3$; and the mortality was summed over multiple census tracts (SCAQMD, July 2007). It also appears as if this older methodology was applied differently (both in inputs and other details) than in the port projects, which may be one reason the calculated mortality increases vary so widely.

Despite the lack of a released and/or approved state or federal methodology, one could propose to apply a concentration-response function, such as the one CARB developed, to a small project such as the Warren Project. However, peer-reviewers of the CARB study noted specific concerns about applying the CARB methodology to specific emission sources (even large-scale sources such as the ports). As noted in the 2008 CARB study:

- Small population samples may introduce systemic uncertainties in exposure and susceptibility, and the age/sex distribution of the population should be adjusted if the county-wide incidence rate is applied to smaller areas;
- Population demographics should be the same as those in the concentration-response function;
- The effect of population size is important and is a function of variability and confidence intervals of the underlying epidemiological studies; and
- The concentration-response function will vary based on the source of PM and other caveats, including those above.

For the Warren Project, the area of increased $PM_{2.5}$ concentration is very small; the population that could potentially be affected is very small; the demographics of that population are unknown; and the concentration impacts are negligible. All Project-related incremental annual average $PM_{2.5}$ concentration increases are less than 0.27 $\mu g/m^3$, and the area of incremental concentrations greater than 0.1 $\mu g/m^3$ is less than 0.09 square miles, which is less than 4 percent of the local census tract. (For comparison, 1 $\mu g/m^3$ is the SCAQMD's significance threshold for annual average $PM_{2.5}$ and U.S. EPA rounds annual $PM_{2.5}$ concentrations to the nearest 0.5 $\mu g/m^3$ when determining attainment status, based on the accuracy of $PM_{2.5}$ monitoring.) It is not possible to determine if county-level annual death rates (per person ages 30 and older from all causes) and population (ages 30 and older) metrics are applicable or if the concentration-response function is appropriate to such a small area.

For completeness, it is noted that OEHHA does have a promulgated REL for DPM of 5 $\mu g/m^3$. The REL is a concentration below which no adverse health effects are expected. As mentioned previously, the predominant PM from the Warren Project is from natural gas combustion, and incremental $PM_{2.5}$ concentration increases from the Project are well below 5 $\mu g/m^3$.

Conclusion

The results of the analysis of the Warren Project demonstrate and evidence that: 1) the criteria pollutant emissions from the proposed project are below the LSTs, and thus will not cause or contribute to an exceedance of any ambient air quality standards; and 2) potential adverse health impacts associated with construction or operational emissions are expected to be less than significant because the emissions are below a level at which health effects could occur. Although CARB's epidemiologically-based concentration-response methodology could be hypothetically applied to try to measure PM mortality for the Warren Project, that approach was rejected because: 1) there are no approved or recommended guidelines for applying this methodology to small projects such as the Warren Project (CARB ,2008; ENVIRON, 2008); and 2) the input assumptions used in calculating mortality would create an uncertain result (CARB, 2008). As such, any result would not provide an accurate assessment to allow the public to make a meaningful evaluation. However, it is believed the public will not be adversely affected by adverse health effects as a result of the proposed project because mortality impacts are expected to be negligible based on a qualitative assessment of the very small change in annual-average $PM_{2.5}$ concentration over the affected area. Therefore, health impacts associated with construction or operational emissions are determined to be less than significant.

3.c). Because the Basin is currently nonattainment for O_3, PM_{10}, and $PM_{2.5}$, related projects could exceed the applicable air quality standard or contribute to an existing or projected air quality exceedance. With regard to determining the significance of the contribution from the proposed project, the SCAQMD recommends that any given project's potential contribution to cumulative impacts should be assessed utilizing the same significance criteria as for project-specific impacts. Therefore, this analysis assumes that individual projects that generate construction or operational emissions that exceed the SCAQMD's recommended daily thresholds for project-specific impacts would also cause a cumulatively considerable increase in emissions for those pollutants for which the Basin is in nonattainment, and, therefore, is considered to have significant adverse air quality impact.

As discussed in item 3(b).above, daily emissions associated with the development and operation of the proposed project will not generate operational and construction emissions or ambient air quality impacts that exceed the SCAQMD's recommended significant thresholds. In addition, the proposed project will exist in an area to the south and east of the facility, which is predominantly associated with industrial operations. An investigation of the surrounding area reveals no similar industrial activity in a half-mile radius surrounding the site of the proposed project. As a result, emissions are not considered to be cumulatively considerable pursuant to CEQA Guidelines §15064(h)(1). As a result, the proposed project is not expected to create significant adverse cumulative air quality impacts during either construction or operation. The project-specific emission increases are less than significant; therefore, the cumulative air quality impacts are not expected to be cumulatively considerable.

3.d). The SCAQMD identifies the following as sensitive receptors: long-term health care facilities, rehabilitation centers, convalescent centers, retirement homes, residences, schools, playgrounds, child care centers, and athletic facilities (CEQA handbook, 1993). As previously indicated, the area surrounding the site is highly developed with several uses. The nearest sensitive receptors to the site are the multi-family residences located across and north of Opp Street and apartments located across and west of Banning Boulevard (see Figure 3, 4a, and 4b).

In addition to limits on criteria pollutants, the SCAQMD limits emissions of TACs and requires a health risk assessment (HRA) to be performed pursuant to Rule 1401 before new or modified equipment can be permitted. Numerous federal, state, and local regulatory agencies have developed lists of TACs. The list of potentially emitted substances considered in the preparation of this risk assessment for the proposed project is identified in the SCAQMD's Risk Assessment Procedures for Rules 1401 and 212, Appendix L (SCAQMD, 2005).

The operation of the proposed project generates various, but minimal, air contaminants. Some of these chemical compounds are potentially carcinogenic, toxic, or hazardous depending on concentration levels or the duration of exposure. Some of these pollutants were consolidated into one category, e.g., polycyclic aromatic hydrocarbons (PAHs). Health effects data are not available for all compounds. Therefore, a total of 14 TACs were included in the HRA analysis (see Appendix C). TAC emissions are expected from the combustion operations (e.g., heater-treater, diesel usage in mobile source, etc.) and fugitive emissions are expected from valves, flanges, and related items. TAC emissions from operations were calculated for the proposed project when it becomes operational and when all combustion units are operating at full rating. A summary of the associated TAC emissions is shown in Appendix C.

Previously, individual health risk assessments were conducted as part of the permit application evaluations for the microturbines and HT#2 to determine if emissions of TACs would exceed the permitting thresholds for cancer risk and health hazard indices under SCAQMD Rule 1401. These results were included in the original permit applications for these devices. The Rule 1401 assessment was conducted by Yorke Engineering and assumed the maximum heat rating. Tier 3 methodology was used and both assessments demonstrate compliance with the requirements of Rule 1401. Although these assessments were not used to assess the proposed project, they provide individual results.

For the proposed project, a health risk assessment of all proposed project equipment was conducted. The incremental increase due to the proposed project was determined by performing an assessment of the baseline conditions and of the new equipment under peak operating conditions. The assessment for the proposed project included operation of the microturbines, HT#2, and Bekaert CEB®. The assessment was conducted using the Industrial Source Complex-Short Term Version 3 (ISCST3) model, which is a USEPA approved model.

The overall maximum increase in cancer risk was found to be 0.70 in one million for residents and 0.13 in one million for off-site workers, which are both less than the SCAQMD's cancer risk significance threshold of 10 in one million (10×10^6) (Table III-11; see Appendix C for details of the health risk assessment). In addition, neither the overall increase in total chronic hazard index (HIC) nor the total acute hazard index (HIA) exceeded 1.0 for any target organ system (Table III-11), or in the alternative, the increase falls under a hazard index level deemed to be safe (see Appendix C). As noted above, six microturbines are currently operating but are not included in the CEQA baseline. Therefore, the increase in risk accounts for the six microturbines, which are already in operation, as well as for the three additional microturbines which may be installed at the site.

TABLE III-8.

PROPOSED PROJECT HEALTH IMPACTS

Impact Parameter	SCAQMD significance threshold	Impact of proposed project
Maximum Increase in Cancer Risk using Residential Exposure Assumptions	≥ 10 in a million	0.70 in a million
Maximum Increase in Cancer Risk using Worker Exposure Assumptions	≥ 10 in a million	0.13 in a million
Maximum Incremental Acute Hazard Index (HIA)	≥1.0	0.02
Maximum Incremental Chronic Hazard Index (HIC)	≥1.0	0.008

The only TAC identified as a possible component of the fugitive VOC emissions from new equipment installed as part of the proposed project is benzene. Benzene emissions were calculated based on the SCAQMD's latest guidelines for fugitive components (SCAQMD, 2003a), and reflect that the data from a previous SCAQMD inspection and monitoring program are representative of the expected emissions from the new components. The fugitive benzene emissions were also found to be well below the screening level thresholds listed in the SCAQMD Risk Assessment Procedures.

Diesel particulate matter (PM), or the solid particles in diesel exhaust, which at times may be visible and include carbon particles or "soot", is a TAC. The health impacts of particulate matter (PM_{10} and $PM_{2.5}$) in general have been studied, and exposure to it is associated with a variety of health effects, including premature death and a number of heart and lung diseases. Thus, cancer and chronic health risk values for diesel PM emitted by internal combustion engines were approved by the Office of Environmental Health Hazard Assessment (OEHHA) and adopted by the CARB in 1998. Diesel PM was recently added to the list of TACs in SCAQMD Rule 1401. Diesel PM emissions were calculated for each phase of construction (Appendix A). Because construction will occur on only several days throughout the proposed project, the emissions will be short-term and will not expose receptors to long-term impacts. Diesel PM emissions currently do not have any known short-term or acute health impacts. Further, short-term construction emissions will result in relatively small levels of emissions (13.3 lbs total PM over three years), and, thus, emissions of diesel PM will not result in any significant risk impacts relative to the known cancer and chronic health (both long term exposure and effect) impacts. In addition, the diesel PM associated with delivery trucks, which will travel to the proposed project during normal business days, will also result in no significant risk impacts. Delivery trucks will make one round trip to the site each month to drop off material (e.g., odorant), resulting in less than 0.04 lbs of diesel PM per year. At a worst-case receptor distance of 25 meters, the SCAQMD toxic screen level (http://www.aqmd.gov/prdas/Risk%20Assessment/RiskAssessment.html) for cancer and chronic health effects is 0.12 lbs per year. Thus, operational diesel PM emissions are substantially less than the screening level used in Rule 1401 compliance. In addition, these small construction and operational increases in diesel PM would not affect the calculated MICR (Table III-10).

The long-term air quality impacts from exposure to TACs were evaluated through the preparation of a Rule 1401 Risk Assessment for the initial SCAQMD permit applications. The assessment evaluated the emissions associated with the operation of the proposed project, and compared them to carcinogenic and non-carcinogenic significance thresholds to determine potential health impacts. As demonstrated in the assessment, both carcinogenic and non-carcinogenic impacts for all receptors will be less than the significance thresholds. In addition, the proposed project will be subject to several SCAQMD rules and existing permit conditions that regulate the amount of emissions that can be generated by the proposed equipment and operations and their related health impacts. Therefore, no significant adverse carcinogenic or non-carcinogenic health impacts associated with the operation of the proposed project are expected, as shown in Table III-11.

3.e). The area surrounding the site is currently developed with industrial, commercial and oil production uses, and is located in a highly developed area to the south and east of existing sources of airborne odors. Fugitive emissions or leaks from new equipment installed during implementation of the proposed project could result in potential odor impacts. However, during operation of the proposed project, the majority of the produced gas will be disposed of in the gas injection/sales equipment or the microturbines. Because these are closed systems, fewer odors are expected. Although the Bekaert CEB® and HT#2 are not closed systems, they are more efficient than the existing Flare King Flare or HT#1, respectively. Additionally, HT#1 will be reconditioned, which will reduce any leaks that resulted from operation of the equipment. As a result, the final proposed project is expected to result in less odor than the baseline condition. Also, fugitive emission components are under the purview of formal regulatory inspection and maintenance programs required under SCAQMD Rules 1173, 1176, and 1148.1. These programs ensure correction of conditions that may cause odor events. The facility maintains a 24-hour environmental surveillance effort that has the effect of minimizing the frequency and magnitude of odor events. Potential odor impacts from the proposed project will not be considerable or significant.

In addition, operators (and the gas utility company) are required by the US DOT and CPUC to odorize natural gas for safety reasons, including leak detection, before sale of the natural gas into a public utility's pipeline system. The odorizing is typically done by injecting trace amounts of mercaptans (an odorous gas) into the otherwise odorless natural gas stream. Fugitive emissions from the natural gas odorant injection system could result in potential odor impacts. However, fugitive emission components associated with the odorant injection system are also under the purview of formal regulatory inspection and maintenance programs required by SCAQMD Rule 1173. As such, these maintenance programs ensure correction of conditions leading to odor events. Additionally, the facility's 24-hour environmental surveillance effort minimizes the frequency and magnitude of odor events. Potential odor impacts from the natural gas odorant injection system are not concluded to be considerable or significant.

3.f). As discussed above, the proposed project will be designed to meet or exceed all criteria and toxic pollutant air quality rules. As such, it is not expected to diminish an existing air quality rule or future compliance requirement resulting in a significant increase in criteria or toxic air pollutants.

3.3 Mitigation Measures

With regard to air quality, no mitigation measures are required for the proposed project because the preceding analyses demonstrate that no significant impacts to air quality are expected.

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

4.1 Significance Criteria

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

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

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

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

4.2 Environmental Setting and Impacts

4.a), b), c), d), e), and **f).** The proposed project would be located entirely within the existing boundaries of the WTU Central Facility, which has already been developed for oil production uses. There are no significant areas of natural open space, and no areas of significant biological resource value on or in the vicinity of the facility. The facility has previously been cleared of vegetation, except for landscaping around the perimeter, for fire safety reasons. No candidate, sensitive or special status species identified in local plans, policies or regulations, or by the California Department of Fish and Game (CDFG) or the U.S. Fish and Wildlife Service (USFWS), are found at the facility, as the facility area supports no habitat for such species. Therefore, no conflicts with local, regional or state Conservation Plans are expected, and, thus, no impact expected from the proposed project.

4.3 Mitigation Measures

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

		Potentially Significant Impact	Less Than Significant Impact	No Impact
V.	**CULTURAL RESOURCES.** Would the project:			
a)	Cause a substantial adverse change in the significance of a historical resource, as defined in §15064.5?	☐	☐	☑
b)	Cause a substantial adverse change in the significance of an archaeological resource, as defined in §15064.5?	☐	☐	☑
c)	Directly or indirectly destroy a unique paleontological resource, or site or unique geologic feature?	☐	☐	☑
d)	Disturb any human remains, including those interred outside formal cemeteries?	☐	☐	☑

5.1 Significance Criteria

Impacts to cultural resources will be considered significant if:

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

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

The proposed project would disturb human remains.

5.2 Environmental Setting and Impacts

5.a) The proposed project will require minor demolition of existing structures, namely the removal of the Flare King flare. However, these structures are not greater than 50 years old and are not historically significant. As a result, no structures of historic importance will be affected by the proposed project.

5.b) No existing structures at the WTU Central Facility are considered archaeologically or historically significant.

5.c) The entire WTU Central Facility has been previously graded and developed. This eliminated any paleontological resources or unique geological features that may have existed on the site. The minor ground-disturbing activities required by the proposed project will not disturb any existing paleontological resources.

5.d) There are no known human remains or burial sites that have been identified at the WTU Central Facility during previous construction activities, so the proposed project is not expected to disturb any human remains. If cultural resources were to be encountered unexpectedly during ground disturbance associated with construction of the proposed project, the proper procedures (i.e. contacting professional archeologists, temporarily halting disturbance work in the vicinity, etc.) will be taken.

5.3 Mitigation Measures

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

		Potentially Significant Impact	Less Than Significant Impact	No Impact
VI.	**ENERGY.** Would the project:			
a)	Conflict with adopted energy conservation plans?	☐	☐	☑
b)	Result in the need for new or substantially altered power or natural gas utility systems?	☐	☐	☑
c)	Create any significant effects on local or regional energy supplies and on requirements for additional energy?	☐	☑	☐

d)	Create any significant effects on peak and base period demands for electricity and other forms of energy?	☐	☑	☐
e)	Comply with existing energy standards?	☐	☐	☑

6.1 Significance Criteria

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

The proposed project conflicts with adopted energy conservation plans or standards.

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

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

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

6.2 Environmental Setting and Impacts

6.a) The proposed project is not expected to conflict with any adopted energy conservation plan because there is no known energy conservation plan that would apply. Further, the proposed project is not expected to substantially increase the WTU Central Facility's energy demand as explained in the following discussion.

6.b), c), d), and **e).** The average electrical demand at the WTU Central Facility for the three months preceding operation of the six microturbines was approximately 4,200 kW. This peak demand was incurred when an all-electric drilling rig was operating on-site. After startup, the six microturbines reduced the overall demand by approximately 420 kW. This represents approximately 10 percent of the facility's total energy demand before implementation of the proposed project. In addition to generating electricity for use on site, the microturbines produce additional heat. This additional heat is efficiently and beneficially used to heat produced water before it is re-injected into the subsurface oil reservoir. The heated water provides the additional benefit of improving oil recovery. By using the additional heat for this beneficial purpose, a steam generator or boiler is not necessary to provide an equivalent benefit. The final proposed project requires about 550 kW of additional electricity. As described above, the six microturbines currently operating serve to offset 420kW of this demand. If the three additional microturbines are installed, 210 kW will be subsequently generated. As a result, the total electricity generated on-site will be 630kW if all nine microturbines are placed into operation. This total electricity will offset the electricity required from the proposed project, thereby placing no increased demand on local utilities.

Warren's WTU Central Facility is currently served by the Los Angeles Department of Water and Power (LADWP) for electricity supply. The LADWP supplies the remainder of the electricity requirements. LADWP supplies more than 22 million megawatt hours of electricity each year to customers throughout Los Angeles. LADWP has approved an Integrated Resource Plan (IRP) that includes financing for an additional 2,400 megawatts of power generation through re-

powering, development of new renewable energy resources, and energy efficiency programs (LADWP, 2003). Sufficient electrical supplies are available from LADWP to handle the potential electricity increase from the proposed project if the three additional microturbines are not installed. Therefore, no significant adverse electricity demand impacts are anticipated from the proposed project.

No significant increase in electricity consumption is expected during the construction period because most of the construction equipment is powered by diesel fuel. Although the construction will occur over a period of approximately three years, the diesel fuel use will be minor because actual construction activities are only expected to occur during a maximum of seven weeks. Therefore, no significant impacts on energy are expected during the construction period.

6.3 Mitigation Measures

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

	Potentially Significant Impact	Less Than Significant Impact	No Impact
VII. GEOLOGY AND SOILS. Would the project:			
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving:	☐	☐	☑
Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area, or based on other substantial evidence of a known fault?	☐	☐	☑
Strong seismic ground shaking?	☐	☐	☑
Seismic–related ground failure, including liquefaction?	☐	☐	☑
Landslides?	☐	☐	☑
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☑
c) Be located on a geologic unit, or soil that is unstable or that would become unstable as a result of the project, and potentially result in on-site or off-site landslides, lateral spreading, subsidence, liquefaction or collapse?	☐	☑	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☑

	Potentially Significant Impact	Less Than Significant Impact	No Impact
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☑

7.1 Significance Criteria

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

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

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

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

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

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

7.2 Environmental Setting and Impacts

7.a). The WTU Central Facility is located in a seismically active region of southern California. Numerous active and potentially active faults with surface expressions (fault traces) have been mapped adjacent to, within and beneath the City of Los Angeles.[3] However, there are no active surface fault traces identified by the State, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map, known to be present at or in the vicinity of the proposed project. Therefore, the possibility of surface fault rupture affecting the proposed project area would be considered remote, and the proposed project would not present any adverse impacts with respect to exposing people or property to hazardous conditions resulting from rupture of a known earthquake fault on the proposed project area.

As with all properties in the seismically active southern California region, the proposed project area is susceptible to ground shaking during seismic events produced by local faults. While it is likely that the proposed project area will be shaken by future earthquakes produced in southern California, operations at the facility will continue to occur in accordance with applicable standards; thus, the increased risks to employees and nearby residents and workers are minimal in the case of a seismic event. The potential seismic hazard to the proposed project would not be higher than in most areas of the City of Los Angeles, or under existing conditions at the facility.

[3] Active faults are classified by the State Division of Mines and Geology as faults showing evidence of surface displacement within the last 11,000 years.

All of the structures associated with the proposed project will be built in conformance with the Uniform Building Code for Zone 4 (i.e., most hazardous), the designation for the area in which the proposed project is located.

According to the Safety Element of the City General Plan, the proposed project area is not located within an area susceptible to liquefaction[4]. Furthermore, the proposed well cellars are not habitable structures that could expose workers or residents to a safety hazard in the event of liquefaction-related ground failure. Additionally, prior to the design of the well cellars, a qualified expert soils consultant sampled the soil and provided design information. Subsequently, the new well cellars were specifically designed according to the Uniform Build Code (UBC) and the California Building Code (CBC) to provide stable soil conditions and to prevent landslides, lateral spreading, liquefaction, and collapse during the drilling of new wells or the "workover" of existing wells. The design load used in these evaluations was well over 1.5 million pounds of force, which far exceeds that which will be encountered in practice.

In addition, according to the Safety Element of the City General Plan, the facility is not located within a hillside area susceptible to landslides[5]. The probability of seismically-induced landslides affecting the proposed project area is considered to be negligible due to the lack of topographic relief across the area.

Overall, impacts due to on-site rupture of a known earthquake fault, risks from seismic ground shaking, potential liquefaction impacts and landslides impacts would be less than significant.

7.b). The vast majority of the WTU Central Facility is currently paved. The minimal construction required is not expected to expose large amounts of soil. Therefore, no significant impacts on topography and soils are expected. Additionally, any soil that is disturbed would be subject to SCAQMD Rule 403, Fugitive Dust, which substantially limits any soil erosion.

7.c). In June 2005, NorCal Engineering, a registered geotechnical consultant, sampled and assessed the soil at the WTU Central Facility to provide guidance for structural engineers who were designing the various new construction activities. The on-site soil was determined to be relatively uniform, and medium dense to dense native silty sands. This soil was assessed as being stable in conformance with the Los Angeles City Building Ordinance for the scope of the proposed project.

The injection of natural gas into an underground formation is a common practice and does not impact the surface or subsurface structures under normal and prudent operating conditions. The injection of natural gas into an underground formation for storage follows very specific safety procedures and requires protective actions throughout the process. The DOGGR requires certain measures be in place to protect the subsurface environment from any impacts of this type of procedure. The selection of the subsurface zone to re-inject natural gas is carefully analyzed to ensure natural gas does not flow through fractures in the formation, or through the cement placed to isolate the injection zone from other zones in the well.

---

[4] City of Los Angeles, Safety Element of the Los Angeles City General Plan, Exhibit B, Areas Susceptible to Liquefaction in the City of Los Angeles, November 1996

[5] City of Los Angeles, Safety Element of the Los Angeles City General Plan, Exhibit C, Landslide Inventory & Hillside Areas in the City of Los Angeles, November 1996.

During the product extraction process, Warren will utilize a specialized mobile truck mounted work-over "rig" to perform the tasks indicated below. The diesel driven rig will be DOT and CARB approved, and will operate immediately adjacent to or over the applicable well head. Due to the nature of the equipment, there is a slight chance of spillage of either produced fluids or hydrocarbons on the surface in the immediate vicinity of the well head due to compromised hoses, tubing or leaking vessels. These leaks are usually addressed immediately with absorbent pads or spill containment basins.

Warren (or its contractor) will install Class III blow-out prevention equipment to ensure there are no uncontrolled releases of well fluids. Water will then be pumped into the well to displace the existing fluids in preparation for the inspection of the casing using a portable, diesel-driven pump. A specialized truck mounted unit, called a wireline unit, is utilized to inspect the well casing and check the integrity and top of the cement that was used to fill the space between the drilled hole and the steel casing. Once this inspection is completed, the same unit will be utilized to perforate the well casing and cement the formation at the specific depth where the natural gas is to be re-injected at approximately 4,000 feet below the surface). A pressure seal called a packer will then be run into the well on high integrity pipe, called tubing. The packer will be set and pressure tested just above the injection zone to provide a seal to prevent natural gas or other fluids from flowing into or pressurizing the space between the casing and the tubing. Pressure testing of the tubing and casing and the integrity of the cement between the casing pipe and the formation wall are witnessed and approved by the DOGGR. The rig is then moved off the well and surface piping will be installed to connect the electric compressor to the well.

As the gas re-injection operation commences, natural gas is pressurized by the compressor and will flow to the well head, down the tubing, and into the subsurface oil reservoir approximately 4,000 feet below the surface. Inadvertent flow of gas or other fluids to aquifers or other formations is prevented by the casing pipe (typically seven inches in diameter), the cement between the casing and the formation wall, the tubing pipe (typically 2-1/2 inches in diameter), and the packer seal. The pressure in the well will be monitored on both the tubing and casing portions of the well to ensure that any leaks are quickly detected and addressed.

Warren has currently filed the application with the DOGGR for the gas injection well. The DOGGR is currently reviewing the application and will decide whether to approve it. If the application is approved (which is likely), the DOGGR will send a letter of approval to Warren, which will contain conditions Warren must adhered to during the well's operation. These conditions will likely contain a requirement for routine monitoring and reporting of the formation zone pressure and other parameters necessary for the DOGGR to continually assess that safe operations are occurring on a routine basis. As a result, no significant impact is expected.

7.d) The NorCal report assessed the soil's Expansion Index in accordance with the Uniform Building Code Standard 18-2. The Expansion Index ranged from 07 to 15, which is defined as "very low" by the ASTM Standard Test Method. Therefore, soils at the WTU Central Facility are not expansive. In addition, the amount of soil disturbed during construction is expected to be minimal. Therefore, no significant impacts related to expansive soils are expected.

7.e) The proposed project's WTU Central Facility is located in a developed area of the City of Los Angeles, which is served by an existing wastewater collection, conveyance and treatment system operated by the City of Los Angeles. No septic tanks or alternative disposal systems are necessary, nor are they proposed. Portable toilets are used to accommodate workers involved in construction and drilling operations. The waste from the portable toilets is collected by Peninsula Septic Service and properly disposed of in the Los Angeles County Sanitation District treatment facility located at Sepulveda Boulevard and I-110. Therefore, no significant impacts on soils from alternative wastewater disposal systems are expected.

7.3 Mitigation Measures

Relative to geology and soils, no mitigation measures are required for the construction or operation of the project because significant adverse impacts to geology or soils are not expected.

