APPENDIX G4

Acronyms

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ACRONYMS AND ABBREVIATIONS

ABBREVIATION	DESCRIPTION
AEGL	Acute Exposure Guidelines Levels
AER	Annual Emissions Report
AFPM	American Fuel and Petrochemical Manufacturers
AN	Application Number
ANS	Alaska North Slope
API	American Petroleum Institute
AQMD	Air Quality Management District
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AU	Alkylation Unit
BACT	Best Available Control Technology
bbl	barrel
bbl/day	barrels per day
bbl/yr	barrels per year
BLEVE	Boiling Liquid Expanding Vapor Explosion
BOE	Barrels of equivalent
BP	BP West Coast Products LLC
BSVs	Bellows-Sealed Valves
BTEX	Benzene, toluene, ethylbenzene, and xylene
CalARP	California Accidental Release Prevention Program
CalEPA	California Environmental Protection Agency
CalOSHA	California Occupational Safety and Health Administration
CARB	California Air Resources Board
CCT	Carson Crude Terminal
CDU	Crude distillation unit
CEC	California Energy Commission
CEMS	Continuous Emissions Monitoring System
CEQA	California Environmental Quality Act
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent-a standard unit for measuring carbon footprint
COP21	Conference of Parties
CPUC	California Public Utilities Commission
CRT	Tesoro Community Response Team
CSB	Chemical Safety and Hazard Investigation Board
dB	Decibel
dBA	A-weighted noise level measurement in decibels
DCU	Delayed Cracker Unit
DDU	Distillate desulfurization unit
DEIR	Draft Environmental Impact Report

ABBREVIATION	DESCRIPTION
DEIS	Draft Environmental Impact Statement
DIAL	Differential Absorption LIDAR
DOT	U.S. Department of Transportation
DPM	Diesel PM
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
EA	Environmental Assessment
EFSEC	Energy Facility Site Evaluation Council
EIA	Energy Information Administration
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EJAG	Environmental Justice Advisory Group
EPA	Environmental Protection Agency
ERPGs	Emergency Response Planning Guidelines
ERC	Emission reduction credit
ESLs	Environmental Screening Levels
FCCU	Fluid Catalytic Cracking Unit
FEIR	Final Environmental Impact Report
FLIR	Forward Looking Infrared camera
FRA	Federal Railroad Administration
GHT	Gasoline Hydrotreater
GHG	Greenhouse gas emissions
H_2S	Hydrogen sulfide
HCN	Hydrogen cyanide
HCU	Hydrocracker Unit
HCU (C)	Carson Hydrocracker Unit
HCU (W)	Wilmington Hydrocracker Unit
hr/day	hours per day
HRA	Health Risk Assessment
HTHA	High-temperature hydrogen attack
HTU	Hydrotreater Unit
HVN	Heavy Vacuum Naphtha
IR	Infrared
LARIC	Los Angeles Refinery Integration and Compliance
lb/day	pounds per day
lb/yr	pounds per year
LDAR	Leak detection and repair
LFL	Lower flammable limit
LHU	Light Hydrotreating Unit
LPG	Liquefied Petroleum Gas
LST	Localized Significance Threshold
LVN	Light Vacuum Naphtha
MACT	Maximum Achievable Control Technology
MATES	Multiple Air Toxic Exposure Study

ABBREVIATION	DESCRIPTION
mmBtu/hr	Million British Thermal Units per hour
MOC	Management of change
MOTEMS	California State Lands Commission Marine Oil Terminal Engineering and Maintenance Standards
mph	Miles per hour
MSDS	Material Safety Data Sheet
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHDS	Naphtha Hydrodesulfurization
NHT	Naphtha Hydrotreater
NOP/IS	Notice of Preparation/Initial Study
NOPV/PCO	Notice of Probable Violation and Proposed Compliance Order
NOV	Notice of Violation
NOx	Nitrogen Oxide
NO_2	Nitrogen Dioxide
NPDES	National Pollutant Discharge Elimination System
NSPS	New Source Performance Standards
NSR	New Source Review
N_2O	Nitrous Oxide
OEHHA	Office of Environmental Health Hazard Assessment
OPEC	Organization of Petroleum Exporting Countries
OSHA	Occupational Safety and Health Administration
PADD	Petroleum Administration for Defense District
PDI	Pollution disparity impact
PELs	Permissible Exposure Limits
PHA	Process Hazard Analysis
PHMSA	Pipeline and Hazardous Material Safety Administration
PM	Particulate Matter
PM2.5	Particulate matter less than 2.5 microns equivalent aerodynamic diameter
PM10	Particulate matter less than 10 microns equivalent aerodynamic diameter
POLB	Port of Long Beach
ppb	Parts per billion
ppm	Parts per million
ppmv	Parts per million by volume
PQV	Program Quality Verifications
PRD	Pressure relief devices
PRR	Public records request
PRV	Pressure relief valves
psia	Pounds per square inch absolute
PSM	Process Safety Management
PSSR	Pre-Startup Safety Review

ABBREVIATION	DESCRIPTION
PSTU	Propane Sales Treating Unit
PSV	Pressure safety valve
PTE	Potential to emit
Rancho LPG	Rancho LPG Holdings LLC
RECLAIM	Regional Clean Air Incentives Market
Refinery	Tesoro Los Angeles Refinery
RELs	Reference exposure levels
RMP	Risk Management Plan
ROG	Reactive organic acid
RTC	RECLAIM trading credit
RVP	Reid Vapor Pressure
RWQCB	Regional Water Quality Control Board
SARP	Sulfuric Acid Regeneration Plant
SCAQMD	South Coast Air Quality Management District
scf	Standard cubic feet
SCIG	Southern California International Gateway
SDS	Safety Data Sheet
SEC	Securities and Exchange Commission
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SOx	Sulfur oxide
SO_2	Sulfur dioxide
SPCC	Spill Prevention, Control and Countermeasure
SRP	Sulfur Recovery Plant
SSC	Startup, shutdown and commissioning
SSM	Startup, shutdown and malfunction
SWRCB	State Water Resources Control Board
TAC	Toxic Air Contaminant
TACs	Toxic Air Contaminants
TAN	Total acid number
Tesoro	Tesoro Refining & Marketing Company LLC
Tesoro Logistics	Tesoro Logistics Operations, LLC
TRB	Transportation Research Board
TVP	True vapor pressure
T2	Marine Terminal 2
ULCC	Ultra Large Crude Carrier
U.S. DOT	United States Department of Transportation
U.S. EIA	United States Energy Information Administration
U.S. EPA	United States Environmental Protection Agency
ug/m^3	Micrograms per cubic meter
Vancouver Energy Project	Vancouver Energy Distribution Terminal Facility
Vacresid	vacuum residue
VCE	Vapor cloud explosion
VGO	Vacuum Gas Oil
VLCC	Very large crude carrier

ABBREVIATION	DESCRIPTION
VOC	Volatile organic compounds
VRU	Vapor recovery unit
WCS	Western Canadian Select

APPENDIX G ATTACHMENTS

A	**Marine Vessel Emissions**
B	**SCAQMD Appendix D Cumulative Impacts White Paper**
C	**Douglas Miller Declaration**
D	**McGovern Response Letter**
E	**Attorney General Letter to the California Energy Commission**
F	**Aaron Meyerle Declaration**
G	**Holly Kranzmann Declaration**
H	**Quest Consultants Memoranda**
I	**Simmons Energy Conference Slides**

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ATTACHMENT A

MARINE VESSEL EMISSIONS

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Attachment A
Tesoro Los Angeles Refinery
Integration and Compliance Project
2015 Anchorage Emissions Summary

Pollutant	Emission Factors (lb/1000 gal fuel)	Emissions (lb/yr)	Emissions (tons/yr)
NOx	451	399673	200
CO	56	49627	25
PM	17	15065	8
ROG	82	72668	36
SOx	7.95	7045	4

Fuel Use 886193 Gallons

Emissons factors from SCAQMD Permit Number G29554

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ATTACHMENT B

SCAQMD APPENDIX D CUMULATIVE IMPACTS WHITE PAPER

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Attachment B

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

White Paper on Potential Control Strategies to Address Cumulative Impacts From Air Pollution

August 2003

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Attachment B

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
GOVERNING BOARD

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

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

MEMBERS:

FRED AGUIAR
Supervisor, Fourth District
San Bernardino County Representative

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

JANE W. CARNEY
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WILLIAM S. CRAYCRAFT
Council Member, City of Mission Viejo
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BEATRICE J. S. LAPISTO-KIRTLEY
Council Member, City of Bradbury
Cities Representative, Los Angeles County/Eastern Region

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Mayor, City of Riverside
Cities Representative, Riverside County

LEONARD PAULITZ
Mayor Pro Tem, City of Montclair
Cities Representative, San Bernardino County

JAMES W. SILVA
Supervisor, Second District
Orange County Representative

CYNTHIA VERDUGO-PERALTA
Governor's Appointee

VACANT
Cities Representative, Los Angeles County/Western Region

EXECUTIVE OFFICER
BARRY R. WALLERSTEIN, D.Env.

Attachment B

FOREWORD

Since its inception in 1997, AQMD's Environmental Justice (EJ) program has sought to identify and address local air quality issues, such as those brought to the agency's attention at Town Hall events and community meetings. Such issues have included concerns that the District's existing permitting, rules, and clean fleet control programs may need enhancements to better address multiple exposures, as experienced in or near urban industrial settings, including those operating in or near low-income communities of color.

The phrase "cumulative air quality impacts" is often used to describe possible health and nuisance impacts potentially related to a given neighborhood's cumulative emissions from sources that individually comply with AQMD, state, and federal rules. As such, cumulative impacts discussed in the White Paper go beyond those covered under CEQA. In neighborhoods near a relatively large number of industrial facilities, or located near heavy cross-town traffic, for example, there is concern about the accumulated effects of numerous emission sources operating within a limited area, particularly as related to air toxics, and when the group of sources is near residences, schools, or other sensitive receptors.

This White Paper is intended to present a forward-looking comprehensive strategy of how the AQMD intends to identify and further address cumulative impacts of air pollution, so that all communities in the South Coast receive equitable treatment and attention as to their local air quality concerns. The AQMD also intends to ensure fair and consistent treatment of local businesses as it carries out this facet of environmental justice.

This paper points out potential ways to achieve more substantial progress in public health protection. It describes a basic, reasoned approach and lays out a number of tools that staff believes can lay a valuable foundation for this emerging effort; the implementation tools will be developed in more detail upon Governing Board direction, and in conjunction with ongoing working group input. The strategies outlined will directly or indirectly contribute to addressing cumulative impacts. For example, some measures are designed to address localized impacts, which are likely to also address cumulative impacts, while other strategies are more for reducing cumulative impacts. The paper also outlines areas requiring more research, and makes suggestions on how to carry this out. Some elements (e.g., MATES II), are parts of other EJ initiatives or Board directives.

This White Paper is a starting point, developed with input from the Cumulative Impacts Working Group, whose members have spent much time and energy in contributing their expert knowledge, experience, and suggestions to this pathfinding effort. Input was also incorporated from five Community Forums held throughout the four-county region in June and July, and three community meetings in August. The report however, represents the AQMD staff's recommendations in this important area of air quality management.

This White Paper is intended as a policy document. With the Governing Board's direction, staff will proceed to work with stakeholders through working groups and a full public process to develop individual proposed rules and policies for the Board's consideration. Addressing cumulative air quality impacts should not be viewed as a means to prohibit growth or to interfere with local land use decisions. AQMD staff will work with local agencies in a partnership, by providing information and technical assistance relative to their critical role in land use and mitigation measures.

Attachment B

Acknowledgements

The following members of the Cumulative Impacts Working Group provided valuable input and their assistance is greatly appreciated.

Facilitator	
Mr. Greg Bourne	Center for Collaborative Policy
Environmental/Community Representatives	
Mr. Luis Cabrales	California League of Conservation Voters Education Fund
Mr. Todd Campbell	Coalition for Clean Air
Mr. Bahram Fazeli	Communities for a Better Environment
Ms. Angela Johnson-Meszaros	University of Southern California
Mr. Angelo Logan	East Yard Communities for Environmental Justice
Mr. Joseph K. Lyou	California Environmental Rights Alliance
Mr. Anastacio Medina	American Lung Association
Ms. Penny Newman	Center for Community Action and Environmental Justice*
Ms. Gail Ruderman-Feuer	Natural Resources Defense Council
Industry Representatives	
Mr. Mike Carroll	Latham & Watkins
Mr. Curt Coleman	California Manufacturers Association
Mr. Bill LaMarr	California Small Business Alliance
Mr. Bill Quinn	California Council for Environmental and Economic Balance
Mr. Gary Stafford	Wood Furniture Manufacturers Association
Mr. Lee Wallace	Sempra Energy
Mr. Mike Wang	Western States Petroleum Association
Local Government / Agency Representatives	
Mr. Greg Adams	Los Angeles County Sanitation Districts
Ms. Detrich B. Allen	City of Los Angeles Environmental Affairs Division
Ms. Linda Murchison	California Air Resources Board
Ms. Winona Victery	U.S. Environmental Protection Agency

* Invited, did not attend

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EXECUTIVE SUMMARY

This report is an outgrowth of the following South Coast Air Quality Management District (AQMD) Governing Board actions:

- October 1997 adoption of ten Environmental Justice (EJ) Initiatives;
- September 2002 approval of enhancements to the EJ program for the Fiscal Year 2002-2003, including a directive to staff to report back on the feasibility of rulemaking to address cumulative impacts of air toxics beyond current AQMD requirements; and
- January 10, 2003 direction to staff to report back to the Board with a White Paper on regulatory and policy options for addressing cumulative impacts from air pollution emissions, including recommendations and schedule. At the January 10th meeting, staff also recommended a work plan that entailed creation of a Cumulative Impacts Working Group and a planned update to the second Multiple Air Toxics Exposure Study (MATES II).

Addressing cumulative impacts is a very complex issue. The working group process, which included a facilitator, was very helpful to staff in the development of the recommended approaches. The Working Group met seven times to discuss a program to reduce cumulative impacts from air pollution. This White Paper presents staff's recommendations regarding options for assessing cumulative impacts from sources of air pollution. It includes consideration of input received from the California Air Resources Board (CARB), U.S. Environmental Protection Agency (EPA), local government representatives, industry, and environmental and community groups on the Working Group, as well as input received from five Community Forums. Key policy issues addressed during the working group process include, but were not limited to:

- scope of the program (i.e., stationary and/or mobile sources; cancer and/or non-cancer health effects; and including particulate emissions);
- defining areas of concern for specific actions to reduce cumulative exposures, and
- potential approaches to address cumulative impacts.

Definitions

For the purposes of developing a program to address cumulative impacts from air pollution emissions, the AQMD staff will rely upon the definition of Environmental Justice that was approved by the Governing Board in October 1997:

> *Environmental Justice means the equitable environmental policymaking and enforcement to protect the health of all persons who live or work in the AQMD, regardless of age, culture, ethnicity, gender, race, socioeconomic status, or geographic location, from the health effects of air pollution.*

Under the subject of Environmental Justice, definitions of cumulative impact were extensively discussed by the Working Group. A cumulative impact can be defined in many ways and it is therefore difficult to arrive at a single definition that fits all circumstances. Cumulative impacts can be regional, as well as localized or neighborhood level. Estimated risks from air toxic measurement at 10 monitoring stations for residents of the South Coast Air Basin (Basin) are ~1,400 in a million (based on a range from about 1,120 in a million to about 1,740 in a million), with some areas experiencing higher risks. Reducing emissions throughout the

Basin would decrease the overall risk on a regional basis and will lower neighborhood risks by varying degrees, depending on the localized circumstances.

The following definition of a cumulative air pollution impact, while not a consensus of the Working Group members, attempts to recognize their viewpoints and develop a working definition:

> *A cumulative air pollution impact is an adverse health effect, risk or nuisance from exposure to pollutants released into the air from multiple air pollution sources.*

Further refinement or variation of this definition may be needed in the future when a specific regulation or policy is formulated. Reference to "air pollution" under this working definition is intended to include not only air toxics, but criteria pollutants, such as particulates, and nuisances (e.g., odors).

Cumulative Impacts Reduction Strategy (CIRS)

At the start of the process, to stimulate discussions, staff introduced four design principles that were factored into the working group process: no redlining (e.g., defining an acceptable/unacceptable geographical area based on level of risk); not interfering with local land use decisions, but making more comprehensive air quality information available to decision makers; reasonable decision-making time frame for CEQA analysis and permits; and resource considerations and regulatory certainty.

Based on the design criteria and early discussions of the working group, staff developed a list of initial options for addressing cumulative impacts for working group comments. Industry and environmental/community representatives were asked to provide design criteria and options. Staff then evaluated the options in an attempt to examine feasibility and to identify where efforts should be prioritized. Several information sources, most notably, MATES II, year 2000 census data, and health care data were examined in an attempt to identify potentially high cumulative impact areas.

Section IV discusses MATES II, census data, and health care information, while Section V outlines the positions and interests of key stakeholder groups. Staff carefully considered the information, as well as the viewpoints expressed by stakeholders, and has the following recommendations:

Approach

The overall approach in addressing cumulative impacts will include several key features:

- Build on existing State Implementation Plan (SIP) programs that address criteria pollutants;
- Start with existing known information (i.e., MATES II) to address cumulative impacts of air toxics;
- Identify high cumulative impact areas and develop effective solutions accordingly; and
- Continue to develop/refine technical databases and tools.

Staff will rely on implementation of the most recently approved Air Quality Management Plan (AQMP) (i.e., 2003) to address criteria pollutants by expeditiously implementing the approved plan.

Attachment B

Cumulative Impacts

Scope

After consideration of information and comments from the Working Group members and from Community Forums, staff recommends that the scope of CIRS include the following areas:

- Cancer risk;
- Hazard Index from non-cancer risk sources;
- Odors; and
- Enforcement.

The proposed control strategies incorporate these elements.

High Impact Areas

After examining MATES II modeling data and incorporating input from stakeholders, staff is recommending that modeled cancer risks be ranked according to mobile and stationary source contribution separately. The ranking provides a priority list to characterize source contribution and identify solutions to address cumulative impacts. MATES II models cancer risk in grid cells of 1 km x 1 km. Staff recommends that the approach for investigating potential high impact areas start with the top 100 grid cells with the highest mobile source impacts and another top 100 grid cells with the highest stationary source impacts. As a result, there will be a total of 200 grid cells analyzed, which may have some overlapping areas, but will be examined separately. Total mobile and stationary source contributions need to be examined separately because the nature of the sources and possible solutions are different. Cumulative impacts can be addressed for localized areas, depending on the nature of the sources in that situation. These top 100 grid cells, each for total mobile or stationary sources, represent the approximate top 1 percent of risks from all grid cells in the MATES II study. The top 100 grid cells should not be viewed as a cut-off point for defining high cumulative impact areas. Rather it serves as guidance to prioritize staff resources. The intent is to work through the ranking (not necessarily limited to the top 100 cells) to evaluate individual circumstances, and to develop solutions accordingly. It is not staff's intent to prohibit growth in the high impact areas identified. This prioritization should be re-examined in future ATCP updates once staff gains more experience in addressing the cumulative impact issues and when additional technical information and tools become available.

Key Elements

Addressing the cumulative impacts associated with exposure to air toxics requires a multi-faceted approach comprised of short- and long-term strategies. AQMD staff's suggested approach consists of three major components:

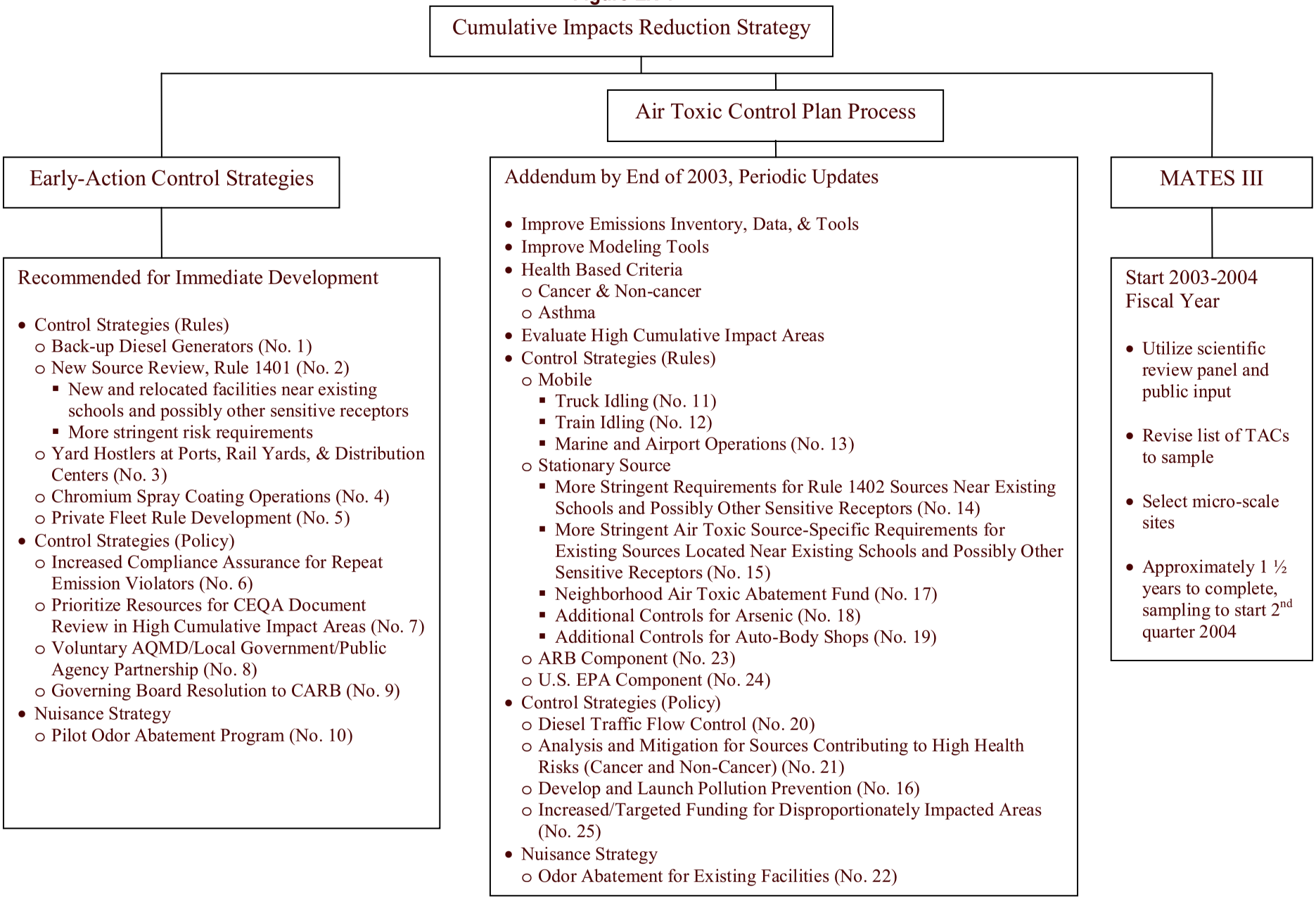
- a set of early action control strategies for immediate development and implementation;
- revisions to Air Toxic Control Plan (ATCP)
  - addendum to the March 2000 ATCP; and
  - periodic updates; and
- a planned update to the Multiple Air Toxics Exposure Study, or conduct MATES III.

Attachment B

Cumulative Impacts

Figure EX-1 is a graphical representation of what is proposed under each component. Early-action strategies are those for which there is sufficient information for development and that can be implemented within 2 to 3 years. The ATCP Addendum will be completed by the end of 2003 and will contain additional strategies that can be developed and implemented in 3 to 5 years. The ATCP is expected to be updated periodically following a similar schedule as the Air Quality Management Plan (AQMP) to reflect the latest technical information and analytical methodology. The third component, MATES III, is already in the planning stages and is anticipated to be completed in approximately 1 ½ years, starting 2nd Quarter 2004. For a more detailed description of the suggested strategies that have been conceptualized, the reader is referred to Section IV of this White Paper.

Figure EX-1


Cumulative Impacts Reduction Strategy
Air Toxic Control Plan Process
Early-Action Control Strategies
Addendum by End of 2003, Periodic Updates
MATES III
Recommended for Immediate Development
• Control Strategies (Rules)
o Back-up Diesel Generators (No. 1)
o New Source Review, Rule 1401 (No. 2)
▪ New and relocated facilities near existing schools and possibly other sensitive receptors
▪ More stringent risk requirements
o Yard Hostlers at Ports, Rail Yards, & Distribution Centers (No. 3)
o Chromium Spray Coating Operations (No. 4)
o Private Fleet Rule Development (No. 5)
• Control Strategies (Policy)
o Increased Compliance Assurance for Repeat Emission Violators (No. 6)
o Prioritize Resources for CEQA Document Review in High Cumulative Impact Areas (No. 7)
o Voluntary AQMD/Local Government/Public Agency Partnership (No. 8)
o Governing Board Resolution to CARB (No. 9)
• Nuisance Strategy
o Pilot Odor Abatement Program (No. 10)
• Improve Emissions Inventory, Data, & Tools
• Improve Modeling Tools
• Health Based Criteria
o Cancer & Non-cancer
o Asthma
• Evaluate High Cumulative Impact Areas
• Control Strategies (Rules)
o Mobile
▪ Truck Idling (No. 11)
▪ Train Idling (No. 12)
▪ Marine and Airport Operations (No. 13)
o Stationary Source
▪ More Stringent Requirements for Rule 1402 Sources Near Existing Schools and Possibly Other Sensitive Receptors (No. 14)
▪ More Stringent Air Toxic Source-Specific Requirements for Existing Sources Located Near Existing Schools and Possibly Other Sensitive Receptors (No. 15)
▪ Neighborhood Air Toxic Abatement Fund (No. 17)
▪ Additional Controls for Arsenic (No. 18)
▪ Additional Controls for Auto-Body Shops (No. 19)
o ARB Component (No. 23)
o U.S. EPA Component (No. 24)
• Control Strategies (Policy)
o Diesel Traffic Flow Control (No. 20)
o Analysis and Mitigation for Sources Contributing to High Health Risks (Cancer and Non-Cancer) (No. 21)
o Develop and Launch Pollution Prevention (No. 16)
o Increased/Targeted Funding for Disproportionately Impacted Areas (No. 25)
• Nuisance Strategy
o Odor Abatement for Existing Facilities (No. 22)
Start 2003-2004 Fiscal Year
• Utilize scientific review panel and public input
• Revise list of TACs to sample
• Select micro-scale sites
• Approximately 1 ½ years to complete, sampling to start 2nd quarter 2004

I. INTRODUCTION

In October 1997, the South Coast Air Quality Management District (AQMD) Governing Board adopted a series of ten Environmental Justice Initiatives, along with four Guiding Principles, to address the potential adverse health effects of air pollution, including air toxics, and set forth a strategy to help ensure that clean air benefits are accorded to all residents and communities of the South Coast Air Basin (Basin). These Initiatives have helped identify and address potential areas of the AQMD's jurisdiction where citizens may be disproportionately impacted by air pollutants. Potential adverse public health impacts from cumulative emissions exposure, particularly from air toxics, are an environmental justice (EJ) concern. In September 2002, the Governing Board approved enhancements to the EJ program for the Fiscal Years 2002-2003. Addressing concerns about cumulative emission impacts is a key objective of the EJ program enhancements. An outgrowth of these enhancements was a Governing Board directive to staff to report back on the feasibility of rulemaking to address cumulative impacts of air toxics beyond current AQMD requirements.

On January 10, 2003, staff reported to the Governing Board on the initial investigation into the development of a cumulative impacts program. Also presented at that meeting was a proposal to develop a White Paper on regulatory and policy options for addressing cumulative impacts from air pollution emissions, including a work plan that entailed creation of a working group, development of a White Paper, and a planned update to the second Multiple Air Toxics Exposure Study (MATES II). The Board directed staff to report back to the Board with a White Paper containing recommendations and schedule.

Addressing cumulative impacts is a very complex issue. There are many factors that contribute to areas of higher impact in the Basin. Land use decisions, some made decades ago, prevalence of freeways and other transportation corridors, density and types of businesses, and local meteorology are some of these factors. Mobile source emissions continue to be the predominant contributor to regional cancer risk in the Basin. Cumulative impacts are somewhat difficult to define and assess. Stakeholders in the working group had divergent viewpoints with respect to what indicators should be used to address cumulative impacts and what approaches are needed. There are data limitations, as well. AQMD has an extensive air monitoring program and has the benefit of MATES II, an extensive toxic monitoring and modeling effort. However, there are knowledge gaps where additional information on air pollution emissions and exposures would be beneficial.

The working group process, which included a facilitator, was very helpful to staff in the development of the recommended approaches. The Working Group met seven times to discuss a program to reduce cumulative impacts from air pollution. This White Paper presents staff's recommendations regarding options for assessing cumulative impacts from sources of air toxics. It includes consideration of input received from the California Air Resources Board (ARB), U.S. Environmental Protection Agency (EPA), local government representatives, industry, and environmental and community groups on the Working Group, as well as input from five Community Forums. Key policy issues addressed during the working group process include, but were not limited to, scope of the program (i.e., stationary and/or mobile sources; cancer and/or non-cancer health effects; and particulate emissions), defining high impact areas for specific actions to reduce cumulative exposures, and potential approaches to address cumulative impacts.

II. DEFINITIONS

For the purposes of developing a program to address cumulative impacts from air pollution emissions, the AQMD staff will rely upon the definition of Environmental Justice that was approved by the Governing Board in October 1997:

> *Environmental Justice means the equitable environmental policymaking and enforcement to protect the health of all persons who live or work in the AQMD, regardless of age, culture, ethnicity, gender, race, socioeconomic status, or geographic location, from the health effects of air pollution.*

Under the subject of Environmental Justice, the definition of cumulative impact was extensively discussed by the Working Group. A cumulative impact can be defined in many ways and it is therefore difficult to arrive at a single definition that fits all circumstances. Cumulative impacts can be regional, as well as localized or neighborhood. Estimated risks from air toxic measurement at 10 monitoring stations for residents of the Basin are ~1,400 in a million (based on a range from about 1,120 in a million to about 1,740 in a million), with some areas experiencing higher risks. Reducing emissions throughout the Basin would decrease the overall risk on a regional basis and will lower neighborhood risks by varying degrees, depending on the localized circumstances.

Definitions were discussed at several Working Group meetings. This was important to different stakeholders because the definitions would help frame the policy discussions and recommendations. The environmental and community groups were interested in ensuring that the definition of cumulative impacts would not be restrictive with respect to needing to prove harm before addressing an impact. These groups also stressed that cumulative impacts are not just related to air pollution, but include other media, such as water pollution, and ingestion.

It was important to industry representatives that the definition of cumulative impact not result in using resources where there was not a nexus demonstrated between pollution sources and health effects. For example, emissions may not result in an adverse impact if the compound is emitted in low amounts or has low toxicity. The following definition proposed by the AQMD staff, while not a consensus, attempts to recognize these view points and develop a working definition.

> *A cumulative air pollution impact is an adverse health effect, risk or nuisance from exposure to pollutants released into the air from multiple air pollution sources.*

Further refinement or variation of this definition may be needed in the future when a specific regulation or policy is formulated. Reference to “air pollution” under this working definition is intended to include not only air toxics, but criteria pollutants, such as particulates, and nuisances (e.g., odors).

III. BACKGROUND

Currently, cumulative impacts are indirectly reduced through the application of existing programs at the federal, state, and local level. The State Implementation Plan (SIP) addresses criteria pollutants and the California Health and Safety Code covers nuisances. Control of air toxics is addressed in a variety of programs as described below.

For air toxics, it is generally assumed by the scientific community that there is no safe level or threshold that can be set relative to cancer risk regardless of the source. The AQMD has very limited jurisdiction over mobile sources and therefore its rules and regulations are primarily geared toward stationary and area sources only. Historically, jurisdiction for reducing mobile source (e.g., motor vehicles, diesel trucks, trains, ships, and aircraft) emissions, and therefore risk contribution, primarily falls to both state and federal levels of government, whereas localized reduction of stationary sources falls to the local level. The regulatory structure for addressing new or modified stationary sources is to require best available control technology (BACT) for air toxics, or T-BACT. Relative to existing sources, risk reductions are sought via rules and regulations, considering technical feasibility and cost.

AQMD's current regulatory program has five principle programs for addressing air toxics.

- Rule 1401 – New Source Review of Toxic Air Contaminants is equipment-specific and limits incremental increases in public health risk from new projects and modifications to existing equipment/processes;
- Rule 1402 – Control of Toxic Air Contaminants from Existing Sources is facility-specific and requires reduction of risk and public notification under certain conditions;
- California Environment Quality Act (CEQA) is project-specific and requires public disclosure and mitigation measures, as necessary, to limit risk;
- Multiple Air Toxics Exposure Study (MATES) is regional and utilizes actual monitored and modeling data to estimate emissions and risk in the Basin; and
- Air Toxics Control Plan is regional and utilizes MATES data in developing recommendations for source-specific and air toxic rules, as well as non-regulatory programs.

The AQMD, together with the state and federal agencies, works to control air pollution emissions from several sources. As mentioned earlier the AQMD has jurisdiction over stationary and area source emissions, as well as mobile source fleets. Over the years several programs and tools have been developed to regulate these sources. These programs and tools and the roles of the state and federal agencies are described in Appendix A.

IV. CUMULATIVE IMPACTS REDUCTION STRATEGY (CIRS)

At the start of the process, to stimulate discussions, staff introduced four design principles that were factored into the working group process: no redlining (e.g., defining an acceptable/unacceptable geographical area based on level of risk); not interfering with local land use decisions, but making more comprehensive air quality information available to decision makers; reasonable decision-making time frame for CEQA analysis and permits; consider resource considerations and regulatory certainty.

Based on the design criteria and early discussions of the working group, staff developed a list of initial options for addressing cumulative impacts for working group comments. Industry and environmental/community representatives provided their own list of design criteria and options. Staff then evaluated the options in an attempt to examine feasibility and to identify where efforts should be prioritized. Staff examined several information sources, most notably, the MATES II, year 2000 census data, and health care data in an attempt to identify potentially high cumulative impact areas.

Cumulative Impacts

In addition to the sections on the control strategies, this report also provides information on MATES II, census data, and the interests of key stakeholder groups. Staff carefully considered the information, as well as viewpoints expressed by stakeholders, and has the following recommendations.

Approach

The overall approach in addressing cumulative impacts includes several key features:

- Build on existing State Implementation Plan (SIP) Programs that address criteria pollutants;
- Start with existing known information (i.e., MATES II) to address cumulative impacts of air toxics;
- Identify high cumulative impact areas and develop effective solutions accordingly; and
- Continue to develop/refine technical database and tools.

These concepts are incorporated in the individual strategies described below.

Scope

After consideration of information and comments from the Working Group members and from Community Forums, staff recommends that the scope of the CIRS include the following areas:

- Cancer risk;
- Hazard Index from non-cancer risk sources;
- Odors; and
- Enforcement.

The control strategies incorporate these components.

Key Elements

Addressing the cumulative impacts associated with exposure to air toxics requires a multi-faceted approach including short- and long-term strategies. AQMD staff's suggested approach consists of three major components:

- a set of early-action control strategies for immediate development and implementation;
- Air Toxic Control Plan process; and
- Planned update to the Multiple Air Toxics Exposure Study, or MATES III.

Analysis for Identification of High Impact Areas

A significant portion of the Working Group discussions focused on potential criteria for determining high impact areas. Basin-wide regional risk and census data maps were developed by staff as part of their analysis and in support of the Working Group discussions.

During 1998 and 1999, the AQMD conducted a second MATES program to further understand the current air toxics setting in the Basin. The results of MATES II were released in March 2000. MATES II examined the potential cancer risk from over 30 known toxic air contaminants including diesel particulates. MATES II data was key in this analysis, as it was an important part of the characterization of cumulative impacts throughout the Basin. It also was an indicator of risk contributions and aided in identifying control strategies and further steps needed, such as improved data, tools, and modeling.

MATES II Data

The results of MATES II indicate that the overall average Basin cancer risk is approximately 1,400-in-one million when diesel emissions are considered; the Basin risk is around 400- to 600-in-one million excluding diesel emissions. Figure 1 contains a map of the Basin showing the range of cancer risk contributed by all sources, including diesel emissions. As seen in Figure 1, the MATES II results also indicate that higher risk levels are seen in the more industrialized areas of the Basin (the south-central portion of Los Angeles County, not the neighborhood of south-central Los Angeles; at freeway interchanges; areas near airports; and industrial areas). However, as seen in Figure 2, mobile sources are the most significant contributors to risk levels in the Basin, with some individual grid cells as high as 5,700 in a million. The stationary source emissions of TACs contribution to the overall estimated risk levels are presented in Figure 3, with some individual grid cells as high as 660 in a million. Stationary source TACs tend to be around the same level year-round. However, mobile source TACs tend to be higher during the fall and winter months. Due to limitations in modeling techniques, stationary source risks tend to be underestimated at the localized level.

Figure 1
Range of Risk From All Sources In the South Coast Air Basin,
Including All Mobile and Stationary Sources

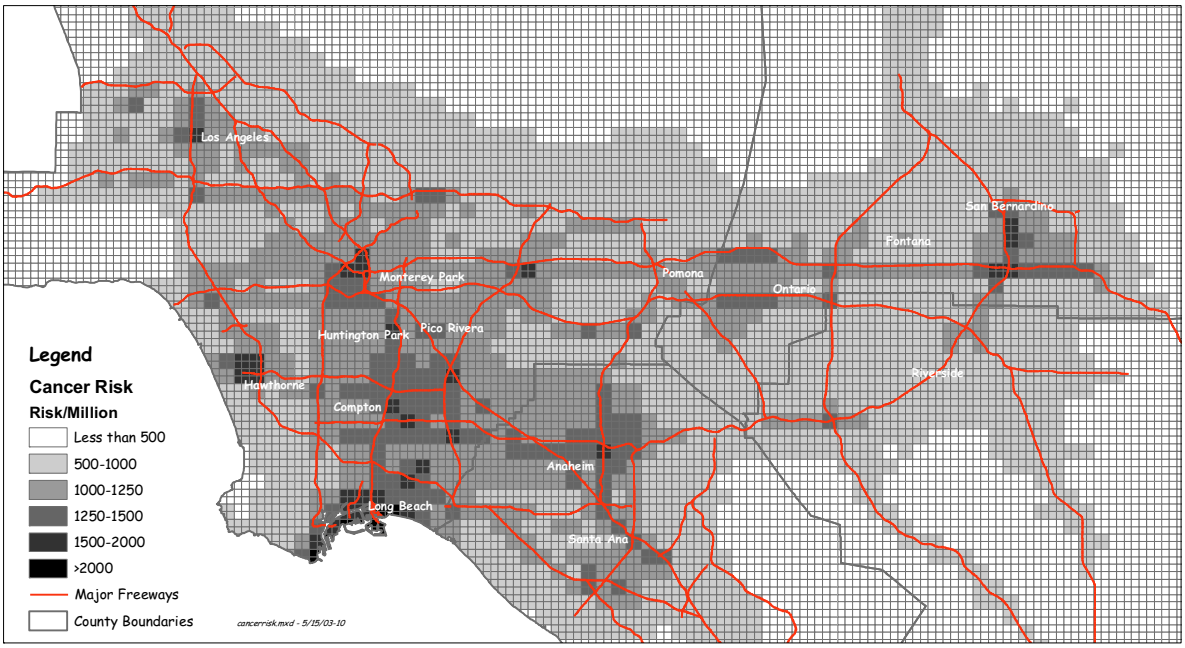


Figure 2
Range of Risk for Mobile Sources Only in the South Coast Air Basin, Including Diesel Particulate

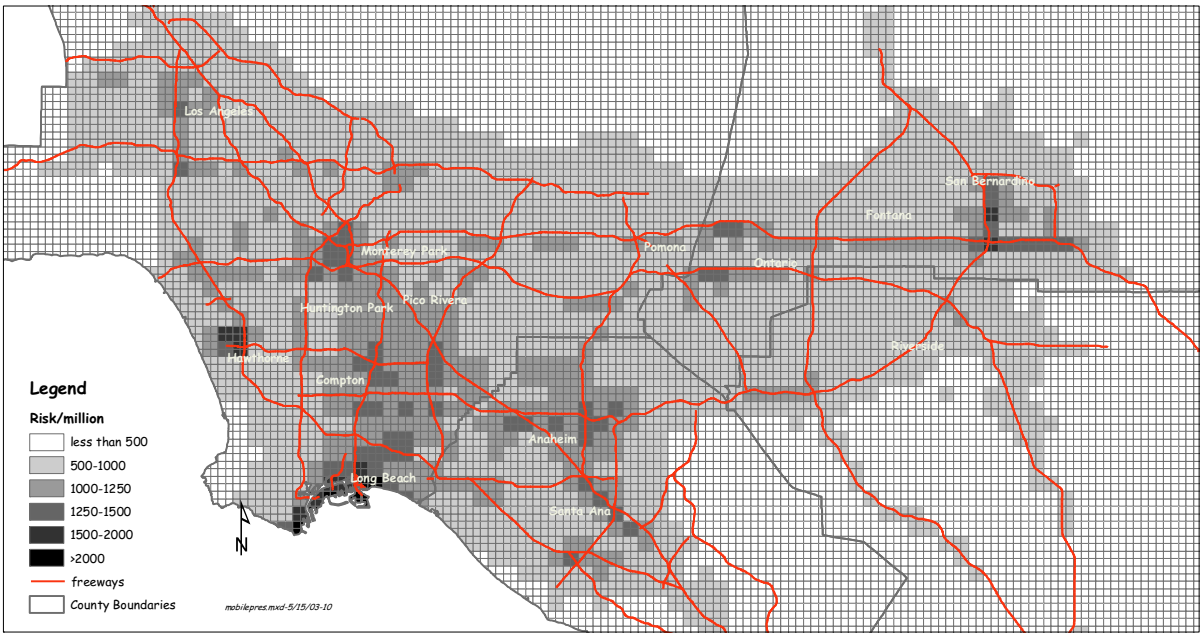
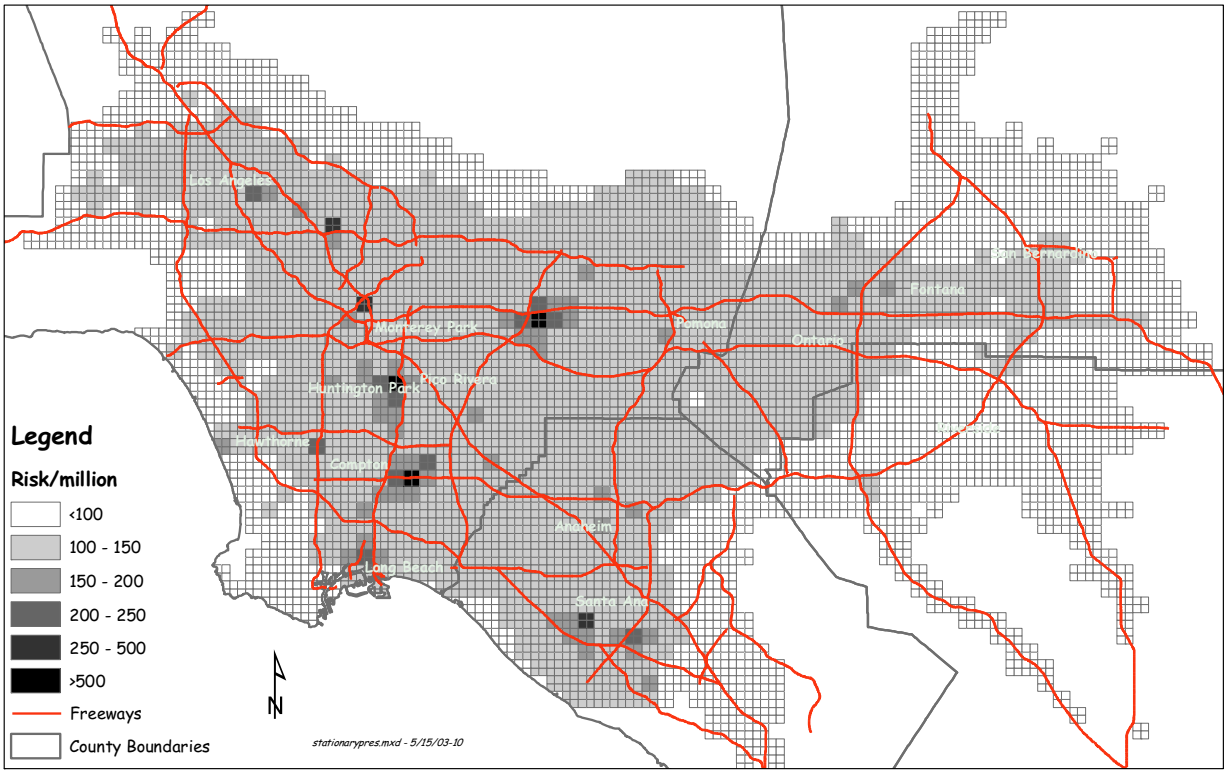


Figure 3
Range of Risk from Stationary Sources Only in the South Coast Air Basin



2000 Census Data

The Governing Board adopted definition of Environmental Justice states that the public health of all persons should be protected, regardless of race, socioeconomic status, etc. However, environmental and community members on the Working Group asked staff to evaluate poverty and ethnicity information that would potentially be used to define high cumulative impact areas.

Consistent with addressing Environmental Justice under the Carl Moyer program, staff examined those census tracts with greater than 10 percent poverty. Utilizing tract level data from the 2000 Census, Figure 4 shows the range of poverty for all demographics for the entire Basin. Staff also examined which areas, have greater than 50 percent non-white population, also utilizing 2000 Census data (see Figure 5). As can be seen from Figures 4 and 5, there is a correlation between areas of high poverty and those of large non-white populations. These areas also correlate strongly with modeled cancer risks. Therefore, prioritizing efforts in areas of high risk would also benefit those areas highlighted by the environmental and community members.

Figure 4
Range of Poverty Within the South Coast Air Basin by Census Tract

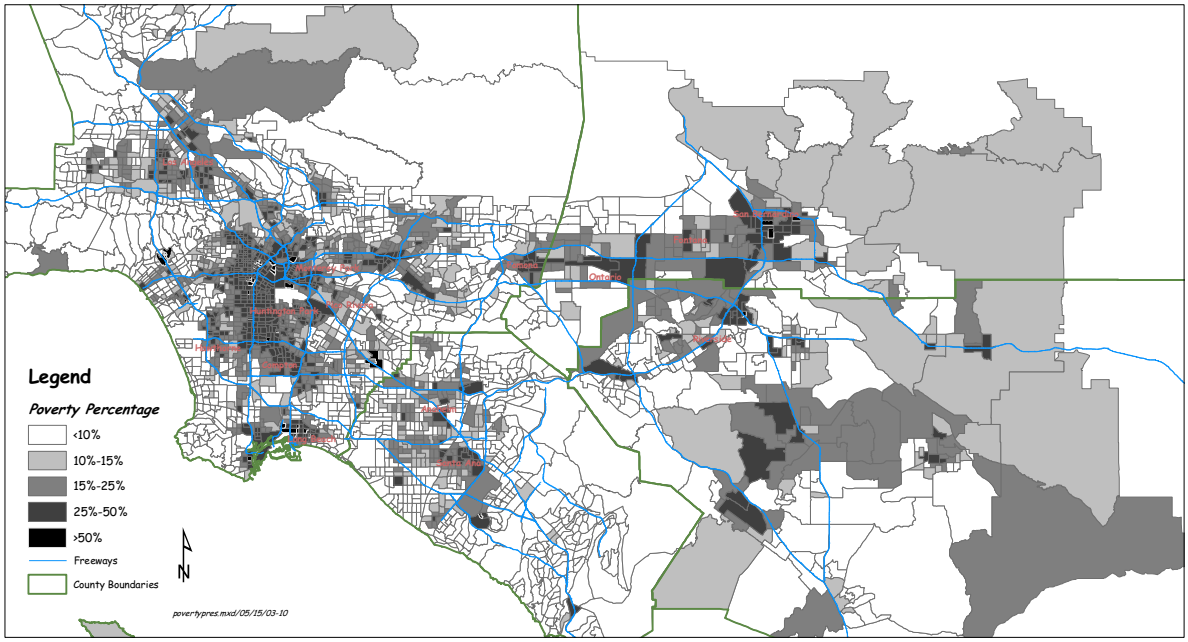
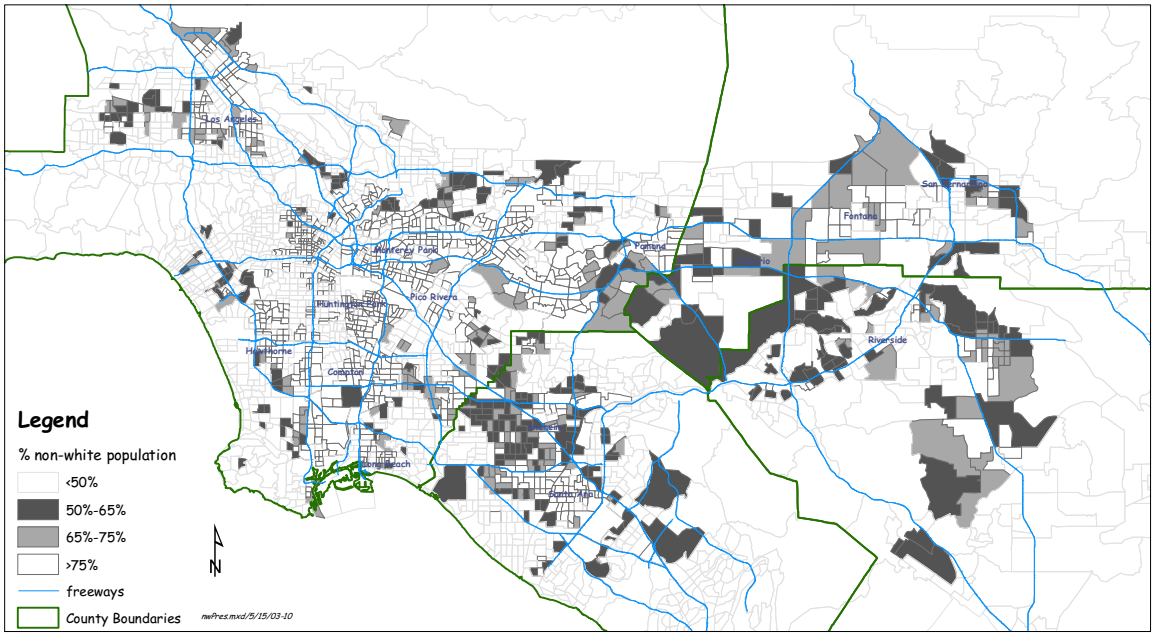


Figure 5
Range of Non-White Populations within the South Coast Air Basin by Census Tract



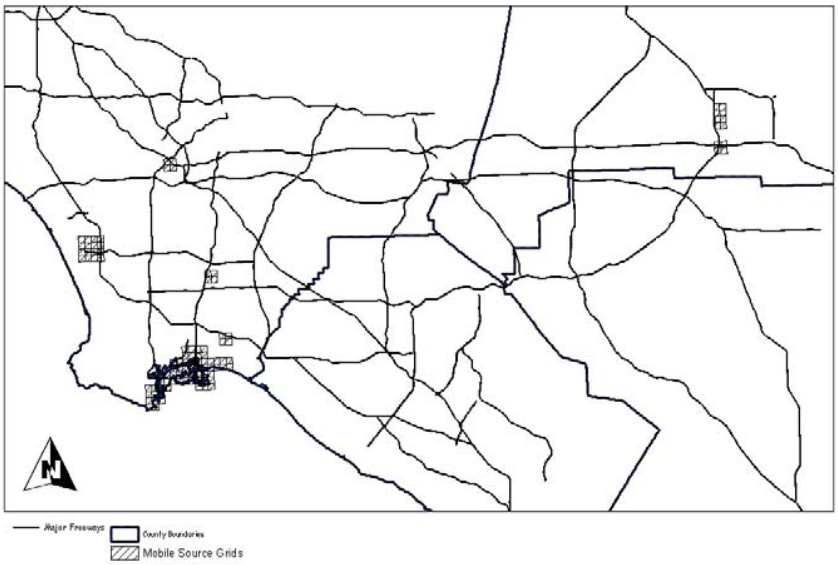
Health Care Data

A request was made at a working group meeting to use health care data to identify areas of high cumulative impacts by using information on rates of air pollution related illnesses, such as asthma. Lack of access to health care could exacerbate cumulative impacts of air pollution. There is not a conclusive source of information for local areas to derive these health-based criteria. Where data might be available, it would be resource intensive to obtain and analyze, as well as only being available for selected areas of the Basin. Therefore, this was determined not to be a practical source of information for prioritizing efforts.

Conclusion

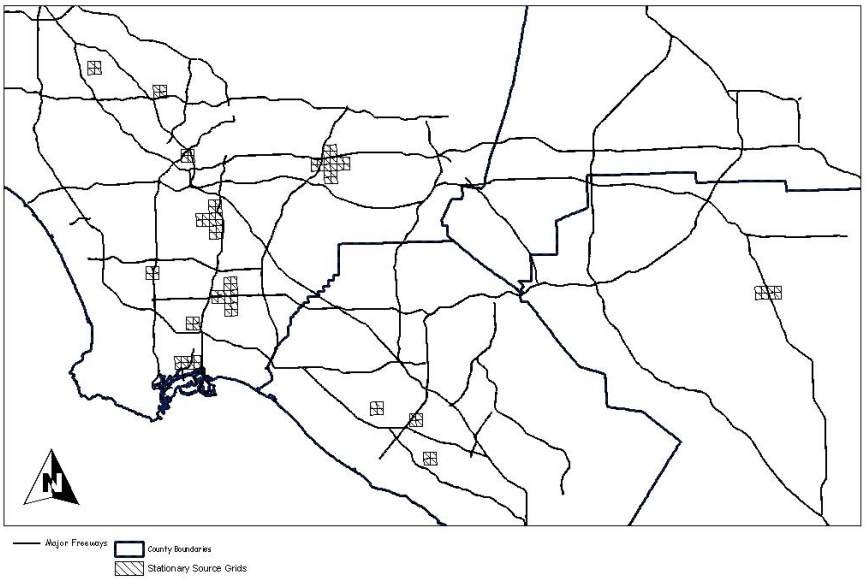
After consideration of the aforementioned data and information, staff recommends that the approach for investigating potential high impact areas start with the top 100 grid cells with the highest mobile source impacts and another top 100 grid cells with the highest stationary source impacts. As a result, there will be a total of 200 grid cells analyzed, which may have some overlapping areas, but will be examined separately. Staff was also asked to look at the top 100 grid cells due to all emission sources, which should be the same as the top cells for mobile sources because greater than 90 percent of the risks are from those sources. Figures 6, 7, and 8 contain preliminary maps using the MATES II data. The location of the top 100 mobile source grid cells are shown on the map in Figure 6, whereas the location of the top 100 stationary source grid cells are shown in Figure 7. Figure 8 shows which grid cells from Figures 7 and 8 overlap.