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

		Potentially Significant Impact	Less Than Significant Impact	No Impact
g)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☑
h)	Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including areas where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☑
i)	Significantly increased fire hazard in areas with flammable materials?	☐	☑	☐

8.1 Significance Criteria

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

Non-compliance with any applicable design code or regulation.

Non-conformance to National Fire Protection Association standards.

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

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

8.2 Environmental Setting and Impacts

8.a), b), and i) The proposed project includes installing a new heater treater, six (and possibly nine) microturbines, gas re-injection equipment, replacing an old flare with a new, high efficiency, burner, and adding additional gas conditioning and odorization equipment in the future. The risk of an explosion, fire, or other hazards is low because this equipment has been or will be designed and manufactured for this specific application.

The WTU Central Facility does not meet the OSHA definition of a Process Safety Management Facility; and, therefore, is not required to have a Risk Management Plan (RMP). After completion of the proposed project, the facility will still not meet the definition of a Process Safety Management Facility.

All of the new equipment included in this proposed project will be using or processing produced natural gas. By its nature, this gas is a hazardous material because of its flammable and explosive characteristics. All of the proposed equipment is specifically designed to handle this gas. Each system has a number of engineered safety controls and systems to ensure this gas is handled properly in accordance with all applicable regulations on a continuous operating basis.

The only other hazardous materials that are used during typical operations (other than the produced gas) include standard oil-based and synthetic lubrication oils used in the compressor, microturbines and molecular sieve, as well as odorant materials mandated by DOT regulations. As a result, hazardous materials are not generated regularly. All of these materials will be stored in proper containers or vessels, will be properly labeled, and will be handled in accordance with all applicable regulations and safety requirements.

The construction equipment used by contractors in the construction of the new equipment will use a variety of typical hazardous materials including lube oils, gasoline and/or diesel fuels, sealants, welding gases, and paints. All of the hazardous materials being used at the site for this proposed project have been used on the site in the past. Although the total amount of materials may increase, there are no new hazardous materials being introduced to the site. Thus, there is no new risk of upset. All of these materials are subject to a variety of management and handling regulations. The proposed project proponent maintains an onsite Safety Coordinator that oversees the proper management of these hazardous materials by the respective construction contractor.

8.c). No existing or proposed schools are located within one-quarter mile of the existing WTU Central Facility. Any potential impacts related to hazards associated with the proposed project are expected to remain within the WTU Central Facility, so no significant adverse impacts to a school are expected.

8. d). The facility is not located in an area which is included on the recent list of hazardous materials sites compiled pursuant to Government Code §65962.5. Therefore, no significant hazards related to hazardous materials handling at the WTU Central Facility, on the environment or to the public are expected.

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

8.g). The proposed project is subject to two specific emergency response plans. The facility has an existing Spill Prevention, Control, and Countermeasure Plan (SPCC) as is required by the USEPA, which requires several measures such as secondary containment walls, routine training, response procedures, and certifications. This SPCC is maintained onsite. A Business Emergency Response Plan is required by the City of Los Angeles Fire Department. This Plan lists the amounts and locations of hazardous materials located onsite and is used by the Fire Department in case it needs to respond to an emergency at the site. Emergency vehicles have access to the proposed project via any of the existing access gates, thereby providing adequate emergency access. Therefore, the proposed project will not be expected to interfere with any adopted emergency response plan or emergency evacuation plan, and no impact from the proposed project will occur.

8.h). The proposed project will not increase the existing risk of fire hazards in areas with flammable brush, grass or trees. No substantial or native vegetation exists within the operational portions of the WTU Central Facility. Therefore, no significant increase in fire hazards is expected to be associated with the proposed project.

8.3 Mitigation Measures

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

		Potentially Significant Impact	Less Than Significant Impact	No Impact
IX.	**HYDROLOGY AND WATER QUALITY.** Would the project:			
a)	Violate any water quality standards or waste discharge requirements?	☐	☐	☑
b)	Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g. the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☑
c)	Substantially alter the existing drainage pattern of the site or area, including alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on- or off-site?	☐	☐	☑
d)	Substantially alter the existing drainage pattern of the site or area, including alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site?	☐	☐	☑
e)	Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☑
f)	Otherwise substantially degrade water quality?	☐	☐	☑
g)	Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map, or other flood hazard delineation map?	☐	☐	☑
h)	Place within a 100-year flood hazard area any structures which would impede or redirect flood flows?	☐	☐	☑
i)	Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☑

		Potentially Significant Impact	Less Than Significant Impact	No Impact
j)	Result in inundation by seiche, tsunami or mudflow?	☐	☐	☑
k)	Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☑
l)	Require or result in the construction of new water or wastewater treatment facilities, or an expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☑
m)	Require or result in the construction of new storm water drainage facilities or an expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☑
n)	Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☑
o)	Require a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☑

9.1 Significance Criteria

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

Water Quality:

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

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

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

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

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

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

Water Demand:

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

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

9.2 Environmental Setting and Impacts

9.a) and f). As an existing oil production facility, the site is required to utilize stormwater pollution control measures. Ordinance No 172,176 and Ordinance No. 173,494 specify Stormwater and Urban Runoff Pollution Control, which requires the application of Best Management Practices (BMPs). Chapter IX, Division 70 of the Los Angeles Municipal Code addresses grading, excavations, and fills. The site operator must also meet the requirements of the Standard Urban Stormwater Mitigation Plan (SUSMP) as approved by the Los Angeles Regional Water Quality Control Board. Continued compliance with the applicable federal, State, and local regulations, Code requirements, and permit provisions would ensure that no significant impacts related to potential discharge into surface water or changes in water quality occur as a result of the proposed project.

9.b) and n). Under the existing oil production operations, water is brought to the surface along with crude oil. This water is obtained from the oil zones and not from fresh water aquifers. Residual oil and solids are removed from the produced water within the water management yard. Resulting treated and clarified water is then injected back into the oil zones. The area has been previously paved and graded to contain storm water on the site. Water is collected and injected back into the oil zones along with the produced water from the drilling operations. There is no increase in water demand from the proposed project. Therefore, the potential impacts to groundwater levels would be less than significant and would not impact fresh water aquifer supplies.

9.c), d), e), k), l), m), and o). The site is located in a dense urbanized area and no stream or river courses are located in the immediate vicinity. The closest water body to the facility is the Dominguez Channel, located approximately one-half mile south east of the facility. The proposed project site and vicinity are relatively flat, and the site has been graded to contain all storm water on site. This water is collected and injected back into the oil zones along with the produced water from the drilling operations, reducing the amount of water runoff from the facility.

The deposition of certain chemicals by cars in the parking areas and internal roadway surfaces could have the potential to contribute metals, oil and grease, solvents, phosphates, hydrocarbons, and suspended solids to the storm drain system. However, impacts to water quality would be reduced since the proposed project would be required to comply with water quality standards and wastewater discharge BMPs set forth by the City of Los Angeles and the State Water Resources Control Board (SWRCB). In addition, required design criteria, as established in the Standard Urban Stormwater Mitigation Plan (SUSMP) for Los Angeles County, would be incorporated

into the proposed project to minimize off-site conveyance of pollutants. Compliance with existing regulations would reduce the potential for water quality impacts to a less than significant level. Therefore, any drainage, runoff, or water quality impacts would be less than significant.

9. g), h), i), and j). According to the Safety Element of the City General Plan, the site is not located within a 100-year flood zone (City of Los Angeles, 1996a), an area subject to inundation in the event of a dam failure (City of Los Angeles, 1996b) or an area subject to tsunami hazard (City of Los Angeles, 1996b). Therefore, no adverse impact is anticipated by the proposed project.

9.3 Mitigation Measures

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

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

10.1 Significance Criteria

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

10.2 Environmental Setting and Impacts

10.a), b), and **c).** The proposed modifications involved in the proposed project will be developed entirely within the existing WTU Central Facility's property boundaries. The proposed project will not physically divide any established communities. Land use of the WTU Central Facility is designated as M2-1VL-O and RD3-1XL-O, which is light industrial zoning and restricted multiple dwelling zoning, respectively. In addition, the WTU Central Facility is located in an Oil Drilling District. As a result, the proposed activities are permitted in the zone, and the proposed project is consistent with the land use designation and does not conflict with any applicable habitat conservation or natural community conservation plan.

10.3 Mitigation Measures

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

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

11.1 Significance Criteria

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

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

11.2 Environmental Setting and Impacts

11.a) and **b).** Although the proposed project would result in a greater amount of oil extraction, 300 million barrels of oil are thought to remain within the Wilmington Oil Field as of 2002.[6] An increase in extraction from 3,000 barrels/day to 8,000 barrels/day is not expected to result in the significant loss of this mineral resource from the Wilmington Oil Field. As a result, no significant impact is expected.

11.3 Mitigation Measures

No significant adverse impacts to mineral resources are expected to occur as a result of construction or operations, so no mitigation measures are required.

[6] http://en.wikipedia.org/wiki/Wilmington_Oil_Field

	Potentially Significant Impact	Less Than Significant Impact	No Impact
XII. NOISE. Would the project result in:			
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☑	☐
b) Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels?	☐	☑	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☑	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☑	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, exposure of people residing or working in the project area to excessive noise levels?	☐	☐	☑
f) For a project within the vicinity of a private airstrip, exposure of people residing or working in the project area to excessive noise levels?	☐	☐	☑

12.1 Significance Criteria

Impacts on noise will be considered significant if:

> Construction noise levels exceed the City of Los Angeles noise ordinance or, if the noise threshold is currently exceeded, proposed project noise sources increase ambient noise levels by more than three decibels (dBA) at the site boundary. Construction noise levels will be considered significant if they exceed federal Occupational Safety and Health Administration (OSHA) noise standards for workers.
>
> The proposed project operational noise levels exceed any of the local noise ordinances at the site boundary or, if the noise threshold is currently exceeded, proposed project noise sources increase ambient noise levels by more than three dBA at the site boundary.
>
> The proposed project will generate noise greater than 90 decibels (db) at the property line (SCAQMD Noise Significance Threshold).

12.2 Environmental Setting and Impacts

12.a), c), and **d).** The eastern portion of the WTU Central Facility borders an industrial trucking and junk yard. The western portion borders a commercial development and vacant parcels. The

northern area shares a border with a baseball park, a multi-family residence, a vacant parcel, and the remnants of the Powder Magazine for Camp Drum. Finally, the southern section faces industrial and commercial areas. The ambient noise environment in the proposed project area is comprised of contributions from equipment and operations within the commercial and industrial areas, and from traffic on roads and railways along or near each of the boundaries of the WTU Central Facility (East Opp Street, Eubank Avenue, Anaheim Street, and Banning Boulevard). Existing noise levels monitored in the northern portion of the WTU Central Facility opposite the closest residences on Opp Street averaged approximately 64 dBA. This average is not significantly different on days when oil drilling occurs compared to days when no oil drilling occurs.

Noise is generated from both construction and operational activities at the WTU Central Facility. Construction equipment is required during construction activities associated with the proposed project. The highest noise impacts from construction will be during installation of new and modified equipment and related items. The construction equipment associated with the proposed project will primarily include backhoes, welding machines, trucks, cranes and compactors. Examples of noise levels from construction equipment are presented in Table XII-1. These noise sources will be periodic over the three-year construction period. Actual construction activities for the proposed project will be limited to a total of approximately seven weeks during this three-year time period.

The construction activities will occur primarily in the center of the WTU Central Facility, except for two activities which will occur toward the southern boundary of the site (see Figure 3). The estimated maximum noise level during installation of new equipment at both locations (center of the facility and southern boundary) is expected to be on average about 83 dBA at a 50 feet radius from the center of the activity for each unit. Using an estimated 6 dBA reduction noise upon doubling the distance from the source, the noise level will drop off to approximately 75 dBA at the property line during construction in the center of the facility. Construction activities along the southern boundary, although adjacent to the property line, will occur inside the masonry wall next to a heavily trafficked street (Anaheim Street). Thus, the closest receptor would be the restaurant across the street. At that distance, the noise level from construction activities will also drop off to approximately 75 dBA. In addition, most of the noise generated from construction activities will be located near ground level and behind either permanent masonry walls or temporary sound barriers. As a result, the noise levels are expected to attenuate to a greater extent than analyzed herein.

The construction activities at the WTU Central Facility are limited by current City of Los Angeles Zoning requirements to the hours of 7 am to 7 pm Monday through Saturday. Because of the nature of the construction activities, the types, number, operation time, and loudness of construction equipment will vary throughout the construction period. As a result, the sound level associated with construction will change as construction progresses. However, the majority of construction activities occur in a single day, and only three activities occur during a period of 10 days. Construction activities IVc, VId, and VIId are assumed to occur over 10 days in different years. This is a conservative estimate and likely overestimates the time needed for the activity. Construction noise sources will thus be temporary and will cease following construction activities.

No significant increase in noise levels is expected and, as a result, no significant noise impacts related to project construction are expected. Therefore, the proposed project noise impacts during the construction phase are expected to be less than significant.

TABLE III-9.

CONSTRUCTION NOISE SOURCES

Equipment	Typical Noise Levels (decibels)[(1),(2)]
Truck	88
Air compressor	81
Flatbed Truck	84
Pickup	70
Tractor Trailer	75
Cranes	83
Pumps	76
Welding Machines	72

[(1)] Data is modified from the City of Los Angeles, 1998. Levels are in dBA at a 50-foot reference distance. These values are based on a range of equipment and operating conditions.
[(2)] Values are intended to reflect noise levels from equipment in good condition, with appropriate mufflers, air intake silencers, etc. In addition, these values assume averaging the sound level over all directions from the listed piece of equipment.

Workers exposed to noise sources in excess of 85 dBA are required to participate in a hearing conservation program. Workers exposed to noise sources in excess of 90 dBA for an 8-hour period will be required to wear hearing protection devices that conform to Occupational Safety and Health Administration/National Institute for Occupational Safety and Health (NIOSH) standards. Because the maximum noise levels during construction activities are expected to be 85 decibels or less, no significant impacts to workers during construction activities are expected.

Operation of the new equipment being installed as part of the proposed project is not expected to generate a significant increase in noise. The proposed six microturbines are already operating at the WTU Central Facility. New equipment includes a Bekaert CEB®, HT#2, a compressor and other equipment needed for gas injection and sales. The Bekaert CEB, stated to generate "low noise levels" by the manufacturer, will replace an existing flare. HT #2 and HT #1 will rarely operate simultaneously. Because of this, there will be little additional noise generated during operation of the proposed project, and no significant increase in noise is expected from these sources. The new equipment will be located within an existing industrial area and within an eight-foot high wall which will assist in buffering new and existing noise levels. Additionally, any noise complaints from community members are proactively handled by onsite supervisors or through an employee who lives in close proximity to the WTU Central Facility. If excess noise is occurring, these employees ensure that on-site workers follow appropriate procedures to reduce the noise (e.g., muffling pipes). Therefore, significant noise impacts from the proposed project are not expected.

12.b). Construction activities that will occur at the facility have the potential to generate low levels of ground-borne vibration onsite. These activities will primarily involve re-working an existing well for gas re-injection and construction of foundations for the project's new

equipment. This onsite ground-borne vibration would be of short duration and indistinguishable from existing operations.

At Warren's request, Navcon Engineering Network conducted a ground-borne vibration study of the site and surrounding areas and published the results in their report in April 2008 (Navcon Engineering Report No. 71884-1). Ground-borne vibrations were measured during times when active well drilling operations were being conducted because this activity represents the greatest exertion of mechanical energy at the site, which is greater than the construction activities planned for the project. Measurements were taken at distances of 10 feet, 100 feet, and 500 feet away from the drilling rig.

The reported results were compared to guidelines established by the International Standards Organization (ISO) and the California Department of Transportation (Caltrans) because neither the City of Los Angeles nor the State of California have established ground-borne vibration regulations. The report concludes that ground-borne vibrations recorded during actual drilling were less than the threshold level of human perception as specified in either the ISO or Caltrans guidelines. Further, the report concludes that measured vibrations were in orders of magnitude less than levels which could damage structures. Vibrations due to construction of the proposed project will be significantly less than those from drilling operations that have been proven in the Navcon report to be imperceptible. Therefore, any vibrations caused during construction activities of the proposed project are expected to be imperceptible and, therefore, not excessive.

Operation of the proposed project does not involve any new drilling or other activities that would increase the ground-borne vibration. Because current activities have been previously analyzed and shown to be below the threshold level of human perception as described above, operation of the proposed project is not anticipated to cause adverse impacts to ground-borne vibration or noise.

12.e) and **f).** The proposed project is not located within an airport land use plan or within the vicinity of a private airstrip. Furthermore, the WTU Central Facility is not located within the normal flight pattern of an airport. Thus, the proposed project will not increase the noise levels to people residing or working in the area.

12.3 Mitigation Measures

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

	Potentially Significant Impact	Less Than Significant Impact	No Impact
XIII. POPULATION AND HOUSING. Would the project:			
a) Induce substantial growth in an area either directly (for example, by proposing new homes and businesses) or	☐	☐	☑

	indirectly (e.g. through extension of roads or other infrastructure)?			
b)	Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☑
c)	Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☑

13.1 Significance Criteria

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

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

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

13.2 Environmental Setting and Impacts

13.a), b) and **c).** The proposed project will require modifications to the existing equipment at the WTU Central Facility, and will not involve an increase, decrease or relocation of population. Labor (an estimated six to 12 employees) for construction activities is expected to come from the existing labor pool in Southern California. Operation of the proposed project is expected to require few, if any, new permanent employees (i.e., maximum of six employees) at the WTU Central Facility. Therefore, construction and operation of the proposed project are not expected to have significant adverse impacts on population or housing, induce substantial population growth, or exceed the growth projections contained in any adopted plans.

13.3 Mitigation Measures

Relative to population and housing, no mitigation measures are required for the construction or operation of the proposed project because no significant adverse impacts to population and housing are expected.

		Potentially Significant Impact	Less Than Significant Impact	No Impact
XIV.	**PUBLIC SERVICES.** Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities in order to maintain acceptable service ratios, response times or other performance objectives for any of the following public services:			
a)	Fire protection?	☐	☐	☑

b)	Police protection?	☐	☐	☑
c)	Schools?	☐	☐	☑
d)	Parks?	☐	☐	☑
e)	Other public facilities?	☐	☐	☑

14.1 Significance Criteria

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

14.2 Environmental Setting and Impacts

14.a). The WTU Central Facility will continue to be served by a City of Los Angeles Fire Department station located less than one-half mile west of the proposed project area. In addition, there is an existing firewater system around the two main areas of the northeast and southwest drill site areas. Although some of the new equipment uses combustion, the proposed project will not increase the requirements or need for additional or altered fire protection. Additionally, a previous project approval required a substantial upgrade in onsite fire control systems, which included numerous new fire monitors, an electric driven fire water booster pump, and additional "through-the-wall" connections. These systems have recently been assessed and approved by the LA Fire Department. No new fire hazards are anticipated, and thus no significant impacts are expected.

14.b). The City of Los Angeles Police Department is the responding agency for law enforcement needs at the WTU Central Facility. All modifications will occur within the confines of the existing boundaries of the WTU Central Facility, with only a few additional workers (maximum of six) possibly required for the operation of the proposed project.

During previous heavy construction periods, Warren had a security guard at the entrance to the WTU Central Facility. However, a new pass-coded security gate has been installed, so there is no need to have a security guard on-site. Therefore, no impacts to the local police department are expected from the project.

14.c), d) and **e).** The local workforce is expected to fill the short-term construction positions required for this proposed project. Only a small increase, if any, in the number of permanent workers is expected at the WTU Central Facility; therefore, the proposed project will not result in an increase in the local population and, thus, no impacts are expected to schools, parks, or other public facilities.

14.3 Mitigation Measures

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

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

15.1 Significance Criteria

The impacts to recreation will be considered significant if:

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

The proposed project adversely affects existing recreational opportunities.

15.2 Environmental Setting and Impacts

15.a) and **b).** The existing labor pool in southern California is sufficient to fulfill the labor requirements for the construction of the proposed project. The operation of the proposed project will require few, if any, additional permanent workers (i.e., maximum of six employees). Therefore, there will be no significant changes in population densities resulting from the proposed project and, thus, no increase in the use of existing neighborhood and regional parks or other recreational facilities.

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

15.3 Mitigation Measures

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

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

16.1 Significance Criteria

The impacts on solid and hazardous waste will be considered significant if the following occur:

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

16.2 Environmental Setting and Impacts

16.a). Non-Hazardous Waste

The removal of the existing flare during the construction phase will generate small amounts of waste metals (e.g., approximately 700 lbs) such as cast iron, structural steel, copper, and stainless steel. These metals will be routed to authorized recyclers for recovery and reuse (i.e., sold as valuable scrap); therefore, they will not burden existing landfills. The demolition of other related structures is expected to generate minimal amounts of waste. The disposal of demolition waste would contribute to the diminishing available landfill capacity. However, sufficient landfill capacity currently exists to handle the one-time disposal of the minimal amount of material. Clean soil excavated to provide new foundations will be reused on-site as backfill where possible. Any excess soils will be diverted to the existing market as clean reusable soil. Therefore, construction impacts of the proposed project on waste treatment and disposal facilities are expected to be less than significant.

During operation, the proposed project is not expected to generate significant quantities of solid waste, which are primarily generated from administrative or office activities. The proposed project will not result in a significant increase in the number of permanent employees at the WTU Central Facility, so no significant increase in solid waste is expected.

16.b). Hazardous Waste

The only hazardous materials that are used during typical operations (other than the produced gas) are generated only during cleaning operations. As a result, hazardous materials are not generated regularly. Although the types of compounds will not change, there will be a slight increase in the amount of compounds generated. However, these materials will be handled in accordance with all regulations. No significant impact is expected.

An existing well will be re-worked to convert it for gas injection. Re-working the existing well does not involve drilling to increase the depth of the well. Instead, the well will be modified to enable it to be used as an injection well. Because the proposed project does not require the drilling of any new wells,, there will be no drilling mud to dispose of. Drilling mud from the ongoing drilling operations is separated; the liquids and fine solids are pumped into a subsurface formation in a well approved by the California DOGGR for this purpose. The larger solids are dried and then hauled off to an approved disposal facility periodically. No change from current drilling activity is anticipated, so no significant impact is expected.

16.3 Mitigation Measures

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

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

17.1 Significance Criteria

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

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

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

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

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

The demand for parking facilities is substantially increased.

Substantial alterations to current circulation or movement patterns of people and goods are induced.

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

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

17.2 Environmental Setting and Impacts

The WTU Central Facility site is bordered by Eubank Avenue to the east, Anaheim Street to the south, Banning Boulevard to the west, and East Opp Street to the north.

17.a) and b). The construction of the proposed project will require up to 12 workers, while the operation of the proposed project will require up to six permanent employees. Sufficient parking for these workers is expected to be available. Because the increased number of vehicles traveling to WTU Central Facility on a daily basis will be minimal, the LOS at nearby affected intersections is not expected to change from C to D, or to increase the volume to capacity ratio by 2% or more. Therefore, no significant adverse impacts on parking are expected.

Truck traffic, including infrequent deliveries of odorant for the gas sales system, will not increase significantly because of the proposed project. With the opening of the pipeline, 40 truck trips have been eliminated each day, thereby reducing traffic leaving the site and entering surrounding streets. Also, any trucks leaving the WTU Central Facility will be required to turn left out of the site and then turn onto Anaheim St. This street is a major thoroughfare and therefore any traffic leaving the site will not significantly impact traffic on the smaller streets surrounding the facility. The proposed project is not expected to have an impact on traffic during the operational phase.

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

17.d). The proposed project does not involve construction of roads or use of incompatible equipment on roads (e.g., farm equipment). Therefore, no increased hazards due to a design feature or incompatible use is expected.

17.e). The proposed project is not expected to result in inadequate emergency access at or adjacent to the WTU Central Facility because the exits and entrances to the WTU Central

Facility will remain unchanged and Warren will continue to maintain the existing emergency access gates to the WTU Central Facility.

17.f). Parking for the proposed project construction and operation workers will be provided within the confines of the existing boundaries of the WTU Central Facility. Therefore, the proposed project will not result in significant impacts on parking.

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

17.3 Mitigation Measures

No significant impacts to transportation or traffic are expected and, thus, no mitigation measures are required.

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

18. MANDATORY FINDINGS OF SIGNIFICANCE

18.a). The proposed project does not have the potential to adversely affect the environment, reduce or eliminate any plant or animal species, or destroy prehistoric records of the past. The proposed project is located in an area that is part of an existing industrial facility which has been previously disturbed, graded and developed and, therefore, does not support any habitat of fish or wildlife species. This proposed project will not extend into environmentally sensitive areas, but

will remain within the confines of an existing, operating facility. For additional information, see Section 4.0 – Biological Resources and Section 5.0 – Cultural Resources.

18.b)

Non-Greenhouse Gas Impacts

The proposed project is not expected to result in significant adverse cumulative environmental impacts. The construction activities associated with the proposed project will not overlap, and, as discussed in Section 3.c), cumulative construction emissions are expected to be less than significant.

The proposed project involves replacing an old flare with a new Bekaert CEB®, installing HT#2, and installing a compressor and related equipment for gas re-injection and possible gas sales. The proposed project's emissions and ambient air quality impacts are below the SCAQMD's thresholds for all criteria air pollutants. No significant adverse air quality impacts are expected, either individually or cumulatively.

With respect to aesthetics, no cumulative impacts are expected because new equipment being installed is of the same or lower height than the current equipment and will be located in the vicinity within the site as equipment with similar uses. In addition, everything will be located within the confines of the existing WTU Central Facility, which is surrounded by an eight-foot high wall. Therefore, no significant change in visual characteristics is expected at the WTU Central Facility, and no cumulative aesthetic impacts are expected.

With respect to noise, no cumulative impacts are expected because any increase in noise during construction of the proposed project will be attenuated due to both distance and existing mitigation measures, such as the permanent masonry wall and temporary noise barriers. The new equipment being installed is expected to generate similar or less noise than the existing equipment. Warren proactively addresses all complaints by providing an employee who lives adjacent to the WTU Central Facility with the authority to ensure that all workers are following appropriate noise procedures (e.g., muffling of pipes). Also, any groundborne vibration generated during the proposed project is expected to be similar to existing vibration. Measurements taken in the area during existing operations were not found to be significant. Therefore, no significant change in noise is expected at the WTU Central Facility, and no cumulative impacts on noise levels are expected.

With respect to geology, no cumulative geology impacts are expected because all of the structures associated with the proposed project will be built in conformance with the Uniform Building Code for Zone 4 (i.e., most hazardous), which is the designation for the area in which the proposed project is located. The new well cellars were specifically designed according to the Uniform Build Code (UBC) and the California Building Code (CBC) to provide stable soil conditions and to prevent landslides, lateral spreading, liquefaction and collapse during the drilling of new wells or the "workover" of existing wells. The design load used in these evaluations was well over 1.5 million pounds of force, which far exceeds that which will be encountered in practice. The soil was assessed as being stable in conformance with the Los Angeles City Building Ordinance for the scope of the proposed project. Therefore, no significant

change in impacts to geology is expected at the WTU Central Facility, and no cumulative geology impacts are expected.