Figure 6
Top 100 Grid Cells for Mobile Sources Only



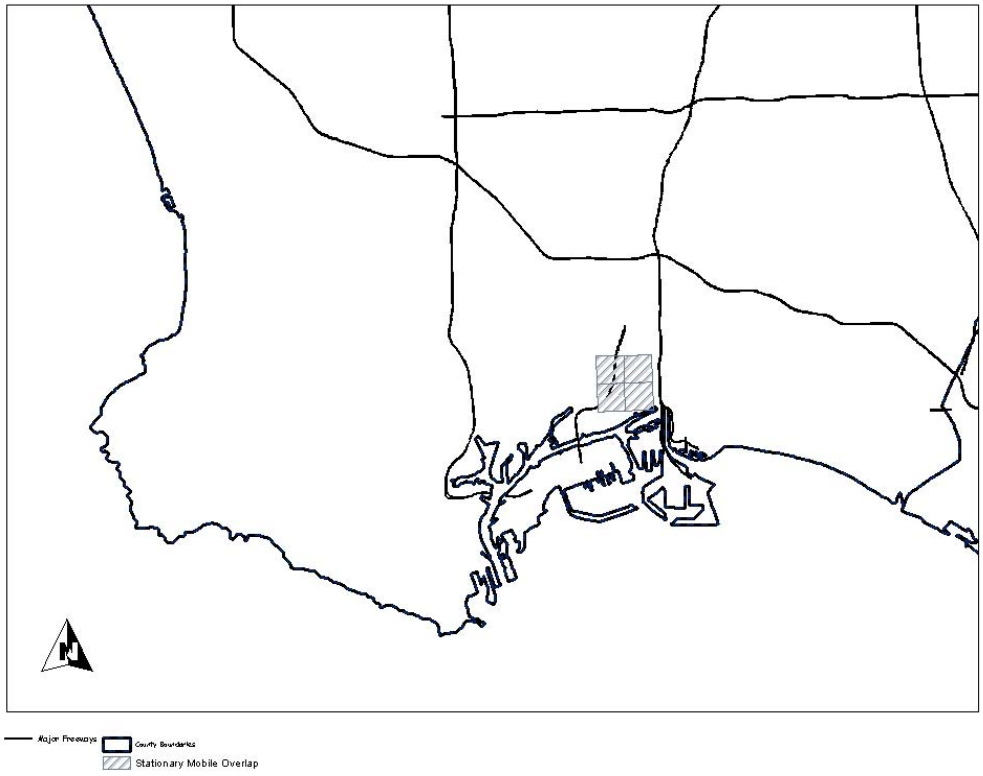
Note: The range of risks due to the mobile source contribution are 1,400 to 5,700 in a million.

Figure 7
Top 100 Grid Cells for Stationary Sources Only



Note: The range of risks due to the stationary source contribution are 160 to 660 in a million.

Figure 8
Overlap of the Top 100 Grid Cells for Both Mobile and Stationary Sources



Mobile and stationary source contributions need to be examined separately because the nature of the sources and possible solutions are different. Furthermore, the MATES II modeling technique (i.e., regional modeling rather than point source modeling) tends to underestimate the potential localized impacts. By evaluating the top mobile and stationary grid cells, cumulative impacts can be addressed for localized areas, depending on the nature of the sources in that situation. These top 100 grid cells represent the approximate top 1 percent of risks from all grid cells in the MATES II study. The top 100 grid cells should not be viewed as a cut-off point for defining high cumulative impact areas. Rather it serves as guidance to prioritize staff resources. Staff will not propose a prohibition of growth in these areas. The intent is to work through the ranking (not limited to the top 100 cells) to evaluate individual circumstances, and to develop solutions accordingly. This prioritization should be re-examined in the future ATCP updates once staff gains more experience in addressing the cumulative impact issues and when additional technical information and tools become available.

As seen in Table 1, when examining the top 100 grid cells, based on cancer risk, for mobile sources only, including diesel particulate, diesel emissions contribute the majority of risk in those cells (more than 90% in most grid cells). Relative to stationary sources, the risk within the top 100 grid cells is mostly contributed (e.g., more than 80%) by perchloroethylene, carbon tetrachloride, ethylene oxide, arsenic, chromium, cadmium, and nickel. Many of these pollutants have or will be controlled through implementation of rules or rule amendments over the last three years. Perchloroethylene and carbon tretrachloride are used as degreasers, ethylene oxide as a sterilizer, arsenic in metallurgical processes, and chromium, cadmium, and nickel in plating operations.

Table 1
Key Mobile and Stationary Source Risk Contributors
(MATES II Modeled Risk Levels)

Category	Key TACs	Range of Cancer Risk
Mobile Sources, Including Diesel Particulate Only	diesel particulate	1,400 – 5,700 in a million
Stationary Sources Only	perchloroethylene (Rules 1122, 1421, &1425) carbon tetrachloride (Rule 1122) ethylene oxide (Rule 1405) arsenic (Rule 1407) chromium (Rule 1469) cadmium (Rule 1426) nickel (Rule 1426)	160 – 660 in a million

CONTROL STRATEGIES FOR REDUCING CUMULATIVE IMPACTS FROM AIR POLLUTION

Early-Action Control Strategies

The following early action control strategies are those that staff recommends should be started immediately. Not all strategies are expected to result in a rulemaking as they may not be necessary after further evaluation or solutions may not be technically or economically feasible at this time. Any strategy that is developed into a rule will go through the full public review process, including CEQA and socioeconomic analysis and public comments, and will be developed for Governing Board consideration. Some of the strategies may already be initiated as part of AQMD's EJ program. Each of these strategies are anticipated to be developed and implemented within 2 to 3 years.

Control Strategies (Rules)

1. Approach: **Air Toxic Control for Back-Up Generators**

   Description: A key finding of MATES II was the significant contribution of cancer risk throughout the Basin by diesel sources. The current AQMD permitting rules exempt emergency engines from Rule 1401 – New Source Review of Toxic Air Contaminants. A number of these sources, such as back-up generators, are located in and around schools, as well as other sensitive receptors. This strategy would seek to reduce air toxic emissions, including diesel particulates, from back-up generators.

   Mechanism: Under this measure, staff would develop requirements to reduce emissions from back-up generators, taking into consideration state Air Toxics Control Measure (ATCM) requirements assessment for diesel particulates and Office of Environmental Health Hazard Assessment (OEHHA) updated risk procedures. Such requirements may include greater limitation on hours for maintenance

operation, designation of when maintenance may be conducted when a generator is located near a sensitive receptor, or requiring the addition of diesel particulate filters. Such requirements may be applied to both existing back-up generators and new generators. Staff has been asked to evaluate whether special consideration is needed for engines to be used under emergency situations for essential public services, such as flood control or earthquakes.

2. Approach: **More Stringent Requirements for New Sources Located Near Existing Schools and Possibly Other Sensitive Receptors**

Description: This control strategy would seek to establish requirements for new and relocated facilities near schools and possibly other sensitive receptors.

Mechanism: Staff would seek to amend Rule 1401 to establish more stringent risk limits for new and relocated facilities emitting air toxics located near existing schools and possibly other sensitive receptors for their risk levels at these receptors. Sensitive receptors include schools (kindergarten through grade 12), licensed daycare centers, hospitals, and convalescent homes. The risk assessment procedures in Rule 1401 would be used to assess the maximum individual cancer risk at the school. These requirements may include more stringent risk limits for new and relocated facilities. If the increase in risk triggers Rule 1402 applicability, this strategy may also seek to expedite Rule 1402 risk reduction. For example, a new facility being located within a specified distance from a school (e.g., within 100 meters as specified in AQMD Rule 1469) may be required to meet a risk limitation of less than 1 in a million without using BACT or less than 10 in a million using BACT for toxics, or T-BACT. It is the staff's intent to use 100 meters as the distance threshold. However, the distance threshold needs to be further discussed through the rulemaking process. In addition, a new facility being located within a certain distance of a school may also be required to reduce a facility-wide cancer risk below the action level prior to the start of operation of the new equipment. The amendment to Rule 1401 associated with this strategy would be for existing schools or sensitive receptors only and would proceed through a two-step hearing process to first identify key policy issues and seek Governing Board direction prior to the rule adoption hearing.

Since this strategy has raised a number of general questions, a summary table (Table 2) has been provided to highlight key elements.

Table 2
Summary of Key Elements of Strategy No. 2

Element	Summary
Applies to:	new and relocated facilities
Variables	• distance • impacts at specified receptors
Sensitive Receptor	• schools (kindergarten through grade 12) • licensed daycare centers • hospitals • convalescent homes
Proposed Strategy	• more stringent risk levels • or expedited Rule 1402 risk reduction, if triggered.

3. Approach: **Yard Hostlers at Ports, Rail Yards, and Distribution Centers**

Description: One source of emissions contributing to a cumulative impact is ground support operations associated with cargo sorting and transport within ports, rail yards, and distribution centers. These sources, known as yard hostlers, can cumulatively create potential increased exposures to the surrounding area due to their emissions. This strategy would seek to reduce emissions from yard hostlers at ports, rail yards, and distribution centers used in conjunction with these operations.

Mechanism: Staff would develop new requirements to control emissions from yard hostlers used at ports, rail yards, and distribution centers (e.g., warehouses). Control strategies could include lower emitting equipment either by add-on control technologies or alternative fuels.

4. Approach: **Chromium Spray Coating Operations**

Description: Emissions of hexavalent chromium have historically been a contributor to the ambient risk contributed by stationary sources throughout much of the Basin. Since 1990, a number of measures have been taken to reduce emissions of chromium from various sources, including metal finishing and coating applications. In 2000, the results of MATES II identified chromium as one of the most significant stationary source toxic air contaminants. Rule 1469 has been strengthened to significantly reduce chromium emissions from metal finishing operations. However, other operations, such as chromium-based spray coating operations have also been identified as potentially contributing to cancer risk. This strategy would investigate and potentially seek to reduce emissions of chromium from these operations.

Mechanism: Staff would conduct an investigation into the remaining risk associated with spray operations using chromium-based coatings, including a technical analysis as to alternative coating materials, or the effectiveness of add-on control equipment. An issue was raised to have staff evaluate the potential toxic characterization of chrome from paint spray operations. In addition, compliance records for metal coating operations will also be examined to determine if non-compliant sources, if any, are contributing significantly to the risk. Consideration will be given to

sources already in compliance with Rule 1402, for example. Staff has been asked to consider sources covered under other rules, such as the aerospace NESHAP and Rule 1124. The result of this effort may result in the adoption of a new or amended rule to control emissions of chromium from spray coating applications.

5. Approach: **Private Fleet Rule Development**

Description: Findings from the MATES II program showed that the largest portion of the ambient cancer risk is contributed by diesel sources throughout the Basin. As a result, the AQMD Governing Board adopted a series of fleet rules (e.g., 1190 series rules) to reduce emissions of diesel particulates from mobile sources within the agency's jurisdiction. This strategy would develop additional new rules for further emission reductions from private fleets.

Mechanism: This strategy would lead to the development of new rules for additional emission reductions from private fleets, such as fuel providers and cargo/shipment carriers. This strategy also leads to the development of the necessary infrastructure to maintain the fleets, which is an important element for sustainability.

Control Strategies (Policy)

6. Approach: **Increased Compliance Assurance for Repeat Emission Violations**

Description: At public outreach meetings, requests are often made for an increased field compliance presence, particularly in those areas consisting of a high concentration of facilities. This stems from the concerns that non-compliance or accidental release would contribute to cumulative impacts. This strategy is to develop and implement an enhanced compliance assurance program for stationary sources which receive multiple notices of violation. Such action will likely provide the greater benefit in high cumulative impact areas.

Mechanism: As an early action measure, this strategy involves the development of a program that would guarantee minimum inspections and minimum penalties for repeat emission violations to assure continuous and consistent compliance. AQMD staff would investigate data and compliance records so as to focus resources to address the more localized issues. In determining repeat emission violations, AQMD staff will take into consideration industry-specific operations and the amount of excess emissions. Thus, facilities with multiple emission-related violations would be inspected at a greater frequency. Rules will be enforced consistently, regardless of facility location. The enhancement would involve more strategic deployment of AQMD field inspections and increased deterrence for repeat emission violators. This strategy will be implemented after approval of the ATCP by the AQMD Governing Board.

7. Approach: **Prioritize Resources for CEQA Document Review in High Cumulative Impact Areas**

Description: Projects with potentially significant adverse environmental impacts require an evaluation under CEQA. AQMD regularly receives CEQA documents prepared by other lead agencies for comments. Air quality is one of the CEQA topics. Relative to air quality impacts, a thorough evaluation of project related emissions, including both mobile and stationary source emissions is needed, particularly for projects located in high cumulative impact areas. This strategy would ensure that CEQA

documents prepared in conjunction with these projects are evaluated by AQMD for potentially significant impacts and that adequate measures are taken to mitigate the impacts when required.

Mechanism: AQMD staff will prioritize resources to ensure adequate intergovernmental review of CEQA documents to ensure the accuracy and the adequacy of air quality impact analyses and the associated mitigation measures, if deemed necessary.

8. Approach: **Voluntary AQMD/Local Government/Public Agency Partnership**

Description: One of the key resources to address potential cumulative impacts associated with emissions from new, modified, and relocated facilities is local government staff such as planners, as they have the ability to control where and how facilities are located in their community. This strategy is to work with local governments and planners through a partnership to provide the necessary information and tools to minimize cumulative impacts from future potentially air toxic emitting facilities and projects in their area.

Mechanism: This strategy would be implemented through an education and outreach program to advise local governments outside the current CEQA analysis process. AQMD would partner with local governments and other public agencies. This effort is different than AQMD's role in review and comment on CEQA projects because it is a more proactive, educational effort, not related to a specific project. In conjunction with the Model Air Quality Element (an EJ enhancement), AQMD staff will offer to make presentations and to consult with City Councils and Planning Commissions regarding land use decisions, and provide them with tools to identify incompatible land uses and to identify and address projects that may have a direct or indirect affect on the health of the surrounding community due to their operations. An air quality/environmental checklist may be developed for use by any local government to aid them in their decisions.

9. Approach: **Governing Board Resolution to CARB**

Description: Mobile sources, which are regulated under CARB, are significant contributors to risk levels in the Basin (see section on MATES II). Consequently, additional controls from this sector would greatly enhance the reduction of cumulative impacts.

Mechanism: This Early Action strategy would entail a Governing Board resolution to CARB urging their partnership and timely control of mobile source emissions. AQMD wants to work with CARB to be full partners in resolving cumulative impacts in this Basin, especially where mobile sources are the key contributors to cumulative impacts. Staff recommends that the resolution include a request that CARB Board members participate in a summit with a delegation of AQMD Board members to discuss this partnership and efforts to assist in reducing cumulative impacts.

Nuisance Strategy

10. Approach: **Pilot Odor Abatement Program**

Description: Nuisance complaints, including odors, have continuously been raised by the public at outreach meetings, such as the AQMD's Town Hall and Environmental Justice (EJ) meetings, as well as Community Forums for addressing cumulative impacts. Odor complaints are a localized issue and can trigger adverse health impacts due

to the physical sensitivity of individuals located in and around the area of incidence. The presence (or absence) of odors does not always relate directly to toxics exposure. Currently, odor issues are addressed after occurrence of the incident through public nuisance complaints (i.e., AQMD Rule 402). This strategy would seek to develop proactive measures to prevent exposure to odors.

Mechanism: To address this issue staff would develop a pilot rule for one or two industries. The pilot rule would set the foundation for a process to determine and implement control requirements for odors from new sources. The selection of industries for this pilot program would be based on the historical nuisance compliant records, recent compliance actions, and input from a working group. The control technologies could include best management practices and would examine technologies used in the past resolution of Orders of Abatement or Notices of Violations (NOV).

Appendix C shows the records of the most frequent confirmed odor complaints from 1988 to 2003 along with the corresponding NOVs. These complaints and NOVs are summarized and organized by standard industrial classification (SIC) codes. The industrial classifications receiving the highest number of odor complaints include: Petroleum Refining, Refuse Systems, and Sewage Systems. The next steps needed to develop a control strategy for these sources of odors would be to analyze individual complaints received regarding facilities in these categories. Once a pattern of complaints is found (i.e., type of odor, area, time of day, weather conditions) it can then be determined if a control strategy can be used to mitigate odors in the ambient air. To accomplish this task, staff would rely on a scientific review group for developing standards, similar to that used for establishing BACT (the same group could be used) for sources of criteria air contaminants.

AIR TOXICS CONTROL PLAN (ATCP) PROCESS

Identifying and resolving cumulative impacts will be a continuous and iterative process since no single solution can adequately address the issues. Therefore, staff is proposing to integrate a cumulative impact component into the ATCP process, which will be updated periodically to incorporate the latest technical information as well as strategies to address air toxic issues (e.g., regional and localized) in the Basin. The ATCP was approved by the Governing Board in March 2000. It was designed to reduce air toxic exposure in the Basin and was envisioned to be updated following the SIP revision process.

Addendum to the Air Toxics Control Plan

An Addendum to the ATCP will be completed after the 2003 update to the Air Quality Management Plan (AQMP). It will include improved emission data and a partial inventory update using the AQMP, as well as data from the implementation of control strategies contained within the March 2000 ATCP to revise current and projected air toxic levels (see Appendix B for ATCP implementation progress). Staff anticipates that the air toxics plan update will be presented to the Governing Board for its approval by the end of 2003. Although MATES III emissions monitoring will not be completed by this time, the inventory and assessment of changes in toxic air pollution levels can proceed for the air toxics plan addendum. Future updates to the ATCP will include MATES III data.

The addendum will utilize information contained in the enhanced Toxic Emissions Inventory, described as follows. The procedure used will be similar to that used in MATES II and the March 2000 ATCP. The base calendar year used for the inventory will be 2000 with future years extending from 2010 to approximately 2020.

The inventory data used will be as follows: on-road sources will use EMFAC 2002 and CARB's most recent specification profiles; point sources not in the AB 2588 program will use calendar year 2000 Annual Emissions Report (AER) data; sources within the AB 2588 program will incorporate any changes reported up to the end of 2000; metal plating facilities, gas stations, and dry cleaners will use the most recent inventory information available; and off road sources will use the data in the 2003 AQMP for calendar years 2000, 2010, and 2020. Once the 2000 inventory is complete, appropriate emission reductions for each category will be determined and a future inventory will be created.

The ATCP Addendum will consider additional health based indicators in the development of control strategies. Consistent with MATES II, the March 2000 air toxics plan primarily focused on cancer-based risks. The air toxics plan Addendum will also consider non-cancer health risks. In addition, it will also examine asthma as a health-based indicator for potential control strategy development to the extent feasible.

The Addendum will have both mobile and stationary control strategies based on technically and economically feasible approaches. Relative to mobile strategies, the efforts will focus on the risks associated with diesel particulate emissions. Control strategies to be developed would include truck and train idling restrictions, and diesel traffic flow management. Staff will also be evaluating other control strategies. This effort will benefit mobile source risk reduction because it will use the CARB Diesel Reduction Plan (October 2000) as a baseline and seek additional reductions beyond what is called for in the state plan.

The ATCP update will include a systematic review of existing toxic rules to determine if additional reductions are technically and economically feasible for facilities located near schools and possibly other sensitive receptors. These efforts may include the addition of sensitive receptor requirements for existing sources through amendments to existing rules and consideration during future rule development.

Other potential control strategies include pollution prevention (such as technical assistance for all facilities and a focus on facilities in higher cumulative impact areas that are close to schools), and funding for localized risk reduction projects, through an abatement fund or other mechanisms.

Analysis of MATES II stationary source cancer risk indicates that perchloroethylene (a.k.a., "perc" or tetrachloroethylene), chromium, arsenic, and carbon tetrachloride were key contributors to cancer risk. Several of these TACs are or will be reduced from implementation of recently adopted and amended rules. Spray coatings containing chromium will be evaluated for further reduction. Arsenic will also be evaluated. Due to odor complaints and the large use of various TACs in paint formulations, staff proposes a two-step process for evaluating odors and potential control approaches for auto-body shops. Additional fleet rules will also be developed.

Conceptually, an outline of Addendum to the March 2000 Air Toxics Control Plan would include the following topics:

Progress in Implementing 2000 Toxics Plan
- AQMD
- State
- Federal
- Previous projections
- Revised projections

Additional Control Strategies
- Introduction, including design criteria used in first plan and any updates
- Early action measures
- Stationary source measures
- Mobile source measures

Implementation
- Time frame
- Partnerships with other agencies and stakeholders
- Environmental and socioeconomic implications
- Outreach
- Monitoring
- Future enhancement

It should be noted that MATES II and the March 2000 ATCP focused primarily on cancer risks. This update will include incremental efforts to reduce cancer risk, since most of these are on-going, long term efforts. The update will also identify high cumulative impact areas for focusing efforts relative to the control strategies.

The following control strategies, which are in addition to the Early Action Control Strategies, are staff's recommendation for further consideration and development. Development of some strategies will begin right away, others may take longer to develop. Not all strategies are expected to result in a rulemaking, as they may not be necessary or feasible upon further evaluation. For example, there were strategies identified in the March 2000 ATCP that did not result in rulemaking and were not pursued after further technical evaluation (i.e., hospital ethylene oxide sterilizers and rubber manufacturing). Any strategy that is developed into a rule will go through the full public review process, including CEQA and socioeconomic analysis, and public comments, and will be developed for Governing Board consideration. Some of the strategies may already be initiated in conjunction with the AQMD's EJ program. Each of these strategies are anticipated to be developed and fully implemented within 3 to 5 years.

Proposed Control Strategies for Addendum to the Air Toxics Control Plan

11. Approach: **Truck Idling**

Description: During many public outreach meetings, staff has heard numerous concerns about the diesel truck traffic associated with the moving of cargo to and from ports, rail yards, and distribution centers. In addition to the traffic from moving cargo, the idling of trucks waiting for loading and unloading contributes to increased ground level emissions that move into nearby areas and contribute to health and nuisance complaints. This strategy will seek to develop requirements to reduce emissions

from diesel truck idling. This control measure was identified in the March 2000 ATCP.

Mechanism: Under this strategy, staff would develop a new rule to control diesel truck idling to the extent feasible, taking into consideration operational needs for the movement of cargo and infrastructure for electrification as necessary.

12. Approach: **Train Idling**

Description: As with truck idling, staff has heard numerous complaints related to rail traffic. This traffic is associated with the moving of cargo to and from ports and rail yards. Particular focus has been on idling locomotives waiting to move cargo. This strategy would likewise seek to develop requirements to reduce emissions from train engine idling.

Mechanism: Under this strategy, staff would develop a new rule to control train idling to the extent feasible, taking into consideration operational needs for the movement of cargo and infrastructure needed to support locomotives.

13. Approach: **Marine and Airport Operations**

Description: Early-Action Strategy No. 3 addresses yard hostlers at ports, rail yards and distribution centers. This strategy would seek to address emissions from marine and airport related operations.

Mechanism: Staff would examine emission reduction options for marine and airport related operations. Staff would first conduct feasibility studies, including AQMD legal authority, control technologies, and cost effectiveness prior to developing specific regulatory programs.

14. Approach: **More Stringent Requirements for Rule 1402 Sources Near Existing Schools and Possibly Other Sensitive Receptors**

Description: As stated under early action measure No. 2, health risks associated with facilities located near existing schools and possibly other sensitive receptors are of concern. Whereas strategy No. 2 would address new and relocated equipment, and new facilities, this strategy would address existing facilities located near (e.g., within 100 meters) schools and possibly other sensitive receptors.

Mechanism: Staff would seek to amend Rule 1402 to add additional requirements for risk levels for facilities located near schools, and possibly other sensitive receptors. Sensitive receptors include schools (kindergarten through grade 12), licensed daycare centers, hospitals, and convalescent homes. The risk assessment procedures in Rule 1401 would be used to assess the maximum individual cancer risk at the school. Such requirement may include lowering the action risk level below the current 25 in a million or expediting the timeframe allowed to implement risk reduction. The amendment to Rule 1402 associated with this strategy would address schools or sensitive receptors only and would proceed through a two-step hearing process to first identify key policy issues and seek Governing Board direction prior to the rule adoption hearing. Staff will seek funding to assist facilities with cost of risk reduction or relocation. Staff's intent is that this would apply to existing facilities and existing sensitive receptors, not for a new sensitive receptor that moves near facilities. Strategy No. 8, the Voluntary AQMD/Local

Government/Public Agency Partnership, will be used to help better inform land use decisions.

Since this strategy has raised a number of general questions, a summary table (Table 3) has been provided to highlight key elements.

Table 3
Summary of Key Elements of Strategy No. 14

Element	Summary
Applies to:	• existing facilities subject to Rule 1402
Variables	• distance • impacts at specified receptors
Sensitive Receptor	• schools (kindergarten through grade 12) • licensed daycare centers • hospitals • convalescent homes
Proposed Strategy	• more stringent risk reduction action levels, or • expedited compliance schedule for risk reductions

15. Approach: **More Stringent Air Toxic Source-Specific Requirements for Sources Near Existing Schools and Possibly Other Sensitive Receptors**

Description: Early action strategy No. 2 addresses facilities located near schools and possibly other sensitive receptors through an amendment to Rule 1401. Strategy No. 14 would address existing facilities located near existing schools and possibly other sensitive receptors through an amendment to Rule 1402. This strategy would seek to amend existing toxic source-specific rules, or for consideration during development of future new toxic rules, to evaluate more stringent requirements and distance and receptor criteria.

Mechanism: Staff would investigate the feasibility of amending existing toxic source-specific rules that currently contain requirements for industries or pieces of equipment to include requirements based on distance and receptor impacts, similar to that contained in Rule 1469-Hexavalent Chromium Emissions From Chrome Plating and Chromic Acid Anodizing Operations. Consideration would also be given during future new rule development. Each source category would be evaluated individually to determine feasible and appropriate proposals.

16. Approach: **Develop and Launch Pollution Prevention Initiatives**

Description: Staff continues to identify and implement pollution prevention measures when developing regulatory and non-regulatory programs. Under this strategy, staff would seek to develop a pilot pollution prevention program that could be initiated in areas of high cumulative impact.

Mechanism: The pilot pollution prevention program would initially be focused on sources contributing to high cumulative risk and would start by concentrating on facilities located near schools. AQMD staff would provide a consultation and make

recommendations to facilities as to how they may improve operations, provide information on low-cost alternatives to lower emissions, or outline steps that can be taken to prevent nuisance complaints. According to the success of this program, it may be expanded to other sensitive receptors. Staff also recognizes that there have been concerns raised by members of the Cal EPA Environmental Justice Advisory Committee with regards to pollution prevention techniques. Such concerns will be taken into account as part of the development of this strategy. Staff's analysis will consider technical feasibility, cost-effectiveness, product quality, and other potential impacts of pollution prevention options. District staff will also work with facilities and local government to seek potential funding for implementing pollution prevention strategies.

17. Approach: **Neighborhood Air Toxics Abatement Fund**
Description: This strategy would call for the creation of a fund that can be used for local programs to reduce public exposures to air pollution and support or match funds for projects that would reduce local exposures to air pollution.
Mechanism: Staff would recommend AQMD establish a Neighborhood Air Toxics Abatement Fund for facilities from penalties and other public funding. Staff would also seek U.S. EPA/state funding designated for EJ/toxic programs for matching funds for high priority mobile source emission reduction projects. The funding mechanism is not intended to be a pay to pollute program nor a means for compliance flexibility. The fund would not be used for strategies Nos. 2 and 14. Strong concerns were raised by environmental and community representatives regarding potential toxic trading and receptors benefiting from the toxic reduction projects not being the same receptors that are affected by the facility. However, they indicated that public funding or penalty monies directed toward reducing toxic emissions would be acceptable and if residual risks cannot be mitigated in a meaningful way, potential relocation of receptors should be considered.

18. Approach: **Additional Controls for Arsenic**
Description: MATES II data indicates that arsenic is one of several compounds that contributes to the ambient risk. This strategy would evaluate and establish additional control requirements for sources of arsenic emissions.
Mechanism: Using the MATES II data, staff will examine the sources of arsenic contributing to the risk levels within the Basin. Staff will then develop technically and economically feasible requirements for the control of arsenic emissions. Such requirements may be implemented through a new or existing rule, depending on the findings of staff's assessment.

19. Approach: **Additional Controls for Auto-body Shops**
Description: During public outreach meetings, auto-body refinishing has been identified as a source of nuisance complaints. This has been verified by examining nuisance complaint records. Due to odor complaints and the variety of TACs in auto-body coatings, this strategy will examine typical causes of odors, compliance status, and evaluate control options for auto-body shops.
Mechanism: This strategy would be implemented in two steps. First, staff would work jointly with stakeholders to conduct a technical assessment of the auto-body refinishing

industry to determine what causes odor complaints. The second step would focus on developing technically and economically feasible options for the reduction of TAC emissions and odors. The options will consider compliance history and impacts on receptors. Such requirements may be implemented through amendments to Rule 1151.

20. Approach: **Diesel Traffic Flow Control**
Description: Companion to strategy No. 11, this strategy would work with local governments and planners to minimize impacts from diesel-based traffic on schools or other sensitive receptors.
Mechanism: Under this strategy, staff would work with local governments and planners to develop alternative traffic patterns for diesel traffic to minimize impacts to schools or other sensitive receptors. This strategy stems from staff's previous analysis for diesel fuel traffic from distribution centers in the Mira Loma area.

21. Approach: **Analysis and Mitigation for Sources Contributing to High Cumulative Air Pollution Impacts (Cancer and Non-Cancer)**
Description: Once the high cumulative impact areas and their key risk contributors are identified, this strategy seeks to develop mitigation measures to reduce air toxic emissions from sources contributing to the cumulative impacts.
Mechanism: Staff would identify those sources in the high ranking areas that contribute to the ambient risk and develop strategies to reduce that risk. Implementation of this strategy will be independent of other strategies contained herein, thereby eliminating duplication. Strategies for sources identified could include regulatory or policy approaches. Regulatory approaches may include, but are not limited to, more stringent new source review or risk reduction requirements for existing sources. Other enforceable legal instruments, such as memorandums of understanding (MOUs) and stipulated abatement orders, may also be used. Staff would recommend the most effective regulatory or policy tools available to reduce cumulative impacts.

Nuisance Strategy

22. Approach: **Odor Abatement Program for Existing Facilities**
Description: As mentioned in Early-Action Control Strategy No. 10, the issue of nuisance odors has continuously been raised at public meetings. This program would build on the Pilot Odor Abatement Program by extending control strategies to existing facilities.
Mechanism: This control strategy would focus on existing equipment that have been identified in the Pilot Odor Abatement Program or other efforts that require measures to prevent exposure to odors. This would include the identification and development of technically feasible and cost-effective retrofit control options.

23. Approach: **ARB Component**
Description: This strategy would consider CARB's air toxics control program to identify sources under their jurisdiction that contribute significantly to cumulative impacts.
Mechanism: Staff would work cooperatively with CARB to identify strategies under their authority for implementation that would be supported at the local level. Such strategies could include requirements for particulate traps for in-use diesel

engines. AQMD could also make recommendations to CARB based on findings from this effort.

24. Approach: **U.S. EPA Component**
Description: As with CARB, this strategy would develop strategies for sources under U.S. EPA jurisdiction that contribute significantly to cumulative impacts.
Mechanism: Staff would work cooperatively with U.S. EPA to identify strategies for mobile sources, such as diesel trucks, trains, and ships that are under U.S. EPA jurisdiction. AQMD could also make recommendations to U.S. EPA based on findings from this effort.

25. Approach: **Increased/Targeted Funding for Disproportionately Impacted Areas**
Description: Prioritize funding to disproportionately impacted areas.
Mechanism: AQMD would continue to prioritize funding for areas of higher risk, similar to the criteria set by AB 1390 (Firebaugh) applicable to the use of Moyer Funds in disproportionately impacted areas and the priority established in the AQMD's grant program for school bus funding and non-perc dry cleaners (50 percent of funding reserved for areas with greater than 1,000 in a million cancer risk or greater than 10 percent population below the poverty level). Funding could also include money from the federal government and other sources. AQMD will maintain an active role in securing continuous funding for Carl Moyer, school bus funding, and other programs where funding is essential for reducing cumulative impacts.

Periodic ATCP Revisions

Future updates to the air toxics plan will be conducted on a periodic basis, the first of which will utilize data from MATES III (discussed below). Future updates will include improved inventories, methodologies, and special studies to focus on achieving greater air toxic emission reductions from stationary and mobile source categories. Development of those plans will rely on an iterative process for prioritization. The updates will also take into consideration comments received at various Town Hall meetings, task forces, and other public meetings.

The ATCP will be subject to periodic revisions, including the following four enhancements:

1. Improve Emissions Inventories, Data and Analysis Tools

This enhancement would involve the development of better data and analytical methods with which to measure, report, and evaluate cumulative air pollution impacts, and programs to address those risks. Such improvements would be made to the AQMD's inventories, as well as the data needed to conduct analyses. This would be accomplished by using special studies (e.g., MATES III), information gained through various rule development efforts and existing efforts to update and improve emissions inventories, such as linking Annual Emission Reporting (AER) program and Air Toxics Hot Spots (AB 2588) databases. Updated inventory information from the state relative to mobiles sources (i.e., EMFAC 2002) will also be utilized for the first ATCP update. Such information will be continually updated on an ongoing basis. This will enable staff to focus and facilitate efforts relative to addressing cumulative impacts and implementing the control strategies in the most efficient manner possible.

2. Improve Modeling Tools

To assess cumulative impacts, staff would utilize improved modeling tools (e.g., 2003 AQMP modeling techniques) for evaluating air toxic impacts at the local level from all nearby sources, including mobile sources, for comparing local level exposures within the region. In the short-term, staff will conduct an assessment using the improved emission inventories associated with the 2003 AQMP to examine progress since the approval of the March 2000 ATCP. Staff would then continue to update these tools on an ongoing basis.

3. Identify and Address Non-Cancer Risks

MATES II focused on examining those TACs contributing to cancer risk throughout the Basin and did not specifically analyze non-cancer impacts associated with those chemicals. At many public outreach meetings, consistent comments were made that such studies should also address non-cancer impacts. This strategy would develop a program that not only seeks to reduce cancer risk, but also identifies ways to reduce chronic and acute non-cancer or other public health exposures. To address this issue in the short-term, staff will be examining the data collected in MATES II to estimate the non-cancer impacts throughout the Basin using the previous data. This information will be used in the ATCP Addendum and to assist in development of the strategies. MATES III will examine non-cancer and asthma impacts (to the extent possible) and staff will seek to use this information for future updates to the ATCP.

4. Evaluate High Cumulative Air Pollution Impact Areas

Using the data and information resulting from the previous three enhancements, staff will refine the approach to prioritize areas of concern based on unusually high levels of cumulative health risk and to identify sources contributing significantly to that risk. This information will be used to develop specific measures to reduce public exposures to air pollution and health risks. As previously described, the approach was developed as a tool to prioritize staff resources, not as a regulatory classification. Staff recommends using MATES II data to examine the top 100 1 km x 1 km grid cells for each mobile and stationary sources to identify sources and potential solutions. The process will then continue with the next 100 grid cells. This approach may be revised when staff gains more experience and new techniques become available. The analysis of potentially high cumulative impact areas will form the foundation to formulate control strategies.

MATES III

As directed by the Governing Board in January 2003, staff will be conducting the third MATES program. As before, AQMD will use a scientific review panel and will seek public input on the various aspects of the program, including monitoring locations and evaluation tools. The list of toxic air contaminants (TACs) will be revised from MATES II to address the risks associated with additional chemicals of concern. Some TACs may be eliminated from the analysis if they were not detected in the previous study.

A key element of MATES III will be the selection of micro-scale sites for localized monitoring. Staff has received numerous suggestions for such sites and will be further evaluating various locations. It is anticipated that monitoring, modeling, analysis, and reporting, will take approximately 1 ½ years. Monitoring is projected to start in April 2004.

V. PUBLIC PROCESS

The Working Group met seven times to discuss a program to reduce cumulative impacts from air pollution. These meetings, plus five Community Forums, helped identify issues and potential approaches.

Working Group and Public Input

Environmental/community, industry, and AQMD staff Working Group members generated separate lists of recommended cumulative impact control strategies. All three lists of suggested options were discussed, combined and narrowed down to a list of 19 options that were provided for public comment at five Community Forums. Staff conducted these forums at various locations throughout the Basin in the evenings or Saturdays (Mira Loma, Fontana, Sun Valley, Santa Ana, and Wilmington) in May and June 2003. A summary of the input received from the Community Forums is provided in Appendix F. Additional strategies were added as a direct result of comments heard at the Community Forums.

The discussion in the following sections highlights interests of the different groups represented on the working group. There were many areas of agreement among the members. First, all parties agreed that areas of high cumulative impacts need to be addressed; it is how that may be accomplished where there are differences. There was also consensus that in order to establish an effective program to reduce cumulative impacts, improvements in emission inventories, data, tools, and modeling are necessary. In addition, all parties agreed that non-cancer risks need to be identified and addressed. These areas of agreement correspond to the enhancements proposed for the periodic updates to the ATCP. There was also general agreement on other suggested control strategies to reduce air emissions from source-specific activities that are currently unregulated, such as truck and train idling (Nos. 11 and 12), yard/port activities (No. 3), chromium spray operations (No. 4), and arsenic controls (No. 18). There was support for the Voluntary AQMD/Local Government/Public Agency Partnerships.

However, there was not consensus on strategies that would result in source-specific requirements for sources, such as more stringent requirements for new or existing sources located close to schools or possibly other sensitive receptors.

Following is a summary of the key interests and recommendations by members of the working group representing industry, environmental/community, and local governments.

Industry

Industry representatives of the Cumulative Impacts Working Group felt that the most effective programs addressing air pollution have resulted from identifying the source(s) of the cumulative air pollution problem and developing strategies for reducing pollution from the sources that are creating the problem. They pointed out that California law provides clear direction in the area of Environmental Justice, defining it as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies." (Government Code §65040. 12(c)), as well as highlighting AQMD's own definition. Industry also felt that the AQMD should use valid tools to identify areas that have unusually high levels of cumulative risk and exposure and develop programmatic solutions to address these areas.

Cumulative Impacts

Pursuant to Health and Safety Code Section 40440(c), industry representatives have pointed out AQMD's obligation to regulate in a manner that results in the most effective and least burdensome programs. They felt that this can only be done if the problem areas are clearly identified and prioritized and the sources of the problem identified. The industry representatives' key recommendations are summarized as follows:

1. Define the areas of concern based on areas which have unusually high levels of cumulative risk when compared to the region;
2. Identify the sources contributing significantly to the health risk in those areas; and
3. Develop programs targeting the sources contributing to the problem.

Environmental/Community

Environmental/community representatives agree that high risk areas should be addressed. In addition, they site the need for better tools and data for analyzing cumulative risks and they suggest a program that is broad and more encompassing. The environmental/community representatives are also interested in:

1. Further developing and implementing methods of pollution prevention;
2. Developing additional mitigation requirements for all facilities, including both existing and future proposed facilities that are located in heavily impacted areas;
3. Establishing emission reduction goals for industry-wide reductions for certain heavy polluting sectors (e.g., refineries, auto body/paint shops, printers, and nail salons);
4. Adoption of specific goals for Hazardous Air Pollutants (HAPs) emission reductions from both the stationary and mobile sources under AQMD's authority. Success would be measured by decreased TAC emissions and increased number of permits denied or not renewed; and
5. Developing and incorporating into source-specific rules health-based and distance-based siting criteria for residential and sensitive receptors, and requiring applicants for new, modified, or renewed permits in heavily impacted areas to verify the underlying assumptions and assertions about emissions and impacts of the proposed equipment and processes.

The environmental and community representatives feel strongly that Rules 1401 and 1402 should be strengthened and applied to all permitted sources, regardless of their contribution to cumulative impacts. They also do not want the Neighborhood Toxic Abatement Fund to be used by facilities to meet more stringent standards.

Local Government

Local government representatives commented that a program to mitigate cumulative risk should only proceed once the highest risk areas and the contributors to those highest risks are identified. In general, across-the-board programs that target risk reduction within the stationary source category while disregarding the large contribution from mobile sources are undesirable. Stationary source risk reduction is appropriate where it has been clearly shown that the stationary source contributes the major portion of the risk. In general local government representatives desire a cumulative impacts program that:

1. Identifies high risk areas from all contributors;
2. Analyzes the risk contributors for those high risk areas;
3. Identifies agencies with authority/jurisdiction;
4. Minimizes disproportionate risk through existing programs if possible, such as expanded fleet rules, AB 2588 etc.; and
5. Creates incentive programs secondly to target under-regulated/unregulated problem source.

VI. RECOMMENDATIONS

Staff recommends the approach outlined within this White Paper, which calls for immediate work to develop the Early-Action Control Strategies and an Addendum to the March 2000 Air Toxics Control Plan, a commitment for future periodic updates to the ATCP, and completion of MATES III.

VII. PROPOSED SCHEDULE

Staff proposes the following schedule:

1. White Paper presented to the Governing Board: September 2003.
2. Addendum to the March 2000 Air Toxics Control Plan: December 2003.
3. Report to the Stationary Source Committee every 6 months.
4. Report to Board once per year as part of the EJ Enhancements.
5. Early-Action Control Strategies developed and implemented within 3 years.
6. Remaining Control Strategies developed and implemented within 3 to 5 years.
7. Working Group meetings, as necessary, to receive input on proposals being developed.

Table 4A presents the proposed schedule for each of the control strategies, sorted by strategy number, addressed in this paper. Table 4B presents the strategies sorted by proposed adoption date.

Table 4A
Control Strategy Schedule
(Sorted by Strategy Number)

No.	Title	Date of Proposed Adoption
Early-Action Control Strategies (Rules)		
1	Air Toxic Control for Back-up Generators	1st Quarter 2004
2	More Stringent Requirements for New Sources Located Near Existing Schools and Possibly Other Sensitive Receptors	2004
3	Yard Hostlers at Ports, Rail Yards, and Distribution Centers	2004-2005
4	Chromium Spray Coating Operations	4th Quarter 2004
5	Private Fleet Rule Development	2004-2005
Early-Action Control Strategies (Policy)		
6	Increased Compliance Assurance for Repeat Emission Violations	2004-2005
7	Prioritize Resources for CEQA Document Review in High Cumulative Impact Areas	2004
8	Voluntary AQMD/Local Government/Public Agency Partnership	2004
9	Governing Board Resolution to CARB	2003
Early-Action Nuisance Strategy		
10	Pilot Odor Abatement Program	2004-2006
Additional Recommended Strategies for the ATCP		
11	Truck Idling	2005
12	Train Idling	2005
13	Marine and Airport Operations	2005-2008
14	More Stringent Requirements for Rule 1402 Sources Near Existing Schools and Possibly Other Sensitive Receptors	2004-2005
15	More Stringent Air Toxic Source-Specific Requirements for Sources Near Existing Schools and Possibly Other Sensitive Receptors	2005-2008
16	Develop and Launch Pollution Prevention Initiatives	Ongoing
17	Neighborhood Air Toxic Abatement Fund	2004 & Ongoing
18	Additional Controls for Arsenic	2005
19	Additional Control for Auto-body Shops	2005
20	Diesel Traffic Flow Control	Ongoing
21	Analysis and Mitigation for Sources Contributing to High Cumulative Air Pollution Impacts (Cancer and Non-Cancer)	2004 & Ongoing
22	Odor Abatement Program for Existing Facilities (Nuisance Strategy)	2005 & Ongoing
23	ARB Component	Ongoing
24	U.S. EPA Component	Ongoing
25	Increased/Targeted Funding for Disproportionate Impacted Areas	Ongoing

*Initial development will commence upon the ATCP Addendum approval by the AQMD Governing Board. Updates will be made in conjunction with future updates to the AQMP and ATCP, as well as using the results derived from the MATES III effort.

Table 4B
Control Strategy Schedule
(Sorted by Date)

No.	Title	Date of Proposed Adoption
9	Governing Board Resolution to CARB	2003
1	Air Toxic Control for Back-up Generators	1st Quarter 2004
2	More Stringent Requirements for New Sources Located Near Existing Schools and Possibly Other Sensitive Receptors	2004
7	Prioritize Resources for CEQA Document Review in High Cumulative Impact Areas	2004
8	Voluntary AQMD/Local Government/Public Agency Partnership	2004
4	Chromium Spray Coating Operations	4th Quarter 2004
3	Yard Hostlers at Ports, Rail Yards, and Distribution Centers	2004-2005
5	Private Fleet Rule Development	2004-2005
6	Increased Compliance Assurance for Repeat Emission Violations	2004-2005
14	More Stringent Requirements for Rule 1402 Sources Near Existing Schools and Possibly Other Sensitive Receptors	2004-2005
10	Pilot Odor Abatement Program	2004-2006
17	Neighborhood Air Toxic Abatement Fund	2004 & Ongoing
21	Analysis and Mitigation for Sources Contributing to High Cumulative Air Pollution Impacts (Cancer and Non-Cancer)	2004 & Ongoing
11	Truck Idling	2005
12	Train Idling	2005
18	Additional Controls for Arsenic	2005
19	Additional Control for Auto-body Shops	2005
13	Marine and Airport Operations	2005-2008
15	More Stringent Air Toxic Source-Specific Requirements for Sources Near Existing Schools and Possibly Other Sensitive Receptors	2005-2008
22	Odor Abatement Program for Existing Facilities (Nuisance Strategy)	2005 & Ongoing
16	Develop and Launch Pollution Prevention Initiatives	Ongoing
20	Diesel Traffic Flow Control	Ongoing
23	ARB Component	Ongoing
24	U.S. EPA Component	Ongoing
25	Increased/Targeted Funding for Disproportionate Impacted Areas	Ongoing

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ATTACHMENT C

DOUGLAS MILLER DECLARATION

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Attachment C

DECLARATION OF Douglas E. Miller

I, Douglas Miller, declare and state as follows:

1. I am the Vice President, California Value Chain Strategy of Tesoro Companies, Inc.

2. This declaration is submitted to explain crude oil and hydrogen supply considerations for Tesoro's Los Angeles Refinery. Specifically, some of the public comments received on the Draft Environmental Impact Report (DEIR) for the Los Angeles Refinery Integration and Compliance Project (proposed project) suggest that increased marine offloading efficiency and decreased delivery costs associated with additional crude oil storage capacity will result in an increase of marine vessel crude oil deliveries to replace pipeline deliveries. As described below, decreases in demurrage costs will not impact crude oil sourcing decisions for the Refinery. This declaration also addresses hydrogen supply to the Refinery, which is limited. In addition, this declaration clarifies that Tesoro does not store LPG at the Rancho LPG facility. In addition, this declaration clarifies public comments that took numerous corporate statements from a variety of sources, including Tesoro's quarterly earnings conference calls, Analyst Day presentations, and other documents or articles such as the Vancouver Energy Project DEIS and news articles, out of context to support claims that the proposed project involves a change in the crude oil blend processing capability of the Refinery. I have personal knowledge of the facts stated in this declaration based upon information that I have obtained during the course and in the scope of my work, and the review of information contained in documents maintained in the normal course of business.

3. Tesoro Companies, Inc. provides corporate development and corporate services for Tesoro Corporation and its subsidiaries and affiliate companies, including Tesoro Refining and Marketing LLC and Tesoro Logistics, LP. The services provided by Tesoro Companies, Inc. includes integrated refining, marketing, and logistics strategy and business development which includes crude oil supply strategies for Tesoro's seven refineries. In the normal course and scope of my employment, I report to the Executive Vice President, Chief Financial Officer and Corporate Development, Mr. Steven Sterin, who reports to the President and CEO of Tesoro Corporation, Mr. Greg Goff. I am responsible for strategy and business development for Tesoro's California value chain, which includes the development, implementation, and integration of strategies for Tesoro's California assets for crude

oil and feedstock acquisition, crude oil and feedstock logistics, refinery business improvement, product distribution and logistics, product marketing, and integration with other Tesoro West Coast assets. My responsibilities include working with all Tesoro Corporation subsidiaries and affiliate companies, including Tesoro Refining and Marketing Company and Tesoro Logistics. As part of my responsibilities, I have knowledge of and am involved in any plans or strategy changes for crude oil and feedstock acquisition, crude oil and feedstock logistics, refinery business improvements, product logistics, product marketing and west coast integration of Tesoro's California assets, including the proposed project. I have been in this role as Vice President, California Value Chain Strategy since April 2015 and have held various roles within Tesoro associated with California refinery crude oil selection, optimization, and business development since May 2002.

4. Tesoro Corporation is an independent refiner and marketer of petroleum products. Tesoro, through its subsidiaries, operates seven refineries in the western United States and a logistics business. Tesoro's retail-marketing system includes over 2,400 retail stations.

5. Refining is an industry that generates revenue based on the difference in value between the products it produces and the crude oil it consumes; this is known as the refining margin. Advantaged crude oil is not a standard term in the refining industry. Tesoro uses the term advantaged crude oil to mean any crude oil that has an improved refining margin over other crude oils processed at the refinery, such that the refinery cost of production is reduced, and therefore, profitability and relative competitive advantage is improved. Advantaged crude oil is typically lower cost (cost-advantaged), but it could also be a crude oil that provides an improved refining yield, or slate of products, notwithstanding a higher crude oil cost. Refiners that can use lower priced crude oils and still produce valuable products have a competitive advantage in the refining industry. The competitive advantage may be based on refinery process unit configuration, on access to crude oils and proximity to markets, or on the location of the refinery.

6. California produced crude oils have several economic advantages over substantially similar quality foreign and Alaska produced crude oils, but the California crude oil production falls well short of the California refinery demand. In 2015, California refineries imported 304,033,000

Attachment C

barrels of foreign crude oil to meet refinery demand.[1] California and Alaska produced crude oil only supplied 36% and 12%, respectively, of the California refineries crude oil demand.[2] Both California and Alaskan crude oil production has decreased historically. However, California production has remained relatively constant over the past five years, with 2013 and 2014 reflecting year over year increases in production.[3] California crude oil reserves remain relatively steady as new reserves are discovered and proven at approximately the same rate as production.[4] California crude oil production is generally economically advantaged over similar quality foreign crude oils due to its relative pricing, long term contract structure, low transportation cost, and ratable supply with frequent, small parcel deliveries to refineries.

7. California crude oils are supplied to refineries primarily by truck and pipeline transportation. At the Refinery, California crude oil is only supplied via pipeline. Costs for pipeline and truck transportation of California crude oils from the production field to refineries are generally less than the transportation costs of crudes transported by marine vessel to the refineries. Pipeline and truck transportation methods also result in the delivery of 1 to 3 days of expected crude oil consumption at a delivery frequency of multiple times per week, where marine deliveries of crude oil supply typically deliver 7 to 25 days of expected crude oil consumption with a marine vessel delivery frequency of 2 to 4 times per month. As a result, refinery inventories of California crude oil are maintained at relatively lower levels and inventory carry costs are reduced compared to marine deliveries because pipeline crude oil is re-supplied frequently. As such, marine deliveries require additional tankage to contain the marine vessel cargo or the use of the marine vessel as floating storage until the vessel can be unloaded into shore side tankage. California crude oil is generally purchased over long term contract periods of one to two years. These term contracts provide favorable payment terms with constant crude oil supply volumes and price differential over the contract period, and these contracts are often automatically extended beyond the initial term until

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[1] http://www.energy.ca.gov/almanac/petroleum_data/statistics/2015_foreign_crude_sources.html

[2] http://www.energy.ca.gov/almanac/petroleum_data/statistics/crude_oil_receipts.

[3] http://www.energy.ca.gov/almanac/petroleum_data/statistics/crude_oil_receipts.

[4] https://www.eia.gov/dnav/pet/pet_crd_pres_dcu_SCA_a.htm

notice is given by either party to renegotiate the contract terms. Contract pricing for term contracts is negotiated by the buyer and seller to the level where the suppliers seek to obtain a price that is greater than or equal to their alternative sale to another refinery while refiners seek to obtain a price that is less than or equal to the value of their alternative crude supply. As such, supply and demand fundamentals result in a market price of California crude oil that remains in parity with the value of the alternative foreign crude oil imports of similar quality. When considering all of these relative factors (transportation cost, payment terms, inventory carrying costs, working capital, and price set by supply and demand fundamentals) together in aggregate, California crude oils are generally advantaged by approximately $0.50 to $0.60 per barrel compared to the marine delivered alternative. As such, pipeline delivered, California crude oils represent an advantaged base level of crude supply to the refinery that is expected to remain relatively constant over time. Additionally, as refinery crude throughput is reduced due to seasonal or long term product demand reductions, the base level California crude will continue to be processed in California refineries, and the incremental crude oil processing rate reductions result in reduced crude oil imports.

8. Demurrage costs are paid to ship owners for the time that vessels are delayed discharging their cargo after they have arrived at a port. In Long Beach, vessels often anchor just off the coast while waiting for on-shore tankage to become available. Large VLCC vessels, which arrive in port with approximately 1.8 MMbbls of crude oil on board, require three to four berthings at the dock to discharge their cargo, due to limited on-shore tankage at the Refinery and the Carson Crude Terminal. Between each berthing, the vessel returns to anchor to wait for shore side tankage to become available prior to making a subsequent berthing to discharge more crude oil. During this time at anchor, the ship emits pollutants as it continues to operate engines associated with hoteling. Due to the number of berthings required to discharge the full contents of the vessel, crude oil berths become congested, and as such, other smaller vessels also experience delays while they wait for berth availability before they can berth at the dock to discharge cargo. Therefore, smaller vessels also experience demurrage charges caused by dock congestion and shore side tankage availability as they wait at anchor for their turn to come to the dock and unload their cargo. Construction of the proposed Carson Crude Terminal crude oil tanks will not completely eliminate demurrage costs; however, the

Attachment C

Refinery waterborne crude oil demurrage cost may be reduced by as much as $0.20 to $0.25 per barrel. Furthermore, the proposed Carson Crude Terminal crude oil tanks will reduce ship discharge delays, berth congestion, and the associated ship emissions.