With respect to hazards, no cumulative hazard impacts are expected because no new materials will be used at the site. Hazardous materials are generated only during cleaning operations as opposed to regular facility operation. The amount of hazardous materials generated will slightly increase, but will be handled according to all regulations. Therefore, no significant change in hazards is expected at the WTU Central Facility, and no cumulative hazard or hazardous materials impacts are expected.

Where a lead agency is examining a project with an incremental effect that is not cumulatively considerable, a lead agency need not consider the effect significant, but must briefly describe the basis for concluding that the incremental effect is not cumulatively considerable. Therefore the proposed project's contribution to air quality, aesthetics, hazards, noise, and traffic are not cumulatively considerable and thus not significant. This conclusion is consistent with CEQA Guidelines §15064 (h)(4), which states, "The mere existence of cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed Project's incremental effects are cumulatively considerable". Therefore, the proposed Project is not expected to result in significant adverse non-GHG cumulative impacts.

GHG Impacts

Global climate change refers to changes in average climatic conditions on earth as a whole, including temperature, wind patterns, precipitation, and storms. Global warming, a related concept, is the observed increase in the average temperature of the earth's surface and atmosphere. One identified cause of global warming is an increase of GHGs in the atmosphere. The six major GHGs identified by the Kyoto Protocol are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs). GHGs absorb longwave radiant energy reflected by the earth, which warms the atmosphere. GHGs also radiate longwave energy both upward to space and back down toward the surface of the earth. The downward part of this longwave radiation that is absorbed in the atmosphere is known as the "greenhouse effect." Some studies indicate that the potential effects of global climate change may include rising surface temperatures, loss in snow pack, rise of sea levels, more extreme heat days per year, and more drought years.

Events and activities, such as the industrial revolution and natural emissions, have contributed to the increase in atmospheric levels of GHGs. As reported by the CEC, California contributes 1.4 percent of the global and 6.2 percent of the national manmade GHG emissions (CEC, 2004). Approximately 80 percent of manmade GHGs in California are from fossil fuel combustion and over 70 percent of GHG emissions are composed of CO_2 emissions (CARB, 2007).

In response to growing scientific and political concern regarding global climate change, California has recently adopted a series of laws to reduce both the level of GHGs in the atmosphere and to reduce emissions of GHGs from commercial and private activities within the state.

- In September 2002, Governor Gray Davis signed Assembly Bill (AB) 1493, which requires the development and adoption of regulations to achieve "the maximum feasible reduction of greenhouse gases" emitted by noncommercial passenger vehicles, light-duty trucks, and other vehicles used primarily for personal transportation in the State.
- In June 2005, Governor Schwarzenegger signed Executive Order S-3-05, which established GHG emissions reduction targets for the state, as well as a process to ensure that the targets are met. As a result of this executive order, the California Climate Action Team (CAT), led by the Secretary of the California State Environmental Protection Agency (CalEPA), was formed. The CAT published its first report in March 2006, in which it laid out several recommendations and strategies for reducing GHG emissions and reaching the targets established in the executive order.
- In September 2006, Governor Schwarzenegger signed California's Global Warming Solutions Act of 2006 (AB32). AB32 requires CARB to establish a statewide GHG emissions cap for 2020; adopt mandatory reporting rules and an emission reduction plan for significant sources of GHG emissions; and adopt regulations to achieve the maximum technologically feasible and cost effective reductions of GHGs.
- SB1368, a companion bill to AB32, requires the California Public Utilities Commission (CPUC) and the CEC to establish GHG emission performance standards for the generation of electricity, whether generated inside the State or generated outside and then imported into California. SB1368 provides a mechanism for reducing the emissions of electricity providers, thereby assisting CARB to meet its mandate under AB32. On January 25, 2007, the CPUC adopted an interim GHG Emissions Performance Standard (EPS), which is a facility-based emissions standard requiring that all new long-term commitments for baseload generation to serve California consumers be with power plants that have GHG emissions no greater than a combined cycle gas turbine plant. That level is established at 1,100 pounds of CO_2 per megawatt-hour (MW-hr).
- California Senate Bill 97 (SB97), passed in August 2007, is designed to work in conjunction with CEQA and AB32. SB97 requires the California Office of Planning and Research (OPR) to prepare and develop guidelines for the mitigation of GHG emissions or the effects thereof, including, but not limited to, effects associated with transportation and energy consumption. These guidelines must be transmitted to the CA Resources Agency by July 1, 2009 to be certified and adopted by January 1, 2010. The OPR and the Resources Agency shall periodically update these guidelines to incorporate new information or criteria established by CARB pursuant to AB32. SB97 will apply to any environmental impact report, negative declaration, mitigated negative declaration, or other document required by CEQA, except for a limited number of prescribed types of projects. SB97 will be automatically repealed January 1, 2010.

There has also been activity at the federal court level on the regulation of GHGs. In *Massachusetts v. Environmental Protection Agency* (Docket No. 05–1120), argued on November 29, 2006 and decided on April 2, 2007, the U.S. Supreme Court held that not only did the USEPA have authority to regulate GHGs, but also that the USEPA's reasons for not regulating GHGs did not fit the statutory requirements. The U.S. Supreme Court ruled that CO_2 and other GHGs are pollutants under the Clean Air Act, and that the USEPA must regulate GHG emissions if it determines such emissions pose an endangerment to public health or welfare. To date, the USEPA has not made such a finding or developed a regulatory program for GHG emissions.

The SCAQMD adopted a "Policy on Global Warming and Stratospheric Ozone Depletion" on April 6, 1990. The policy commits the SCAQMD to consider global impacts in rulemaking and in drafting revisions to the AQMP. In March 1992, the SCAQMD Governing Board reaffirmed this policy and adopted amendments to the policy, including the following directives:

- Phase out the use and corresponding emissions of chlorofluorocarbons (CFCs), methyl chloroform (1,1,1-trichloroethane or TCA), carbon tetrachloride, and halons by December 1995;
- Phase out the large quantity use and corresponding emissions of hydrochlorofluorocarbons (HCFCs) by the year 2000;
- Develop recycling regulations for HCFCs (e.g., SCAQMD Rules 1411 and 1415);
- Develop an emissions inventory and control strategy for methyl bromide; and,
- Support the adoption of a California greenhouse gas emission reduction goal.

The SCAQMD has established a Climate Change Policy, adopted by the SCAQMD Governing Board at its September 5, 2008 meeting, to actively seek opportunities to reduce emissions of criteria, toxic, and climate change pollutants. The policy includes the intent to assist businesses and local governments implementing climate change measures, decrease the agency's carbon footprint, and provide climate change information to the public. The SCAQMD will take the following actions:

1. Work cooperatively with other agencies/entities to develop quantification protocols, rules, and programs related to greenhouse gases;
2. Share experiences and lessons learned relative to the Regional Clean Air Incentives Market (RECLAIM) to help inform state, multi-state, and federal development of effective, enforceable cap-and-trade programs. To the extent practicable, staff will actively engage in current and future regulatory development to ensure that early actions taken by local businesses to reduce greenhouse gases will be treated fairly and equitably. Staff will seek to streamline administrative procedures to the extent feasible to facilitate the implementation of AB32 measures;
3. Review and comment on proposed legislation related to climate change and greenhouse gases, pursuant to the 'Guiding Principles for SCAQMD Staff Comments on Legislation Relating to Climate Change' approved at the Board Special Meeting in April 2008;
4. Provide higher priority to funding TAO projects or contracts that also reduce greenhouse gas emissions;
5. Develop recommendations through a public process for an interim greenhouse gas CEQA significance threshold, until such time that an applicable and appropriate statewide greenhouse gas significance level is established. Provide guidance on analyzing greenhouse gas emissions and identify mitigation measures. Continue to consider GHG impacts and mitigation in SCAQMD lead agency documents and in comments when SCAQMD is a responsible agency;
6. Revise the SCAQMD's Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning to include information on greenhouse gas strategies as a resource for local governments. The Guidance Document will be consistent with state guidance, including CARB's Scoping Plan;

7. Update the Basin's greenhouse gas inventory in conjunction with each Air Quality Management Plan. Information and data used will be determined in consultation with CARB, to ensure consistency with state programs. Staff will also assist local governments in developing greenhouse gas inventories;
8. Bring recommendations to the Board on how the agency can reduce its own carbon footprint, including drafting a Green Building Policy with recommendations regarding SCAQMD purchases, building maintenance, and other areas of products and services. Assess employee travel as well as other activities that are not part of a GHG inventory and determine what greenhouse gas emissions these activities represent, how they could be reduced, and what it would cost to offset the emissions;
9. Provide educational materials concerning climate change and available actions to reduce greenhouse gas emissions on the SCAQMD website, in brochures, and other venues to help cities and counties, businesses, households, schools, and others learn about ways to reduce their electricity, reduce vehicle miles traveled, access alternative mobility resources, utilize low emission vehicles, and implement other climate friendly strategies; and
10. Conduct conferences, or include topics in other conferences, as appropriate, related to various aspects of climate change, including understanding impacts, technology advancement, public education, and other emerging aspects of climate change science.

The legislative and regulatory activity detailed above is expected to require significant development and implementation of energy efficient technologies and shifting of energy production to renewable sources.

The GHG inventory for California is presented in Table XVIII-1 (CARB, 2007). According to the inventory, the total statewide manmade (or industrial) net GHG emissions in 2004 were approximately 480 million metric tons (MT) per year of CO_2 equivalent (CO_2eq) emissions. Global emissions of GHGs in 1990 were estimated by the Intergovernmental Panel on Climate Change to be 32,100 million MT of CO_2eq emissions.

TABLE III-10.

CALIFORNIA GHG EMISSIONS AND SINKS SUMMARY

Categories Included in the Inventory	1990	2004
ENERGY	**386.41**	**420.91**
Fuel Combustion Activities	**381.16**	**416.29**
Energy Industries	157.33	166.43
Manufacturing Industries & Construction	24.24	19.45
Transport	150.02	181.95
Other Sectors	48.19	46.29
Non-Specified	1.38	2.16
Fugitive Emissions From Fuels	**5.25**	**4.62**
Oil and Natural Gas	2.94	2.54
Other Emissions from Energy Production	2.31	2.07
INDUSTRIAL PROCESSES & PRODUCT USE	**18.34**	**30.78**
Mineral Industry	4.85	5.90
Chemical Industry	2.34	1.32
Non-Energy Products from Fuels & Solvent Use	2.29	1.37
Electronics Industry	0.59	0.88
Product Uses as Substitutes for Ozone Depleting Substances	0.04	13.97
Other Product Manufacture & Use Other	3.18	1.60
Other	5.05	5.74
AGRICULTURE, FORESTRY, & OTHER LAND USE	**19.11**	**23.28**
Livestock	11.67	13.92
Land	0.19	0.19
Aggregate Sources & Non-CO_2 Emissions Sources on Land	7.26	9.17
WASTE	**9.42**	**9.44**
Solid Waste Disposal	6.26	5.62
Wastewater Treatment & Discharge	3.17	3.82
EMISSION SUMMARY		
Gross California Emissions	**433.29**	**484.4**
Sinks and Sequestrations	**-6.69**	**-4.66**
Net California Emissions	**426.60**	**479.74**

CARB, 2007.

GHG Significance Criteria

The analysis of GHGs is far different from the analysis of criteria pollutants for the following reasons. For criteria pollutants, significance thresholds are based on daily emissions because the attainment or non-attainment status is based on daily exceedances of applicable ambient air quality standards. Furthermore, several ambient air quality standards are based on the relatively short-term exposure effects on human health (e.g., one-hour and eight-hour). On the contrary, because the half-life of CO_2 is approximately 100 years, the effects of GHGs are longer-term and thus affect global climate over a relatively long time frame. Thus, the SCAQMD's current position is to evaluate GHG effects over a longer time frame than a single day.

The SCAQMD has convened a "Greenhouse Gases CEQA Significance Thresholds Working Group" to consider a variety of benchmarks and potential significance thresholds to evaluate GHG impacts. On December 5, 2008, the SCAQMD adopted an interim CEQA GHG

Significance Threshold for projects where SCAQMD is the lead agency (SCAQMD, 2008). This interim threshold is set at 10,000 MT CO_2eq per year. As additional information is compiled regarding the level of GHG emissions that constitute a significant cumulative climate change impact, SCAQMD will continue to revisit and possibly revise the level of GHG emissions considered to be significant.

Other Significance Criteria Initiatives

The SCAQMD'S Greenhouse Gas CEQA Significance Thresholds Working Group has prepared the "Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Thresholds." This draft guidance proposes a tiered approach to determining GHG significance of projects (SCAQMD, 2008, pg. 3-10). The first two tiers involve (1) exempting the project because of potential reductions of GHG emissions allowed under CEQA and (2) demonstrating that the project's GHG emissions are consistent with a local general plan. Because neither of these tiers is applicable for the proposed project, the analysis shifts to Tier 3. Tier 3 proposes a limit of 10,000 MT CO_2eq per year as the incremental increase signifying significance (SCAQMD, 2008, pg. 3-11). Projects with incremental increases below this threshold will not be cumulatively considerable. The final potential threshold methodology considered for this analysis is Tier 4, the percent reduction approach being considered by the working group (SCAQMD, 2008, pg. 3-16). With the passing of AB 32, a goal was established of reducing California's GHG emissions to 1990 levels by 2020, a reduction of approximately 25 to 30% from forecast emission levels. Tier 4 thus entails comparing the percent reduction in emissions under the proposed project to emissions under a business-as-usual (BAU) scenario. If this percent reduction is 30 percent or greater, it is assumed that the project will contribute to reducing GHG emissions to achieve current and potential future regulatory goals and, therefore, the proposed project would not be cumulatively considerable.

In its *CEQA & Climate Change* document (January, 2008), the California Air Pollution Control Officers Association (CAPCOA) identified many potential GHG significance threshold options. The CAPCOA document indicates that establishing quantitative thresholds is a balance between setting the level low enough to capture a substantial portion of future residential and non-residential development, while at the same time setting a threshold high enough to exclude small development projects that will contribute a relatively small fraction of the cumulative statewide GHG emissions. For example, CAPCOA identifies one potential significance threshold as 10,000 MT CO_2eq per year, which was considered by the Market Advisory Committee for inclusion in a Greenhouse Gas Cap and Trade System in California. Another potential threshold identified by CAPCOA is 25,000 MT CO_2eq per year, which is CARB's mandatory reporting threshold under AB 32. In addition, another potential threshold is to quantify the percentage of the total statewide inventory of GHG emissions represented by emissions from a single project. If emissions are a relatively small percentage of the total inventory, it is probable that the project will have little or no effect on global climate change.

CARB released a preliminary draft staff proposal "Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act" on October 24, 2008 (CARB, 2008). Under this draft staff proposal, a project would be determined to have a less than significant impact if incremental GHG emissions after

mitigation are less than 7,000 MT CO_2eq/yr. Currently, this draft proposal is in a public review comment period, with the next workshop scheduled for December 2008.

GHG Analysis

The new and modified equipment built and installed as part of the proposed project has been evaluated for all direct GHG emission sources, including emissions associated with the combustion devices, construction activities, and commuting. The proposed project is estimated to result in an incremental increase of 8,271 MT CO_2eq per year (see Table XVIII-2) based on the final, full-scale, typical proposed project operations.

According to available information, the statewide inventory of CO_2eq emissions for the year 1990 is 427 million MT, and for the year 2020 is 600 million MT under a business-as-usual scenario. Interpolation of an inventory for the year 2012 (i.e., year of final project implementation) results in approximately 554 million MT of CO_2eq. As shown in Table XVIII-2, the final phase of the proposed project (estimated to begin in 2012) emits 11,335 MT CO_2eq per year, which represents 0.00205 percent of the statewide GHG inventory in 2012. Table XVIII-2 shows the total emissions in CO_2eq during the implementation of the proposed project (i.e., operation and construction), in addition to emissions from the final proposed project.

TABLE III-11.

ESTIMATED GHG EMISSIONS (CO_2EQ) DURING PROJECT IMPLEMENTATION AND FINAL PROPOSED PROJECT

Year	Estimated Emissions		
	Annual Emissions[1] (MT CO_2eq/yr)	Percent of Statewide Inventory (%)	Emissions Increase[2] (MT CO_2eq/yr)
2008 (baseline)	3,063	0.00055	--
2009	10,331	0.00186	7,268
2010	8,907	0.00161	5,843
2011	9,279	0.00167	6,215
Final project (2012 and beyond)	11,335	0.00205	8,271
Significance threshold			10,000

[1] Assumes full scale production will be occurring over 365 days per year beginning in 2012.
[2] The emissions increase represents the phase emissions minus the baseline emissions. For example, the final project emissions increase is 8,279 (11,342 – 3,063 = 8,279).

SCAQMD Significance Threshold Analysis

As shown above in Table XVIII-2, the proposed project will result in an emissions increase of 8,271 MT CO_2eq per year. This emissions increase is less than the interim significance threshold of 10,000 MT CO_2eq per year, and thus the emissions from the proposed project are less than significant.

Additional Analysis

For the Tier 3 approach, which has been discussed by SCAQMD but not adopted, annual emissions occurring from 2008 (i.e., baseline) through 2012 (i.e., final project implementation) were calculated. These emissions are the total of construction and operation emissions occurring in each year. Then, the incremental difference was calculated for years 2009 through 2012 compared to the baseline in 2008. The incremental increases for each year of project implementation are less than the proposed Tier 3 Significance Threshold of 10,000 MT CO_2eq per year (Table XVIII-2), indicating that GHG emissions from implementing the proposed project are not considerably significant.

CAPCOA defines a BAU as the projection of GHGs into the future based on current technology and regulations in absence of other reductions. Adoption of new GHG reduction regulations (e.g., CARB's Scoping Plan measures) in the future establishes new BAU (i.e., evolves over time). A BAU scenario normally defines CEQA's no-project alternative, but does not necessarily form the project baseline. A BAU scenario was defined such that the facility did not pursue gas sales and used an additional flare to dispose of the produced gas. Due to these changes, a total of two Bekaert flares would be needed to handle the excess gas. The proposed project's emissions are 45 percent less than this BAU scenario, which is a greater percentage than the average GHG reduction necessary to achieve the AB 32 goals (see Table XVIII-3, Appendix D). This reduction is largely due to beneficial uses of the produced gas. Upon project completion with excess gas either re-injected or sold off-site, less gas will be sent to the Bekaert CEB® than if the excess gas was flared as is typically done (i.e., BAU scenario). This 45 percent reduction serves as basis for the SCAQMD's conclusion that GHG emissions from implementing the proposed project are insignificant.

If GHG emissions are analyzed for a 30-year timeline from 2009 through 2039, the annual average emission over those 30 years are 11,152 MT CO_2eq per year. The annual average emission over those 30 years without implementation of the proposed project is 3,063 MT CO_2eq per year, for a difference of 8,062 MT CO_2eq per year.

TABLE XII-1.

ESTIMATE PERCENT REDUCTION IN GHG EMISSIONS (CO_2eq) BETWEEN BUSINESS AS USUAL SCENARIO AND PROPOSED FINAL FULL-SCALE PROJECT

Scenario	CO_2eq Emissions	
	Final Phase Emissions (MT/yr)	Maximum Emissions Increase (MT/yr)[1]
Business as usual	20,613	
Full Oil/Gas Production Sales (expected permitted emissions)	11,335	-45%

[1] Assumes full scale production will be occurring over 365 days per year beginning in 2012.

Conclusions

As stated above GHG emissions are considered cumulative impacts. The potential GHG emissions from the proposed project (1) are less than the SCAQMD's adopted significance threshold of 10,000 MT per year; (2) constitute only a small percentage of the total statewide GHG inventory in 2012; (3) are below CARB's mandatory reporting threshold under AB 32 of 25,000 MT per year; and (4) are a reduction in emissions compared to a business as usual scenario that is greater than the reduction mandated under AB 32. Therefore, cumulative GHG impacts from the final proposed project are less than significant.

18c). The proposed project will replace an old flare with a new Bekaert CEB®, and will install HT#2, a compressor and related equipment for gas re-injection and possible gas sales. The proposed project will result in an increase of approximately 16.0 pounds per day of VOC emissions and approximately 20.5 pounds per day of NO_x from operations, which are below the SCAQMD's operational significance thresholds. The potential health impacts of the emission increases were evaluated in a health risk assessment (see Appendix C). The results of the HRA indicated that the TAC emissions in the vicinity of the WTU Central Facility would be less than significant. The cancer risks to the maximum exposed individual resident (MEIR) and maximum exposed individual worker (MEIW) are well below the one per million significance threshold and below the noncarcinogenic thresholds. The proposed project is not expected to increase the potential hazard impacts and the hazard impacts were determined to be less than significant. Therefore, no significant health impacts or other adverse impacts to humans are expected due to operation of the proposed project.

REFERENCES

Air Quality Management Plan (AQMP), 2007. Final 2007 Air Quality Management Plan. Adopted by the AQMD Governing Board June 1, 2007.

California Air Resources Board (CARB), 2007. Draft California Greenhouse Gas Inventory. Last updated November 19, 2007.

California Air Resources Board (CARB), 2008. Methodology for Estimating Premature Deaths Associated with Long-term Exposure to Fine Airborne Particulate Matter in California. Staff Report. October 24, 2008

California Energy Commission (CEC), 2003. Transportation Fuels, Technologies, and Infrastructure Assessment. Adopted by CEC November 12, 2003.

California Energy Commission (CEC), 2004. Inventory of California Greenhouse Gas Emissions and Sinks: 1990-1999.

City of Los Angeles, 1996a. Safety Element of the Los Angeles City General Plan, Exhibit G, Inundation & Tsunami Hazard Areas in the City of Los Angeles, November 1996.

City of Los Angeles, 1996b. Safety Element of the Los Angeles City General Plan, Exhibit F, 100-Year & 500-Year Flood Plains in the City of Los Angeles, November 1996.

ENVIRON International Corporation (ENVIRON), 2008. Personnel communication between Dr. Hien Tran of the California Air Resource Board and Dr. Robert Scofield of ENVIRON. December 5, 2008.

Jones & Stokes Associates. 2007. URBan EMISsions (URBEMIS) 2007 model, Version 9.2.4.

Port of Long Beach. 2008. Draft Environmental Impact Report / Draft Environmental Impact Statement (DEIR/DEIS) for the Middle Harbor Redevelopment Project. May.

Port of Los Angeles. 2007. Berths 136-147 [TraPac] Container Terminal Project Final Environmental Impact Statement/ Final Environmental Impact Report (FEIS/FEIR). December.

South Coast Air Quality Management District (SCAQMD), 1993. CEQA Air Quality Handbook, SCAQMD, May 1993.

South Coast Air Quality Management District (SCAQMD), 2003a. Guidelines for fugitive emissions calculations. SCAQMD June 2003.

South Coast Air Quality Management District (SCAQMD), 2003b. Final localized significance threshold methodology. Adopted by SCAQMD October 6, 2006.

South Coast Air Quality Management District (SCAQMD), 2005. Risk Assessment Procedures for Rules 1401 and 212, Appendix L.

South Coast Air Quality Management District (SCAQMD), 2007. Air Quality Management Plan (AQMP), 2007. Final 2007 Air Quality Management Plan. Adopted by the AQMD Governing Board June 1, 2007.

South Coast Air Quality Management District (SCAQMD), 2007. Final Program Environmental Assessment for Proposed Amended Rule 1309.1 - Priority Reserve and Re-Adoption of Rule 1315 – Federal New Source Review Tracking System. July.

South Coast Air Quality Management District (SCAQMD), 2008. Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans. Adopted by SCAQMD December 5, 2008.

ACRONYMS

ABBREVIATION	DESCRIPTION
AB	Assembly bill
AB 32	Assembly bill 32: California's Global Warming Solutions Act of 2006
AHM	acutely hazardous material
AQMP	Air Quality Management Plan
Basin	South Coast Air Basin
BACT	Best Available Control Technology
BTU	British Thermal Units
BTU/hr	British Thermal Units per hour
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEPA	California State Environmental Protection Agency
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CAT	Climate Action Team
CDFG	California Department of Fish and Game
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFC	chlorofluorocarbon
CH_4	methane
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2eq	CO_2 equivalent
CPUC	California Public Utilities Commission
dBA	A-weighted noise level measurement in decibels
DOGGR	Division of Oil, Gas, and Geothermal Resources
EIR	Environmental Impact Report
EPS	Emissions Performance Standard
ERPG	Emergency Response Planning Guideline
FWKO	Free Water Knock-Out
GHG	greenhouse gas
GMC	Growth Management Chapter
H_2SO_4	hydrogen sulfate
HCFC	hydrochlorofluorocarbon
HFC	hydrofluorocarbon
HI	Hazard Index
HIA	Acute Hazard Index
HIC	Chronic Hazard Index
HRA	Health Risk Assessment
IRP	Integrated Resource Plan
IS	Initial study
ISC	Industrial Source Complex
ISCST3	Industrial Source Complex Model Short Term Version 3
LADWP	Los Angeles Department of Water and Power

lbs	pounds
lbs/hr	pounds per hour
LOS	Level of Service
LST	Localized Significance Threshold
MEIR	Maximum exposed individual resident
MEIW	Maximum exposed individual worker
MICR	Maximum individual cancer risk
MMscf	Million Standard Cubic Feet
MND	Mitigated negative declaration
MT	metric ton
MW-hr	megawatt-hour
N_2	nitrogen
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NIOSH	National Institute of Occupational Safety and Health
NOP	Notice of Preparation
NO_x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
O_3	ozone
OEHHA	Office of Environmental Health Hazard Assessment
OPR	Office of Planning and Research
OSHA	Occupational Safety and Health Administration
PAHs	Polynuclear Aromatic Hydrocarbons
PFC	perfluorocarbon
PM	particulate matter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
PM_{10}	particulate matter less than 10 microns in diameter
ppbv	parts per billion by volume
ppm	parts per million
ppmv	parts per million by volume
RCPG	Regional Comprehensive Plan and Guide
RECLAIM	Regional Clean Air Incentives Market
SB	Senate bill
SCAQMD	South Coast Air Quality Management District
SF_6	sulfur hexafluoride
SO_x	sulfur oxide
TACs	toxic air contaminants
ug/l	micrograms per liter
ug/m^3	micrograms per cubic meter
US DOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compounds
WTU	Wilmington Townlot Unit

GLOSSARY

TERM	DEFINITION
Ambient Noise	The background sound of an environment in relation to which all additional sounds are heard
Barrel	42 gallons.
Crude Oil	Crude oil is "unprocessed" oil, which has been extracted from the subsurface. It is also known as petroleum and varies in color, from clear to tar-black, and in viscosity, from water to almost solid.
dBA	The decibel (dDB) is one tenth of a *bel* where one bel represents a difference in noise level between two intensities I_1, I_0 where one is ten times greater than the other. (A) indicates the measurement is weighted to the human ear.
Flares	Emergency equipment used to incinerate gases during upset, startup, or shutdown conditions
Heater	Process equipment used to raise the temperature of refinery streams processing.
Natural Gas	A mixture of hydrocarbon gases that occurs with petroleum deposits, principally methane together with varying quantities of ethane, propane, butane, and other gases.
Seiches	A vibration of the surface of a lake or landlocked sea that varies in period from a few minutes to several hours and which many change in intensity.