9. Increasing crude oil storage capacity will allow the refinery to be more efficient and will result in cost savings, as evidenced by the estimated demurrage cost savings in statement 8 of $0.20 to $0.25 per barrel. But these savings are significantly less than the California crude oil advantage in statement 7 of approximately $0.50 to $0.60 per barrel, and are not sufficient to drive crude oil sourcing decisions to favor marine deliveries over pipeline deliveries of California crude oil. Therefore, decreases in demurrage costs will not impact crude oil sourcing decisions for the Refinery.

10. Additionally, crude oil spot market purchasing decisions are generally made approximately 30 to 90 days prior to delivery, depending on transit time to the refinery. Delivered crude oil pricing is subject to global supply and demand market fundamentals and transportation cost changes. As such, optimized crude oil spot purchases are made from different regions of the world based on the delivered cost and the relative product values produced for each crude oil. In order to benefit from spot market purchase opportunities cause by price fluctuations, crude oil spot purchasing decisions are made based on the price and availability of crude oils that meet refinery delivery timing needs during a rolling 120 day planning process and are not made far in advance of deliveries. As such, a specific refinery purchases crude oil based on the delivered price, availability, and relative product value of crude oils that can be delivered to the refinery at similar times to meet the refinery's crude oil consumption requirements. The planned processing rate at a refinery does not create demand for any particular crude oil supply source since a change in the delivered crude oil price, relative to other crude oil alternatives, will produce a change in the refinery's economic demand for that crude oil grade.

11. Due to stringent low sulfur, aromatics, and other product specifications that require extensive hydrotreating of process unit feedstocks and products, many California refineries, including the Refinery, limit operations based on hydrogen supply. The Refinery hydrogen demand is large (i.e., over 200 million standard cubic feet per day of hydrogen). Currently, the Refinery produces hydrogen both in processing units and hydrogen plants and purchases hydrogen from the Air Products

Carson and Wilmington Plants. The Air Products facilities are operated at capacity and typically cannot supply the Refinery with additional hydrogen. The Refinery currently uses all available produced and purchased hydrogen (i.e., the Refinery operates to its hydrogen limit) such that operations are carefully managed based on the available hydrogen.

12. The Rancho LPG facility is an existing facility that is not owned or operated by Tesoro in any way. Additionally, Tesoro does not lease tankage at Rancho LPG. Tesoro does regularly sell excess LPG on the open market. Rancho LPG and others, who may contract with Rancho LPG to store product at Rancho LPG, may be customers of Tesoro. However, none of the LPG stored at the Rancho LPG facility in San Pedro is owned by Tesoro. Further, the Rancho LPG facility operates independently of and is not part of the proposed project.

13. The remainder of this declaration addresses Comment Letter 81, Attachment 8. For ease of reference, the paragraphs in Attachment 8 have been numbered sequentially from one to 21 (see Exhibit A, Items 1 through 21).

14. With respect to Items 1, 2, and 3 of Attachment 8 (which contain out of context statements and materials from analyst and investor events), it is important to note that analyst and investor discussions typically contain a high level overview of strategic projects that Tesoro plans to implement. Items 1, 2, and 3 thus present a big picture overview of some of Tesoro's strategic projects at the time of the respective presentations. Some comments suggest that these overview statements indicate a specific intention to increase transportation of Bakken and heavy Canadian crude oil to the Los Angeles Refinery as a result of the proposed project (see, e.g., Comment G1-81.23). However, the comments misunderstand or mischaracterize the statements because they relate to multiple, distinct Tesoro projects and strategies, and use generic descriptors regarding crude oil (e.g., "advantaged"). Providing context just prior to the selected Item 1 quote, Mr. Casey stated, "Now, as I told you, I also get to update you on some strategic investments,. . ." Items 2 and 3 of Attachment 8 are slides 13 and 15 of the Morgan Stanley Refining Corporate Access Day Presentation[5] and represent separate, unrelated strategic investments for Tesoro. Each of the bullet items on slide 13

[5] Morgan Stanley Refining Corporate Access Day Presentation, http://phx.corporate-ir.net/External.File?item=UGFyZW50SUQ9NjMzNDYwfENoaWxkSUQ9MzM4NDAyfFR5cGU9MQ==&t=1

Attachment C

represent separate, unrelated strategic investments. The four slides following slide 13 in the Presentation (see Exhibit B, slide numbers 14, 15, 16, and 17) dedicate a slide to each specific strategic investment to explain the strategy and value of each independent investment. Providing slides 13 and 15 as Items 2 and 3 in Attachment 8 without the context of the Presentation slides that immediately precede and follow Item 3 removes the context of the separate strategic investments presented at the Morgan Stanley conference. When reviewing Items 2 and 3 in context with the omitted Presentation slides, it is clear that the presentation is discussing four separate and distinct strategic investments. The proposed project and the Vancouver Energy Project are not related. Because it is a separate and distinct investment, the proposed project will proceed with or without the Vancouver Energy Project. As the slides reflect, only the Mixed Xylene Project and the Anacortes Isomerization Project are related. Slide 17 clearly shows that the Isomerization Project at the Tesoro Anacortes Refinery "Increases Mixed Xylenes production."

15. Items 4 and 5 are accurate statements regarding the proposed project.

16. Items 6, 7, and 8 are indicated as quotes from Tesoro. However, they are not properly referenced. I have attempted to identify the transcripts or other documents from which the quotes may be taken. Items 6, 7, and 8 appear to come from the Thomson Reuters transcript from December 9, 2015[6].

17. Item 6 is a statement that refers to Tesoro's existing West Coast refinery capabilities and logistics connectivity. It is not in any way associated with the proposed project.

18. Item 7 includes a statement made by Mr. Casey, at the time Tesoro's Executive Vice President, Operations, at Tesoro's 2015 Analyst and Investor Day presentation regarding plans for the proposed project followed by summary statements regarding the performance of Tesoro's California region in 2015. Mr. Casey's projection that the California region will contribute large revenue gains is not specific to the Refinery. Thus, if the comment is implying that those gains were resulting from new crude oil access these statements don't provide factual support, because the statement does not

[6]Thomson Reuters Streetevents Edited Transcript, TSO- Tesoro Corporation 2015 Analyst and Investor Day, December 9, 2015, 2:00PM, at pages 8 and 11

discuss new crude oil access at all. Moreover, the projection of revenue gains is not linked exclusively to the Refinery, or to the proposed project.

19. Item 8 is an accurate description of one of the proposed project elements that is key to enabling the proposed project emissions reductions. The Interconnecting Pipeway allows refinery intermediates to be efficiently transferred between Carson and Wilmington operations and is one of the elements that helps facilitate the retirement of the Wilmington FCC unit.

20. None of the statements regarding the proposed project in Items 4 through 8 is contrary to any of the other project statements. The proposed project will enable the Refinery to operate more cleanly and efficiently, reducing local emissions and providing significant benefits to the local economy. When the Refinery operates more efficiently, Tesoro will realize economic and competitive advantages from further integrating the Carson and Wilmington Operations.

21. Items 9, 10, and 11 are statements from a Morningstar analyst report on Tesoro Corporation valuation estimate and reflect the opinion of the author. These are not statements by Tesoro and should not be attributed to Tesoro to reflect its business intentions or strategy regarding the proposed project. The Morningstar author's comments appear in the "Investment Thesis" section of the report where the author appears to comment on 2013 market conditions and the potential impact to Morningstar's evaluation of Tesoro's valuation. Item 11 in Attachment 8 notes that construction of a Washington rail terminal adds strategic value to Tesoro, but as discussed above, the proposed Vancouver Energy Project is unrelated to the proposed project. Item 10 in Attachment 8 correctly notes that Tesoro will gain further advantage from integrating Carson and Wilmington Operations. Operations integration and efficiency is one of the primary objectives of the proposed LARIC project, and it is necessary to realize the emissions reduction from the proposed project. Item 9 citing the possibility that Tesoro can improve the performance of Carson by "optimizing its crude slate" is speculation on the part of the author and is unrelated to the proposed project. The proposed project will not cause a change in the Refinery's crude oil blend processing capability because its operating envelope will remain the same before and after the proposed project. The proposed project does not facilitate a change in refinery crude capability to process a lighter crude slate, and it is not clear what the author believes would be an "optimized" slate. As discussed above, there are many factors that go

into a determination of what makes a crude source desirable, including lower cost, but also improved refining yield. In any event, while reflective of general good business principles (i.e. the Refinery should seek to maximize yield at the lowest cost), this statement was not made nor endorsed by Tesoro.

22. Item 12 is information taken from a PowerPoint presentation given by Mr. Scott Spendlove, at the time Tesoro's Chief Financial Officer, at the Simmons conference[7]. The Item refers to an illustration of possible Refinery crude oil opportunities, and indicates that possibly up to 50% of the Refinery feedstock could be accommodated with heavy California and Bakken crude oil, within the existing refinery crude processing capability. The slide was intended to reflect the existing capability of Tesoro's California and Alaska refineries to process mid-continent crude oil when blended with locally produced crude oils in each region. Because the illustration depicts current refinery capabilities and the proposed project does not facilitate a change in the Refinery's capability to process a lighter crude oil blend, this illustration is unrelated to the proposed project. Since the Refinery crude processing capability constraints are fixed, the illustrated blend of California Heavy and Bakken crude oil would have to displace a similar amount and composition of blended crude oils in the refinery crude slate, or it would reduce the overall Refinery throughput. Reducing throughput would greatly reduce the economic incentive to process the California Heavy and Bakken blend.

23. The quotes provided in Item 13 are not included in the referenced presentation at the Simmons Energy Conference, so it is not possible to identify the context from which these quotes were extracted. However, these quotes may have been taken from the Deutsche Bank Presentation and appear to refer to acquisition synergies where Tesoro has consolidated gasoline and diesel distribution through Tesoro terminals acquired in 2013 instead of from third party terminals. The consolidation of gasoline and diesel distribution throughout the acquired terminals and truck racks was completed in 2014. The consolidation of terminals and truck racks was completed several years ago, is independent of refinery operations, and is unrelated to the proposed project.

[7] Simmons Energy Conference, *Transformation through Distinctive Performance,* February 27, 2014

24. Item 14 is not a quote from Tesoro. The Vancouver Energy Project is intended to supply North American crude oil (which could originate from Colorado, Montana, North Dakota, Utah, Wyoming and Canada) to West Coast refineries.[8] The Vancouver Energy Project would supply all West Coast refineries, not just Tesoro refineries.

25. Items 15 through 20 are factual statements regarding the Vancouver Energy Project. As discussed in statement 14 above, the proposed project and the Vancouver Energy Project are separate and distinct investments that are unrelated projects.

26. Items 21 and 22 refer to Tesoro's announcement regarding the purchase of assets, including crude oil gathering, pipeline transportation, storage and rail loading facility, in the Bakken region. Tesoro is a refining and marketing company that does not own or invest in crude oil production fields. Tesoro owns infrastructure and facilities to transfer and process crude oil produced by others. The acquisition of additional assets in the Bakken region is unrelated to the proposed project and was an addition to its logistics in the Bakken region, which is beneficial for Tesoro Logistics. The acquisition enables Tesoro to gather and transport additional Bakken region crude oil. Prior to the acquisition, Tesoro was dependent on third party rail loading terminals to facilitate loading Bakken crude oil into rail cars. With the acquisition, Tesoro can now gather additional Bakken crude oil and utilize its own rail loading terminal to ship Bakken crude oil. Item 21 references a newspaper article that suggests the acquisition was intended to supply the West Coast. It is important to note that Tesoro operates two refineries in North Dakota and one in Washington that process significant quantities of Bakken crude oil, such that Bakken crude oil consumption represents approximately 15% of the total Tesoro refining system crude slate. As such, significant Bakken region logistics infrastructure is utilized to support Tesoro operations. However, this infrastructure is unrelated to the proposed project, which is not expected to change the crude oil blend processed at the Los Angeles Refinery.

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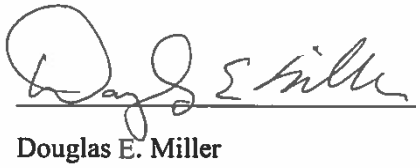
[8] Draft EIS for the Tesoro Savage Vancouver Energy Distribution Terminal Project available at http://www.efsec.wa.gov/Tesoro%20Savage/SEPA%20-%20DEIS/DEIS%20PAGE.shtml

Attachment C

I declare under penalty of perjury under the laws of the State of Texas that the foregoing is true and correct. Executed January 27, 2017, at San Antonio, Texas.



Douglas E. Miller

Attachment C

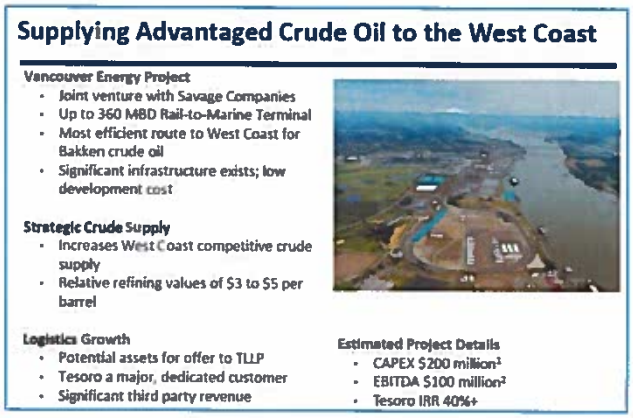
Exhibit A
CEB Attachment 8 with Brackets and Numbers

Tesoro statement:

"When you think about formalizing competitive advantage and fully integrating our value chain, that is really what the Los Angeles Integration and Compliance Project is about. And when we think about creating value, we are not just thinking about advantaged crude oils in front of our refineries, but we're thinking about how that supply to the west coast of advantaged crude oils can change the shape of the crude oil supply/demand dynamics for the west coast. And that's what we are trying to accomplish through Vancouver Energy."[1] 1

Tesoro slides:[2]

2



3

[1] Edited Transcript TSO - Tesoro Corporation 2015 Analyst and Investor Day, December 09, 2015, p. 10, available at https://www.google.com/search?q=EDITED+TRANSCRIPT+TSO+-+Tesoro+Corporation+2015+Analyst+and+Investor+Day+EVENT+DATE%2FTIME%3A+DECEMBER+09%2C+2015+%2F+2%3A00PM+GMT&oq=EDITED+TRANSCRIPT+TSO+-+Tesoro+Corporation+2015+Analyst+and+Investor+Day+EVENT+DATE%2FTIME%3A+DECEMBER+09%2C+2015+%2F+2%3A00PM+GMT&aqs=chrome..69i57.471j0j4&sourceid=chrome&ie=UTF-8

[2] Tesoro Presentations webpage, weblink: Morgan Stanley Corporate Access Day, 5/12/16, Slideshow entitled: *Driven to Create Value, Morgan Stanley Refining Corporate Access Day, May 2016*, Slide 13 &15, available at: http://phx.corporate-ir.net/phoenix.zhtml?c=79122&p=irol-presentations , Attachment XX

Attachment C

Exhibit A
CEB Attachment 8 with Brackets and Numbers

Tesoro Public Relations Project Purpose description:[3]

"Tesoro plans to invest $460 million to physically connect, further integrate and upgrade our adjacent Carson and Wilmington facilities, so that our combined Los Angeles Refinery operates more cleanly and efficiently. 4

"Pending permitting and approvals, the Los Angeles Refinery Integration and Compliance (LARIC) project will improve air quality, substantially reduce local emissions, upgrade refinery equipment and provide significant benefits to the local economy." 5

Contrasts with Tesoro description to investors regarding new crude oil access:[4]

"When you think about our portfolio, with almost 740,000 barrels a day of capacity on the west coast, we have a very large and competitive position . . . four excellent refineries with just absolutely superb waterborne logistics connectivity, so not only for crude oil, advantaged crude oil access up and down the coast . . . 6

"This is the Los Angeles Integration and Compliance Project, and, boy, it has been a pleasure. . . . this business is performing very, very well this year and it is going to contribute -- that region will contribute onwards of $2 billion of revenue to our 2015 results 7

". . . And then, we do two large pipelines, 45-inch bores going under two major transportation corridors, and I think all totaled it is something like 18 miles of pipe that we are putting in in these projects that will formally connect and unleash the full power of a full integrated site, and that's the exciting thing about this project. 8

Tesoro and industry literature showed the same kinds of statements about crude oil transport when the Project was first brought out as part of a Negative Declaration in 2014 (before it was withdrawn under protest that it needed a full DEIR, and published again in the full 2016 DEIR):

Morningstar report, July 2013:[5]

Specifically, Tesoro can dramatically improve the performance of Carson by optimizing its crude slate with light crude from the Bakken. . . . 9

Tesoro should gain further advantages from integrating Carson with the Wilmington refinery. 10

Increasing throughput of light and heavy discount crude from the Mid-Continent and Canada via rail will likely benefit Tesoro more, though. To this end, Tesoro recently entered an agreement to develop a 120 mb/d crude by rail and marine facility in Washington. *[later expanded to 360,000 bbls/day]* 11

[3] http://www.tesorolaproject.com/aboutlaric/ , and during community meetings held by Tesoro.
[4] http://phx.corporate-ir.net/phoenix.zhtml?c=79122&p=irol-transcriptsarchive
[5] 7/24/2013 http://analysisreport.morningstar.com/stock/archive?t=TSO&region=USA&culture=en-US&productcode=MLE&docId=604033

Attachment C

Exhibit A
CEB Attachment 8 with Brackets and Numbers

Tesoro February 2014 slideshow:[6]

> "Extending the advantaged crude oil to the West Coast," and changing the Los Angeles operations crude oil feedstock from 15% California Heavy crude to "Potentially up to 50% California Heavy and Bakken" crude oil (Slide 13). 12

> "Terminaling, Transportation, and Storage" will "Consolidate Tesoro volumes in Southern California distribution system" and "Open Southern California to third-party business" 13

Tesoro Savage Vancouver Washington Terminal, recently given a two-year lease extension, is a key part of Tesoro West Coast plans to bring crude to its refineries, from the Bakken region, with options for Canadian crude. The Tesoro/Savage Vancouver, Washington joint venture *Vancouver Energy Terminal* on the Columbia River is a crude-by-rail to oil tanker terminal. The Vancouver Energy website states:[7] 14

> Tesoro and Savage formed a joint venture to build and operate the Vancouver Energy terminal, which will accept and ship crude oil that originates in the midcontinent of North America – including the Bakken formation – at the Port of Vancouver USA via rail. The crude oil will be temporarily and safely stored in secure tanks, then transferred to customers' vessels, shipped by customers to West Coast oil refineries, and converted into transportation fuels and other products for U.S. consumption. 15

The Tesoro Savage Vancouver Draft Environmental Impact Statement (DEIS) for the Tesoro Savage terminal states:[8]

> The Applicant is proposing to construct and operate a Facility that would receive an average of 360,000 barrels (bbl) of crude oil per day by rail, temporarily store the oil onsite, and then load the oil onto marine vessels for transport to existing refineries primarily located on the West Coast of the United States.[2] (at p. ES-2) 16

> . . . While projecting future market conditions is nearly impossible, based on the strength of Bakken production and market conditions known at this time, it is assumed that the Bakken would be the likely source of the mid-continent North American crude oil delivered to the proposed Facility. 17

The Tesoro Savage Vancouver DEIS also states:[9]

> Starting in 2017, the proposed Facility could receive crude oil from any source with rail access to the Port; however, according to information provided by the Applicant, the most likely sources would be northern mid-continent crude oil produced in North 18

[6] Simmons Energy Conference, *Transformation through Distinctive Performance,* February 27, 2014, http://phx.corporate-ir.net/phoenix.zhtml?c=79122&p=irol-presentations attached

[7] https://www.vancouverenergyusa.com/
[8] http://www.efsec.wa.gov/Tesoro%20Savage/SEPA%20-%20DEIS/DEIS%20PAGE.shtml
[9] Tesoro Savage DEIS, Fact Sheet, http://www.efsec.wa.gov/Tesoro%20Savage/SEPA%20-%20DEIS/DEIS%20PAGE.shtml

Attachment C

Exhibit A
CEB Attachment 8 with Brackets and Numbers

> Dakota and Montana, and in Canada. An average of four unit trains per day would arrive at the proposed Facility. 18 cont.

CEO Greg Goff regarding the Vancouver project approval:[10]

> "The hearings are formally set for the end of June through about 30 days, so the latter part of July," he said. **"We expect a final Environmental Impact Statement to be issued this fall, followed by a recommendation to the Governor of Washington,"** Goff added. 19

Despite widespread public opposition to the Project, the lease renewal was granted by the Commission unanimously in April (*Vancouver Port Gives Oil Companies What They Want — More Time*).[11] 20

Tesoro announced in December of 2015 plans for added capacity to pump 65,000 bpd of crude oil out of the Bakken (N. Dakota region), and to store and transport this crude for West Coast use.[12]

Acquisitions include the 97-mile BakkenLink crude oil pipeline, which connects to several third-party gathering systems, a 28-mile gathering system in the core of the Bakken, "where most of the drilling in today's low price environment is being done," a 154,000 bpd rail loading and a 657,000 bbl storage facility in Fryburg. 21

> ***"We expect our enhanced system to provide Tesoro's West Coast facilities with cost-effective access to advantaged crude oil and provide producers additional market access. . . ."*** Tesoro spokesperson Brendan Smith said in an emailed statement. 22

[10] May 6, 2016, S&P Global: Tesoro cuts 2016 spending on project permitting delays, https://www.linkedin.com/pulse/sp-global-tesoro-cuts-2016-spending-project-delays-janet-mcgurty

[11] Oregon Public Broadcasting (OPB), April 15, 2016, http://www.opb.org/news/article/vancouver-port-oil-terminal-lease-extension/

[12] *Tesoro plans to purchase Bakken pipeline, storage,* Jessica Holdman, Bismarck Tribune, Dec 17, 2015, http://tsocorp.com/customers-and-suppliers/wholesale/terminals/

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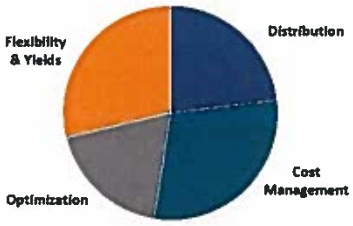
Exhibit B

Morgan Stanley Refining Corporate Access Day 5-12-16 Slides 12 through 17

Improvements Bolstering Earnings Growth

- Targeting **$200 million of annual improvement**



- Driving $150 million of operating expense savings relative to peers by 2018[1]

1) Relative to peers as reported in Worldwide Fuels Refinery Benchmarking Study ("Solomon Study")

12 | Tesoro

Strategic Investments for Distinctive Value

- **Creating advantage through integration**
  - Los Angeles Refinery Integration and Compliance Project
- **Changing** the West Coast crude oil supply dynamics
  - Vancouver Energy Project
- **Capturing higher margins** in a high growth market
  - West Coast Mixed Xylenes Project
  - Anacortes Isomerization Project

13 | Tesoro

Attachment C

Exhibit B

Morgan Stanley Refining Corporate Access Day 5-12-16 Slides 12 through 17

Creating Competitive Advantage at the Los Angeles Refinery

Los Angeles Integration and Compliance Project

- Completes full integration of Los Angeles Refinery
- Provides 30 to 40 MBD of **gasoline and distillate yield flexibility**
- Improves intermediate feedstock **flexibility**
- **CO_2 emissions reduced** over 300,000 tons annually[1]
- Reduces NOx, SOx and CO emissions

Estimated Project Details

- CAPEX $460 million
- EBITDA $100 million
- IRR 20%[2]

Enhancing West Coast competitive position

1) CO2 reduction associated with expected operations
2) Includes benefits from capital avoidance

14 | Tesoro

Supplying Advantaged Crude Oil to the West Coast

Vancouver Energy Project

- Joint venture with Savage Companies
- Up to 360 MBD Rail-to-Marine Terminal
- Most efficient route to West Coast for Bakken crude oil
- Significant infrastructure exists; low development cost

Strategic Crude Supply

- Increases West Coast competitive crude supply
- Relative refining values of $3 to $5 per barrel

Logistics Growth

- Potential assets for offer to TLLP
- Tesoro a major, dedicated customer
- Significant third party revenue

Estimated Project Details

- CAPEX $200 million[1]
- EBITDA $100 million[2]
- Tesoro IRR 40%+

1) Tesoro and Savage capital expenditures
2) Tesoro expected EBITDA

15 | Tesoro

Attachment C

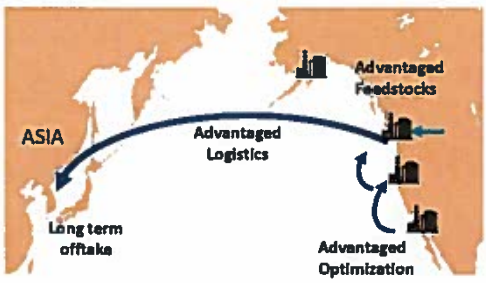
Exhibit B

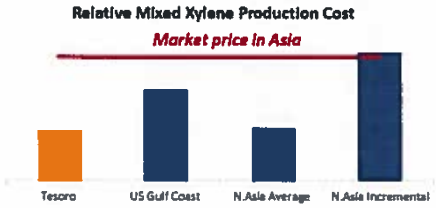
Morgan Stanley Refining Corporate Access Day 5-12-16 Slides 12 through 17

Supplying Mixed Xylene to Asia

West Coast Mixed Xylene Project

- Upgrading gasoline components to mixed xylene
- Large and growing market in Asia
- Transportation cost advantage relative to the Gulf Coast
- Manufacturing cost advantage
- New logistics business opportunity





Estimated Project Details

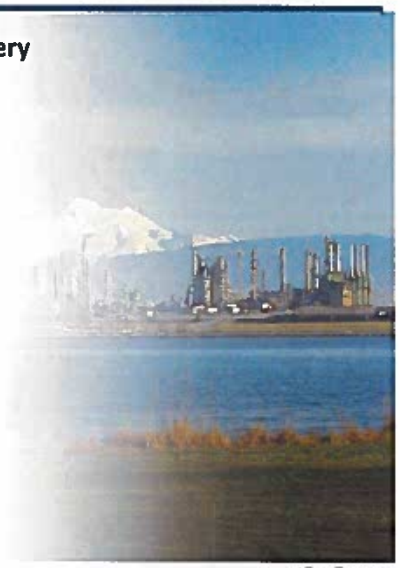
- CAPEX $300 million
- EBITDA $100 million
- IRR 20%

16 | Tesoro

Optimize Gasoline Production at Anacortes

Isomerization Project at Anacortes Refinery

- **Reduces octane** production costs
- Efficiently **meets Tier III** sulfur requirements
- **Increases** Mixed Xylenes production



Estimated Project Details

- CAPEX $100 million
- EBITDA $40 million
- IRR 20%

17 | Tesoro

ATTACHMENT D

McGOVERN RESPONSE LETTER

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Attachment D

Dr. Stephen J. McGovern, PE
PetroTech Consultants, LLC
912 Brandywine Drive
Bear, DE 19701
856-371-3463

March 6, 2017

Jillian Wong
Planning and Rules Manager
SCAQMD
21865 Copley Drive
Diamond Bar, CA 91765

Dear Ms. Wong,

The attached document contains responses to some of the comments that were submitted to the DEIR for the Tesoro LA refinery projects. Let me know if you have any additional questions.

Sincerely yours,

Stephen J. McGovern

Attachment D

Response to Comment Letter G1.78

I am a refining expert with more than 44 years of experience in the petroleum refining industry and hold advanced degrees in Chemical Engineering. I was retained by SCAQMD to review and analyze the Tesoro Los Angeles Refinery Integration and Compliance Project (project) and its potential environmental impacts. My report was included in the DEIR as Appendix F.

Comment letter G1.78 claims, among other things, that (1) the project was designed to, and would in fact, facilitate a switch from the Refinery's current crude slate to a new slate that will consist largely or entirely of Bakken crude oil and Canadian oil sands crudes; and (2) the project was designed to, and would in fact, facilitate an increase in production. The letter goes on to describe environmental impacts that would purportedly result from these operational changes. This memo responds generally to these claims, and specifically to comments G1.78.103 through G1.78.121 which address my report. Furthermore, it is my opinion that the project will not have any significant environmental impacts that were not identified in the FEIR.

In support of its claims, Letter G1.78 makes the following assertions:

- The project's proposed increase in storage tank capacity will allow the Refinery to increase production by 30,000-40,000 bbl/day or more.
- The new crude tanks will allow higher vapor pressure crudes to be processed in the Refinery.
- Several unit modifications are specifically designed to allow higher vapor pressure crudes to be processed in the Refinery.
- The project will allow the Refinery to process more "heavy", higher sulfur crudes, specifically more Canadian oil sands crudes.
- The project will allow the Refinery to process more "light" crudes with higher VOC and toxic emissions, specifically more Bakken crude.
- By inference, Bakken and Canadian crudes have more severe environmental impacts than all other crudes available on the open market.

For the reasons explained below, these assertions are incorrect. The project was not designed to, and will not in fact, facilitate either a switch to a new crude slate or an increase in production.

The project will not increase crude processing capacity more than 6,000 bbl/day

The DEIR explained that the project will increase the capacity of the DCU to process crude oil by 6,000 bbl/day. This increase represents an approximately 2% increase in crude oil processing capacity for the refinery overall. The DEIR evaluated the environmental impacts of this increased crude capacity. Based on my review of the current Refinery configuration and the proposed project, I have concluded that the DEIR is correct – the project will not increase the

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Refinery's crude oil processing capacity by more than 6,000 bbl/day.

The claim that the project will increase the Refinery's capacity beyond 6,000 bbl/day is based on two assumptions: 1) the increased capacity of the Refinery's crude oil storage tanks and related pipelines purportedly will allow an increase in the amount of crude processed at the Refinery; and 2) in a corporate earnings telephone call of May 5, 2016, the chairman and CEO of Tesoro purportedly stated that the refinery will produce 30,000 to 40,000 bbl/day more gasoline and distillate. These assumptions are incorrect.

First, the increase in crude oil storage capacity will not allow the Refinery to process more crude oil. As clearly stated in Chapter 1 (page 1-9), Chapter 2 (page 2-2 and following) and Appendix F (page F-11 and following) of the DEIR, the crude processing capability of the Refinery is limited by the process units within the Refinery, not the size of the crude oil storage tanks or related pipelines. The increased capacity of the tanks and pipelines was designed to allow very large tankers to offload their deliveries in one port call instead of two or more, and will have no effect on the Refinery's capacity to process crude oil.

Second, I have reviewed the corporate earnings conference call that purportedly states the Refinery will produce 30,000 to 40,000 bbl/day more gasoline and distillates. Tesoro's chairman and CEO's precise statement was as follows: "[the project will] yield flexibility of between 30,000 to 40,000 barrels a day of gasoline and distillates." This statement is consistent with the project description in the DEIR and my report, which explain that, after the proposed project, the Refinery would have the *flexibility* to *switch* production between gasoline and distillate in the amount of 30,000 to 40,000 bbl/day. This is a substitution of one product for another, not a net increase in total production. The ability to switch production from gasoline to distillate gives the Refinery the ability to better match seasonal demand profiles and meet the expected future demand for more distillate. Nothing in the statement remotely suggests that the project will enable an increase in production of 30,000 to 40,000 bbl/day.

The Wilmington FCCU produces primarily gasoline. The Unit has a very limited ability to produce distillates (diesel fuel and jet fuel). The shutdown of the Wilmington FCC, the modest expansion of the Wilmington and Carson hydrocrackers and hydroteating units, and the addition of the wet jet treater will allow the refinery to produce more distillates, with a corresponding decrease in the amount of gasoline produced. Hydrocracking units have more flexibility to switch between gasoline and distillate production than FCC units, which provides the ability to switch between gasoline and diesel production.

The Project will not increase the Refinery's overall production of petroleum products

Despite the fact that the Project may increase the amount of crude oil processed in the DCU by as much as 6,000 bbl/day, the Project will actually cause a slight decrease in the refinery's overall production of petroleum products. This is so because the 6,000 bbl/day increase in

crude oil feed will be more than offset by a large decrease in the amount of vacuum gas oil (VGO) that the refinery currently uses as feedstock for the Wilmington FCCU. On average, the refinery purchases about 10,000 bbl/day of VGO on the open market for this purpose. With the FCCU shutdown, the refinery's overall feedstock will be decreased by that amount.

The "floating roof" design for the new crude tanks is not tailored to Bakken crude; floating roofs meet BACT, and are therefore required by law

The project involves the installation of up to eight new crude oil storage tanks. Two of these tanks will be internal floating roof tanks, and up to six will be domed external floating roof tanks. Letter G1.78 claims that these new tanks are specifically designed to facilitate a crude switch to Bakken. In support of this conclusion, the letter cites two facts: 1) based on their design, the tanks will be able to hold crude oil that is relatively high in Reid Vapor Pressure (RVP); and 2) Bakken crude oil is high in RVP. It simply does not follow from these facts, however, that the tanks were designed to hold Bakken crude oil.

It is true that internal floating roof tanks and domed external floating roof tanks will allow the storage of high RVP crudes such as Bakken. The decision to use these particular tank designs, however, was completely unrelated to any purported switch in crude slate. These designs were chosen because they meet the "Best Available Control Technology" requirement imposed under the District's rules.[1]

The project will not facilitate the processing of higher vapor pressure crude blends

Contrary to what letter 78 asserts, the project will not facilitate the processing of crude blends with higher RVP. For the reasons explained below, on average, the vapor pressure of crude blends processed would be the same or lower than before the project.

The crude oil components that are the largest contributors to the vapor pressure of the crude oil are the gases propane, normal and iso-butane, and normal and iso-pentane. After they are distilled out of the crude blend in the crude unit, the Refinery uses these components in various ways. The Refinery uses propane as a small component of fuel gas to fired combustion equipment. The Refinery uses iso-butane as feed to the alkylation unit. The Refinery blends limited amounts of normal and iso-butane and normal and iso-pentane into gasoline. The propane, butane and pentane that are not used in these ways are treated and sold.

It is important to understand that the Refinery has an inherent economic incentive to minimize

[1] Although the AQMD will make the BACT determination at a later point in the process, both the District and Tesoro determined that, if the decision were made today, Tesoro would be required to choose one of three designs: (1) internal floating roof; (2) domed external floating roof; and (3) fixed roof with vapor control >=99%. (*See* memorandum from Danny Luong to Jillian Wong re BACT for storage tanks.) Thus Tesoro, appropriately, proposed designs that meet the District's current BACT standards.

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the RVP of the crude oil blends that it processes and, consequently, of the overall crude slate that it purchases. This is so because these components (propane, butanes, and pentanes) have a lower wholesale value than crude oil. The incentive to minimize RVP, in order to minimize excess LPG remaining at the end of the refining process, will only become stronger as a result of the project, for two reasons. First, the project will reduce the Refinery's need for energy by installing many new heat exchangers and by increasing the amount of diesel produced as compared with gasoline. (*See* DEIR page F13). This means that the Refinery will have less use for propane as a combustion fuel. Second, by reducing the amount of gasoline produced, the Refinery will have less need for normal and iso-butane and normal and iso-pentane to be blended into gasoline.

The comment letter suggests that the new propane treaters imply an increase in the vapor pressure of the crude processed in the Refinery. This is incorrect. It is true that the project will increase the amount of propane that is recovered and sold. The increase, however, is unrelated to the RVP of crude blends purchased. The amount of propane recovered after the project will increase in three ways. First, with the shutdown of the Wilmington FCC, the refinery will need to import a propane/propylene stream to produce the alkylate (premium blending stock) that is required to meet CARB gasoline specifications. The propylene is reacted with isobutane to produce alkylate. The propane that accompanies the purchased propylene must be treated and sold as LPG. Second, the expanded hydrocrackers will produce additional propane that must be treated and sold. Finally, the product recovery system of the catalytic reforming unit is also being modified to increase the amount of propane recovered. Since the refinery demand for propane as fuel will decrease, this additional propane must be treated and sold.

The project will not facilitate the processing of more Canadian oil sands crudes

The U.S. imports more crude oil from Canada than any other country. Much of this oil is produced from oil sands by various technologies. Although these crudes have received much negative publicity because of their method of production, their impact on refinery operation is no different than any other heavy, high sulfur crude oil currently available to the Refinery. In fact, some properties, such as acidity make these Canadian crudes less corrosive than other heavy crudes.

As discussed in detail in Appendix F of the DEIR (beginning on page F-10), the amount of heavy crude that can be processed in the Refinery is limited by the processing capabilities of the Refinery, primarily by the capacities of the coker and sulfur plant. As stated previously, Canadian oil sands crude cannot be processed by itself and must be blended with other types of crude before processing. Therefore, there are no additional impacts other than what have been evaluated in the DEIR because the Refinery is physically constrained to process crude within the existing operating envelope. The sulfur plant is not being expanded. Although it has operated at about 96% of rated capacity in the past, several units are being modified to remove a small amount of incremental sulfur to meet Tier 3 sulfur regulations. The total sulfur removal capacity of the refinery is still limited by the sulfur recovery unit (SRU). 96% of rated capacity is essentially a practical operating limit. Since the SRU is a support process to enable the Refinery to meet

environmental regulations, the refinery must reserve a small amount of capacity to absorb operating variability. The refinery has no dedicated storage capacity for the SRU feed (gaseous H_2S). Since the SRU is not being modified the refinery cannot process a higher sulfur crude slate. The coker heater, which heats the feed to the fractionation tower within the Delayed Coker Unit, is being rerated, but cases evaluated in the DEIR showed that using the increased furnace capability to increase crude capacity and not to process heavier crudes had a more severe environmental impact and was the scenario evaluated in the DEIR.

The project will not facilitate the processing of more light crudes with higher VOC and TAC content

VOC emissions are primarily a function of the vapor pressure of the materials processed in the refinery and the vessels used to contain the materials. As discussed above, the proposed project will not allow the Refinery to process higher vapor pressure crudes. On the contrary, the proposed project will result in incentives to minimize the vapor pressure of purchased crudes.

As discussed in both the DEIR and the comment letter, vapor pressure is not uniquely related to the API or "lightness" of the crude. Crude vapor pressure is mostly determined by the components in the oil as it is extracted from the ground and by the processing that the oil receives before being delivered to the refinery. Bakken crude, for example, has a higher vapor pressure than many other crudes because the producing fields are rather recently developed and the post production infrastructure and regulations are currently being developed to better control crude vapor pressure.

The first Refinery unit in which the crude oil is processed is the desalter/crude unit complex. This unit removes the light hydrocarbons (propane, butanes and pentanes), gasoline range material and much of the distillate range material from the crude oil. The remaining heavy hydrocarbons are then processed in the vacuum towers to remove the rest of the distillate and the vacuum gas oil (FCC feed) from the vacuum residue or coker feed. The ability of the crude unit to separate lighter hydrocarbons from the crude oil (often referred to as the lifting capability of the crude unit) is not being modified. Increasing the lifting capability of the crude unit would require modifications that are not part of this Project (see DEIR page 2-18 for a discussion of the modifications that would be required to increase the lifting capabilities of the crude units.) Therefore, the Refinery will not be able to process additional volumes of lighter crudes than it is currently able to process. Specifically, modifications to No. 51 Vacuum Unit will give the Refinery the capability of removing more distillate from the FCC feed but not the capability of running lighter or higher vapor pressure crudes.

One of the toxic air components highlighted by the commenter is the benzene content of various crude oils. Benzene has the highest combination of vapor pressure and toxicity of the hydrocarbons commonly found in crude oil. The benzene content of many crude oils is not always reported in the open literature. Although lighter crudes might be expected to contain more benzene than heavier crudes, this is not always true. The type of crude oil (paraffinic,

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naphthenic or aromatic) also affects the benzene content of the crude oil. The benzene content of several representative heavy Canadian oil sands crudes was presented in Appendix F (pages F-10, F-11) One recent report of Bakken benzene content indicates that this paraffinic crude has a very low (<.03%) benzene content.

Since little information is publicly available on the benzene content of various crude oils, the comment letter used the values contained in various "Safety Data Sheets" (SDSs) to estimate the toxic components in various crude oils. SDSs are legally required documents that must accompany specified hazardous materials. SDSs are intended to alert workers and others to potential hazards associated with such materials, including health hazards and the risks of fire and explosion. Consistent with this purpose, SDSs set forth the *maximum* amounts of particular compounds that could possibly be present in any particular hazardous material. SDSs do not set forth expected or *actual* values for each hazardous compound. By design, the values reported in an SDS are always higher than expected values, often by a very large margin.

The benzene content of the various products that leave the Refinery must also be controlled. Gasoline contains essentially all of the benzene that leaves the Refinery with the products. The federal limit on the average benzene content of gasoline is 0.62 vol% with a maximum for any batch of 1.1 vol% in California. (The federal maximum per batch limit is 1.3 vol%.) A small amount of benzene enters the Refinery with the crude oil, but most of the benzene is produced by the various units within the Refinery, such as the FCC, the catalytic reformer and the coker. The Refinery also has process units (Bensat units) that convert benzene into cyclohexane which is much less hazardous. The operation of all of these units must be coordinated to produce gasoline that meets the required benzene specifications. If more benzene enters the Refinery with the crude oil, then the operation of the other units must be modified to stay within the allowable benzene content of gasoline. Benzene content of the crude is one of many factors that refineries consider in the crude purchase decision process. Again, because gasoline production (the only outlet of benzene from the Refinery) is expected to decline in the future, the Refinery has an incentive to minimize the amount of benzene it brings in with the crude oil.

The Project will not increase the number or size of flaring events at the Refinery

Refinery flare systems are emergency safety systems which work in concert with relief valves on process unit equipment to minimize the environmental and safety implications of unforeseen problems on any process unit. The flare continuously burns a small amount of clean natural gas so it is always on "hot standby" in the event that it is needed.

Many of the refinery process units operate at elevated temperatures and pressures. The vessels that contain these hot, high pressure streams are designed under very strict ASME codes as required by the various regulatory agencies. All of these vessels must also be protected with relief valves to prevent catastrophic failures. In the unlikely event that a vessel

approaches it maximum operating conditions, these relief valves and other safety systems safely transfer a portion of the vessels contents to the flare system.

The flare system normally recovers most of this material for reprocessing, but in very large events the unrecoverable material is burned by the flares to minimize its impact on the environment. By definition, emergency events are unpredictable. The DEIR used accepted statistical methods to estimate the probability of a flare event.

It is my opinion that the refinery will be less likely to experience a flaring event after the proposed project, for three reasons. First, many of the PRVs that will be added will be added to existing units that already have PRVs. These new PRVs will not add any gas to the flare gas recovery system, they will simply provide an additional escape route in the unlikely event that a vessel approaches or exceeds its maximum operating conditions. Second, the project involves only 30 PRVs being added to vessels that are not currently connected to the flare gas recovery system by existing PRVs. This number is a relatively small increase, given that currently there are 2,190 PRVs connected to the refinery's flare gas recovery system. Third, more importantly, there is no correlation between the number of PRVs at a refinery and the number or size of flaring events. (See Master Response 15, Figure G0-2.4-1.)

Specific Responses to G1.78.103 through G1.78.121

Response to comments G1-78.104

The comment states that the project would facilitate an increase in deliveries of crude by ship. This is incorrect. The project's increase in crude storage tank capacity will eliminate the need for a second port call by allowing very large tankers to unload their cargo in one port call. It will not in any way result in more crude oil being delivered by ship as opposed to pipeline. There is no causal connection between the project's increased capacity for storing crude oil and any purported increase in deliveries by ship.

And, the project is not designed to facilitate the processing of any particular crude oil, whether Bakken, Canadian tar sands, or any other crude oil. No refinery can predict what crudes it will process in the future or even what crudes will be available in the future. These decisions are made in near real time based on price, availability, quality, product demands, product pricing and environmental constraints. My report showed that production from the California oil fields declined historically. Even if production stabilizes, these California crudes are the crudes that are primarily delivered by pipeline and could be replaced by waterborne crudes as time progresses if economic or environmental considerations change. In addition, the crude blends that are actually processed must remain within the processing capabilities of the Refinery based on the Refinery's unique configuration of equipment. The Project will not modify the Refinery's crude oil processing capabilities, other than the change to the permit description of Heater H- 100 which will allow the Refinery to process 6,000 barrels per day more crude oil, or a slightly heavier blend of crude oil.

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Response to Comment G1-78.105

The comment addresses my conclusion that any change in crude slate will not significantly change process emissions because crudes delivered to the Refinery are blended to specifications (notably weight and sulfur content) based on the Refinery's unique configuration of process equipment. The comment states, without any support, that "[t]he objectionable refining parameters, such as too much sulfur, are blended out in these charging tanks, but not the parameters responsible for environmental impacts." This statement is incorrect for at least two reasons. First, stoichiometry (a basic Chemical Engineering principal) states that ALL chemical components in a mixture will blend in proportion to their percentages in the blend components and the percentages of the streams in the blend. Second, evaporative emissions of both VOCs and TACs, which are the focus of subsequent comments *do* blend linearly according to Raoult's law.

The comment also states that, notwithstanding the fact that crudes are blended to a specific operating envelope of crude properties, a change in crude slate can create impacts upstream of the processing equipment at storage tanks and fugitive components such as valves and flanges. As explained at length elsewhere in the responses to comments, the Project is not designed to, and will not in fact, facilitate a switch in the slate of crudes delivered to the Refinery. In any case, the DEIR carefully considered the Project's emissions from storage tanks and fugitive components based on a conservatively high maximum vapor pressure of 11 psia true vapor pressure, the maximum vapor pressure allowable by SCAQMD Rule 463 (see page 4-22 through 4-23 and Table 4.2-4 of the DEIR). So, even if the Project involved a switch to a high RVP crude such as Bakken (which it clearly does not), the DEIR considered the "worst -case" emissions from storage tanks and fugitive components.

Response to Comment G1-78.106

The next specific comment, *"[t]hird,* the constituents in crudes that may result in environmental impacts (e.g.,benzene) do not cause processing constraints and are *very* different from those that do cause processing problems (e.g., sulfur, waxes, naphthenic acids)." This statement is incorrect. Both the benzene content and volatility of gasoline are limited by both the state of California and federal regulations. The Refinery contains a process unit that removes benzene from gasoline (Bensat unit) to meet these limits on benzene content and distillation columns on a number of other units that are designed to control the volatility of the various products. The processing constraints of the benzene reduction unit as well as the other distillation, stripper and stabilizer columns in the Refinery, limit the amount of benzene and VOCs in crude blends that can be effectively processed within the Refinery.

Petroleum refining is a highly complex, multivariable process with multiple constraints on each product. As discussed in detail in my report (beginning on page F-8), this multivariable optimization problem is solved using linear programing (LP). This technique tracks the various stream properties, especially those with compositional constraints such as benzene and vapor

pressure. The LP also contains critical environmental constraints. I have reviewed these business confidential LP models of the base Refinery and the post project configuration. This review was part of my overall evaluation.

Response to Comment G1-78.107

This specific comment lists six (6) equipment or process changes that are part of the proposed project and contends that "[t]hese changes will allow the integrated refinery to import and process significant amounts of very light crude oils, such as Bakken crudes, as well as Canadian tar sands crudes and blends of these two. These crudes have chemical characteristics that set them apart from the crude slate currently refined, even though they may be blended to the same general range of sulfur and API gravity in the crude slates charged to the distillation units."

As discussed above, the only parameter that sets Canadian tar sands crudes apart is their "carbon footprint". Otherwise, they are similar to other high sulfur, heavy crudes that are currently processed at the Refinery. The only property that potentially differentiates Bakken crude from other light crudes is its vapor pressure. As discussed above, the current and proposed configuration of the Refinery limits the amount of high sulfur and high vapor pressure crudes that can be processed. As explained below and in more detail in Chapter 2 and Appendix F of the DEIR, the six (6) equipment or process changes referenced in the comments will not facilitate the processing of lighter crude blends.

Replacement of older crude storage tanks with newer tanks that are capable of storing higher vapor pressure crude oil. The commenter erroneously concludes that these new tanks are designed to facilitate a switch to higher vapor pressure crudes. As explained above, the tank designs were required by the SCAQMD as BACT because they will reduce emissions from all types of crude oil, including crudes with relatively high vapor pressure and relatively low vapor pressure.

Shutdown of the Wilmington FCC. An FCC unit is often the largest point source emitter in a petroleum refinery. The primary purpose of an FCC unit is to produce gasoline from intermediate crude oil fractions. The proposed project will result in the shutdown of this unit and increase hydrocracker capacity to reduce emissions and also to allow the Refinery to increase the production of diesel fuel, a lower volatility product than gasoline, to better meet potential future product demands.

Increase in propane recovery. This change will improved energy efficiency, lower GHG emissions, and balance the additional propane that will enter the refinery with LPG imported to produce alkylate. A number of new heat exchangers are being added to the Refinery to improve energy efficiency. These heat exchangers recover additional heat from various process streams and reduce the amount of fuel gas that the Refinery burns to run the various process units. The refining process produces a byproduct mix of light hydrocarbons, including some propane, that are normally burned within the refinery to supply the fuel gas requirements of the various process heaters. Since the overall fuel gas use in the refinery will be reduced as a result of the proposed project, additional propane must be removed from the fuel gas system and

sold as LPG.

Installation of a new wet jet treater. This new process unit removes trace contaminants from jet fuel to produce the high quality jet fuel that is required for commercial and military use. Raw jet fuel, before treatment, is an intermediate fraction of crude oil. The new wet jet treater does not convert lighter hydrocarbons into heavier material or heavier material into lighter material. The installation of the new wet jet treater allows the Refinery to repurpose existing hydrotreating units to meet the Tier 3 gasoline requirements and to provide flexibility to produce additional jet fuel and diesel fuel in response to market demands.

Purported "increase in capacity of units that process light process streams including the No. 51 Vacuum Unit and HTU-1,-2, and-4." First, No. 51 vacuum unit does not process any streams that are normally classified as "light." It is a vacuum distillation unit that is being modified to remove additional heavy diesel fuel from the FCC feed. This is required to allow the Wilmington FCC unit to be shut down. HTU-1 and 2 are being modified to remove additional sulfur from gasoline blending components to enable the refinery to meet the federally mandated requirements for ultralow sulfur Tier 3 gasoline. HTU-4 primarily processes FCC feed which is not a "light stream." The modifications to HTU-4 are primarily in the product recovery section of the unit to allow the recovery of additional low sulfur distillates and reduce the amount of these materials that will be processed on the Carson FCC.

The increased firing rates of various heaters. Although the firing rate of several heaters is expected to increase, the combined fuel gas usage of ALL process heaters in the refinery is expected to decrease because of the improved energy efficiency for the refinery with the installation of the new heat exchangers, the shutdown of the Wilmington FCC and other modifications associated with the proposed project.

Response to comment G1-78.108

This comment again assumes, incorrectly, that the project will facilitate a change in the Refinery's crude slate. The comment goes on to opine that, even if the crude blend that is actually processed post-project has essentially the same weight and sulfur content as the pre-project blend, 1) the post-project blend will be different in other respects because of the purported change in crude slate, and 2) the purported change in crude slate will cause environmental impacts both before and after blending.

As explained at length elsewhere, this project will not facilitate a switch to any particular crude slate, nor will any purported switch produce impacts that were not examined in the DEIR. In assessing the project's emissions from storage tanks and fugitive emissions, the DEIR used the "worst case" crude oil properties for each stream in order to ensure that all possible project impacts would be considered regardless of which specific crudes the Refinery purchases, stores, and processes in the future. (see DEIR, Appendix B-3 Table A-19 (pages B-3-110 through B-3-112).) Other emissions from process equipment are generated by heaters, boilers, flares and furnaces, and these emissions will not change as long as the crude blends processed remain of similar weight and sulfur content. And, the proposed project will not facilitate a change in the

crude blend processed (other than that potentially associated with changes to the permit description of heater H-100). In any event, the process units were analyzed as a "worst case" increase, which is their potential to emit.

Response to comment G1-78.109

As explained above and elsewhere, in assessing the project's emissions from storage tanks and fugitive emissions, the DEIR used the "worst case" crude oil properties for each stream in order to ensure that all possible project impacts would be considered regardless of which specific crudes the Refinery purchases, stores, and processes in the future. (see DEIR, Appendix B-3 Table A-19 (pages B-3-110 through B-3-112).)

Response to comments G1-78.110 & 111

This comment correctly states that crude oils contain a variety of different sulfur compounds. However, it incorrectly cites this as the reason for the 2012 accident at the Chevron Richmond refinery. Although sulfur induced corrosion led to the failure, the final CSB report concluded that improper metallurgy in the 52 inch section of pipe that failed was the technical cause of the accident. Proper piping upstream of the failed section that was exposed to the same sulfur compounds showed very little corrosion. The CSB report of the Chevron accident does state that hydrogen sulfide (H2S) is the most corrosive sulfur compound and as this comment notes, its impact is discussed in the DEIR.

Response to comments G1-78.112 & 113

This comment states that different crudes could contain different types of sulfur even if they had the same total sulfur content. While this is technically correct, this fact bears little relevance to the current evaluation. As explained at length above and elsewhere, the Project is not designed to facilitate a switch to any new slate of crudes. And, since one cannot predict the particular slate of crudes that will be delivered to the Refinery at any given point in the future, any attempt to analyze crudes with specific sulfur compounds would be speculative.

The comment specifically mentions mercaptans. The odor threshold and exposure limits for mercaptans are higher than those for H2S. According to CDC and OSHA websites, hydrogen sulfide is more odiferous and hazardous than any mercaptan. For example the IDLH for H2S is 100 ppm and the IDLH for methyl mercaptan is 150 ppm. Odor detection of both compounds is very sensitive to the individual. Some individuals cannot smell sulfur compounds while others are highly sensitive. H2S emissions are evaluated in the DEIR. H2S emissions can be considered a proxy for other sulfur compounds.

Response to comments G1-78.114 & 115

As explained above and elsewhere, in assessing the project's emissions from storage tanks and fugitive emissions, the DEIR used the "worst case" crude oil properties for each stream in order to ensure that all possible project impacts would be considered regardless of which specific

crudes the Refinery purchases, stores, and processes in the future.

As far as emissions from process equipment, my analysis concluded that none of the proposed Refinery modifications would allow the Refinery to utilize a crude slate that had a notably higher average vapor pressure than current operations. My conclusion that, "there is no valid reason to believe that the crudes that arrive after the LARIC project will be higher volatility than those currently processed" was based on my full analysis of the Refinery configurational changes, not just the API and sulfur content of the crude as this comment implies.