APPENDIX A

EMISSIONS FROM PROPOSED PROJECT

TABLE OF CONTENTS
WARREN E&P NEW EQUIPMENT PROJECT – NEGATIVE DECLARATION

APPENDIX A
EMISSIONS FROM PROPOSED PROJECT:
COMBUSTION, CONSTRUCTION, AND FUGITIVES

Table No. **Page No.**

A.1. Summary of Emission Factor Source by Combustion Unit A-1
A.2. CEQA Projected Emissions for Current, Interim, and Final Project Conditions A-4
A.3. Offroad Emission Estimates for Construction of the Compressor Pad A-9
A.4. Fugitive Emissions Resulting from Addition of New Equipment at Warren's Central Facility A-12
A.5. Daily Construction Emissions Separated Into Fugitive Dust And Off-Road Combustion Emissions A-16
A.6. Fugitive Emissions Resulting From Combustion Equipment At Warren's Central Facility..... A-19
A.7. Total Emissions During Phase During The Proposed Project Implementation: Combustion, Fugitives, Construction, And Commuting..... A-24

APPENDIX A

EMISSIONS FROM PROPOSED PROJECT

Introduction

Typically, operational and construction emissions are analyzed separately because they occur at distinct times during the proposed project. However, for this proposed Project, there are overlapping periods of operation and construction emissions. Because of this, total emissions (i.e., from combustion and construction) are analyzed. First, combustion emissions that occur in interim operating scenarios are discussed. Second, construction and commuter activities are defined and emissions are estimated for each construction activity. Then, fugitive emissions arising from operational activities are provided. Finally, emissions from each phase during the proposed project implementation are defined, with distinct combinations of interim operation scenarios, construction activities, and fugitive emissions.

Combustion Emissions

Emissions of NO_x, VOC, CO, SO_x, PM, PM_{10}, $PM_{2.5}$, CO_2 and toxic air contaminants (TACs) were calculated for each combustion unit (heater treaters #1 [HT #1] and #2 [HT #2], Flare King Flare, Bekaert CEB®, and Microturbines).

Table A.1 below summarizes whether the emissions factors used for each combustion unit were calculated using manufacturer guarantee data or were based on reported emissions factors (SCAQMD default, AP-42, American Petroleum Institute values, etc.). Table A.1 provides detailed information of the source and/or parameters used to calculate appropriate emission factors. For all calculations, the SCAQMD default higher heating value of 1,050 Btu/scf was used.

TABLE A.1.

SUMMARY OF EMISSION FACTOR SOURCE BY COMBUSTION UNIT

Unit	VOC	NO_x	SO_x	CO	PM, PM_{10}, $PM_{2.5}$	CO_2	TACs
Heater Treater #1	SCAQMD Default	Calculated	SCAQMD Default	SCAQMD Default	SCAQMD Default	AP-42	AP-42
Heater Treater #2	SCAQMD Default	Calculated	SCAQMD Default	SCAQMD Default	SCAQMD Default	AP-42	AP-42
Flare King Flare	Original Appl.	Original Appl.	Original Appl.	Original Appl.	Original Appl.	API Table	Original Appl.
Bekaert CEB	Calculated	Calculated	SCAQMD Default	Calculated	AP-42	API Table	AP-42
Microturbines	Calculated	Calculated	AQMD Value	Calculated	AQMD Value	AP-42	AP-42

Operational combustion emissions were grouped by interim operation scenarios, i.e., a period of time during which specific combustion equipment is operating. Warren's presently permitted combustion sources are the Flare King Flare and HT #1. In addition, Warren currently has a hot water heater listed as equipment on Permit # F86179. Because this hot water heater is technically exempt from permitting under SCAQMD's Rule 219, is not currently operating, and a request was

submitted to have it removed from the permit, the emissions from the existing hot water heater were not included in the baseline. The six microturbines were installed and are currently operating under a Settlement Agreement with the SCAQMD. Permit applications were submitted in 2007 and are currently being processed. For this analysis and to be conservative, emissions from the microturbines are not included in the baseline emissions total, although they are included in interim and final proposed project calculations. Combustion emissions during each interim were then calculated. For all interim scenarios, emissions were analyzed at 100 percent of the heat input rating and fuel flow. However, because of the projected gas production rates, the equipment is unlikely to operate at maximum capacity. Below is a summary of the assumptions made for each interim operating scenario as it relates to calculation of the combustion emissions. The below scenarios discuss typical, expected operation. Because the analysis was done assuming 100 percent of maximum operation, the analysis is therefore conservative.

- Baseline
  - Operation of HT #1, Flare King
  - Fuel flow and heat input ratings reflect current operational values.
- Interim I:
  - Operation of HT #1, Flare King, and six microturbines
  - HT #1 and the Flare King will operate at current fuel flow and heat input ratings.
  - Operation of the six microturbines is anticipated to be up to 135 Mscf/day or roughly 86 percent of their maximum power output.
- Interim II:
  - Operation of HT #1, Bekaert CEB®, and six microturbines.
  - The Bekaert CEB® will now be permitted and operational, and the Flare King Flare will be removed from service and dismantled. The Bekaert is anticipated to operate at roughly 64 percent of its capacity during this phase, consistent with expected gas fuel flow rates.
  - HT #1 will operate at fuel flow rate consistent with oil production levels during this time.
  - The microturbines will continue to operate at similar loads as the previous phase.
- Interim III:
  - Operation of HT #2, Bekaert CEB®, and six microturbines
  - HT #2 will now be permitted and operational. It is anticipated the unit will initially start operating at only 28 percent of its rated capacity, based on expected gas fuel flow rates, which are determined by oil production rates. HT #1 will be temporarily removed from service for cleaning and refurbishing.
  - The Bekaert CEB® will operate at levels consistent with expected gas fuel flow rates.
  - The microturbines will continue to operate at levels similar to those in Interim II.
- Interim IV:
  - Operation of HT #2, Bekaert CEB®, six microturbines, and gas re-injection
  - HT #2 and the microturbines will continue to operate at similar levels to those anticipated in Interim III.
  - The Bekaert CEB® will be reduced to ready standby status (35 mscfd), operating at 10 percent of its rated capacity.
- Interim V: (*Note: This interim operation is only necessary if gas production rates reach levels which warrant it.*)
  - Operation of HT #1, HT #2, Bekaert CEB®, six microturbines, and gas sales

    - HT #2 and the microturbines will be utilized at full capacity during this phase. The Bekaert CEB® will be reduced to ready standby status (35 mscfd), operating at 10 percent of its rated capacity.
- Final Project: (*Note: If gas production rates warrant it, the final project will include gas sales; otherwise, the final project will include re-injection.*)
    - Operation of HT #1, HT #2, Bekaert CEB®, nine microturbines, and gas sales. The equipment will operate at up to 100 percent of their permitted capacity.

Table A.2 provides a summary of the daily emissions associated with each of these interim operating scenarios.

TABLE A.2

CEQA PROJECTED EMISSIONS FOR CURRENT, INTERIM, AND FINAL PROJECT CONDITIONS
COMBUSTION EMISSIONS

May 2008 Baseline (HT #1, Flare King)

Device/Process	Heat Input Rating (MMbtu/hr)	Fuel flow (Mscf/day)	Percent of rating (%)	VOC (lb/day)	NO_X (lb/day)	SO_X (lb/day)	CO (lb/day)	PM, PM_{10}, $PM_{2.5}$ (lb/day)	CO_2 (metric ton/ day)
Heater treater #1	2.5	22.0	39%	0.2	0.8	0.0	0.8	0.2	1.2
Flare King	4	50.0	55%	3.9	3.8	0.2	20.8	1.1	2.9
	Totals[1]:	72	--	4.0	4.6	0.3	21.5	1.2	4.1

Interim I (HT #1, Flare King, 6 MTs)

Device/Process	Heat Input Rating (MMbtu/hr)	Fuel flow (Mscf/day)	Percent of rating (%)	VOC (lb/day)	NO_X (lb/day)	SO_X (lb/day)	CO (lb/day)	PM, PM_{10}, $PM_{2.5}$ (lb/day)	CO_2 (metric ton/ day)
Heater treater #1	2.5	57.1	100%	0.4	2.2	0.1	2.0	0.4	3.1
Flare King	4	91.4	100%	7.1	6.9	0.4	38.0	1.9	5.3
Microturbines (6)	5.7	130.1	100%	8.7	6.0	0.2	6.1	0.9	7.1
	Totals[1]:	279	--	16.2	15.1	0.7	46.1	3.3	15. 5

Interim II (HT #1, Bekaert CEB®, 6 MTs)

Device/Process	Heat Input Rating (MMbtu/hr)	Fuel flow (Mscf/day)	Percent of rating (%)	VOC (lb/day)	NO_X (lb/day)	SO_X (lb/day)	CO (lb/day)	PM, PM_{10}, $PM_{2.5}$ (lb/day)	CO_2 (metric ton/ day)
Heater treater #1	2.5	57.1	100%	0.4	2.2	0.1	2.0	0.4	3.1
Bekaert CEB®	17	388.6	100%	1.7	7.4	0.6	3.0	1.0	22.3
Microturbines (6)	5.7	130.1	100%	8.7	6.0	0.2	6.1	0.9	7.1
	Totals[1]:	576	--	10.9	15.6	1.0	11.1	2.3	32.5

TABLE A.2

CEQA PROJECTED EMISSIONS FOR CURRENT, INTERIM, AND FINAL PROJECT CONDITIONS
COMBUSTION EMISSIONS

Interim III (HT #2, Bekaert CEB®, 6 MTs)

Device/Process	Heat Input Rating (MMbtu/hr)	Fuel flow (Mscf/day)	Percent of rating (%)	VOC (lb/day)	NO_X (lb/day)	SO_X (lb/day)	CO (lb/day)	PM, PM_{10}, $PM_{2.5}$ (lb/day)	CO_2 (metric ton/ day)
Heater treater #2	12	274.3	100%	1.9	5.2	0.5	9.6	2.1	14.9
Bekaert CEB®	17	388.6	100%	1.7	7.4	0.6	3.0	1.0	22.3
Microturbines (6)	5.7	130.1	100%	8.7	6.0	0.2	6.1	0.9	7.1
	Totals[1]:	793	--	12.4	18.7	1.3	18.7	3.9	44.3

Interim IV (HT #2, Bekaert CEB®, 6 MTs, Reinjection)

Device/Process	Heat Input Rating (MMbtu/hr)	Fuel flow (Mscf/day)	Percent of rating (%)	VOC (lb/day)	NO_X (lb/day)	SO_X (lb/day)	CO (lb/day)	PM, PM_{10}, $PM_{2.5}$ (lb/day)	CO_2 (metric ton/ day)
Heater treater #2	12	274.3	100%	1.9	5.2	0.5	9.6	2.1	14.9
Bekaert CEB® (standby at 35 Mscfd)	17	35.0	9%	0.2	0.7	0.1	0.3	0.1	2.0
Microturbines (6)	5.7	130.1	100%	8.7	6.0	0.2	6.1	0.9	7.1
	Totals[1]:	309	--	10.8	11.9	0.7	16.0	3.0	24.0

Interim V (HT #1, HT #2, Bekaert CEB®, 6 MTs, Gas sales)

Device/Process	Heat Input Rating (MMbtu/hr)	Fuel flow (Mscf/day)	Percent of rating (%)	VOC (lb/day)	NO_X (lb/day)	SO_X (lb/day)	CO (lb/day)	PM, PM_{10}, $PM_{2.5}$ (lb/day)	CO_2 (metric ton/ day)
Heater treater #1	2.5	57.1	100%	0.4	2.2	0.1	2.0	0.4	3.4
Heater treater #2	12	274.3	100%	1.9	5.2	0.5	9.6	2.1	14.9
Bekaert CEB® (standby at 35 Mscfd)	17	35.0	9%	0.2	0.7	0.1	0.3	0.1	2.0
Microturbines (6)	5.7	130.1	100%	8.7	6.0	0.2	6.1	0.9	7.1
	Totals[1]:	366	--	11.2	14.1	0.8	18.0	3.5	27.5

TABLE A.2

CEQA PROJECTED EMISSIONS FOR CURRENT, INTERIM, AND FINAL PROJECT CONDITIONS
COMBUSTION EMISSIONS

Final Project (Full oil/gas production: HT #1, HT #2, Bekaert CEB®, 9 MTs, Gas sales)

Device/Process	Heat Input Rating (MMbtu/hr)	Fuel flow (Mscf/day)	Percent of rating (%)	VOC (lb/day)	NO_X (lb/day)	SO_X (lb/day)	CO (lb/day)	PM, PM_{10}, $PM_{2.5}$ (lb/day)	CO_2 (metric ton/ day)
Heater treater #1 (online)	2.5	57.1	100%	0.4	2.2	0.1	2.0	0.4	3.1
Heater treater #2	12	274.3	100%	1.9	5.2	0.5	9.6	2.1	14.9
Bekaert CEB®	17	388.6	100%	1.7	7.4	0.6	3.0	1.0	22.3
Microturbines (9)	8.5	195.1	100%	13.1	9.1	0.3	9.2	1.4	10.6
	Totals[1]:	720	--	17.2	23.9	1.5	23.8	4.8	51.0

[1] Totals may not equal the sum of the categories due to rounding.

Construction and Commuter Emissions

In order to implement the final proposed project, construction activities will be required, including grading, welding, crane lifts, and other similar activities. Fugitive dust emissions (PM_{10}, $PM_{2.5}$, and PM) will be generated during construction of equipment pads and foundations. In addition, combustion emissions will be emitted from the diesel and gasoline mobile source vehicles used on-site. URBan EMISsions (URBEMIS) 2007 model (version 9.2.4) was used for estimating fugitive dust emissions associated with grading. EMFAC2007 was used for on-road vehicle emissions (i.e., delivery trucks for the odorant). OFFROAD2007 was used for all other emissions, including off-road vehicles and gasoline-powered construction vehicles. Construction activities were separated into activities required to install a given piece of equipment. The following assumptions were used in the model runs.

- Construction I: Installation of the Bekaert CEB® and removal of the Flare King
  - Two truck trips, two crane lifts, and on-site crane operation (300 hp; two hours) within a single day. (This is a conservative assumption for day-specific emissions, because installation will likely occur over 2 or more days.)
- Construction II: Installation of HT #2 and re-furbishment of HT #1
  - Two truck trips, one crane lift, and on-site crane operation (700 hp; one hour) within a single day. (This is a conservative assumption for day-specific emissions, because installation will likely occur over 2 or more days.)
- Construction III: Grading for compressor pad
  - On-site operation of a grader (174 hp; six hours), dozer (357 hp; six hours), backhoe (108 hp; seven hours), and water truck (189 hp; eight hours) within one day
  - Grading emissions were based on an area of one acre; to calculate the fugitive dust emissions associated with grading during this Phase, the URBEMIS results were ratioed by the size of the pad area (10’ × 20’)
- Construction IV: Construction and installation of compressor
  - Construction IVa: Construction of compressor pad
    - On-site operation of a backhoe (70 hp; six hours), gas compactor (5 hp; four hours), and diesel concrete truck (250 hp; one hour) within one day
  - Construction IVb: Setting compressor
    - On-site crane operation (700 hp; four hours) within one day
  - Construction IVc: Pipe fabrication/installation
    - On-site diesel welding (45 hp; 80 hours), crane operation (250 hp; 20 hours), and backhoe operation (70 hp; 20 hours) over ten days
  - Construction IVd: Electrical installation (no associated emissions)
- Construction V: Conversion of well
  - On-site diesel crane operation (350 hp; 12 hours) within one day
- Construction VI: Installation of gas sales equipment
  - Construction VIa: Grading for concrete pad (this activity is the same as Construction III)
  - Construction VIb through VIe: These activities are the same as Construction IVa through IVd
- Construction VII: Installation of three additional microturbines
  - Construction VIIa through VIIe: These activities are the same as Construction VIa through VIe

Tables A.3, A.4, and A.5 summarize the emissions associated with these construction activities.

TABLE A.3

OFFROAD EMISSION FACTORS, OPERATION HOURS, AND LOAD FACTORS USED TO CALCULATE CONSTRUCTION EMISSIONS

					Emission factors (lb/hr)					
Phase	**Equipment**	**HP**	**Total hours**	**Load factor**	**CO**	**NO_X**	**PM (exh)**	**VOC**	**SO_x**	**CO_2**
Construction I: Bekaert	Diesel crane (1)[1]	300	1	0.43	0.776	1.99	0.077	0.201	0.00177	180
	Diesel crane (1)[1]	300	1	0.43	0.776	1.99	0.077	0.201	0.00177	180
Construction II: HT #2	Diesel crane (1)[2]	700	1	0.43	1.3	3.42	0.131	0.341	0.00304	303
Construction III: Grading for compressor pad	Grader (1)[3]	174	6	0.61	0.748	1.53	0.0864	0.195	0.00139	124
	Dozer (1)[4]	357	6	0.59	1.99	3.5	0.149	0.389	0.0026	265
	Tractor/loader/backhoe (1)[5]	108	7	0.55	0.37	0.65	0.0594	0.108	0.000606	51.7
	Water truck (1)[6]	189	8	0.5	0.479	1.86	0.0659	0.182	0.00187	166
Construction IV: Compressor										
IVa: Construction of concrete pad	Tractor/loader/backhoe (1)[5]	70	6	0.465	0.37	0.65	0.0594	0.108	0.000606	51.7
	Gas compactor (1)[7]	5	4	0.62	1.09	0.0195	0.0175	0.0253	0.0000858	2.08
	Diesel concrete truck (1)[6]	250	1	0.62	0.479	1.86	0.0659	0.182	0.00187	166
IVb: Setting compressor	Diesel crane (1)[1]	250	2	0.43	0.776	1.99	0.077	0.201	0.00177	180
IVc: Pipe fabrication/installation	Diesel welding (1)[8]	45	80	0.62	0.314	0.288	0.0302	0.124	0.000362	28
	Diesel crane (1)[1]	250	20	0.43	0.776	1.99	0.077	0.201	0.00177	180
	Tractor/loader/backhoe (1)[5]	70	20	0.465	0.37	0.65	0.0594	0.108	0.000606	51.7

TABLE A.3

OFFROAD EMISSION FACTORS, OPERATION HOURS, AND LOAD FACTORS USED TO CALCULATE CONSTRUCTION EMISSIONS

Phase	Equipment	HP	Total hours	Load factor	CO	NO_X	PM (exh)	VOC	SO_x	CO_2
Construction V: Conversion of well	Diesel crane (1)[1]	350	12	0.43	0.776	1.99	0.077	0.201	0.00177	180
Construction VI: Gas sales										
VIa: Grading for concrete pad	Grader (1)[3]	174	6	0.61	0.748	1.53	0.0864	0.195	0.00139	124
	Dozer (1)[4]	357	6	0.59	1.99	3.5	0.149	0.389	0.0026	265
	Tractor/loader/backhoe (1)[5]	108	7	0.55	0.37	0.65	0.0594	0.108	0.000606	51.7
	Water truck (1)[6]	189	8	0.5	0.479	1.86	0.0659	0.182	0.00187	166
VIb: Construction of concrete pad	Tractor/loader/backhoe (1)[5]	70	6	0.465	0.37	0.65	0.0594	0.108	0.000606	51.7
	Gas compactor (1)[7]	5	4	0.62	1.09	0.0195	0.0175	0.0253	0.0000858	2.08
	Diesel concrete truck (1)[6]	250	1	0.62	0.479	1.86	0.0659	0.182	0.00187	166
VIc: Setting compressor	Diesel crane (1)[1]	250	2	0.43	0.776	1.99	0.077	0.201	0.00177	180
VId: Pipe fabrication/installation	Diesel welding (1)[8]	45	80	0.62	0.314	0.288	0.0302	0.124	0.000362	28
	Diesel crane (1)[1]	250	20	0.43	0.776	1.99	0.077	0.201	0.00177	180
	Tractor/loader/backhoe (1)[5]	70	20	0.465	0.37	0.65	0.0594	0.108	0.000606	51.7

TABLE A.3

OFFROAD EMISSION FACTORS, OPERATION HOURS, AND LOAD FACTORS USED TO CALCULATE CONSTRUCTION EMISSIONS

Phase	Equipment	HP	Total hours	Load factor	CO	NO_x	PM (exh)	VOC	SO_x	CO_2
Construction VII: MTs										
VIIa: Grading for concrete pad	Grader (1)[3]	174	6	0.61	0.748	1.53	0.0864	0.195	0.00139	124
	Dozer (1)[4]	357	6	0.59	1.99	3.5	0.149	0.389	0.0026	265
	Tractor/loader/backhoe (1)[5]	108	7	0.55	0.37	0.65	0.0594	0.108	0.000606	51.7
	Water truck (1)[6]	189	8	0.5	0.479	1.86	0.0659	0.182	0.00187	166
VIIb: Construction of concrete pad	Diesel backhoe (1)[5]	70	6	0.465	0.37	0.65	0.0594	0.108	0.000606	51.7
	Gas compactor (1)[7]	5	4	0.62	1.09	0.0195	0.0175	0.0253	0.0000858	2.08
	Diesel concrete truck (1)[6]	250	1	0.62	0.479	1.86	0.0659	0.182	0.00187	166
VIIc: Setting compressor	Diesel crane (1)[1]	250	2	0.43	0.776	1.99	0.077	0.201	0.00177	180
VIId: Pipe fabrication/installation	Diesel welding (1)[8]	45	80	0.62	0.314	0.288	0.0302	0.124	0.000362	28
	Diesel crane (1)[1]	250	20	0.43	0.776	1.99	0.077	0.201	0.00177	180
	Tractor/loader/backhoe (1)[5]	70	20	0.465	0.37	0.65	0.0594	0.108	0.000606	51.7

[1] Crane, diesel, 250-500 hp.
[2] Crane, diesel, 500-750 hp.
[3] Crane, diesel, 120-175 hp.
[4] Rubber-tired dozer, diesel, 250-500 hp.
[5] Tractors/loaders/backhoes, diesel, 50-120 hp.
[6] Off-highway trucks, diesel, 175-250 hp.
[7] Plate compactor, gas, <15 hp.
[8] Other construction equipment, diesel, 25-50 hp.

TABLE A.4

DAILY CONSTRUCTION EMISSIONS CALCULATED USING OFFROAD EMISSION FACTORS (TABLE A.3)

					Emissions (lb/day)					
Phase	**Equipment**	**HP**	**Total hours**	**Load factor**	**CO**	**NO_X**	**PM (exh)**	**VOC**	**SO_x**	**CO_2**
Construction I: Bekaert	Diesel crane (1)[1]	300	1	0.43	0.334	0.856	0.033	0.086	0.001	77.400
	Diesel crane (1)[1]	300	1	0.43	0.334	0.856	0.033	0.086	0.001	77.400
				TOTALS	0.667	1.711	0.066	0.173	0.002	154.800
Construction II: HT #2	Diesel crane (1)[2]	700	1	0.43	0.559	1.471	0.056	0.147	0.001	130.290
				TOTALS	0.559	1.471	0.056	0.147	0.001	130.290
Construction III: Grading for compressor pad	Grader (1)[3]	174	6	0.61	2.738	5.600	0.316	0.714	0.005	453.840
	Dozer (1)[4]	357	6	0.59	7.045	12.390	0.527	1.377	0.009	938.100
	Tractor/loader/backhoe (1)[5]	108	7	0.55	1.425	2.503	0.229	0.416	0.002	199.045
	Water truck (1)[6]	189	8	0.5	1.916	7.440	0.264	0.728	0.007	664.000
				TOTALS	13.123	27.932	1.336	3.235	0.024	2254.985
				TOTALS (ratioed by area)	0.030	0.064	0.003	0.007	0.000	5.186

TABLE A.4

DAILY CONSTRUCTION EMISSIONS CALCULATED USING OFFROAD EMISSION FACTORS (TABLE A.3)

Phase	Equipment	HP	Total hours	Load factor	CO	NO_X	PM (exh)	VOC	SO_x	CO_2
Construction IV: Compressor										
IVa: Construction of concrete pad	Tractor/loader/backhoe (1)[5]	70	6	0.465	1.032	1.814	0.166	0.301	0.002	144.243
	Gas compactor (1)[7]	5	4	0.62	2.703	0.048	0.043	0.063	0.000	5.158
	Diesel concrete truck (1)[6]	250	1	0.62	0.297	1.153	0.041	0.113	0.001	102.920
				TOTALS	4.032	3.015	0.250	0.477	0.003	252.321
IVb: Setting compressor	Diesel crane (1)[1]	250	2	0.43	0.667	1.711	0.066	0.173	0.002	154.800
				TOTALS	0.667	1.711	0.066	0.173	0.002	154.800
IVc: Pipe fabrication/installation	Diesel welding (1)[8]	45	80	0.62	1.557	1.428	0.150	0.615	0.002	138.880
	Diesel crane (1)[1]	250	20	0.43	1.335	3.423	0.132	0.346	0.003	309.600
	Tractor/loader/backhoe (1)[5]	70	20	0.465	0.688	1.209	0.110	0.201	0.001	96.162
				TOTALS	3.580	6.060	0.393	1.162	0.006	544.642
Construction V: Conversion of well	Diesel crane (1)[1]	350	12	0.43	4.004	10.268	0.397	1.037	0.009	928.800
				TOTALS	4.004	10.268	0.397	1.037	0.009	928.800

TABLE A.4

DAILY CONSTRUCTION EMISSIONS CALCULATED USING OFFROAD EMISSION FACTORS (TABLE A.3)

Phase	Equipment	HP	Total hours	Load factor	CO	NO_X	PM (exh)	VOC	SO_x	CO_2
Construction VI: Gas sales										
VIa: Grading for concrete pad	Grader (1)[3]	174	6	0.61	2.738	5.600	0.316	0.714	0.005	453.840
	Dozer (1)[4]	357	6	0.59	7.045	12.390	0.527	1.377	0.009	938.100
	Tractor/loader/backhoe (1)[5]	108	7	0.55	1.425	2.503	0.229	0.416	0.002	199.045
	Water truck (1)[6]	189	8	0.5	1.916	7.440	0.264	0.728	0.007	664.000
				TOTALS	13.123	27.932	1.336	3.235	0.024	2254.985
				TOTALS (ratioed by area)	0.030	0.064	0.003	0.007	0.000	5.186
VIb: Construction of concrete pad	Tractor/loader/backhoe (1)[5]	70	6	0.465	1.032	1.814	0.166	0.301	0.002	144.243
	Gas compactor (1)[7]	5	4	0.62	2.703	0.048	0.043	0.063	0.000	5.158
	Diesel concrete truck (1)[6]	250	1	0.62	0.297	1.153	0.041	0.113	0.001	102.920
				TOTALS	4.032	3.015	0.250	0.477	0.003	252.321
VIc: Setting compressor	Diesel crane (1)[1]	250	2	0.43	0.667	1.711	0.066	0.173	0.002	154.800
				TOTALS	0.667	1.711	0.066	0.173	0.002	154.800
VId: Pipe fabrication/installation	Diesel welding (1)[8]	45	80	0.62	1.557	1.428	0.150	0.615	0.002	138.880
	Diesel crane (1)[1]	250	20	0.43	1.335	3.423	0.132	0.346	0.003	309.600
	Tractor/loader/backhoe (1)[5]	70	20	0.465	0.688	1.209	0.110	0.201	0.001	96.162
				TOTALS	3.580	6.060	0.393	1.162	0.006	544.642

TABLE A.4

DAILY CONSTRUCTION EMISSIONS CALCULATED USING OFFROAD EMISSION FACTORS (TABLE A.3)

Phase	Equipment	HP	Total hours	Load factor	CO	NO_X	PM (exh)	VOC	SO_x	CO_2
Construction VII: MTs										
VIIa: Grading for concrete pad	Grader (1)[3]	174	6	0.61	2.738	5.600	0.316	0.714	0.005	453.840
	Dozer (1)[4]	357	6	0.59	7.045	12.390	0.527	1.377	0.009	938.100
	Tractor/loader/backhoe (1)[5]	108	7	0.55	1.425	2.503	0.229	0.416	0.002	199.045
	Water truck (1)[6]	189	8	0.5	1.916	7.440	0.264	0.728	0.007	664.000
				TOTALS	13.123	27.932	1.336	3.235	0.024	2254.985
				TOTALS (ratioed by area)	0.030	0.064	0.003	0.007	0.000	5.186
VIIb: Construction of concrete pad	Diesel backhoe (1)[5]	70	6	0.465	1.032	1.814	0.166	0.301	0.002	144.243
	Gas compactor (1)[7]	5	4	0.62	2.703	0.048	0.043	0.063	0.000	5.158
	Diesel concrete truck (1)[6]	250	1	0.62	0.297	1.153	0.041	0.113	0.001	102.920
				TOTALS	4.032	3.015	0.250	0.477	0.003	252.321
VIIc: Setting compressor	Diesel crane (1)[1]	250	2	0.43	0.667	1.711	0.066	0.173	0.002	154.800
				TOTALS	0.667	1.711	0.066	0.173	0.002	154.800
VIId: Pipe fabrication/installation	Diesel welding (1)[8]	45	80	0.62	1.557	1.428	0.150	0.615	0.002	138.880
	Diesel crane (1)[1]	250	20	0.43	1.335	3.423	0.132	0.346	0.003	309.600
	Tractor/loader/backhoe (1)[5]	70	20	0.465	0.688	1.209	0.110	0.201	0.001	96.162
				TOTALS	3.580	6.060	0.393	1.162	0.006	544.642

TABLE A.5

DAILY CONSTRUCTION EMISSIONS SEPARATED INTO FUGITIVE DUST AND OFF-ROAD COMBUSTION EMISSIONS

Construction Activity		Emissions (lb/day)						
		CO	NO_X	PM_{10}	$PM_{2.5}$	VOC	SO_x	CO_2
Construction I: Bekaert CEB®	Dust	0	0	0.000	0	0	0.000	
	Off-road	0.667	1.711	0.066	0.066	0.173	0.002	154.800
Construction II: HT #2	Dust	0	0	0	0	0	0	0
	Off-road	0.559	1.471	0.056	0.056	0.147	0.001	130.290
Construction III: Grading for compressor pad	Dust	0	0	0.092	0.092	0	0	0
	Off-road	0.030	0.064	0.003	0.003	0.007	0.000	5.186
Construction IV: Compressor		4.032	6.060	0.393	0.393	1.162	0.006	544.642
Construction of concrete pad	Dust	0	0	0	0	0	0	0
	Off-road	4.032	3.015	0.250	0.250	0.477	0.003	252.321
Setting compressor	Dust	0	0	0	0	0	0	0
	Off-road	0.667	1.711	0.066	0.066	0.173	0.002	154.800
Pipe fabrication/installation	Dust	0	0	0	0	0	0	0
	Off-road	3.580	6.060	0.393	0.393	1.162	0.006	544.642
Construction V: Conversion of well	Dust	0	0	0	0	0	0	0
	Off-road	4.004	10.268	0.397	0.397	1.037	0.009	928.800
Construction VI: Gas sales		4.032	6.060	0.393	0.393	1.162	0.006	544.642
Grading for concrete pad	Dust	0	0	0.092	0.092	0	0	0
	Off-road	0.030	0.064	0.003	0.003	0.007	0.000	5.186
Construction of concrete pad	Dust	0	0	0	0	0	0	0
	Off-road	4.032	3.015	0.250	0.250	0.477	0.003	252.321
Setting gas sales equipment	Dust	0	0	0	0	0	0	0
	Off-road	0.667	1.711	0.066	0.066	0.173	0.002	154.800
Pipe fabrication/installation	Dust	0	0	0	0	0	0	0
	Off-road	3.580	6.060	0.393	0.393	1.162	0.006	544.642

TABLE A.5

DAILY CONSTRUCTION EMISSIONS SEPARATED INTO FUGITIVE DUST AND OFF-ROAD COMBUSTION EMISSIONS

Construction Activity		Emissions (lb/day)						
		CO	NO_X	PM_{10}	$PM_{2.5}$	VOC	SO_x	CO_2
Construction VII: MTs		4.032	6.060	0.393	0.393	1.162	0.006	544.642
Grading for concrete pad	Dust	0	0	0.092	0.092	0	0	0
	Off-road	0.030	0.064	0.003	0.003	0.007	0.000	5.186
Construction of concrete pad	Dust	0	0	0	0	0	0	0
	Off-road	4.032	3.015	0.250	0.250	0.477	0.003	252.321
Setting microturbines	Dust	0	0	0	0	0	0	0
	Off-road	0.667	1.711	0.066	0.066	0.173	0.002	154.800
Pipe fabrication/installation	Dust	0	0	0	0	0	0	0
	Off-road	3.580	6.060	0.393	0.393	1.162	0.006	544.642

As part of the construction emissions, additional workers will commute to the site for the construction activities. In addition to construction emissions, scenarios beginning with Interim IV will result in emissions due to commuting of additional workers to the site for equipment operation. URBEMIS was used to estimate the emissions associated with additional vehicular traffic to the site. A total of 12 workers were assumed during construction activities. For additional vehicular traffic associated with commuting, a total of six workers per day (i.e., up to two workers per shift) were assumed beginning after Activity VI. The trip length was assumed to be a rural trip to be conservative. The vehicles were assumed to be 50% light duty autos and 50% light duty trucks, comprised of 50% less than 3,750 lbs and 50% between 3,751 and 5,750 lbs. In addition, beginning with Phase V, additional emissions will be associated with heavy duty truck traffic due to delivery of odorants. URBEMIS was used to model the emissions assuming one 100% heavy duty vehicle making a two-way trip one day each month.

Fugitive VOC Emissions

Fugitive emissions are categorized as tankage, bulkloading, and general fugitives (e.g., valves, flanges, etc.).

Fugitive emissions for additional valves, flanges, etc. to be installed with the proposed project were estimated using the SCAQMD's *Guidelines for Fugitive Emission Calculations* (June 2003). A summary of the input parameters and emission estimates per fugitive source are included in Table A.6.

TABLE A.6

FUGITIVE EMISSIONS RESULTING FROM COMBUSTION EQUIPMENT AT WARREN'S CENTRAL FACILITY

Fugitive emissions resulting from HT #1 at Warren's WTU[1]

Component type	Number of components screened[2]			SVRFs for THC[3] (lb/hr/source)		THC Emissions (lb/day)			Speciated Emissions[4] (lb/day)				
	< 10k ppmv	≥ 10k ppmv	Total	< 10k ppmv	≥ 10k ppmv	< 10k ppmv	≥ 10k ppmv	Total	ROC	Methane	Ethane	Inerts	Benzene
Valves	12	0	12	7.70E-05	3.01E-01	0.022	0.000	0.022	0.002	0.016	0.001	0.004	0.000
PRD s[5]	1	0	1	3.20E-04	3.00E-01	0.008	0.000	0.008	0.001	0.006	0.000	0.001	0.000
Flange sets	50	0	50	6.20E-05	1.30E-01	0.074	0.000	0.074	0.005	0.053	0.002	0.014	0.000
Pumps	0	0	0	2.20E-03	2.00E-01	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Connectors	0	0	0	2.60E-05	5.70E-02	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Open-ended lines	0	0	0	5.30E-05	1.20E-01	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Compressors	0	0	0	3.20E-04	3.00E-01	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Others	15	0	15	3.20E-04	3.00E-01	0.115	0.000	0.115	0.008	0.083	0.003	0.022	0.001
								TOTAL	0.015	0.158	0.005	0.042	0.001

Fugitive emissions resulting from HT #2 at Warren's WTU[1]

Component type	Number of components screened[2]			SVRFs for THC[3] (lb/hr/source)		THC Emissions (lb/day)			Speciated Emissions[4] (lb/day)				
	< 10k ppmv	≥ 10k ppmv	Total	< 10k ppmv	≥ 10k ppmv	< 10k ppmv	≥ 10k ppmv	Total	ROC	Methane	Ethane	Inerts	Benzene
Valves	12	0	12	7.70E-05	3.01E-01	0.022	0.000	0.022	0.002	0.016	0.001	0.004	0.000
PRDs[5]	1	0	1	3.20E-04	3.00E-01	0.008	0.000	0.008	0.001	0.006	0.000	0.001	0.000
Flange sets	50	0	50	6.20E-05	1.30E-01	0.074	0.000	0.074	0.005	0.053	0.002	0.014	0.000
Pumps	0	0	0	2.20E-03	2.00E-01	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Connectors	0	0	0	2.60E-05	5.70E-02	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Open-ended lines	0	0	0	5.30E-05	1.20E-01	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Compressors	0	0	0	3.20E-04	3.00E-01	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Others	15	0	15	3.20E-04	3.00E-01	0.115	0.000	0.115	0.008	0.083	0.003	0.022	0.001
								TOTAL	0.015	0.158	0.005	0.042	0.001

Fugitive emissions resulting from Flare King flare at Warren's WTU[1]													
Component type	Number of components screened[2]			SVRFs for THC[3] (lb/hr/source)		THC Emissions (lb/day)			Speciated Emissions[4] (lb/day)				
	< 10k ppmv	≥ 10k ppmv	Total	< 10k ppmv	≥ 10k ppmv	< 10k ppmv	≥ 10k ppmv	Total	ROC	Methane	Ethane	Inerts	Benzene
Valves	4	0	4	7.70E-05	3.01E-01	0.007	0.000	0.007	0.001	0.005	0.000	0.001	0.000
PRDs[5]	1	0	1	3.20E-04	3.00E-01	0.008	0.000	0.008	0.001	0.006	0.000	0.001	0.000
Flange sets	12	0	12	6.20E-05	1.30E-01	0.018	0.000	0.018	0.001	0.013	0.000	0.003	0.000
Pumps	0	0	0	2.20E-03	2.00E-01	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Connectors	0	0	0	2.60E-05	5.70E-02	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Open-ended lines	0	0	0	5.30E-05	1.20E-01	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Compressors	0	0	0	3.20E-04	3.00E-01	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Others	2	0	2	3.20E-04	3.00E-01	0.015	0.000	0.015	0.001	0.011	0.000	0.003	0.000
								TOTAL	0.003	0.035	0.001	0.009	0.00029

Fugitive emissions resulting from Bekaert CEB at Warren's WTU[1]													
Component type	Number of components screened[2]			SVRFs for THC[3] (lb/hr/source)		THC Emissions (lb/day)			Speciated Emissions[4] (lb/day)				
	< 10k ppmv	≥ 10k ppmv	Total	< 10k ppmv	≥ 10k ppmv	< 10k ppmv	≥ 10k ppmv	Total	ROC	Methane	Ethane	Inerts	Benzene
Valves	4	0	4	7.70E-05	3.01E-01	0.007	0.000	0.007	0.001	0.005	0.000	0.001	0.000
PRDs[5]	1	0	1	3.20E-04	3.00E-01	0.008	0.000	0.008	0.001	0.006	0.000	0.001	0.000
Flange sets	12	0	12	6.20E-05	1.30E-01	0.018	0.000	0.018	0.001	0.013	0.000	0.003	0.000
Pumps	0	0	0	2.20E-03	2.00E-01	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Connectors	0	0	0	2.60E-05	5.70E-02	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Open-ended lines	0	0	0	5.30E-05	1.20E-01	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Compressors	0	0	0	3.20E-04	3.00E-01	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Others	2	0	2	3.20E-04	3.00E-01	0.015	0.000	0.015	0.001	0.011	0.000	0.003	0.000
								TOTAL	0.003	0.035	0.001	0.009	0.00029

Fugitive emissions resulting from six MTs at Warren's WTU[1]													
Component type	Number of components screened[2]			SVRFs for THC[3] (lb/hr/source)		THC Emissions (lb/day)			Speciated Emissions[4] (lb/day)				
	< 10k ppmv	≥ 10k ppmv	Total	< 10k ppmv	≥ 10k ppmv	< 10k ppmv	≥ 10k ppmv	Total	ROC	Methane	Ethane	Inerts	Benzene
Valves	8	0	8	7.70E-05	3.01E-01	0.015	0.000	0.015	0.001	0.011	0.000	0.003	0.000
PRDs[5]	1	0	1	3.20E-04	3.00E-01	0.008	0.000	0.008	0.001	0.006	0.000	0.001	0.000
Flange sets	24	0	24	6.20E-05	1.30E-01	0.036	0.000	0.036	0.002	0.026	0.001	0.007	0.000
Pumps	0	0	0	2.20E-03	2.00E-01	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Connectors	6	0	6	2.60E-05	5.70E-02	0.004	0.000	0.004	0.000	0.003	0.000	0.001	0.000
Open-ended lines	1	0	1	5.30E-05	1.20E-01	0.001	0.000	0.001	0.000	0.001	0.000	0.000	0.000
Compressors	0	0	0	3.20E-04	3.00E-01	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Others	6	0	6	3.20E-04	3.00E-01	0.046	0.000	0.046	0.003	0.033	0.001	0.009	0.000
								TOTAL[6]	0.008	0.078	0.002	0.021	0.001

Fugitive emissions resulting from gas injection system at Warren's WTU[1]													
Component type	Number of components screened[2]			SVRFs for THC[3] (lb/hr/source)		THC Emissions (lb/day)			Speciated Emissions[4] (lb/day)				
	< 10k ppmv	≥ 10k ppmv	Total	< 10k ppmv	≥ 10k ppmv	< 10k ppmv	≥ 10k ppmv	Total	ROC	Methane	Ethane	Inerts	Benzene
Valves	5	0	5	7.70E-05	3.01E-01	0.009	0.000	0.009	0.001	0.007	0.000	0.002	0.000
PRDs[5]	2	0	2	3.20E-04	3.00E-01	0.015	0.000	0.015	0.001	0.011	0.000	0.003	0.000
Flange sets	10	0	10	6.20E-05	1.30E-01	0.015	0.000	0.015	0.001	0.011	0.000	0.003	0.000
Pumps	0	0	0	2.20E-03	2.00E-01	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Connectors	1	0	1	2.60E-05	5.70E-02	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000
Open-ended lines	1	0	1	5.30E-05	1.20E-01	0.001	0.000	0.001	0.000	0.001	0.000	0.000	0.000
Compressors	1	0	1	3.20E-04	3.00E-01	0.008	0.000	0.008	0.001	0.006	0.000	0.001	0.000
Others	3	0	3	3.20E-04	3.00E-01	0.023	0.000	0.023	0.002	0.017	0.001	0.004	0.000
								TOTAL	0.005	0.052	0.002	0.014	0.000

[1] The Screening Value Range (SVR) Method was used according to the AQMD's "Guidelines for Fugitive Emissions Calculations" (June 2003). This Method was chosen based on Warren's previous assessment in the 2006-2007 AER using the SVR Method and using gas analytical data from Warren.

[2] The number of components are estimates obtained from Warren. The distribution around 10k ppmv is based on Warren's 2006-07 AER and the assumption that emissions from these new components should be similar to existing equipment.

[3] All SVR Factors (SVRFs) obtained from Table IV-2c for gas/light liquid in AQMD's "Guidelines for Fugitive Emissions Calculations" (June 2003).

[4] Speciated emissions are based on THC Emissions and the gas analysis provided by Warren.

[5] The SVRF for "Others" was used for PRDs (based on 2006-2007 AER).

Gas	Percent
ROC[1]	6.96%
Methane[2]	71.80%
Ethane[2]	2.26%
Inerts[2]	18.97%
Benzene[3]	0.60%

[1] The ROC gas percentage was calculated using a mass balance (i.e., 100% - sum of methane, ethane, inerts, benzene).
[2] The methane, ethane, and inerts gas percentages were obtained from Warren's gas analytical data.
[3] The benzene gas percentage was obtained from Warren's 2006-2007 AER.

Proposed Project Phase Emissions

Implementation of the proposed project is separated into distinct phases with specific combinations of operational combustion equipment, construction and commuting activities, and fugitive emissions. The proposed phases are as follows:

- Phase 0: Baseline; Fugitives (HT#1, Flare King, tankage, bulkloading, and general)
- Phase I: Interim I; Construction I; Fugitives (HT#1, Flare King, 6 MTs, tankage, bulkloading, and general)
- Phase II: Interim II; Construction II; Fugitives (HT#1, Bekaert CEB®, 6 MTs, tankage, bulkloading, and general)
- Phase III: Interim III; Construction III; Fugitives (HT#2, Bekaert CEB®, 6 MTs, tankage, bulkloading, and general)
- Phase IV: Interim III; Construction IV; Fugitives (HT#2, Bekaert CEB®, 6 MTs, tankage, bulkloading, and general)
- Phase V: Interim III; Construction V; Fugitives (HT#2, Bekaert CEB®, 6 MTs, tankage, bulkloading, and general)
- Phase VI: Interim IV; Construction VI; Fugitives (HT#2, Bekaert CEB®, 6 MTs, reinjection, tankage, bulkloading, and general)
- Phase VII: Interim V; Construction VII; Fugitives (HT#1, HT#2, Bekaert CEB®, 6 MTs, gas sales)
- Final: Final; Fugitives (HT#1, HT#2, Bekaert CEB®, 9 MTs, gas sales)

TABLE A.7

TOTAL EMISSIONS DURING PHASE DURING THE PROPOSED PROJECT IMPLEMENTATION: COMBUSTION, FUGITIVES, CONSTRUCTION, AND COMMUTING

Device/Process	VOC (lb/day)	NO_x (lb/day)	SO_x (lb/day)	CO (lb/day)	PM, PM_{10}, $PM_{2.5}$ (lb/day)
Baseline					
Baseline	4.0	4.6	0.3	21.5	1.2
Fugitives	2.4	0.0	0.0	0.0	0.0
TOTAL(1)	6.4	4.6	0.3	21.5	1.2
Phase I (Interim I, Construction I)					
Interim I	16.3	15.1	0.7	46.1	3.3
Fugitives	2.4	0.0	0.0	0.0	0.0
TOTAL(1)	18.7	15.1	0.7	46.1	3.3
Difference from baseline	12.3	10.5	0.5	24.6	2.0
Construction I	0.2	1.7	0.0	0.7	0.1
TOTAL(1)	12.5	12.2	0.5	25.2	2.1
Phase II (Interim II, Construction II)					
Interim II	10.9	15.6	1.0	11.1	2.3
Fugitives	2.4	0.0	0.0	0.0	0.0
TOTAL(1)	13.3	15.6	1.0	11.1	2.3
Difference from baseline	6.9	11.0	0.7	-10.4	1.1
Construction II	0.1	1.5	0.0	0.6	0.1
TOTAL(1)	7.0	12.5	0.7	-9.8	1.1
Phase III (Interim III, Construction III)					
Interim III	12.4	18.7	1.3	18.7	3.9
Fugitives	2.4	0.0	0.0	0.0	0.0
TOTAL(1)	14.8	18.7	1.3	18.7	3.9
Difference from baseline	8.4	14.1	1.1	-2.8	2.7
Construction III	0.0	0.1	0.0	0.0	0.1
Commuting	0.4	0.4	0.0	4.0	0.0
TOTAL(1)	8.8	14.2	1.1	-2.8	2.8

TABLE A.7

TOTAL EMISSIONS DURING PHASE DURING THE PROPOSED PROJECT IMPLEMENTATION: COMBUSTION, FUGITIVES, CONSTRUCTION, AND COMMUTING

Device/Process	VOC (lb/day)	NO_x (lb/day)	SO_x (lb/day)	CO (lb/day)	PM, PM_{10}, $PM_{2.5}$ (lb/day)
Phase IV (Interim III, Construction IV)					
Interim III	12.4	18.7	1.3	18.7	3.9
Fugitives	2.4	0.0	0.0	0.0	0.0
TOTAL(1)	14.8	18.7	1.3	18.7	3.9
Difference from baseline	8.4	14.1	1.1	-2.8	2.7
Construction IV	1.2	6.1	0.0	4.0	0.4
Commuting	0.4	0.4	0.0	4.0	0.0
TOTAL(1)	10.0	20.5	1.1	5.2	3.1
Phase V (Interim III, Construction V)					
Interim III	12.4	18.7	1.3	18.7	3.9
Fugitives	2.4	0.0	0.0	0.0	0.0
TOTAL(1)	14.8	18.7	1.3	18.7	3.9
Difference from baseline	8.4	14.1	1.1	-2.8	2.7
Construction V	1.0	10.3	0.0	4.0	0.4
Commuting	0.4	0.4	0.0	4.0	0.0
Heavy Duty Vehicle Trips	0.1	0.9	0.0	0.3	0.0
TOTAL(1)	9.9	25.6	1.1	5.5	3.1

TABLE A.7

TOTAL EMISSIONS DURING PHASE DURING THE PROPOSED PROJECT IMPLEMENTATION: COMBUSTION, FUGITIVES, CONSTRUCTION, AND COMMUTING

Device/Process	VOC (lb/day)	NO_x (lb/day)	SO_x (lb/day)	CO (lb/day)	PM, PM_{10}, $PM_{2.5}$ (lb/day)
Phase VI (Interim IV, Construction VI)					
Interim IV	10.9	11.9	0.7	16.0	3.0
Fugitives	2.4	0.0	0.0	0.0	0.0
TOTAL(1)	13.3	11.9	0.7	16.0	3.0
Difference from baseline	6.9	7.3	0.5	-5.6	1.8
Construction VI	1.2	6.1	0.0	4.0	0.4
Commuting	0.4	0.4	0.0	4.0	0.0
Heavy Duty Vehicle Trips	0.1	0.9	0.0	0.3	0.0
TOTAL(1)	8.6	14.6	0.5	2.8	2.3
Phase VII (Interim V, Construction VII)					
Interim V	11.2	14.1	0.8	18.0	3.5
Fugitives	2.5	0.0	0.0	0.0	0.0
TOTAL(1)	13.7	14.1	0.8	18.0	3.5
Difference from baseline	7.3	9.5	0.6	-3.6	2.2
Construction VII	1.2	6.1	0.0	4.0	0.4
Commuting	0.4	0.4	0.0	4.0	0.0
Heavy Duty Vehicle Trips	0.1	0.9	0.0	0.3	0.0
TOTAL(1)	9.0	16.8	0.6	4.8	2.7

TABLE A.7

TOTAL EMISSIONS DURING PHASE DURING THE PROPOSED PROJECT IMPLEMENTATION: COMBUSTION, FUGITIVES, CONSTRUCTION, AND COMMUTING

Device/Process	VOC (lb/day)	NO_x (lb/day)	SO_x (lb/day)	CO (lb/day)	PM, PM_{10}, $PM_{2.5}$ (lb/day)
Final Project					
Interim V	17.1	23.9	1.5	23.8	4.8
Fugitives	2.5	0.0	0.0	0.0	0.0
TOTAL[1]	19.6	23.9	1.5	23.8	4.8
Difference from baseline	13.2	19.3	1.3	2.3	3.6
Commuting	0.4	0.4	0.0	4.0	0.0
Heavy Duty Vehicle Trips	0.1	0.9	0.0	0.3	0.0
TOTAL[1]	13.7	20.5	1.3	6.6	3.6

[1] Totals may not sum due to rounding.

ATTACHMENT A1

Table A.1a: Heater Treater #1 Emission Factors

ENVIRON calculations (data from application, Warren, and vendor information)

1. Given values

Category	Value	Units	Source
HHV - refined	1,050	MMbtu/MMscf	SCAQMD Default
H_2S concentration in fuel[1]	10	ppm	Gas analytical data
NO_x Concentration	30	ppm at 3% O_2	Per source test data provided by AQMD

[1] Based on Warren's gas analytical data

2. Assumed values

Category	Value	Units	Source
Heat input	2.5	MMbtu/hr	HT #1 permit
HHV	1,050	MMbtu/MMscf	SCAQMD Default
NO_X molecular weight[1]	46	lb/lb-mole	Periodic table
H2S molecular weight	34	lb/lb-mole	Periodic table
SO_X molecular weight[2]	64	lb/lb-mole	Periodic table

[1] The molecular weight of NO_X assumes NO_2.

3. Conversion factors

Category	Value	Units	Source
Fuel burned per energy unit	8,710	dscf/MMbtu	
Oxygen correction	1.17	O_2/corrected O_2	20.9/(20.9-3)
Volume conversion	385.44	scf/lb-mole	
Parts in one million	1,000,000	ppm	
Molar ratio (SO2/H2S)	1	lb-mole SO2/lb-mole H2S	Conservatively assumes complete combustion of H2S to SO2

4. Calculation of VOC emission factor

Category	Value	Units	Source
Manufacturer guarantee	n/a	lb/MMbtu	
VOC EF	7.00	lb/MMscf	AQMD default

5. Calculation of NO_X emission factor

Category	Value	Units	Source
Per AQMD Data	0.036	lb/MMbtu	Calculation
NO_X EF	38.23	lb/MMscf	Per data provided by AQMD.