Although Figure 3 in the comments shows no relationship between crude sulfur content and vapor pressure, it does show a weak relationship between density and vapor pressure for low density (high API gravity) light crudes. Furthermore, the data source that is referenced for preparation of the plot, reports the vapor pressure of the various crudes as true vapor pressure measured by ASTM test D6377; however, the plot is erroneously labeled as Reid vapor pressure, exaggerating the effect. Knowing the difference between true vapor pressure and Reid vapor pressure is essential to the science of evaluating environmental impacts. The importance of this error will be discussed in more detail in the response to comment G1-78.117

Response to comments G1-78.116
Previously addressed under comments G1-78.114 & 115.

Response to comments G1-78.117

This comment attempts to clarify some of the different tests used to quantify vapor pressure of petroleum streams including crude oil; however, as written, it confuses the various methods for measuring vapor pressure and how they relate to evaporative losses.

There are several different ASTM approved methods for measuring vapor pressure of petroleum streams. The most commonly used methods are as follows:

- Reid vapor pressure (ASTM test D323-15) (note: the -XX following a method number is the latest revision date for the standard.),
- Standard method for determination of the vapor pressure of crude oil $VPCR_x$ (D6377-16),
- Standard test method for vapor pressure of petroleum products (mini method) (D5191-15), as well as several others.

These measurement methods must be followed very closely and differ slightly in equipment and techniques. D6377 is a recently developed test that overcomes some of the shortcomings of the older Reid vapor pressure test. Vapor pressures determined by ASTM method D6377 are commonly referred to as true vapor pressure (TVP).

Although the vapor pressure values measured with method D6377 are often referred to as true vapor pressures (TVP) and are usually higher than those determined by the Reid vapor pressure method D323, the true vapor pressure of a sample is also a function of the temperature of the sample. All of the tests discussed above measure and report the vapor pressure of the sample

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at 100F.

The comment states, "The DEIR neglected to disclose the well-known relationship between the vapor pressure of a crude oil and the amount of emissions released from equipment containing the crude." This statement is false. The DEIR used the EPA approved procedures in AP-42, Section 7.1 to calculate the emissions from the equipment containing the crude. This is a public document that inherently contains the "well-known relationships".

AP-42, Section 7 uses the vapor pressure at the average ambient temperatures of the storage vessels to calculate losses from the vessels. There are approved procedures for adjusting both Reid vapor pressure and "true vapor pressure" measured at 100F to the lower actual ambient temperatures that are normally encountered in petroleum storage vessels in California.

Also, Figure 11 of the Turner, Mason report prepared for the North Dakota Petroleum Council shows a strong seasonal variation in the D6377 vapor pressure of Bakken crude. The vapor pressure is lowest in the summer when storage tank temperatures would be highest. The lower vapor pressure during the warmer months at least partially compensates for the higher storage tank temperatures during the summer. Figures 1 and 2 of Appendix F of the DEIR show similar seasonal trends in gravity and benzene contents of the Canadian crudes. This is typical of most crudes where properties including vapor pressure are adjusted seasonally for ease and safety of handling.

Response to comment G1-78.118

As explained above and elsewhere, the project will not facilitate a switch to any new slate of crude oils. Moreover, the DEIR used the "worst case" crude oil properties for each stream in order to ensure that all possible project impacts would be considered regardless of which specific crudes the Refinery purchases, stores, and processes in the future.

Response to G1-78.119

The hazards analysis is based on heat and material balances, which are trade secret Refinery process unit information (see Master Response 17).

Response to comment G1-78.120

The first paragraph of this comment again is a misrepresentation of statements in the CSB report. The increase in sulfur in the Richmond refinery was not a result of "creep" but was a step change that most likely was the result of specific equipment modifications. Figure 14 of the Draft CSB report shows normal annual variations in sulfur content for most of the period, but also an abrupt jump in sulfur content of more than 50% around the year 1999. This is not creep within an existing constraint, but most likely a modification to the Richmond refinery. Furthermore, the Final CSB report concluded that although sulfidation corrosion was the cause of the failure, a decision not to replace the pipe section one year before it failed and the type of metallurgy in the pipe were deemed to be more important factors than the higher sulfur

content of the stream (Section 4 and Figure 26 of the Final Chevron CSB report).

The second paragraph states, "These types of accidents can be reasonably expected to result from incorporating tar sands crudes into the Los Angeles Refinery crude slate, even if the range of sulfur and gravity of the crudes remain the same." This conclusion is not supported by data. Even if Tesoro were to increase the amount of Canadian crudes processed in the refinery, these crudes have a lower TAN than the heavy California crudes they are likely to replace, as was discussed in Appendix F of the DEIR (page F-24).

Many US refineries that were designed to process domestic crudes have successfully run very high percentages of heavy Canadian crudes without any "catastrophic incidents." These catastrophic accidents are prevented by the corrosion monitoring and maintenance programs discussed in the DEIR (page F-24). Many catastrophic incidents, such as the Chevron Richmond accident and the Challenger explosion, can ultimately be attributed to management not following the recommendations of their technical experts.

Response to comment G1-78.121

The comments continue to postulate that the proposed project is really a crude switching project and this aspect was not properly evaluated. This is not true. The primary purposes of the project are as follows:

- Improve the overall energy and operational efficiency of the Refinery through integration;
- Comply with federally mandated Tier 3 gasoline specifications; and
- Reduce NOx, SOx and GHG emissions from the Refinery.

And, the DEIR used the "worst case" crude oil properties for each stream in order to ensure that all possible project impacts would be considered regardless of which specific crudes the Refinery purchases, stores, and processes in the future. (see DEIR, Appendix B-3 Table A-19 (pages B-3-110 through B-3-112).) Other emissions from process equipment are generated by heaters, boilers, and furnaces, and these emissions will not change as long as the crude blends processed remain of similar weight and sulfur content. In any event, the potential environmental impacts from direct and indirect process equipment were analyzed for their potential to emit, which is a worst case analysis.

Response to comments G1-78.122

This comment reiterates points previously made. See responses above.

Additional Biographical Information

In addition to the summary of my experience included in my CV (DEIR Appendix F), I would like to highlight some specific projects that I have contributed to that confirm my qualifications to participate in this important study. Several specific projects are include below:

Attachment D

- Prepared papers detailing the refinery modifications required to produce both Tier 2 gasoline and Ultra Low Sulfur Diesel Fuel (ULSD).
- Participated in several studies with different refiners to investigate what specific equipment modifications would be required to produce ULSD in individual refineries.
- Assisted a refiner in evaluating options to produce Tier 3 gasoline.
- Conducted a study to compare the economic and operational differences of HF, sulfuric acid and solid acid alkylation processes.
- Participated in several overall refinery yield and energy studies to improve refinery cost and energy efficiency within existing operational limitations, including environmental constraints.
- Assisted several refineries in testing and analyzing emissions from FCC units.
- Was lead process engineer for several FCC, hydrocracker and hydrotreater modifications and new construction.
- Served on two National Research Council Committees concerning the economic and environmental impacts of biofuel production in comparison with petroleum refining and other fuel technologies.
- Provided guidance to the U.S. Government Accountability Office regarding the availability of advanced biofuels.
- Assisted refiners in configuring refinery LP models to better represent their specific refinery and the overall impact of projected refinery modifications.

Respectfully submitted,

Dr. Stephen J McGovern, PE

1226303.1

ATTACHMENT E

ATTORNEY GENERAL LETTER TO THE CALIFORNIA ENERGY COMMISSION

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Attachment E

KAMALA D. HARRIS
Attorney General

State of California
DEPARTMENT OF JUSTICE

455 GOLDEN GATE AVENUE, SUITE 11000
SAN FRANCISCO, CA 94102-7004

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May 17, 2013

Robert B. Weisenmiller, Ph.D.
Chair, California Energy Commission
1516 Ninth Street, MS-33
Sacramento, CA 95814

Dear Chair Weisenmiller:

After a nine month investigation that involved close cooperation between our agencies, we have reached an agreement with Tesoro that resolves our concerns arising from Tesoro's proposed acquisition of BP's Southern California refining and marketing assets. The concessions we received from Tesoro will advance our effort to protect competition, the environment, and jobs in the state of California. We could not have achieved such a resolution to the investigation without the generous assistance of the CEC and its staff, and for that we are grateful.
At the outset of the investigation, we had significant concerns about the potential effect of the acquisition on competition. Over the course of the investigation the parties and various third parties combined to produce millions of pages of documents and voluminous amounts of data. We reviewed these documents and data, subpoenaed the parties and numerous third parties for testimony, and secured a leading economist in the field of oil and gas to conduct various analyses of the markets at issue. After a thorough investigation and review of the evidence, many of our initial market competition concerns were addressed, and our office decided that our remaining consumer, environmental and job security issues were appropriately addressed through a letter-agreement. Some of the facts that lead us to this conclusion include:

- Demand for CARB gasoline has declined over the past several years resulting in excess capacity;
- A significant amount of excess capacity will be controlled by refiners other than Tesoro;
- The acquisition leaves intact seven refiners on the West Coast; and
- The structure of the retail market has become less vertically integrated and Tesoro, along with many other refiners, no longer sets street prices for gasoline.

Below is a summary of the agreement we have reached with Tesoro, including a description of our remaining issues and the binding commitments Tesoro has made to address them.

Competition Issues

Capacity Concerns -- Reductions in CARBOB capacity have led to increases in the prices California consumers pay for gasoline. One of our primary concerns here was that the acquisition would enable Tesoro, as the largest refiner in Southern California, to reduce capacity and increase prices. In response to these concerns, however, Tesoro has agreed not to reduce capacity of CARBOB for a period of three years. Over the next three years, Tesoro will maintain the historical average daily production for both the Carson and Wilmington refineries. Tesoro has also agreed to increase CARBOB capacity in the amount of 400 barrels per day to ensure that California continues to have excess CARBOB capacity on hand in the event of an unplanned refinery outage. Tesoro will also provide our office with monthly production volume data for all of its West Coast refineries, so that we can monitor Tesoro's compliance with these commitments.

Maintenance of the ARCO Brand -- As part of the acquisition Tesoro will take ownership of the ARCO brand in Southern California. The ARCO brand plays an important role as the value leader in the market for branded retail gasoline in Southern California. It is important to our office that consumers continue to reap the benefits of ARCO's lower prices for years to come. Accordingly, Tesoro has agreed to maintain ARCO's status as a low cost fuel provider. Tesoro has agreed to provide our office with data for average monthly dealer tankwagon prices for all of its retail brands in Southern California so that we can monitor its compliance with this commitment.

Environmental Issues

Tesoro has stated that the acquisition will enable it to achieve significant synergies, some of which will benefit the environment by lowering greenhouse gases and emissions. Specifically, Tesoro has stated that the acquisition will enable it to install a single distillate desulfurization unit ("DDU") for both the Carson and Wilmington refineries.[1] The California Air Resources Board has studied this issue and has concluded that the installation of a DDU for the combined facility would result in a reduction of emissions and greenhouse gases. Additionally, Governor Brown sent a letter to Tesoro on April 8, 2013, stressing the importance of installing a DDU should the acquisition proceed. Tesoro has committed to provide our office with an annual progress report detailing the steps it has taken to realize the synergies resulting from the acquisition, including the installation of a DDU, so that we can monitor its commitments to lower greenhouse gasses and emissions.

[1] Currently, both Carson and Wilmington utilize fluid catalytic cracking ("FCC") units to convert feedstock (gasoil) into intermediate products that the refineries further process. The FCC units produce much lower cracking yields (and result in higher emissions and greenhouse gases) than a DDU.

Attachment E

Job Security

Acquisitions such as this one often lead to significant layoffs, which are then touted as "synergies" by the companies. Our office was concerned that this acquisition might lead to similar reductions in jobs. As a result, Tesoro has agreed not to eliminate any jobs at either the Carson or Wilmington refineries for a period of two years. Tesoro will provide our office with an annual report detailing employment data at the refineries so that we can monitor its compliance with this commitment.

In conclusion, we believe that these commitments will help ensure that California's oil and gas markets remain competitive for years to come, help to reduce greenhouse gases and emissions, and protect jobs for potentially thousands of Californians. Over the next several years we will be vigilant in monitoring Tesoro's compliance with its commitments, and we hope to continue working closely with the CEC in this respect. Through our combined expertise and enforcement authority we can ensure that Tesoro follows through with its commitments and the synergies resulting from this acquisition will benefit all Californians.

Sincerely,

KATHLEEN E. FOOTE
Senior Assistant Attorney General

For KAMALA D. HARRIS
Attorney General

KEF:dbc

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ATTACHMENT F

AARON MEYERLE DECLARATION

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Attachment F

DECLARATION OF AARON A. MEYERLE

I, Aaron A. Meyerle, declare and state as follows:

1. I am an employee of Union Pacific Railroad. I am a Senior Business Director Marketing and Sales.

2. This declaration is submitted in support of Tesoro's Los Angeles Refinery Integration and Compliance Project. I have personal knowledge of the facts stated in this declaration based upon information that I have obtained during the course and in the scope of my work, and the review of information contained in documents maintained in the normal course of business.

3. In the normal course and scope of my employment I oversee the marketing and sales activity involving petroleum refineries such as Tesoro. I am aware of the general service provided by Union Pacific at that facility.

4. Deliveries to the Tesoro Los Angeles Refinery on Track 415 (the north track) have historically been made between 0600 and 1400 hours. No changes to the delivery timeframe are anticipated in the foreseeable future.

I declare under penalty of perjury under the laws of the State of Nebraska that the foregoing is true and correct.

Executed January 20, 2017, at Omaha, Nebraska.

Aaron A. Meyerle

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ATTACHMENT G

HOLLY KRANZMANN DECLARATION

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Attachment G

DECLARATION OF Holly P. Kranzmann

I, Holly Kranzmann, declare and state as follows:

1. I am the Vice President, Logistics Development-West Coast, for Tesoro Logistics GP, LLC ("Tesoro Logistics GP"), the general partner of Tesoro Logistics LP ("Tesoro Logistics").

2. This declaration is submitted to clarify:

a. Statements made by Tesoro Logistics senior management during quarterly earnings conference calls or during analyst day presentations; and

b. Agreements between Tesoro Refining & Marketing Company LLC ("TRMC") and Tesoro Logistics Operations LLC ("TLO"), a wholly-owned subsidiary of Tesoro Logistics, including the Long Beach Berth Access, Use and Throughput Agreement.

I have personal knowledge of the facts stated in this declaration based upon information that I have obtained during the course and in the scope of my work, and the review of information contained in documents maintained in the normal course of business.

3. In the normal course and scope of my employment I report to the President of Tesoro Logistics GP, Mr. Phil Anderson, who reports to the Chairman and CEO of Tesoro Logistics, GP, Mr. Greg Goff. I am responsible for the commercial aspects of all terminal and transportation assets for Tesoro Logistics and its subsidiaries including crude oil, intermediate feedstocks, and finished transportation fuels volumes and revenues. As part of my responsibilities, I have knowledge of and am involved in any plans for expansion of terminals, docks, and pipeline transportation assets within Tesoro Logistics. I have been in this role as Vice President, Logistics Development – West Coast since November of 2013.

4. Tesoro Logistics is a full-service logistics company operating, through its subsidiaries, primarily in the western and mid-continent regions of the United States. Tesoro Logistics owns and operates a network of crude oil, feedstocks and finished transportation fuels pipelines as well as crude oil, feedstocks and finished transportation fuels truck and marine terminals. Tesoro Logistics provides services for third party customers as well as TRMC by

transporting products to the marketplace and supplying the refineries with feedstocks and crude needs.

5. During the May 1, 2014 First Quarter 2014 Tesoro Logistics LP Earnings Conference Call, Philip Anderson made the following statement: "We have two of our terminals are (sic) being expanded to handle additional capacity, and those expansions will come online this summer. And that will allow us to bump up volumes either very late in the second quarter or early in the third quarter." This statement is referencing increased capacity at Tesoro Logistics product (gasoline and diesel) distribution terminals, not the marine terminals that handle crude oil. [1] The product distribution terminals are being expanded in order to reduce reliance on, and costs of using, third-party product distribution facilities. Expansion at Tesoro Logistics' product terminals is not in any way associated with the proposed Los Angeles Refinery Integration and Compliance project or with an increase in Refinery throughput.

6. I am familiar with the Long Beach Berth Access, Use and Throughput Agreement ("Berth Access Agreement") between TRMC and TLO. Annex D to the Berth Access Agreement was included as a requirement of a TLO customer to specify crude oils that TLO must accommodate as part of that customer's Berth Access Agreement. For consistency, Annex D was carried over to agreements between TLO and TRMC. Annex D does not represent an actual or allowable list of crude oils managed by the Long Beach marine terminal during the proposed project baseline or any other years.

7. Annex D, described in Item 6 above, remains part of the Berth Access Agreement between TLO and its customer today. However, the Berth Access agreements between TRMC and TLO have been amended and restated to provide for the elimination of non-essential requirements such as Annex D and the product specification limits of Annex B. The amended and restated Berth Access Agreements are unrelated to the proposed project, and were adopted to simplify the agreements. Accordingly, these agreements do not limit the types of crude oils that may be accommodated and do not reflect the Refinery's actual crude oil use.

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[1] Thomson Reuters Streetevents Edited Transcript, TLLP- Q1 2014 Tesoro Logistics LP Earnings Conference Call, May 1, 2014, at page 6.

Attachment G

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct. Executed February 1, 2017, at La Palma, California.

Holly P. Kranzmann

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ATTACHMENT H

QUEST CONSULTANTS MEMORANDA

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Attachment H

MEMORANDUM

TO: Marcia Baverman
Environmental Audit Inc.

DATE: January 9, 2017

FROM: John B. Cornwell
Quest Consultants Inc.

SUBJECT: Additional Information

This memorandum is to consolidate some of the information Quest has provided Environmental Audit over the past several months. None of this information is new and would be considered common knowledge to professionals in the consequence and risk analysis fields. This information is simply presented in order to better educate the reader of the worst-case consequence modeling performed by Quest.

This memorandum is divided into six sections, as listed below. Each section is addressed individually and the definitions and explanations described would be the same regardless of the facility that is subject to a worst-case analysis per the California Environmental Quality Act (CEQA) guidance.

1. Definitions
2. Decision Analysis
3. Event Trees
4. Concurrent Pipeline Failures
5. Vapor Cloud Explosions
6. Wind Speeds for Fire Radiation Calculations

1. DEFINITIONS

The definitions listed below are drawn directly from the CCPS[1] guidelines. These are common industry terms that are often misunderstood by the general public. In particular, the word "risk" is often interpreted to mean "consequence" or "impact" without any mention of the frequency of such an event. The CEQA guidelines address acutely hazardous material (AHM) consequences without reference to frequency or risk.

Bounding group (of incidents): A small number of incidents selected to bracket the spectrum of possible incidents, which may include those catastrophic incidents sometimes referred to as the Worst Credible Incident and Worst Possible Incident. [In the CEQA analysis Worst Credible Incident = Worst Case.]

Consequence analysis: The analysis of the expected effects of incident outcome cases independent of frequency or probability.

Consequences: A measure of the expected effects of an incident outcome case.

[1] CCPS (2000), *Guidelines for Chemical Process Quantitative Risk Analysis*. Center for Chemical Process Safety of the American Institute of Chemical Engineers, 3 Park Avenue, New York, New York, 2000. (ISBN 0-8169-0720-X)

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Domino effects: The triggering of secondary events, such as toxic releases, by a primary event, such as an explosion, such that the result is an increase in consequences or area of an effect zone. Generally only considered when a significant escalation of the original incident results.

Effect zone: For an incident that produces an incident outcome to [*sic*] toxic release, the area over which the airborne concentration equals or exceeds some level of concern. For a flammable release, the area over which a particular incident outcome case produces an effect based on a specified criterion. For a loss of containment incident producing thermal effects, the area over which a particular incident outcome case produces an effect based on a specified radiative heat stress limit. [In the CEQA analysis Effect zone = Impact zone.]

Event tree (analysis): A graphical logic model that identifies and quantifies possible outcomes following an initiating event.

Worst credible incident: The most severe incident, considering only incident outcomes and their consequences, of all identified incidents and their outcomes, that is considered plausible or reasonably believable.

Worst possible incident: The most severe incident, considering only incident outcomes and their consequences, of all identified incidents and their outcomes.

Attachment H

2. DECISION ANALYSIS

The first step in identifying which potential releases to model in a worst-case modeling study such as that required by CEQA is to determine how "credible" the potential event may be. The Los Angeles County Fire Department (LACFD) took a risk matrix approach to this and published its guidance in 1994[2].

The risk matrix defined by LACFD is presented below.

Table 1
LACFD Risk Matrix

		FREQUENCY				
		A FREQUENT	B PERIODICAL	C OCCASIONAL	D POSSIBLE	E IMPROBABLE
CRITICALITY	I CATASTROPHIC	1	1	1	2	4
	II SEVERE	1	2	3	3	4
	III MODERATE	2	3	4	4	4
	IV SLIGHT	4	4	4	4	4

The LACFD goes a step further and defines values for frequency, criticality, and the risk codes as they apply to a person(s) exposure to a hazard. The LACFD definitions are listed below.

Frequency Ranking

A – FREQUENT = 0 to 1 year, more than once a year
B – PERIODICAL = Every 1 to 10 years, at least once each decade
C – OCCASIONAL = Every 10 to 100 years, probably during the life of the plant
D – POSSIBLE = Every 100 to 10,000 years, not expected at this plant, but could occur
E – IMPROBABLE = Not for 10,000 or more years, not expected or likely to occur at all

Criticality Ranking

I – CATASTROPHIC = Results in death
II – SEVERE = Results in multiple injuries
III – MODERATE = Results in a single injury
IV – SLIGHT = Results in operational problems only

Risk Code

1 – Critical (must be improved) = Mitigate within six months with administrative or engineering controls (to reduce the Risk Code to 3 or 4).

[2] RMPP (1994), *Risk Management and Prevention Program Guidelines*. Los Angeles County Fire Department, Health Hazardous Materials Division, October 1994.

2 – Undesirable (should be improved) = Mitigate within one year with administrative or engineering controls (to reduce the Risk Code to 3 or 4).
3 – Acceptable (with controls) = Verify need for engineering controls, or that administrative controls are in place for hazard.
4 – Acceptable = No mitigation action required for identified hazard.

The LACFD Risk Matrix is not directly applicable to the worst case consequence modeling performed as part the risk of upset consequence modeling required by the CEQA guidelines. However, it can be instructive to review the approach taken by the LACFD. When the worst case approach is taken by the CEQA risk of upset analysis, only the release events in Risk Codes 1 and 2 would apply since these have the potential to cause multiple injuries or fatality. The 1 and 2 Risk Codes comprise seven of the 20 elements of the LACFD Risk Matrix. The lowest frequency associated with any of the Risk Codes 1 and 2 is POSSIBLE. The POSSIBLE frequency category has a lower bound of once in 10,000 years. Put another way, the LACFD allows for incidents that may result in a fatality or multiple injuries if the frequency of the incident is less than one in 10,000 years,

The risk approach taken by the LACFD can be applied to the choice of which release events should be modeled for a worst case analysis within the CEQA guidelines. In this approach, the lower limit of frequency is expanded (lower to allow for larger events to be analyzed since small events tend to occur more often but do not have large impacts and large events are less frequent, but have larger impacts). Figure 1 below represents how the decision analysis is made in support of a worst case consequence analysis. Note that the LACFD frequency definitions are bounded by the dashed yellow box.

When applied to the risk of upset analysis required by the CEQA guidelines, the following can be taken from Figure 1.

1. No modeling is conducted to evaluate events that are physically impossible. For example, a train jumping the track and traveling 2,000 feet before colliding with a crude oil storage tank causing a release.
2. No modeling is conducted to evaluate events that are possible but have such a low frequency of occurrence that they are not deemed credible (these are called incredible). For example, an asteroid falling from the sky and hitting a crude oil storage tank, causing a release.
3. Only events deemed credible, with a high enough frequency of occurrence not to be deemed incredible (see #2 above) are subject to evaluation as a worst case event.

The choice of where to "draw the line" between incredible and credible is not defined in the CEQA guidelines. However, a reasonable measure is for an individual event that has an original release frequency of less than one in one million per year is not considered credible. While this frequency is not employed as a hard rule in the risk of upset analysis, this criteria does rule out evaluation of the following type of events.

1. Boiling Liquid Expanding Vapor Explosions (BLEVEs) of two (or more) pressurized storage vessels at exactly the same time (in order to produce a larger radiant impact zone than with an individual vessel BLEVE).
2. Two (or more) vessels failing at exactly the same time.

There are many examples that if the frequency were calculated, the frequency of these events would be found to be less than the frequency of an asteroid causing a release from a crude oil storage tank. Thus, these events fall into the incredible category and are not part of the worst case consequence modeling.

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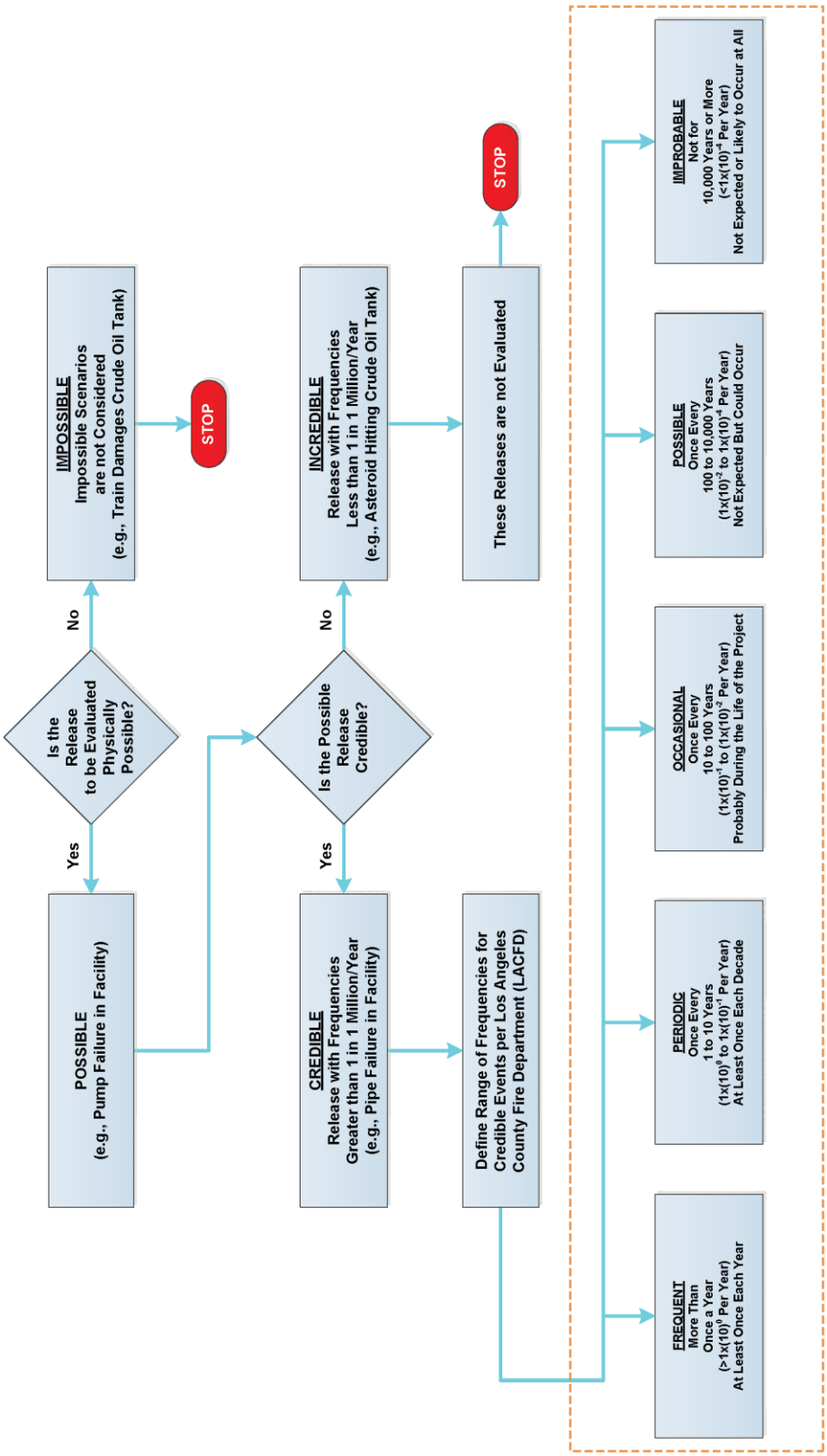


Figure 1
Decision Analysis Flow Chart

Attachment H

3. EVENT TREES

Following the selection of initiating events developed by the decision analysis step, event trees are used to identify the various hazards that could result following a release. There are many forms of event trees. Some account for available safety systems (both active and passive), and some do not. A simple example of an event tree that can be used in a risk of upset consequence analysis is presented in Figure 2.