6. Calculation of SO_X emission factor

Category	Value	Units	Source
Manufacturer guarantee	0.002	lb/MMbtu	
SO_X EF	1.66	lb/MMscf	AQMD default

7. Calculation of CO emission factor

Category	Value	Units	Source
Manufacturer guarantee	n/a	lb/MMbtu	
CO EF	35.00	lb/MMscf	AQMD default

8. Calculation of PM emission factor

Category	Value	Units	Source
Manufacturer guarantee	n/a	lb/MMbtu	
PM, PM_{10}, and $PM_{2.5}$ EF[1]	7.50	lb/MMscf	AQMD default

[1] Per CEIDARS List for Gaseous Fuel Combustion, the PM_{10} and $PM_{2.5}$ fraction is equal to PM.

9. Calculation of CO_2 emission factor

Category	Value	Units	Source
Manufacturer guarantee	n/a	lb/MMbtu	
CO_2 EF	120,000	lb/MMscf	Per AP-42 Chapter 1.4

10. Emission factors Default? N

Category	Value	Units	Source
VOC EF	7	lb/MMscf	AQMD default
NO_X EF	38.23	lb/MMscf	Per data provided by AQMD.
SO_X EF	1.660440017	lb/MMscf	AQMD default
CO EF	35	lb/MMscf	AQMD default
PM, PM_{10}, and $PM_{2.5}$ EF	7.5	lb/MMscf	AQMD default
CO_2 EF	120,000	lb/MMscf	Per AP-42 Chapter 1.4
CH4 EF	2.3	lb/MMscf	Per AP-42 Chapter 1.4
N2O EF	2.2	lb/MMscf	Per AP-42 Chapter 1.4

Table A.1b: Heater Treater #2 Emission Factors

ENVIRON calculations (data from application, Warren, and vendor information)

1. Given values

Category	Value	Units	Source
NO_X emitted concentration[1]	15	ppm	Manufacturer guarantee
H_2S concentration in fuel[2]	10	ppm	Gas analytical data
HHV - refined	1,050	MMbtu/MMscf	SCAQMD Default

[1] Based on pending application

[2] Based on Warren's gas analytical data.

2. Assumed values

Category	Value	Units	Source
Heat input	12	MMbtu/hr	HT #2 application
HHV	1,050	MMbtu/MMscf	SCAQMD Default
NO_X molecular weight[1]	46	lb/lb-mole	Periodic table
H2S molecular weight	34	lb/lb-mole	Periodic table
SO_X molecular weight[2]	64	lb/lb-mole	Periodic table

[1] The molecular weight of NO_X assumes NO_2.

[2] The molecular weight of SO_X assumes SO_2.

3. Conversion factors

Category	Value	Units	Source
Fuel burned per energy unit	8,710	dscf/MMbtu	
Oxygen correction	1.17	O_2/corrected O_2	20.9/(20.9-3)
Volume conversion	385.44	scf/lb-mole	
Parts in one million	1,000,000	ppm	
Molar ratio (SO2/H2S)	1	lb-mole SO2/lb-mole H2S	Conservatively assumes complete combustion of H2S to SO2

4. Calculation of VOC emission factor

Category	Value	Units	Source
Manufacturer guarantee	n/a	lb/MMbtu	
VOC EF	7.00	lb/MMscf	AQMD default

5. Calculation of NO_X emission factor

Category	Value	Units	Source
Manufacturer guarantee	0.018	lb/MMbtu	Calculation
NO_X EF	19.12	lb/MMscf	Based on manufacturer's guarantee (see 5)

$$\frac{EF parts}{10^6\ parts} \times \frac{20.9\%}{20.9\% - 3\%} \times 8{,}710 \frac{dscf}{MMBtu} \times MW \frac{lb}{lb-mole} \times \frac{1 lb-mole}{385.44 ft^3} = EF \frac{lb}{MMBtu}$$

6. Calculation of SO_X emission factor

Category	Value	Units	Source
Manufacturer guarantee	0.002	lb/MMbtu	Calculation
SO_X EF	1.66	lb/MMscf	AQMD default

7. Calculation of CO emission factor

Category	Value	Units	Source
Manufacturer guarantee	n/a	lb/MMbtu	
CO EF	35.00	lb/MMscf	AQMD default

8. Calculation of PM emission factor

Category	Value	Units	Source
Manufacturer guarantee	n/a	lb/MMbtu	
PM, PM_{10}, and $PM_{2.5}$ EF[1]	7.50	lb/MMscf	AQMD default

[1] Per CEIDARS List for Gaseous Fuel Combustion, the PM_{10} and $PM_{2.5}$ fraction is equal to PM.

9. Calculation of CO_2 emission factor

Category	Value	Units	Source
Manufacturer guarantee	n/a	lb/MMbtu	
CO_2 EF	120,000	lb/MMscf	Per AP-42 Chapter 1.4

10. Emission factors — Default? N

Category	Value	Units	Source
VOC EF	7	lb/MMscf	AQMD default
NO_X EF	19.12	lb/MMscf	Based on manufacturer's guarantee (see 5)
SO_X EF	1.660440017	lb/MMscf	AQMD default
CO EF	35	lb/MMscf	AQMD default
PM, PM_{10}, and $PM_{2.5}$ EF	7.5	lb/MMscf	AQMD default
CO_2 EF	120,000	lb/MMscf	Per AP-42 Chapter 1.4
CH4 EF	2.3	lb/MMscf	Per AP-42 Chapter 1.4
N2O EF	2.2	lb/MMscf	Per AP-42 Chapter 1.4

Table A.1c: Bekaert CEB Emission Factors

ENVIRON calculations (data from application, Warren, and vendor information)

1. Given values

Category	Value	Units	Source
NO_X emitted concentration	15	ppm	Burner application (supplemental information packgage); Manufacturer guarantee; spec sheet
CO emitted concentration	10	ppm	Flare application (supplemental information packgage); Manufacturer guarantee; spec sheet
VOC emitted concentration	10	ppm	Manufacturer guarantee (CxHy)
PM emitted concentration[1]	40	μg/L	AP 42-13.5-1, note C (Industrial flares)
H_2S emitted concentration[2]	10	ppm	Gas analytical data
HHV - refined	1,050	MMbtu/MMscf	SCAQMD Default

[1] The PM concentration assumes lightly smoking flare. This may significantly overestimate PM emissions for the Bekaert CEB.
[2] Based on Warren's gas analytical data.

2. Assumed values

Category	Value	Units	Source
Heat input	17	MMbtu/hr	Burner application (cover letter); manufacturer spec sheet
HHV	1,050	MMbtu/MMscf	SCAQMD Default
NO_X molecular weight[1]	46	lb/lb-mole	Periodic table
CO molecular weight	28	lb/lb-mole	Periodic table
VOC molecular weight[2]	16	lb/lb-mole	Periodic table
H2S molecular weight	34	lb/lb-mole	Periodic table
SO_X molecular weight[3]	64	lb/lb-mole	Periodic table

[1] The molecular weight of NO_X assumes NO_2.
[2] The molecular weight of VOC assumes CH4 (per AQMD)
[3] The molecular weight of SOx assumes SO2

3. Conversion factors

Category	Value	Units	Source
Fuel burned per energy unit	8,710	dscf/MMbtu	
Oxygen correction	1.17	O_2/corrected O_2	20.9/(20.9-3)
Volume conversion	385.44	scf/lb-mole	
Parts in one million	1,000,000	ppm	Conversion
Mass conversion	453.59	g/lb	Conversion
Volume conversion	28.32	L/scf	Conversion
Conversion	1,000,000	dscf/MMscf; μg/g	Conversion
Molar ratio (SO2/H2S)	1	lb-mole SO2/lb-mole H2S	Conservatively assumes complete combustion of H2S to SO2

4. Calculation of VOC emission factor

Category	Value	Units	Source
Manufacturer guarantee	0.004	lb/MMbtu	Calculation
VOC EF	4.43	lb/MMscf	Based on manufacturer's guarantee (see 4)

5. Calculation of NO_X emission factor

Category	Value	Units	Source
Manufacturer guarantee	0.018	lb/MMbtu	Calculation
NO_X EF	19.12	lb/MMscf	Based on manufacturer's guarantee (see 5)

$$\frac{EF parts}{10^6\ parts} \times \frac{20.9\%}{20.9\% - 3\%} \times 8{,}710 \frac{dscf}{MMBtu} \times MW \frac{lb}{lb-mole} \times \frac{1 lb-mole}{385.44\ ft^3} = EF \frac{lb}{MMBtu}$$

6. Calculation of SO_X emission factor

Category	Value	Units	Source
Manufacturer guarantee	0.002	lb/MMbtu	
SO_X EF	1.66	lb/MMscf	AQMD default

7. Calculation of CO emission factor

Category	Value	Units	Source
Manufacturer guarantee	0.007	lb/MMbtu	Calculation
CO EF	7.76	lb/MMscf	Based on manufacturer's guarantee (see 7)

8. Calculation of PM emission factor

Category	Value	Units	Source
AP 42 EF	40.0	μg/L	AP 42
PM, PM_{10}, and $PM_{2.5}$ EF[1]	2.50	lb/MMscf	Based on AP 42 (see 8)

[1] Per CEIDARS List for Flares, the PM_{10} and $PM_{2.5}$ fraction is equal to PM.

9. Calculation of CO_2 emission factor

Category	Value	Units	Source
Manufacturer guarantee	n/a	lb/MMbtu	
CO_2 EF[1]	126,621	lb/MMscf	Table 4.1, American Petroleum Institute, Compendium of greenhouse gas emissions methodologies for the oil and gas industry

[1] American Petroleum Institute, *Compendiium of Greenhouse Gas Emissions Methodologies for the Oil and Gas Industry* , February 2004. http://www.api.org/ehs/climate/new/upload/2004_COMPENDIUM.pdf

10. Emission factors Default? N

Category	Value	Units	Source
VOC EF	4.43	lb/MMscf	Based on manufacturer's guarantee (see 4)
NO_X EF	19.12	lb/MMscf	Based on manufacturer's guarantee (see 5)
SO_X EF	1.66	lb/MMscf	AQMD default
CO EF	7.76	lb/MMscf	Based on manufacturer's guarantee (see 7)
PM, PM_{10}, and $PM_{2.5}$ EF	2.50	lb/MMscf	Based on AP 42 (see 8)
CO_2 EF	126,621	lb/MMscf	Table 4.1, American Petroleum Institute, Compendium of greenhouse gas emissions methodologies for the oil and gas industry
CH4 EF	2.3	lb/MMscf	Per AP-42 Chapter 1.4
N2O EF	0.64	lb/MMscf	Per AP-42 Chapter 1.4

Table A.1d: Flare King Emission Factors

ENVIRON calculations (data from application, Warren, and vendor information)

1. Given values

Category	Value	Units	Source
HHV - refined	1,050	MMbtu/MMscf	SCAQMD Default
H_2S emitted concentration [1]	10	ppm	Gas analytical data

[2] Based on Warren's gas analytical data.

2. Assumed values

Category	Value	Units	Source
Heat input	4	MMbtu/hr	Old flare
HHV	1,050	MMbtu/MMscf	SCAQMD Default
H2S molecular weight	34	lb/lb-mole	Periodic table
SO_X molecular weight [2]	64	lb/lb-mole	Periodic table

3. Conversion factors

Category	Value	Units	Source
Fuel burned per energy unit	8,710	dscf/MMbtu	
Oxygen correction	1.17	O_2/corrected O_2	20.9/(20.9-3)
Volume conversion	385.44	scf/lb-mole	
Parts in one million	1,000,000	ppm	

4. Calculation of VOC emission factor

Category	Value	Units	Source
Manufacturer guarantee	n/a	lb/MMbtu	
VOC EF	77.28	lb/MMscf	Per A/N 305487 (provided by AQMD)

5. Calculation of NO_X emission factor

Category	Value	Units	Source
Manufacturer guarantee	n/a	lb/MMbtu	
NO_X EF	75.39	lb/MMscf	Per A/N 305487 (provided by AQMD)

6. Calculation of SO_X emission factor

Category	Value	Units	Source
Manufacturer guarantee	n/a	lb/MMbtu	
SO_X EF	4.31	lb/MMscf	Per A/N 305487 (provided by AQMD)

7. Calculation of CO emission factor

Category	Value	Units	Source
Manufacturer guarantee	n/a	lb/MMbtu	
CO EF	415.49	lb/MMscf	Per A/N 305487 (provided by AQMD)

8. Calculation of PM emission factor

Category	Value	Units	Source
Manufacturer guarantee	n/a	lb/MMbtu	
PM, PM_{10}, and $PM_{2.5}$ EF [1]	21.21	lb/MMscf	Per A/N 305487 (provided by AQMD)

[1] Per CEIDARS List for Flares, the PM_{10} and $PM_{2.5}$ fraction is equal to PM.

9. Calculation of CO_2 emission factor

Category	Value	Units	Source
Manufacturer guarantee	n/a	lb/MMbtu	
CO_2 EF [1]	126,621	lb/MMscf	Table 4.1, American Petroleum Institute

[1] American Petroleum Institute, *Compendiium of Greenhouse Gas Emissions Methodologies for the Oil and Gas Industry* , February 2004. http://www.api.org/ehs/climate/new/upload/2004_COMPENDIUM.pdf

10. Emission factors Default? N

Category	Value	Units	Source
VOC EF	77.28	lb/MMscf	Per A/N 305487 (provided by AQMD)
NO_X EF	75.39	lb/MMscf	Per A/N 305487 (provided by AQMD)
SO_X EF	4.31	lb/MMscf	Per A/N 305487 (provided by AQMD)
CO EF	415.49	lb/MMscf	Per A/N 305487 (provided by AQMD)
PM, PM_{10}, and $PM_{2.5}$ EF	21.21	lb/MMscf	Per A/N 305487 (provided by AQMD)
CO_2 EF	126,621	lb/MMscf	Table 4.1, American Petroleum Institute, Compendium of greenhouse gas emissions methodologies for the oil and gas industry
CH4 EF	2.3	lb/MMscf	Per AP-42 Chapter 1.4
N2O EF	0.64	lb/MMscf	Per AP-42 Chapter 1.4

Table A.1e: Microturbines Emission Calculations

ENVIRON calculations (from application, Warren, and vendor information)

1. Given values

Category	Value	Units	Source
Number of MTs	6	microturbines	MT application cover letter
VOC emitted concentration	50	ppm at 15% O_2	Data provided by AQMD, BACT Achieved in Practice
VOC emitted concentration, option a	48	ppm at 15% O2	
NO_X emitted concentration	12	ppm at 15% O_2	Data provided by AQMD, BACT Achieved in Practice
CO emitted concentration	20	ppm at 15% O_2	Data provided by AQMD, BACT Achieved in Practice
H_2S emitted concentration[1]	10	ppm	Gas analytical data
Mass conversion	453.59	g/lb	
Conversion	0.000001	MMbtu/btu	
Conversion	1,000,000	dscf/MMscf; μg/g	
HHV - refined	1,050	MMbtu/MMscf	SCAQMD Default

[1] Based on Warren's gas analytical data.

2. Assumed values

Category	Value	Units	Source
Nominal power output	92	kW	Ingersoll Rand specs, @0F
Nominal HHV	13550	btu/kWh	Ingersoll Rand specs, with gas booster
Heat input	0.9485	MMbtu/hr/MT	Calculation
Heat input	5.691	MMbtu/hr	Calculation
HHV	1,050	MMbtu/MMscf	SCAQMD Default
VOC molecular weight[1]	16	g/mol	Per data provided by AQMD
NO_X molecular weight[2]	46	g/mol	Periodic table
H2S molecular weight	34	lb/lb-mole	Periodic table
SO_X molecular weight[3]	64	lb/lb-mole	Periodic table
CO molecular weight	28	g/mol	Periodic table

[1] The molecular weight of VOC assumes methane.
[2] The molecular weight of NO_X assumes NO_2.
[3] The molecular weight of SO_X assumes SO_2.

3. Conversion factors

Category	Value	Units	Source
Fuel burned per energy unit	8,710	dscf/MMbtu	
Oxygen correction	3.54	O_2/corrected O_2	20.9/(20.9-15); Manufacturer specified 15% O_2
Oxygen correction	1.17	O_2/corrected O_2	20.9/(20.9-3)
Volume conversion	385.44	scf/lb-mole	
Parts in one million	1,000,000	ppm	
Molar ratio (SO2/H2S)	1	lb-mole SO2/lb-mole H2S	Conservatively assumes complete combustion of H2S to SO2

4. Calculation of VOC emission factor

Category	Value	Units	Source
Per AQMD Data	0.064	lb/MMbtu	Calculation
VOC EF	67.24	lb/MMscf	Calculated per data provided by AQMD

$$\frac{Conc}{10^6\,parts}\times\frac{20.9\%}{20.9\%-15\%}\times 8{,}710\frac{dscf}{MMBtu}\times MW\frac{lb}{lb-mole}\times\frac{1\,lb-mole}{385.44\,ft^3}=EF\frac{lb}{MMBtu}$$

5. Calculation of NO_X emission factor

Category	Value	Units	Source
Per AQMD Data	0.044	lb/MMbtu	Calculation
NO_X EF	46.40	lb/MMscf	Calculated per data provided by AQMD

6. Calculation of SO_X emission factor

Category	Value	Units	Source
Manufacturer guarantee	0.002	lb/MMbtu	Calculation
SO_X EF	1.66	lb/MMscf	AQMD default

7. Calculation of CO emission factor

Category	Value	Units	Source
Per AQMD Data	0.045	lb/MMbtu	Calculation
CO EF	47.07	lb/MMscf	Calculated per data provided by AQMD

8. Calculation of PM emission factor

Category	Value	Units	Source
Manufacturer guarantee	n/a	lb/MMbtu	
PM, PM_{10}, and $PM_{2.5}$ EF[1]	6.93	lb/MMscf	Per data provided by AQMD

[1] Per CEIDARS List for Gaseous Fuel Combustion, the PM_{10} and $PM_{2.5}$ fraction is equal to PM.

9. Calculation of CO_2 emission factor

Category	Value	Units	Source
Manufacturer guarantee	n/a	lb/MMbtu	
CO_2 EF	120,000	lb/MMscf	Per AP-42 Chapter 1.4

10. Emission factors

Default? N

Category	Value	Units	Source
VOC EF	67.24	lb/MMscf	Calculated per data provided by AQMD
VOC EF, option a	64.55	lb/MMscf	
NO_X EF	46.40	lb/MMscf	Calculated per data provided by AQMD
SO_X EF	1.66	lb/MMscf	AQMD default
CO EF	47.07	lb/MMscf	Calculated per data provided by AQMD
PM, PM_{10}, and $PM_{2.5}$ EF	6.93	lb/MMscf	Per data provided by AQMD
CO_2 EF	120,000	lb/MMscf	Per AP-42 Chapter 1.4
CH4 EF	2.3	lb/MMscf	Per AP-42 Chapter 1.4
N2O EF	2.2	lb/MMscf	Per AP-42 Chapter 1.4

APPENDIX B

AIR DISPERSION MODELING

TABLE OF CONTENTS
WARREN E&P NEW EQUIPMENT PROJECT – INITIAL STUDY

APPENDIX B
AIR DISPERSION MODELING

Table No. **Page No.**

B.1. Emissions Sources and Rates in Each Modeling Scenario B-3
B.2. Point Source Parameters B-7
B.3. Maximum Overall Air Quality Impacts From the Proposed Project B-9
B.4. Project-Related Operational and Construction Air Quality Impacts for Different Construction Phases B-10

Figure No. **Page No.**

B.1. Extent of Receptor Grids B-6
B.2. Image of the Facility and Surrounding Neighborhood B-8

APPENDIX B
AIR DISPERSION MODELING

Introduction

The Industrial Source Complex-Short Term Version 3 (ISCST3) model, a USEPA approved model, was used to simulate the air dispersion from the emission sources of the project. Breeze ISC GIS Pro v5.21 was used for developing ISCST3 input files and modeling the air dispersion.

Model Scenarios

Changes in criteria pollutant concentrations resulting from implementation of the proposed project and from the final proposed project were estimated by modeling the "CEQA baseline" scenario, construction phases I through VII, and the final proposed project at full build-out. Construction impacts from each phase were added separately to the final proposed project impacts (full build-out) as a conservative estimate of combined construction and operation impacts in the interim years. The "CEQA baseline" impacts were then subtracted from each combined impacts (operational and construction) scenario to evaluate incremental impacts of the proposed project. The following assumptions should be taken into consideration when interpreting the results of this modeling analysis:

- As discussed in the text, the CEQA baseline excludes six microturbines that are currently operating at the facility. As a result, incremental impact estimates are conservative since it assumes the six microturbines are new.
- All sources except fugitive and construction emissions are treated as point sources within the dispersion model. Each of the sources was considered as one single point source with the exception of HT #2. Because HT #2 has two stacks, this piece of equipment was split into two individual point sources for modeling (Model parameters can be found in Table B.2).
- Fugitive emissions of criteria pollutants are modeled as a rectangular area source covering the area in which the additional sources are to be added to the WTU Central Facility. The area source was visually placed in the dispersion model using the base map image as a reference. This source was modeled assuming a ground-level release covering a total area of approximately 6,756 m^2.
- Construction emissions occur in two areas: construction north and construction south. Only phase II occurs in construction south, with all other phases occurring in construction north.
- Fugitive dust emissions resulting from construction activities are modeled as a rectangular area source covering construction north or construction south (depending on the phase being modeled). Combustion emissions during construction activities are modeled as adjacent volume sources covering the construction areas.
- Tables presented in Appendix A include Project emissions from commuter vehicles and heavy-duty delivery trucks. Those offsite emissions sources were not included in the impacts assessment since their emissions occur almost entirely offsite.

Dispersion modeling was conducted to evaluate 1-hour average, 8-hour average, and 24-hour average impacts (short-term), as well as annual average impacts (long-term). Operational

emissions are presented in Appendix A. Table B.1 below summarizes the emissions rates for the individual construction phases. According to the construction schedule, construction activities occur no more than a few days in a single year; however, both short-term construction impacts (1-hr, 8-hr and 24-hr averaged concentrations) and long-term construction impacts (annual averaged concentrations) are evaluated here.

TABLE B.1

EMISSIONS SOURCES AND RATES IN EACH MODELING SCENARIO

Construction Activity	Scenario[1]		Emissions (g/s)						
			CO	NOX	PM10	PM2.5	ROG	SOx	CO2
Construction I: Bekaert	*1467c*	Dust	0	0	0	0	0	0	0
		Off-road	0.0035036	0.008985	0.000347649	0.000347649	0.0009075	7.99142E-06	0.812686
Construction II: HT #2	*2*	Dust	0	0	0	0	0	0	0
		Off-road	0.0029347	0.007721	0.000295728	0.000295728	0.000769795	6.86268E-06	0.684011
Construction III: Grading for compressor pad	*367a*	Dust	0	0	0.000482086	0.000482086	0	0	0
		Off-road	0.0001585	0.000337	1.61316E-05	1.61316E-05	3.90567E-05	2.91057E-07	0.027228
Construction IV: Compressor									
Construction of concrete pad	*467b*	Dust	0	0	0	0	0	0	0
		Off-road	0.0211702	0.015829	0.001312394	0.001312394	0.002503704	1.60801E-05	1.324665
Setting compressor	*1467c*	Dust	0	0	0	0	0	0	0
		Off-road	0.0035036	0.008985	0.000347649	0.000347649	0.0009075	7.99142E-06	0.812686
Pipe fabrication/installation	*467d*	Dust	0	0	0	0	0	0	0
		Off-road	0.0187966	0.031816	0.002061724	0.002061724	0.006098507	3.13266E-05	2.859322
Construction V: Conversion of well	5	Dust	0	0	0	0	0	0	0
		Off-road	0.0210215	0.053908	0.002085895	0.002085895	0.005444998	4.79485E-05	4.876118
Construction VI: Gas sales									
Grading for concrete pad	*367a*	Dust	0	0	0.000482086	0.000482086	0	0	0
		Off-road	0.0001585	0.000337	1.61316E-05	1.61316E-05	3.90567E-05	2.91057E-07	0.027228
Construction of concrete pad	*467b*	Dust	0	0	0	0	0	0	0
		Off-road	0.0211702	0.015829	0.001312394	0.001312394	0.002503704	1.60801E-05	1.324665
Setting gas sales equipment	*1467c*	Dust	0	0	0	0	0	0	0
		Off-road	0.0035036	0.008985	0.000347649	0.000347649	0.0009075	7.99142E-06	0.812686
Pipe fabrication/installation	*467d*	Dust	0	0	0	0	0	0	0
		Off-road	0.0187966	0.031816	0.002061724	0.002061724	0.006098507	3.13266E-05	2.859322

TABLE B.1

EMISSIONS SOURCES AND RATES IN EACH MODELING SCENARIO

Construction VII: MTs									
Grading for concrete pad	*367a*	Dust	0	0	0.000482086	0.000482086	0	0	0
		Off-road	0.0001585	0.000337	1.61316E-05	1.61316E-05	3.90567E-05	2.91057E-07	0.027228
Construction of concrete pad	*467b*	Dust	0	0	0	0	0	0	0
		Off-road	0.0211702	0.015829	0.001312394	0.001312394	0.002503704	1.60801E-05	1.324665
Setting microturbines	*1467c*	Dust	0	0	0	0	0	0	0
		Off-road	0.0035036	0.008985	0.000347649	0.000347649	0.0009075	7.99142E-06	0.812686
Pipe fabrication/ installation	*467d*	Dust	0	0	0	0	0	0	0
		Off-road	0.0187966	0.031816	0.002061724	0.002061724	0.006098507	3.13266E-05	2.859322

(1) Scenarios with the same 'Scenario' ID (column 2) represent construction activities with the same emissions.

Model Parameters and Data

Model Parameters

Model parameters for the ISCST3 simulations, were based on two South Coast Air Quality Management District (SCAQMD) Guidance Documents:

1. SCAQMD 2005. Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics "Hot Spots" Information and Assessment Act (AB2588). July 2005. Available at: http://www.aqmd.gov/prdas/AB2588/pdf/AB2588_Guidelines.pdf
2. SCAQMD 2003. Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis. August 2003. Available at: http://www.aqmd.gov/ceqa/handbook/mobile_toxic/diesel_analysis.doc

Per both documents, the following model control options are used:

- Use regulatory default? No
- Urban or Rural? Urban
- Gradual plume rise? No
- Stack tip downwash? Yes
- Buoyancy induced dispersion? Yes
- Calms processing? No
- Missing data processing? No

It should be noted that point sources are not known to be located on or in close proximity to any buildings and therefore building downwash is not considered in this analysis. ENVIRON also assumed none of the point sources in the model had rain caps or horizontal stacks.

Receptors

Three sets of receptors were evaluated, each using spacing consistent with the guidance documents cited above:

1. Boundary receptors along the facility fence-line spaced at 20-meter intervals
2. A Cartesian grid at 50 m spacing centered at the facility and extending approximately 250 to 300 m in each direction from the property boundary.
3. A Cartesian grid at 100 m spacing surrounding the 50-m grid and extending approximately 1 mile in each direction from the property boundary.

ENVIRON evaluated criteria pollutants at each grid point. Figure B.1 shows the extent of the large and small grid as well as the boundary receptors.

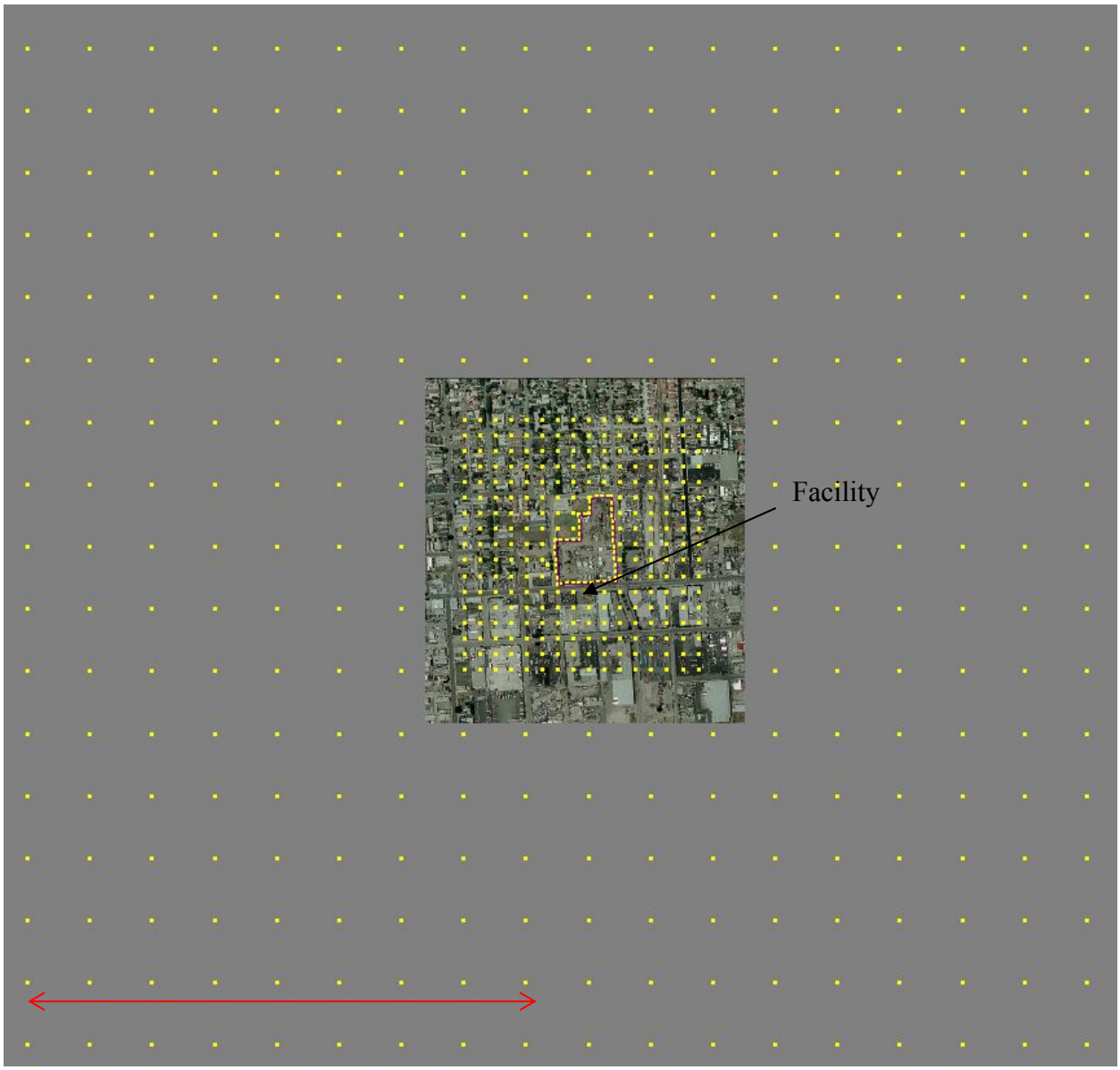


Figure B.1. Extent of receptor grids. Red line represents approximately 1 mile.

Meteorology data

The SCAQMD monitoring station with meteorological data located closest to the facility's location of Wilmington, California is the Long Beach station. The 1981 SCAQMD meteorological data of this station was used in the model.

Terrain data

Elevations were imported into the dispersion model using two adjacent 7.5-minute USGS Digital Elevation Model (DEM) files with 10 m spacing. The DEM files were downloaded from www.mapmart.com in SDTS format and are identified as "Long Beach" and "Torrance". The DEM files were imported into the Breeze software, which uses the U.S.EPA's AERMAP program to calculate the elevations of the sources and receptors using an interpolation scheme.

Operational source parameters

Emission sources included in the CEQA Baseline modeling are HT #1 and the existing Flare King. Emission sources included in the implementation phases include combinations of HT #1, HT #2, nine identical microturbines, the planned Bekaert CEB flare, and fugitive emissions associated with the new equipment. Table B.2 presents the parameters used to model those sources.

The locations of the existing and planned point sources were provided by facility staff to ENVIRON on a map of the facility (see Figure 3 in the main document), and these were visually located in the model using a satellite image of the facility as a base map. Figure B.1 shows a satellite image of the facility, the boundary receptors and the grid receptors.

TABLE B.2

POINT SOURCE PARAMETERS

Source ID	Description	Stack Height	Temp	Velocity	Stack Diameter
		meter	K	m/sec	meter
Heater treater 1	Heater treater	6.1	477.6	1.3	0.6096
Flare*	Flare King	4.88	1033	1.9	0.915
Heater treater 2 (2)	Heater treater	6.1	477.6	2.74	0.9144
Flare	Bekaert CEB	4.42	1366.5	19[(1)]	0.915
Microturbines (9)	Microturbine	3.05	533.2	25.4	0.254

[(1)] 19 m/sec represents the Bekaert operating at permitted capacity.

Construction source parameters

The two types of construction sources that were modeled were fugitive dust emissions (PM10 and PM2.5 only) and exhaust emissions (all pollutants). Model representation of these sources followed the methodology used by the SCAQMD to develop Localized Significance Thresholds as described in:

- SCAQMD 2008. Final Localized Significance Threshold Methodology. June 2003, Revised July 2008. Available at: http://www.aqmd.gov/CEQA/handbook/LST/Method_final.pdf

Exhaust emissions are modeled using adjacent volume sources covering each of the two construction areas (north and south). Volume sources had a release height of 5 m, initial lateral dimension of 10 m, and initial vertical dimension of 1.4 m, per the LST guidelines. Fugitive dust sources are modeled using area sources that cover each of the two construction areas with a release height of 0 and conservatively assumed to have 0 initial depth.

Figure B.2. Image of the facility and surrounding neighborhood. The purple line delineates the project boundary. Blue points represent point sources (see Figure 2 in main document for source descriptions); green area represents the area of fugitive emissions.

Air Quality Impacts

To reduce the individual model runs necessary for each pollutant, we implement a "chi over Q" approach (i.e., χ/Q, $\mu g/m^3$ per g/sec) using ISCST3. Using this approach each source is assigned an equivalent 1 g/s emissions rate in the model, which then generates χ/Q (or dispersion factors) for each source -receptor combination. Those factors are combined with emission rates in a database in the post-processing step to evaluate the incremental criteria pollutant concentrations and health impacts.

Table B.3 shows the maximum impact corresponding to each threshold. The maximum impact over all of the combined "construction plus operation "scenarios is reported. The impacts from each scenario are shown in Table B.4.

NO_2 Emissions

Emissions of NO_2 were also evaluated using the χ/Q approach . However, the USEPA default factor of 0.75 NO_2/NO_x was applied to all operational NO_x emissions to account for the conversion of NO to NO_2. In addition, a factor of 0.114 was applied to NO_x emissions from construction activities. The value of 0.114 represents a NO_2/NO_x ratio to account for conversion of NO to NO2 at distances of 200 m per the LST methodology. This factor was applied because all of the receptors with a combined "construction plus operational" impact (assuming all NOx was NO2) greater than the significance threshold were dominated by construction sources and were found within 200 meters of the construction emissions (Table B.3, B.4).

PM Emissions

Impacts due to emissions of PM (PM_{10}, $PM_{2.5}$) were determined by directly modeling PM emissions in the model (i.e., rather than using the dispersion factors in the post-processing step) in order to accurately account for simultaneous construction and operational impacts. Results shown in Table B.3 and B.4 reflect the results obtained from the model.

TABLE B.3

MAXIMUM OVERALL AIR QUALITY IMPACTS FROM THE PROPOSED PROJECT

Maximum Project Impacts[1]							
Emission Source	**Attainment**				**Nonattainment**		
	NO_2 (ppm)[2]		**CO (ppm)[3]**		**PM_{10}[4] (ug/m3)**		**$PM_{2.5}$[5] (ug/m3)**
	1-hour	**Annual**	**1-hour**	**8-hour**	**24-hour**	**Annual**	**24-hour**
Background concentration	0.11	0.0207	3	2.6	--	--	--
Incremental difference, with construction (Project - Baseline + construction)	0.02	0.0005	0.08	0.0452	2.23	0.27	2.23
Resulting concentration (Background + incremental)	0.13	0.021	3.08	2.65	--	--	--
SCAQMD Threshold	0.18	0.053	20	9	2.5	1	2.5
Significant?	No	No	No	No	No	No	No

(1) In cases where the concentrations in ppm were not sensitive enough to determine the scenario with the maximum impact, the raw results from the model in ug/m^3 were used.
(2) The maximum impact for one-hour NO_2 occurred in Scenario 5; the maximum impact for annual NO_2 occurred in Scenario 467d.
(3) The maximum impact for one-hour CO occurred in Scenario 467b; the maximum impact for annual CO occurred in Scenario 467b.
(4) The maximum impact for 24-hour PM_{10} occurred in Scenario 467d; the maximum impact for annual PM_{10} occurred in Scenario 467d.
(5) The maximum impact for 24-hour $PM_{2.5}$ occurred in Scenario 5.

TABLE B.4

PROJECT-RELATED OPERATIONAL AND CONSTRUCTION AIR QUALITY IMPACTS FOR DIFFERENT CONSTRUCTION PHASES

Scenario 367a

Emission Source	Attainment				Nonattainment		
	NO_2 (ppm)		CO (ppm)		PM_{10} (ug/m3)		$PM_{2.5}$ (ug/m3)
	1-hour	Annual	1-hour	8-hour	24-hour	Annual	24-hour
Background concentration	0.11	0.0207	3	2.6	--	--	--
Incremental difference, with construction (Project - Baseline + construction)	0.01	0.0005	0.02	0.01	1.86	0.27	1.86
Resulting concentration (Background + incremental)	0.120	0.021	3.018	2.609	--	--	--
SCAQMD Threshold	0.18	0.053	20	9	2.5	1	2.5
Significant?	No	No	No	No	No	No	No

Scenario 2

Emission Source	Attainment				Nonattainment		
	NO_2 (ppm)		CO (ppm)		PM_{10} (ug/m3)		$PM_{2.5}$ (ug/m3)
	1-hour	Annual	1-hour	8-hour	24-hour	Annual	24-hour
Background concentration	0.11	0.0207	3	2.6	--	--	--
Incremental difference, with construction (Project - Baseline + construction)	0.01	0.0005	0.02	0.01	1.55	0.27	1.55
Resulting concentration (Background + incremental)	0.121	0.021	3.025	2.611	--	--	--
SCAQMD Threshold	0.18	0.053	20	9	2.5	1	2.5
Significant?	No	No	No	No	No	No	No

TABLE B.4

PROJECT-RELATED OPERATIONAL AND CONSTRUCTION AIR QUALITY IMPACTS FOR DIFFERENT CONSTRUCTION PHASES

Scenario 467b

Emission Source	Attainment				Nonattainment		
	NO_2 (ppm)		CO (ppm)		PM_{10} (ug/m3)		$PM_{2.5}$ (ug/m3)
	1-hour	Annual	1-hour	8-hour	24-hour	Annual	24-hour
Background concentration	0.11	0.0207	3	2.6	--	--	--
Incremental difference, with construction (Project - Baseline + construction)	0.01	0.0005	0.08	0.05	2.08	0.27	2.08
Resulting concentration (Background + incremental)	0.123	0.021	3.076	2.645	--	--	--
SCAQMD Threshold	0.18	0.053	20	9	2.5	1	2.5
Significant?	No	No	No	No	No	No	No

Scenario 1467c

Emission Source	Attainment				Nonattainment		
	NO_2 (ppm)		CO (ppm)		PM_{10} (ug/m3)		$PM_{2.5}$ (ug/m3)
	1-hour	Annual	1-hour	8-hour	24-hour	Annual	24-hour
Background concentration	0.11	0.0207	3	2.6	--	--	--
Incremental difference, with construction (Project - Baseline + construction)	0.01	0.0005	0.03	0.01	1.76	0.27	1.76
Resulting concentration (Background + incremental)	0.121	0.021	3.027	2.615	--	--	--
SCAQMD Threshold	0.18	0.053	20	9	2.5	1	2.5
Significant?	No	No	No	No	No	No	No

Scenario 467d

Emission Source	Attainment				Nonattainment		
	NO_2 (ppm)		CO (ppm)		PM_{10} (ug/m3)		$PM_{2.5}$ (ug/m3)
	1-hour	Annual	1-hour	8-hour	24-hour	Annual	24-hour
Background concentration	0.11	0.0207	3	2.6	--	--	--
Incremental difference, with construction (Project - Baseline + construction)	0.02	0.0005	0.07	0.04	1.61	0.27	1.61
Resulting concentration (Background + incremental)	0.126	0.021	3.069	2.641	--	--	--
SCAQMD Threshold	0.18	0.053	20	9	2.5	1	2.5
Significant?	No	No	No	No	No	No	No

TABLE B.4

PROJECT-RELATED OPERATIONAL AND CONSTRUCTION AIR QUALITY IMPACTS FOR DIFFERENT CONSTRUCTION PHASES

Scenario 5							
Emission Source	**Attainment**				**Nonattainment**		
	NO_2 (ppm)		**CO (ppm)**		**PM_{10} (ug/m3)**		**$PM_{2.5}$ (ug/m3)**
	1-hour	**Annual**	**1-hour**	**8-hour**	**24-hour**	**Annual**	**24-hour**
Background concentration	0.11	0.0207	3	2.6	--	--	--
Incremental difference, with construction (Project - Baseline + construction)	0.02	0.0005	0.08	0.04	2.23	0.27	2.23
Resulting concentration (Background + incremental)	0.130	0.021	3.075	2.645	--	--	--
SCAQMD Threshold	0.18	0.053	20	9	2.5	1	2.5
Significant?	No	No	No	No	No	No	No

APPENDIX C

HEALTH RISK EVALUATION

TABLE OF CONTENTS
WARREN E&P NEW EQUIPMENT PROJECT – INITIAL STUDY

APPENDIX C
HEALTH RISK EVALUATION

Table No. **Page No.**

C.1. TAC Emission Rates from Project (Combustion Equipment).....C-1
C.2. Toxicity Values Used in the Health Risk Evaluation.....C-3
C.3. Health Risk Evaluation Methodology C-5
C.4. Proposed Project Health Impacts.....C-8

APPENDIX C
HEALTH RISK EVALUATION

Health Risk Evaluation

Emissions

Emissions of toxic air contaminants (TACs) were calculated for the maximum permitted capacity of each piece of equipment and using the emission factors shown below (Table C.1).

TABLE C.1

TAC EMISSION RATES FROM PROJECT (COMBUSTION EQUIPMENT)[1]

Heater Treater #1		
TACS	**EF (lb/mmscf)**	**peak emissions (lb/day)**
acetaldehyde	0.0031	1.77E-04
acrolein	0.0027	1.54E-04
ammonia	3.2	1.83E-01
benzene	0.0058	3.31E-04
ethyl benzene	0.0069	3.94E-04
formaldehyde	0.0123	7.02E-04
hexane	0.0046	2.63E-04
Naphthalene	0.0003	1.71E-05
PAHs (w/out naphthalene)	0.0001	5.71E-06
propylene	0.53	3.03E-02
toluene	0.0265	1.51E-03
xylene	0.0197	1.12E-03
Heater Treater #2)[(2)]		
TACS	**EF (lb/mmscf)**	**peak emissions (lb/day)**
acetaldehyde	0.0031	8.50E-04
acrolein	0.0027	7.41E-04
ammonia	3.2	8.78E-01
benzene	0.0058	1.59E-03
ethyl benzene	0.0069	1.89E-03
formaldehyde	0.0123	3.37E-03
hexane	0.0046	1.26E-03
Naphthalene	0.0003	8.23E-05
PAHs (w/out naphthalene)	0.0001	2.74E-05
propylene	0.53	1.45E-01
toluene	0.0265	7.27E-03
xylene	0.0197	5.40E-03

TABLE C.1

TAC EMISSION RATES FROM PROJECT (COMBUSTION EQUIPMENT)[(1)]

Nine Microturbines[(3)]		
TACS	**EF (lb/MMBtu)**	**peak emissions (lb/day)**
1,3-butadiene	0.00000043	8.80E-05
acetaldehyde	0.00004	8.19E-03
acrolein	0.0000064	1.31E-03
benzene	0.000012	2.46E-03
ethyl benzene	0.000032	6.55E-03
formaldehyde	0.00071	1.45E-01
PAHs (w/out naphthalene)	0.0000009	1.84E-04
propylene oxide	0.0000013	2.66E-04
toluene	0.00013	2.66E-02
xylene	0.000064	1.31E-02
Bekaert CEB		
TACS	**EF (lb/mmscf)[1]**	**peak emissions (lb/day)**
Benzene	0.159	0.0617874
Formaldehyde	1.169	0.4542734
Naphthalene	0.011	0.0042746
PAHs	0.003	0.0011658

(1) Emissions are for equipment operating at full capacity.
(2) Emissions are shown for both burners of HT #2.
(3) Emissions are shown for nine microturbines.

Toxicity

Toxicity studies with laboratory animals or epidemiological studies of human populations are relied upon to develop toxicity criteria. The toxicities of many of the volatile TACs emitted from the proposed project are relatively well-known with well-established toxicity criteria. Toxicological values used in this assessment are listed in Table C.2. Unless otherwise noted in Table C.2, values are taken from Cal/EPA OEHHA and CARB's Consolidated Table of Approved Risk Assessment Health Values as provided in the Hotspots And Reporting Program (HARP) version 1.4.[1]

[1] See Cal/EPA. 2004. Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values. Office of Environmental Health Hazard Assessment and Air Resources Board. (April 4, 2005) and HARP version 1.4 available at http://www.arb.ca.gov/toxics/harp/harp.htm

TABLE C.2

TOXICITY VALUES USED IN THE HEALTH RISK ASSESSMENT

TAC	CAS	Cancer Risk			Chronic HI		Acute HI	
		CP	MPw	MPr	CREL	MPr/MPw	AREL	AF[1]
1,3-butadiene	106-99-0	6.00E-01	1.00	1.00	2.00E+01	1.00	1.00E+00	-
acetaldehyde	75-07-0	1.00E-02	1.00	1.00	9.00E+00	1.00	1.00E+00	-
Acrolein[2]	107-02-8	-	-	-	6.00E-02	1.00	1.90E-01	1
ammonia	7664-41-7	-	-	-	2.00E+02	1.00	3.20E+03	1
benzene	71-43-2	1.00E-01	1.00	1.00	6.00E+01	1.00	1.30E+03	0.73
ethyl benzene[3]	100-41-4	8.70E-03	1.00E+00	1.00E+00	2.00E+03	1.00	1.00E+00	-
formaldehyde	50-00-0	2.10E-02	1.00	1.00	3.00E+00	1.00	9.40E+01	1
hexane	110-54-3	-	-	-	7.00E+03	1.00	1.00E+00	-
Naphthalene	91-20-3	1.20E-01	1.00	1.00	9.00E+00	1.00	1.00E+00	-
PAHs (without naphthalene)	1150	3.90E+00	14.62	29.76	-	-	1.00E+00	-
propylene	115-07-1	-	-	-	3.00E+03	1.00	1.00E+00	-
propylene oxide	75-56-9	1.30E-02	1.00	1.00	3.00E+01	1.00	3.10E+03	1
toluene	108-88-3	-	-	-	3.00E+02	1.00	3.70E+04	1
xylene	1330-20-7	-	-	-	7.00E+02	1.00	2.20E+04	1

(1) Averaging factor to account for acute impacts for individual TACs whose REL is based on periods longer than 1-hr exposure, taken from SCAQMD Risk Assessment Procedures for Rules 1401 and 212 Version 7.0 July 2005.
(2) Acute impacts of acrolein are currently being reviewed by OEHHA – historical REL value of 1.9 is used here
(3) Ethyl benzene designated as a carcinogen in November 2007

Health Effects

Compounds were evaluated for their potential health effects in two categories, carcinogenic (cancer) and non-carcinogenic (non-cancer). Almost all compounds produce non-carcinogenic effects at sufficiently high doses, but only some compounds are associated with carcinogenic effects. Most regulatory agencies consider carcinogens to pose a risk of cancer at all exposure levels (i.e., a "no-threshold" assumption); that is, any increase in dose is assumed to be associated with an increase in the probability of developing cancer. In contrast, non-carcinogens generally are thought to produce adverse health effects only when some minimum exposure level is reached (i.e., a threshold).

The health effects due to emissions of TACs are evaluated using the maximum incremental cancer risk (MICR), chronic hazard indices (HICs), and acute hazard indices (HIAs). Table C.3 summarizes the health risk methodology which follows the SCAQMD RISK ASSESSMENT PROCEDURES for Rules 1401 and 212 Version 7.0, July 2005. Primary and secondary exposure pathways include inhalation, non-inhalation primary, and non-inhalation secondary exposure pathways. The primary non-inhalation pathways include dermal exposure, water ingestion, crop ingestion (direct deposition), and soil ingestion. The secondary non-inhalation pathways include ingestion of mother's milk, fish, dairy products, all types of meat and eggs, and crop ingestion (root uptake). All of these exposure pathways are conservative and evaluated using multi-pathway factors per the Rule 1401/212 guidance.

Cancer risk, chronic HI, and acute HI were calculated for the CEQA baseline and for the final proposed project.

1) CEQA Baseline: maximum permitted operation of HT #1 and the Flare King flare

2) Final proposed project: maximum permitted operation of HT #1, HT #2, Bekaert CEB®, and nine microturbines

The impacts for the baseline and proposed project were calculated at each grid receptor using the "chi over Q" approach (i.e., χ/Q, $\mu g/m^3$ per g/sec) described in Appendix B. The difference in health impacts between the baseline and proposed project were calculated at each receptor, which is considered the CEQA incremental impact for that receptor. After calculating the incremental impact for each receptor, the maximum difference over all receptors was identified; this maximum difference is the maximum impact for the proposed project. All calculations and processing were done in an Access database.

TABLE C.3

HEALTH RISK ASSESSMENT METHODOLOGY

Health Impact	Approach & Parameter Values
Cancer Risk (resident exposure)	Methodology follows SCAQMD RISK ASSESSMENT PROCEDURES for Rules 1401 and 212 Version 7.0 July 2005 **Maximum Individual Cancer Risk (MICR) = Cancer Potency (CP) x Dose-Inhalation (DI) x Multipathway Factor (MPr)** **DI = Emissions(Q) x χ/Q x DBRr x EVFr x AF_{ann} x 10^{-6}** **Total MICR = Σ MICR over all TACs** CP: inhalation slope factor from HARP version 1.4 software internal database for each TAC MPr: residential carcinogen multipathway factor per Rule 1401 Reference Tables for each TAC χ/Q: annual average dispersion factor found using EPA's ISCST3 dispersion model DBRr: Resident Daily Breathing Rate DBR = 302 (m^3/kg-day) EVFr: Resident Exposure Value Factor EVF = 0.96 AF_{ann}: Adjustment factor to account for time-of-day residential exposure = 1 DBRr, EVFr and AF_{ann} from Rule 1401 Reference Tables
Cancer Risk (worker exposure)	Methodology follows SCAQMD RISK ASSESSMENT PROCEDURES for Rules 1401 and 212 Version 7.0 July 2005
	Maximum Individual Cancer Risk (MICR) = Cancer Potency (CP) x Dose-Inhalation (DI) x Multipathway Factor (MPw)
	DI = Emissions(Q) x χ/Q x DBRw x EVFw x AF_{ann} x 10^{-6}
	Total MICR = Σ MICR over all TACs
	CP: inhalation slope factor from HARP version 1.4 software internal database for each TAC
	MPr: residential carcinogen multipathway factor per Rule 1401 Reference Tables for each TAC
	χ/Q: annual average dispersion factor found using EPA's ISCST3 dispersion model
	DBRw: Worker Daily Breathing Rate DBR = 149 (m^3/kg-day)
	EVFw: Worker Exposure Value Factor EVF = 0.38
	AF_{ann}: Adjustment factor to account for time-of-day worker exposure = 1 (emissions rates assumed not to change during work hours)
	DBRw, EVFw, from Rule 1401 Reference Tables

Health Impact	Approach & Parameter Values
Chronic Health Index (resident exposure)	Methodology follows SCAQMD RISK ASSESSMENT PROCEDURES for Rules 1401 and 212 Version 7.0 July 2005 **Chronic HI (HIC) = Emissions(Q) x χ/Q x Multipathway Factor (MPr) / Chronic REL** **Total HIC = Σ HIC over all TACs** χ/Q: annual average dispersion factor found using EPA's ISCST3 dispersion model MPr: residential multipathway factor for chronic hazards per Rule 1401 Reference Tables for each TAC REL: Chronic Relative Exposure Limits (RELs) from HARP version 1.4 software internal database for each TAC
Chronic Health Index (worker exposure)	Methodology follows SCAQMD RISK ASSESSMENT PROCEDURES for Rules 1401 and 212 Version 7.0 July 2005
	Chronic HI (HIC) = Emissions(Q) x χ/Q x Multipathway Factor (MPw) / Chronic REL
	Total HIC = Σ HIC over all TACs
	χ/Q: annual average dispersion factor found using EPA's ISCST3 dispersion model
	MPw: worker multipathway factor for chronic hazards per Rule 1401 Reference Tables for each TAC
	REL: Chronic Relative Exposure Limits (RELs) from HARP version 1.4 software internal database for each TAC
Acute Health Index	Methodology follows SCAQMD RISK ASSESSMENT PROCEDURES for Rules 1401 and 212 Version 7.0 July 2005 **Acute HI (HIA) = Emissions(Q) x χ/Q x AF / Acute REL** **Total HIA = Σ HIA over all TACs** χ/Q: maximum 1-hr average dispersion factor found using EPA's ISCST3 dispersion model AF: averaging factor for individual TACs whose REL is based on periods longer than 1-hr exposure (per Rule 1401 Reference Tables for each TAC) REL: Acute Relative Exposure Limits (RELs) from HARP version 1.4 software internal database for each TAC

Impacts

For cancer risk and HIC, both residential and worker exposure scenarios were considered for each grid receptor. Since there is no difference in resident and worker HIC multi-pathway factor for the TACs considered here, HIC is the same for resident and worker exposure assumptions. The maximum cancer risk and HIC were evaluated at all off-site receptors, while the maximum HIA was evaluated at all the receptors including boundary and off-site receptors. Health impacts are reported in Table C.4.

It should be noted that risk was calculated using both worker and residential exposure assumptions at all offsite receptors including those that are not physically located at residences or workplaces. This was done to provide the most comprehensive and conservative assessment possible. The point of maximum impact for both residential and worker risk was at a location that was neither a resident nor workplace. Using residential exposure assumptions at this location overestimates cancer risk; in other words, the estimated risk experienced by the maximum exposed resident would be lower than the value reported in Table C.4.

TABLE C.4.

PROPOSED PROJECT HEALTH IMPACTS[1]

Health impact	SCAQMD significance threshold	Impact of proposed project
Maximum Increase in Cancer Risk using Residential Exposure Assumptions	≥ 10 in a million	0.70 in a million
Maximum Increase in Cancer Risk using Worker Exposure Assumptions	≥ 10 in a million	0.13 in a million
Maximum Incremental Acute Hazard Index (HIA)	≥1.0	0.02
Maximum Incremental Chronic Hazard Index (HIC)	≥1.0	0.008

[1] This table is the same as Table III-10 in the main document.

APPENDIX D

EVALUATION OF GREENHOUSE GAS EMISSIONS

TABLE OF CONTENTS

APPENDIX D
EVALUATION OF GREENHOUSE GAS EMISSIONS

Table No. **Page No.**

D.1. Total Daily GHG Emissions During Each Phase of Project Implementation D-2
D.2. Project Implementation Schedule D-7
D.3. Total GHG Emissions During Each Phase and Year of Project Implementation D-8
D.4. Annual GHG Emissions During Project Implementation D-9
D.5. Total GHG Emissions for the Final Proposed Project and the Business-as-Usual Scenario D-12

APPENDIX D
EVALUATION OF GREENHOUSE GAS EMISSIONS

Emissions Calculation

Greenhouse gas (GHG) emissions consist of direct emissions (e.g., combustion) and indirect emissions (e.g., water use and electricity). Direct GHG emissions, including emissions from combustion, commuting, and construction, were calculated using emission factors from AP-42 and the American Petroleum Institute. Attachment A1 provides details on these emission factors. Indirect GHG emissions include emissions arising from water usage and the purchase of electricity produced off-site. The proposed project is not expected to require additional water at the site. Additional electricity will be required but will be supplied by the microturbines. As a result, no indirect GHG emissions were calculated for the proposed project.

Emissions from all interim phases, as well as the final proposed project, were calculated and compared to the baseline (Table D.1). As a supplement to Table D.1, the project implementation schedule, previously discussed in the main document, is included in Table D.2. In addition, the emissions for each year from 2009 through final proposed project implementation in 2012 are described (Table D.3 and D.4).

TABLE D.1
TOTAL DAILY GHG EMISSIONS DURING EACH PHASE OF PROJECT IMPLEMENTATION

Baseline						
Device/Process	**Heat Input Rating (MMbtu/hr)**	**Fuel flow (Mscf/day)**	**Percent of rating (%)**	**CO_2 (MT CO_2/day)**	**CH_4[1] (MT CO_2eq/day)**	**N_2O[2] (MT CO_2eq/day)**
Heater treater #1 (100%)	2.5	57.1	100%	3.11	1.37E-04	1.69E-02
Flare King Flare (100%)	4.0	91.4	100%	5.25	2.19E-03	7.86E-03
	Totals:	149		8.36	3.57E-03	2.47E-02
					Total (MT/day)	8.39

Phase I (Construction I, Interim 1)						
Device/Process	**Heat Input Rating (MMbtu/hr)**	**Fuel flow (Mscf/day)**	**Percent of rating (%)**	**CO_2 (MT CO_2/day)**	**CH_4[1] (MT CO_2eq/day)**	**N_2O[2] (MT CO_2eq/day)**
Heater treater #1	2.5	57.1	100%	3.11	1.37E-03	1.69E-02
Flare King	4.0	91.4	100%	5.25	2.19E-03	7.86E-03
Microturbines (6)	5.7	130.1	100%	7.08	3.12E-03	3.84E-02
Construction emissions	--	--	--	0.07	--	--
	Totals:	279		15.52	6.69E-03	6.32E-02
					Total (MT/day)	15.59

TABLE D.1
TOTAL DAILY GHG EMISSIONS DURING EACH PHASE OF PROJECT IMPLEMENTATION

Phase II (Construction 2, Interim 2)

Device/Process	Heat Input Rating (MMbtu/hr)	Fuel flow (Mscf/day)	Percent of rating (%)	CO_2 (MT CO_2/day)	CH_4[1] (MT CO_2eq/day)	N_2O[2] (MT CO_2eq/day)
Heater treater #1	2.5	57.1	100%	3.11	1.37E-03	1.69E-02
Bekaert CEB	17.0	388.6	100%	22.32	9.33E-03	3.34E-02
Microturbines (6)	5.7	130.1	100%	7.08	3.12E-03	3.84E-02
Construction emissions	--	--	--	0.06	--	--
	Totals:	576		32.58	1.38E-02	8.87E-02
					Total (MT/day)	32.68

Phase III (Construction 3, Interim 3)

Device/Process	Heat Input Rating (MMbtu/hr)	Fuel flow (Mscf/day)	Percent of rating (%)	CO_2 (MT CO_2/day)	CH_4[1] (MT CO_2eq/day)	N_2O[2] (MT CO_2eq/day)
Heater treater #2	12.0	274.3	100%	14.93	6.58E-03	8.10E-02
Bekaert CEB	17.0	388.6	100%	22.32	9.33E-03	3.34E-02
Microturbines (6)	5.7	130.1	100%	7.08	3.12E-03	3.84E-02
Construction emissions	--	--	--	0.00	--	--
Commuting	--	--	--	0.15	--	--
	Totals:	793		44.50	1.90E-02	1.53E-01
					Total (MT/day)	44.67

TABLE D.1
TOTAL DAILY GHG EMISSIONS DURING EACH PHASE OF PROJECT IMPLEMENTATION

Phase IV (Construction 4, Interim 3)

Device/Process	Heat Input Rating (MMbtu/hr)	Fuel flow (Mscf/day)	Percent of rating (%)	CO_2 (MT CO_2/day)	CH_4[1] (MT CO_2eq/day)	N_2O[2] (MT CO_2eq/day)
Heater treater #2	12.0	274.3	100%	14.93	6.58E-03	8.10E-02
Bekaert CEB	17.0	388.6	100%	22.32	9.33E-03	3.34E-02
Microturbines (6)	5.7	130.1	100%	7.08	3.12E-03	3.84E-02
Construction emissions	--	--	--	0.25	--	--
Commuting	--	--	--	0.15	--	--
	Totals:	793		44.74	1.90E-02	1.53E-01
					Total (MT/day)	44.91

Phase Va (Construction 5, Interim 3)[1]

Device/Process	Heat Input Rating (MMbtu/hr)	Fuel flow (Mscf/day)	Percent of rating (%)	CO_2 (MT CO_2/day)	CH_4[1] (MT CO_2eq/day)	N_2O[2] (MT CO_2eq/day)
Heater treater #2	12.0	274.3	100%	14.93	6.58E-03	8.10E-02
Bekaert CEB	17.0	388.6	100%	22.32	9.33E-03	3.34E-02
Microturbines (6)	5.7	130.1	100%	7.08	3.12E-03	3.84E-02
Construction emissions	--	--	--	0.42	--	--
Commuting	--	--	--	0.15	--	--
Heavy duty vehicle trips	--	--	--	0.15	--	--
	Totals:	793		45.07	1.90E-02	1.53E-01
					Total (MT/day)	45.24

[1] Phase V has different operational characteristics before and after construction. As a result, the Phase was separated into a Phase Va (Interim 3, Construction 5) and Phase Vb (Interim 4). The total duration of the Phase is 487 days; Phase Va is assumed to last 10 days (i.e., number of days for Construction 5) and Phase Vb is assumed to last the remaining 387 days.

TABLE D.1
TOTAL DAILY GHG EMISSIONS DURING EACH PHASE OF PROJECT IMPLEMENTATION

Phase Vb (Interim 4)[1]

Device/Process	Heat Input Rating (MMbtu/hr)	Fuel flow (Mscf/day)	Percent of rating (%)	CO_2 (MT CO_2/day)	CH_4[1] (MT CO_2eq/day)	N_2O[2] (MT CO_2eq/day)
Heater treater #2	12.0	274.3	100%	14.93	6.58E-03	8.10E-02
Bekaert CEB	17.0	35.0(3)	9%(3)	2.01	8.40E-04	3.01E-03
Microturbines (6)	5.7	130.1	100%	7.08	3.12E-03	3.84E-02
Construction emissions	--	--	--	0.00	--	--
Commuting	--	--	--	0.15	--	--
Heavy duty vehicle trips	--	--	--	0.05	--	--
Gas reinjection	--	--	--	--	--	--
	Totals:	439		24.23	1.05E-02	1.22E-01
					Total (MT/day)	24.36

Phase VI (Construction 6, Interim 4)

Device/Process	Heat Input Rating (MMbtu/hr)	Fuel flow (Mscf/day)	Percent of rating (%)	CO_2 (MT CO_2/day)	CH_4[1] (MT CO_2eq/day)	N_2O[2] (MT CO_2eq/day)
Heater treater #2	12.0	274.3	100%	14.93	6.58E-03	8.10E-02
Bekaert CEB	17.0	35.0(3)	9%(3)	2.01	8.40E-04	3.01E-03
Microturbines (6)	5.7	130.1	100%	7.08	3.12E-03	3.84E-02
Construction emissions	--	--	--	0.25	--	--
Commuting	--	--	--	0.15	--	--
Heavy duty vehicle trips	--	--	--	0.05	--	--
Gas reinjection	--	--	--	--	--	--
	Totals:	439		24.48	1.05E-02	1.22E-01
					Total (MT/day)	24.61

TABLE D.1
TOTAL DAILY GHG EMISSIONS DURING EACH PHASE OF PROJECT IMPLEMENTATION

Phase VII (Construction 7, Interim 5)						
Device/Process	**Heat Input Rating (MMbtu/hr)**	**Fuel flow (Mscf/day)**	**Percent of rating (%)**	**CO_2 (MT CO_2/day)**	**CH_4[1] (MT CO_2eq/day)**	**N_2O[2] (MT CO_2eq/day)**
Heater treater #1	2.5	57.1	100%	3.11	1.37E-03	1.69E-02
Heater treater #2	12.0	274.3	100%	14.93	6.58E-03	8.10E-02
Bekaert CEB	17.0	35.0[(3)]	9%[(3)]	2.01	8.40E-04	3.01E-02
Microturbines (6)	5.7	130.1	100%	7.08	3.12E-03	3.84E-02
Construction emissions	--	--	--	0.25	--	--
Commuting	--	--	--	0.15	--	--
Heavy duty vehicle trips	--	--	--	0.05	--	--
Gas sales	--	--	--	--	--	--
	Totals:	497		27.59	1.19E-02	1.39E-01
					Total (MT/day)	27.74

TABLE D.1
TOTAL DAILY GHG EMISSIONS DURING EACH PHASE OF PROJECT IMPLEMENTATION

Final Project (Full oil/gas production: HT #1, HT #2, Bekaert CEB, 9 MTs, Gas sales)						
Device/Process	**Heat Input Rating (MMbtu/hr)**	**Fuel flow (Mscf/day)**	**Percent of rating (%)**	**CO_2 (MT CO_2/day)**	**CH_4[1] (MT CO_2eq/day)**	**N_2O[2] (MT CO_2eq/day)**
Heater treater #1	2.5	57.1	100%	3.11	1.37E-03	1.69E-02
Heater treater #2	12.0	274.3	100%	14.93	6.58E-03	8.10E-02
Bekaert CEB	17.0	35.0[3]	9%[3]	2.01	8.40E-04	3.01E-03
Microturbines (9)	8.5	195.1	100%	10.62	4.68E-03	5.77E-02
Commuting	--	--	--	0.15	--	--
Heavy duty vehicle trips	--	--	--	0.05	--	--
Gas sales	--	--	--	--	--	--
	Totals:	562		30.88	1.35E-02	1.59E-01
					Total (MT/day)	31.05

[1] The global warming potential for CH_4 (23 tonne CO_2eq per 1 tonne CH_4) was used to convert CH_4 to CO_2eq.
[2] The global warming potential for N_2O (296 tonne CO_2eq per 1 tonne N_1O) was used to convert N_2O to CO_2eq.
[3] As described in the Findings of Fact in the Stipulated Order of Abatement, the Bekaert CEB® will be maintained in ready-standby mode once the gas reinjection system is operational, except in the cases of breakdowns or scheduled maintenance.

TABLE D.2
PROJECT IMPLEMENTATION SCHEDULE

Phase	Operation and Construction Activities[(1),(2)]	Approximate Date
0	Baseline; Operation of HT#1, and Flare King flare	2008
I	Operation of HT#1, 6 microturbines, and Flare King flare Construction of the Bekaert CEB® and removal of the Flare King flare and hot water heater	Q1 2009
II	Operation of HT#1, 6 microturbines, and Bekaert CEB® Construction of HT#2 and refurbishment of HT#1	Q2 2009
III	Operation of HT#2, 6 microturbines, and Bekaert CEB® Grading of compressor pad	Q2 2009
IV	Operation of HT#2, 6 microturbines, and Bekaert CEB® Construction and installation of the compressor	Q2 2009
V	Operation of HT#2, 6 microturbines, and Bekaert CEB® Construction needed to convert well for reinjection	Q2 2009 – Q3 2010
VI	Operation of HT#2, 6 microturbines, Bekaert CEB®, and gas reinjection Construction of gas sales equipment	Q4 2010 – Q3 2011
VII	Operation of HT#2, 6 microturbines, Bekaert CEB®, and gas sales Construction of 3 additional microturbines	Q4 2011
Final	Operation of HT#1, HT#2, 9 microturbines, Bekaert CEB®, and gas sales	2012

(1) As noted in the text, some of these phases may not be necessary (e.g., direct gas sales if production warrants this approach; continuing re-injection, but not going to gas sales, if production is too low; not installing additional microturbines if production does not warrant it).
(2) This schedule is for analysis purposes only and is used for calculating proposed project emissions.

TABLE D.3
TOTAL GHG EMISSIONS DURING EACH PHASE AND YEAR OF PROJECT IMPLEMENTATION

Phase	Start date	Assumed Duration (days)[1]	Total Emissions[2] (MT)	Emissions, Year I (MT)[3],[4]	Emissions, year II (MT)[3],[4]
Phase I	Q1, 2009	46	711	711	--
Phase II	Q1, 2009	46	1,491	1,491	--
Phase III	Q2, 2009	30	1,359	1,359	--
Phase IV	Q2, 2009	30	1,366	1,366	--
Phase Va[5]	Q2, 2009	10	459	459	--
Phase Vb[5]	Q2, 2009	387	11,613	4,946	6,667
Phase VI	Q4, 2010	365	8,983	2,240	6,743
Phase VII	Q4, 2011	90	2,536	2,536	--
Final Project	Q1, 2012	yearly	11,335	11,335	--

[1] Some of these phases may not be necessary (e.g., direct gas sales if production warrants this approach; continuing re-injection, but not going to gas sales, if production is too low; not installing additional microturbines if production does not warrant it). This schedule is for analysis purposes only and is used for calculating proposed project emissions.

[2] Total emissions for each phase were calculated by adding the construction GHG emissions (i.e., construction emissions occurring over specified number of days; see Appendix A) and the operational GHG emissions (i.e., phase emissions shown in Table D-1 over the duration shown in this table).

[3] Phases V and VI overlap multiple years. The annual emissions for each year were calculated by applying a ratio of the days operating in the first year to the total emissions. For example, Phase V occurs 213 days of 2009 and 274 days of 2010. The emissions in 2009 are 9,616.5 (9,616.5 = 213/487 * 21,972).

[4] Phase V occurs during 2009 and 2010. Phase VI occurs during 2010 and 2011.

[5] Phase V has different operational characteristics before and after construction. As a result, the Phase was separated into a Phase Va (Interim 3, Construction 5) and Phase Vb (Interim 4). The total duration of the Phase is 487 days; Phase Va is assumed to last 10 days (i.e., number of days for Construction 5) and Phase Vb is assumed to last the remaining 387 days.

TABLE D.4.

ESTIMATED GHG EMISSIONS (CO_2EQ) DURING PROJECT IMPLEMENTATION AND FINAL PROPOSED PROJECT

Year	Estimated Emissions		
	Annual Emissions[1] (MT CO_2eq/yr)	Percent of Statewide Inventory (%)	Emissions Increase[2] (MT CO_2eq/yr)
2008 (baseline)	3,063	0.00055	--
2009	10,331	0.00186	7,268
2010	8,907	0.00161	5,843
2011	9,279	0.00167	6,215
Final project (2012 and beyond)	11,335	0.00205	8,271

[1] Assumes full scale production will be occurring over 365 days per year beginning in 2012.
[2] The emissions increase represents the phase emissions minus the baseline emissions. For example, the final project emissions increase is 8,279 (11,335 – 3,063 = 8,271).

If GHG emissions are analyzed for a 30-year timeline from 2009 through 2039, the annual average emission over those 30 years are 11,158 MT CO_2eq per year. The annual average emission over those 30 years without implementation of the proposed project is 3,063 MT CO_2eq per year, for a difference of 8,095 MT CO_2eq per year.

Evaluation of Significance

As described in the ND, no significance threshold has been formally established for GHG emissions. However, the SCAQMD has proposed an approach incorporating multiple tiers for evaluation. Two of the potential approaches include a significance threshold of an incremental increase of 10,000 MT CO_2eq per year and a business-as-usual (BAU) approach.

SCAQMD Significance Criteria

The incremental increase of 10,000 MT CO_2eq was approved on December 5, 2008 as the interim significance threshold. As shown in Table D.4, the proposed project is estimated to emit a total of 11,335 MT CO_2eq per year. This annual emissions results in an expected emissions increase of 8,271 MT CO_2eq per year. This emissions increase is less than the interim significance threshold of 10,000 MT CO_2eq per year, and thus the emissions from the proposed project are less than significant.

Other Significance Criteria

The BAU approach has been discussed, but not adopted, by the SCAQMD. CAPCOA defines a BAU as the projection of GHGs into the future based on current technology and regulations in absence of other reductions. Adoption of new GHG reduction regulations (e.g., CARB's Scoping Plan measures) in the future establishes new BAU (i.e., evolves over time). A BAU scenario normally defines CEQA's no-project alternative, but does not necessarily form the project baseline. This approach entails comparing the percent reduction in emissions under the proposed project to emissions under a BAU scenario. If this percent reduction is 30 percent or greater, it is assumed that the project will contribute to reducing GHG emissions to achieve current and potential future regulatory goals and, therefore, the proposed project would not be cumulatively considerable. As a result, GHG emission impacts would be considered less than significant.

As described in the main document, the gas production rate at the WTU Central Facility is not certain. If gas production is maintained at a rate of 1,090 to 1150 Mscf per day for approximately six months, then Warren will install gas reinjection or sales equipment. However, if production does not reach this level, gas reinjection and/or sales are not economically feasible. Based on this, a BAU scenario was defined as the WTU Central Facility without gas reinjection or sales. For evaluation purposes, a set rate of produced gas was assumed. This set rate was the rate of gas below which gas reinjection and/or sales are not economically viable (i.e., 1,000 Mscf per day). This rate of gas production is comparable to that expected during the proposed project.

The two cases being analyzed are:

- BAU scenario: Operation of HT #1, HT #2, six microturbines[2], and two Bekaert CEBs

- Final proposed project: Operation of HT #1, HT #2, nine microturbines, and gas sales or reinjection

As described above, both scenarios are analyzed assuming a total fuel flow rate of 1,000 Mscf per day. For the BAU scenario, the produced gas is first directed to HT #1 (57 Mscf per day), HT #2 (274.3 Mscf per day), and the six microturbines (130.1 Mscf per day). Neither gas reinjection nor gas sales are occurring under the BAU scenario. Therefore, the remainder of the gas that is not used as fuel for the above-described equipment is assumed to be flared. In order to flare the remainder of the gas (538.5 Mscf per day), the WTU Central Facility would need a total of two Bekaert CEBs® (Table D.5). The combined fuel flow rate of 538.5 Mscf per day to the two Bekaert CEBs® is equivalent to 69% of the rated capacity.

For the final proposed project, the produced gas is directed to HT #1 (57 Mscf per day), HT #2 (274.3 Mscf per day), and the nine microturbines (195.1 Mscf per day). Then, gas is directed to the Bekaert CEB®. As described in the Findings of Fact in a Stipulated Order of Abatement (Hearing Dates August 13 and 14, 2008; Case No. 5649-2), "once the gas re-injection operation is permitted, installed and operational, the Bekaert Burner will be placed in ready-standby mode, thereby significantly reducing combustion emissions." The Bekaert CEB® will be maintained in this ready standby mode (35 Mscf per day) once the gas reinjection system is operational, except in the cases of breakdowns or scheduled maintenance. The remainder of the gas (438.5 Mscf per day) is routed to gas reinjection or sales.

Based on total GHG emissions in CO_2eq (Table D.5), the final proposed project represents a 45 percent reduction compared to the BAU scenario.

[2] The BAU scenario with the six microturbines was chosen because 1) six microturbines are currently operating at the WTU Central Facility; and 2) this produces conservatively low estimates of BAU emissions as compared to including the nine microturbines that could be used to maximize on-site beneficial usage of produced gas.

TABLE D.5
TOTAL GHG EMISSIONS FOR THE FINAL PROPOSED PROJECT AND THE BUSINESS AS USUAL SCENARIO

BAU Project (Full oil/gas production: HT #1, HT #2, 6 microturbines, and 2 Bekaert Flares to handle excess gas)									
Combustion Equipment	**Heat Input Rating (MMbtu/hr)**	**Fuel flow (Mscf/day)**	**Percent of rating (%)**	**CO_2 (lb/MMscf)**	**CO_2 (MT/day)**	**CH_4 (lb/MMscf)**	**CH_4[1] (MT CO_2eq/ day)**	**N_2O (lb/MMscf)**	**N_2O[2] (MT CO_2eq/ day)**
Heater treater #1	2.5	57.1	100%	120,000.00	3.11	2.30	1.37E-03	2.20	1.69E-02
Heater treater #2	12.0	274.3	100%	120,000.00	14.93	2.30	6.58E-03	2.20	8.10E-02
Bekaert CEB (2)	34.0	538.5[(3)]	69%[(3)]	126,621.20	30.94	2.30	1.14E-02	0.64	4.63E-02
Microturbines (6)[(4)]	5.7	130.1	100%	120,000.00	7.08	2.30	4.68E-03	2.20	3.84E-02
Commuting	--	--	--	--	0.15	--	--	--	--
Heavy duty vehicle trips	--	--	--	--	0.05	--	--	--	--
	Totals:	1000.0			56.27		2.40E-02		1.83E-01
								Total (MT/yr)	20,613

(1) The global warming potential for CH_4 (23 MT CO_2eq per 1 MT CH_4) was used to convert CH_4 to CO_2eq.
(2) The global warming potential for N_2O (296 MT CO_2eq per 1 MT N_1O) was used to convert N_2O to CO_2eq.
(3) The 2 Bekaert CEB® flares will be operating at 69% to handle the remaining gas from the analyzed fuel flow rate of 1000 Mscfd.
(4) Six microturbines are operating in the BAU scenario because the six pieces of equipment are currently constructed and operating at the WTU Central Facility under an Order of Abatement.

TABLE D.5
TOTAL GHG EMISSIONS FOR THE FINAL PROPOSED PROJECT AND THE BUSINESS AS USUAL SCENARIO

Final Project (Full oil/gas production: HT #1, HT #2, Bekaert CEB, 9 MTs, Gas sales)									
Device/Process	**Heat Input Rating (MMbtu/hr)**	**Fuel flow (Mscf/day)**	**Percent of rating (%)**	**CO_2 (lb/MMscf)**	**CO_2 (MT/day)**	**CH_4 (lb/MMscf)**	**CH_4[1] (MT CO_2eq/ day)**	**N_2O (lb/MMscf)**	**N_2O[2] (MT CO_2eq/ day)**
Heater treater #1	2.5	57.1	100%	120,000.00	3.11	2.30	1.37E-03	2.20	1.69E-02
Heater treater #2	12.0	274.3	100%	120,000.00	14.93	2.30	6.58E-03	2.20	8.10E-02
Bekaert CEB	17.0	35.0[(5)]	9%[(5)]	126,621.20	2.01	2.30	8.40E-04	0.64	3.01E-03
Microturbines (9)	8.5	195.1	100%	120,000.00	10.62	2.30	4.68E-03	2.20	5.77E-02
Gas reinjection/sales	--	438.5	--	--	--	--	--	--	--
Commuting	--	--	--	--	0.15	--	--	--	--
Heavy duty vehicle trips	--	--	--	--	0.05	--	--	--	--
	Totals:	1000.0			30.88		1.35E-02		1.59E-01
								Total (MT/yr)	11,335
								% Reduction	-45%

(1) The global warming potential for CH_4 (23 MT CO_2eq per 1 MT CH_4) was used to convert CH_4 to CO_2eq.
(2) The global warming potential for N_2O (296 MT CO_2eq per 1 MT N_1O) was used to convert N_2O to CO_2eq.
(3) The 2 Bekaert CEB® flares will be operating at 69% to handle the remaining gas from the analyzed fuel flow rate of 1000 Mscfd.
(4) Six microturbines are operating in the BAU scenario because the six pieces of equipment are currently constructed and operating at the WTU Central Facility under an Order of Abatement.
(5) As described in the Findings of Fact in the Stipulated Order of Abatement, the Bekaert CEB® will be maintained in ready-standby mode once the gas reinjection system is operational, except in the cases of breakdowns or scheduled maintenance.