Figure 2 is a simple example of an event tree for a release from a natural gas pipeline. The original release frequency (far left of event tree) is listed as $3.66 \times (10)^{-8}$ failures/foot/year. In simple terms, as you move from left to right on the event tree you encounter factors that define the probability of a specific outcome. In the example shown in Figure 2, only two factors are incorporated.

1. Hole size
2. Ignition timing

There are many others that could be incorporated and by doing so, reduce the probability of a specific "outcome." Several factors that could be included are:

1. Release orientation (e.g., up, down, 45 degrees, etc.)
2. Wind speed
3. Atmospheric stability
4. Relative humidity
5. Emergency Isolation

In the risk of upset analysis, the top branch (rupture) dominated the potential impacts. Dependent on such factors as fluid phase (vapor, liquid, two-phase), temperature, pressure, composition, reactivity, toxicity, etc. one particular hazard impact zone (hazard zone) may extend further than another. In the risk of upset study, the extent of each impact zone (overpressure, radiant, toxic) is calculated per the event tree, without regard to frequency as the initiating events have already been selected in the decision analysis step described earlier. However, in the presentation of worst case results, only the event that produces the largest impact distance (effect zone) is presented for each unit.

	Release Hole Size	Ignition Timing	Probability	Annual Probability per Foot of Pipe	Outcome
Release from a 24-inch Natural Gas Transmission Pipeline (Annual Probability 3.66×10^{-8} ft/yr)	Rupture (4%)	Immediate Ignition (10%)	0.004	1.46×10^{-10}	Torch Fire
		Delayed Ignition (20%)	0.008	2.93×10^{10}	Flash Fire/Torch Fire/VCE
		No Ignition (70%)	0.028	1.02×10^{-9}	Dissipation
	6 inch (3%)	Immediate Ignition (10%)	0.003	1.10×10^{-10}	Torch Fire
		Delayed Ignition (20%)	0.006	2.20×10^{-10}	Flash Fire/Torch Fire/VCE
		No Ignition (70%)	0.021	7.69×10^{-10}	Dissipation
	2 inch (5%)	Immediate Ignition (2%)	0.001	3.66×10^{-11}	Torch Fire
		Delayed Ignition (5%)	0.0025	9.15×10^{-11}	Flash Fire/Torch Fire/VCE
		No Ignition (93%)	0.0465	1.70×10^{-9}	Dissipation
	0.75 inch (10%)	Immediate Ignition (2%)	0.002	7.32×10^{-11}	Torch Fire
		Delayed Ignition (5%)	0.005	1.83×10^{-10}	Flash Fire/Torch Fire/VCE
		No Ignition (93%)	0.093	3.40×10^{-9}	Dissipation
	0.25 inch (78%)	Immediate Ignition (2%)	0.0156	5.71×10^{-10}	Torch Fire
		Delayed Ignition (5%)	0.039	1.43×10^{-9}	Flash Fire/Torch Fire/VCE
		No Ignition (93%)	0.7254	2.65×10^{-8}	Dissipation

Figure 2
Example Event Tree for a 24-inch Natural Gas Transmission Line

4. CONCURRENT PIPELINE FAILURES

Concurrent failure of two (or more) pipelines in a common corridor resulting in combined impacts is not considered a credible event as confirmed by an evaluation of publicly available pipeline failure data.

The Pipeline Hazardous Materials Safety Administration (PHMSA) is part of the United States Department of Transportation (US DOT). PHMSA keeps track of liquid and gas pipeline releases in the United States. PHMSA maintains a publically available data base for all the pipelines under the jurisdiction of the US DOT. This includes all natural gas transmission and distribution pipelines as well as liquid (e.g., gasoline, LPG, etc.) transmission and distribution pipelines. The PHMSA database also includes many gathering lines that would not normally be found in populated areas.

Quest filtered the data from the PHMSA website[3] to isolate releases caused by earthquakes. The dates in the database range from 1970 to near-present day.

In order to determine where concurrent pipeline failures occurred, Quest identified all of the releases that occurred on the same date and location. After reviewing the incidents, multiple releases occurred in Los Angeles during the Northridge earthquake on January 17, 1994. Table 2 lists a portion of the PHMSA data base for pipelines that failed in Los Angeles during the Northridge earthquake. The first column in Table 2 identifies the location of the release as defined by the pin numbers in the figures. Figures 3, 4, and 5 show the locations of these failures along the pipelines.

The pipeline releases did not occur in a common location and were spread out all over Los Angeles. There is no record of two pipeline releases that occurred at locations near enough to consider the two hazards together. Each release produced an independent hazard. From this review, it was found that there is no evidence that two (or more) pipelines, beside each other, in a common corridor, have failed concurrently during an earthquake.

Thus, according to the decision analysis process described earlier, the concurrent failure of two (or more) pipelines in a common corridor, close enough to combine their hazardous impacts, was not determined to be a credible event as it has not occurred.

[3] http://www.phmsa.dot.gov/pipeline/library/data-stats/distribution-transmission-and-gathering-lng-and-liquid-accident-and-incident-data

Table 2
PHMSA Pipeline Accidental Release Data - Liquid Pipelines

MAP #	DATE	COUNTY	CAUSE	CAUSE 2	RPTID	OPID	NAME	SPLOC	COMM	NARRATIVE
1	1/17/1994	LOS ANGELES	FAILED WELD		19940043	5522	FOUR CORNERS PIPELINE CO	LOCATED IN A CHRISTMAS TREE FARM NORTH OF MAGIC MOUNTAIN PKWY. E. OF 1-5 S. OF SANTA CLARA RIVER W. OF THE CITY BOUNDARY SANTA CLARITA(SEC21,T4N,R16W)FCPL LINE1	CRUDE OIL	T SPILL SITE VACUUMED RECOVERABLE CRUDE OIL, REMOVED CONTAMINATED SOIL FOR ROAD BASE PROCESSING.
2	1/17/1994	LOS ANGELES	OUTSIDE FORCE DAMAGE	EARTHQUAKE	19940044	5522	FOUR CORNERS PIPELINE CO	LOCATED NEAR THE CROSSING OF POSEY CREEK IN POSEY CANYON-ONE MILE E.OF I-5 SAND BUNKER, E. OF PYRAMID LAKE - W. OF OLD RIDGE ROUTE (SEC 36,T7N,R18W) FCPL LINE 1	CRUDE OIL	FAILURE OF GIRTH WELD DURING EARTHQUAKE, CONTAINED SPILL WITH PRIMARY AND SECONDARY EARTHEN DAMS. REPAIRED/REPLACED DAMAGED PIPELINE AT SPILL SITE. VACUUMED RECOVERABLE CRUDE OIL AND REMOVED CONTAMINATED SOIL FOR ROAD PROCESSING.
3	1/17/1994	LOS ANGELES	FAILED WELD	EARTHQUAKE	19940045	5522	FOUR CORNERS PIPELINE CO	LOCATED IN THE VALENCIA GOLF COURSE W. OF MCBEAN PKWY N. OF VALENCIA BLVD S. OF MAGIC MOUNTAIN PKWY E. OF I-5 SANTA CLARITA (SEC 21,T4N,R16W) FCPL - LINE 1	CRUDE OIL	FAILURE OF GIRTH WELD DURING EARTHQUAKE, REPAIRED/REPLACED DAMAGED PIPELINE AT SPILL SITE. VACUUMED RECOVERABLE CRUDE OIL AND REMOVED CONTAMINATED SOIL FOR ROAD BASE PROCESSING.
4	1/17/1994	LOS ANGELES	OUTSIDE FORCE DAMAGE	EARTHQUAKE	19940048	5522	FOUR CORNERS PIPELINE CO	NEWHALL PUMP STATION, 26186 W. MCBEAN PKWY, VALENCIA CA. W. SIDE OF MCBEAN PKWY, & S. OF VALENCIA BLVD IN SANTA CLARITA FCPL - LINE 1	CRUDE OIL	FAILURE OF GIRTH WELD DURING EARTHQUAKE, OIL SPILT ONTO MCBEAN PARKWAY ENTERED STORM DRAIN AND SANTA CLARA RIVER (12 MILES). REPAIRED/REPLACED DAMAGED PIPELINE AT NEWHALL PUMP STATION. VACUUMED RECOVERABLE CRUDE OIL, REMOVED CONTAMINATED SOIL, STEAM CLEANED AND WATER WASHED AFFECTED AREAS.
5	1/17/1994	LOS ANGELES	OUTSIDE FORCE DAMAGE	EARTHQUAKE	19950054	5522	FOUR CORNERS PIPELINE CO	400 FEET WEST OF SIERRA HIGHWAY INTRACT 2703, LOT 14 RANCHO SAN FRANCISCO GRANT, SANTA CLARITA FCPL-LINE 1	CRUDE OIL	FAILURE AT WELD DUE TO EARTHQUAKE REPAIRED/REPLACED DAMAGED PIPELINE REMOVEDCONTAMINATED FOLIAGE AND SOIL FROM AFFECTED CREEK AREA.
6	1/17/1994	LOS ANGELES	OUTSIDE FORCE DAMAGE	EARTHQUAKE	19950055	5522	FOUR CORNERS PIPELINE CO	LEAK WAS LOCATED ON THE PROPERTY OF THE DEPARTMENT OF WATER & POWER, NORTHWEST OF TELFAIR AVENUE AND OLDEN STREET CITY OF LOS ANGELES FCPL-LINE 1	CRUDE OIL	FAILURE OF ACETYLENE WELD DURING EARTHQUAKE, REPAIRED/REPLACED DAMAGED PIPELINE. REMOVED CONTAMINATED SOIL FROM AFFECTED AREA IN THE

MAP #	DATE	COUNTY	CAUSE	CAUSE 2	RPTID	OPID	NAME	SPLOC	COMM	NARRATIVE
										DEPARTMENT OF WATER & POWER YARD.
7	1/17/1994	LOS ANGELES	OUTSIDE FORCE DAMAGE	EARTHQUAKE	19950056	5522	FOUR CORNERS PIPELINE CO	CORNER OF O'MELVENY STREET AND SAN FERNANDO MISSION BLVD. CITY OF SAN FERNANDO FCPL - LINE 1	CRUDE OIL	FAILURE AT WELD DUE TO EARTHQUAKE. REPAIRED/REPLACED DAMAGED PIPELINE. VACUUMED RECOVERABLE CRUDE OIL, STEAM CLEANED AFFECTED AREAS AND REPAIRED AFFECTEDAREAS. COMBINED COSTS FOR THIS LEAK AND A LEAK SEPARATELY REPORTED ON LINE 1AT WOLFSKILL ST AND AMBOY AVE (REPORT #950057) IN CITY OF LOS ANGELES, ARE 3.2MILLION. CLEANUP EXPENSES CANNOT BE EXPLICITLY SEGREGATED FOR THIS INDIVIDUALLEAK BECAUSE THE TWO LEAK SITES ARE CLOSE TOGETHER AND CLEANUP WAS MANAGED ASA JOINT PROJECT.
8	1/17/1994	LOS ANGELES	OUTSIDE FORCE DAMAGE	EARTHQUAKE	19950057	5522	FOUR CORNERS PIPELINE CO	CORNER OF WOLFSKILL STREET AND AMBOY AVENUE CITY OF LOS ANGELES FCPL - LINE 1	CRUDE OIL	FAILURE AT WELD DUE TO EARTHQUAKE, REPAIRED/REPLACED DAMAGED PIPELINE.VACUUMED RECOVERABLE CRUDE OIL AND STEAM CLEANED AFFECTED AREA AND REPAIREDAFFECTED AREA. COMBINED COSTS FOR THIS LEAK AND A LEAK SEPARATELY REPORTED ONLINE 1 AT O'MELVENY ST AND SAN FERNANDO MISSION BLVD (SEE REPORT #950056),CITY OF SAN FERNANDO, ARE 3.2 MILLION. CLEANUP EXPENSES CANNOT BE EXPLICITLYSEGREGATED FOR THIS INDIVIDUAL LEAK BECAUSE THE TWO LEAK SITES ARE CLOSETOGETHER AND CLEANUP WAS MANAGED AS A JOINT PROJECT.

Compiled data September 19, 2016 from data provided by PHMSA at
http://www.phmsa.dot.gov/pipeline/library/data-stats/distribution-transmission-and-gathering-lng-and-liquid-accident-and-incident-data

Attachment H

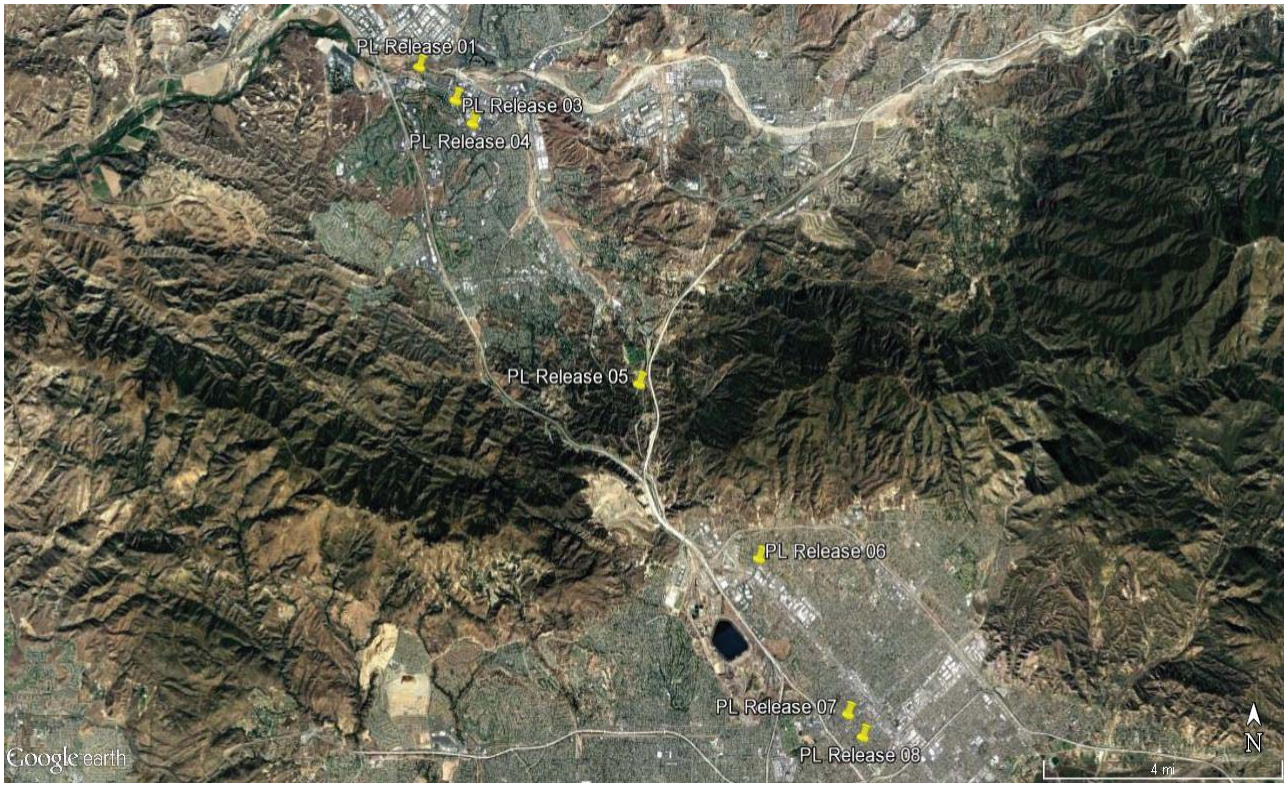


Figure 3
Pipeline Failures in Los Angeles During the Northridge Earthquake (locations 1, and 3 through 8)

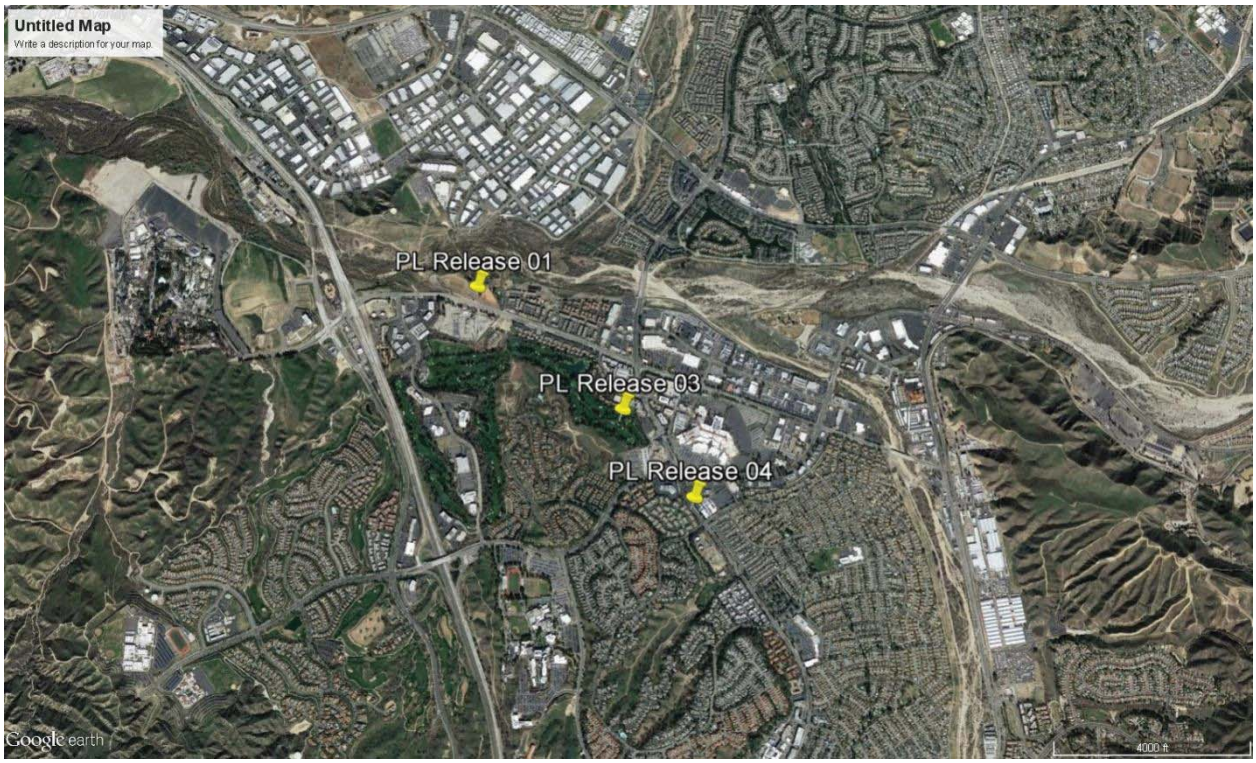


Figure 4
Pipeline Failures in Los Angeles During the Northridge Earthquake (locations 1, 3, and 4)

Attachment H

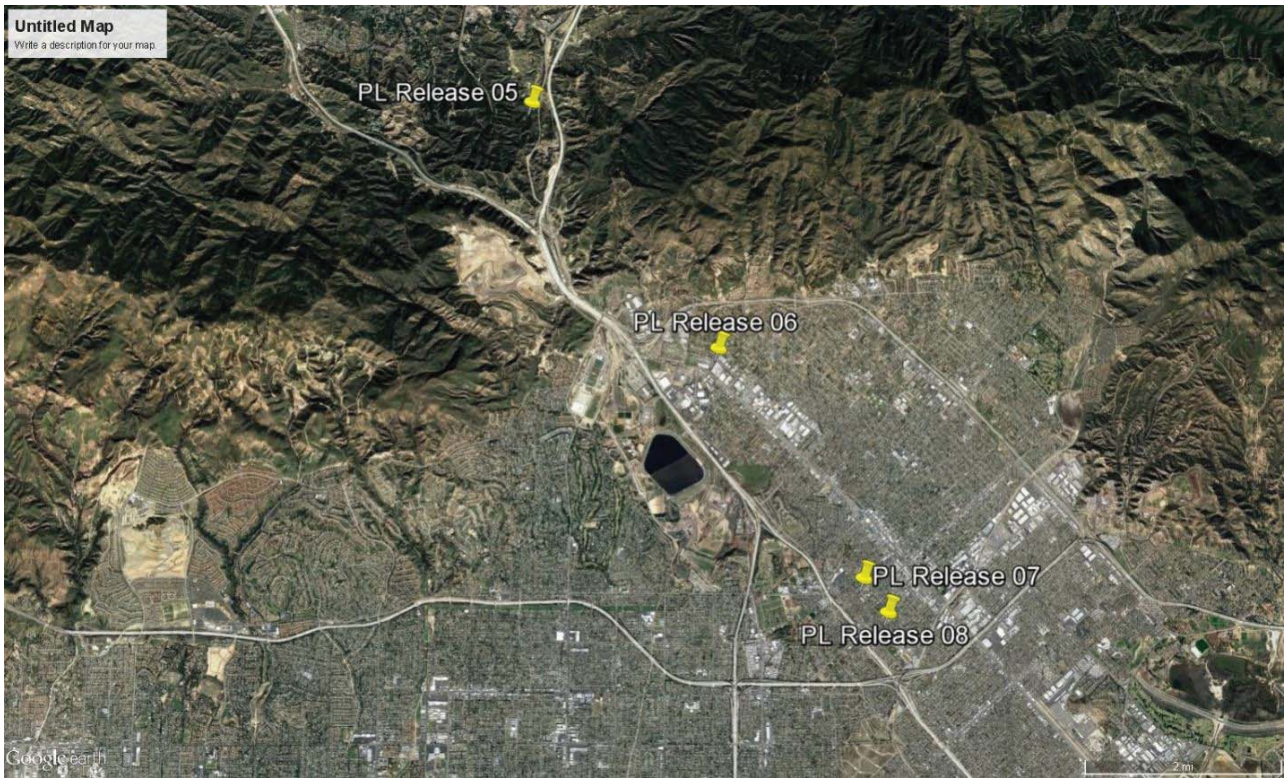


Figure 5
Pipeline Failures in Los Angeles During the Northridge Earthquake (locations 5, 6, 7, and 8)

Attachment H

5. VAPOR CLOUD EXPLOSIONS

When a pool fire occurs, it is the flammable vapor above the liquid pool that burns, not the liquid. The more volatile the liquid, the greater the vapor generation rate from the pool. Thus a pool of butane liquid will generate butane vapor at a higher rate than a pool of diesel fuel will generate diesel vapor. Upon ignition of the flammable vapor above the liquid pool, the flame burns through the flammable region and generates overpressure due to the expansion of the gases (both unburned hydrocarbons and combustion products from the burning process). The overpressure from such a pool fire can be heard (like the sound made by a campfire) but is not of sufficient strength to cause damage to equipment or injury to people. The major impact of a pool fire to equipment and people is from the radiation produced by the fire above the pool.

If a pool forms and does not ignite soon after the release starts, a flammable vapor cloud can form and disperse (travel) downwind. The strength of the overpressure wave generated by a vapor cloud explosion (VCE) is dependent on the reactivity of the flammable gas involved; the presence (or absence) of structures such as walls or ceilings that partially confine the vapor cloud; and the spatial density of obstructions within the flammable cloud[4] [5], the average size of those obstacles, and the overall size of the vapor cloud[6] [7]. Several models reflect the results of several international research programs on vapor cloud explosions, which show that the strength of the blast wave generated by a VCE increases as the degree of confinement and/or obstruction of the cloud increases. The following quotations illustrate this point.

> "On the evidence of the trials performed at Maplin Sands, the deflagration [explosion] of truly unconfined flat clouds of natural gas or propane does not constitute a blast hazard."[8] (Tests conducted by Shell Research Ltd., in the United Kingdom.)
>
> "Both in two- and three-dimensional geometries, a continuous accelerating flame was observed in the presence of repeated obstacles. A positive feedback mechanism between the flame front and a disturbed flow field generated by the flame is responsible for this. The disturbances in the flow field mainly concern flow velocity gradients. Without repeated obstacles, the flame front velocities reached are low both in two-dimensional and three-dimensional geometry."[9] (Tests conducted by TNO in the Netherlands.)

[4] Baker, Q. A., M. J. Tang, E. Scheier, and G. J. Silva (1994), "Vapor Cloud Explosion Analysis." *28th Loss Prevention Symposium*, American Institute of Chemical Engineers (AIChE), April 17-21, 1994.

[5] Baker, Q. A., C. M. Doolittle, G. A. Fitzgerald, and M. J. Tang (1998), "Recent Developments in the Baker-Strehlow VCE Analysis Methodology." *Process Safety Progress*, Vol. 17, No. 4, Winter, 1998, pp 297-301.

[6] Mercx, W.P.M., A.C. van den Berg (1997), *The Explosion Blast Prediction Model in the Revised CPR 14E (Yellow Book)*, TNO Prins Maurits Laboratory, PO Box 45, 2280 AA Rijswijk, The Netherlands. Process Safety Progress, Vol. 16, No. 3, pp. 152-159, Fall 1997.

[7] Mercx, W.P.M., A.C. van den Berg, C.J. Hayhurst, N.J. Robertson, and K.C. Moran (2000), *Developments in Vapour Cloud Explosion Blast Modeling*, Journal of Hazardous Materials 71 (2000) 301-319.

[8] Hirst, W. J. S., and J. A. Eyre (1982), "Maplin Sands Experiments 1980: Combustion of Large LNG and Refrigerated Liquid Propane Spills on the Sea." *Proceedings of the Second Symposium on Heavy Gases and Risk Assessment*, Frankfurt am Main, May 25-26, 1982: pp. 211-224.

[9] van Wingerden, C. J. M., and J. P. Zeeuwen (1983), "Flame Propagation in the Presence of Repeated Obstacles: Influence of Gas Reactivity and Degree of Confinement." *Journal of Hazardous Materials*, Vol. 8, 1983: pp. 139-156.

> "The current understanding of vapor cloud explosions involving natural gas is that combustion only of that part of the cloud which engulfs a severely congested region, formed by repeated obstacles, will contribute to the generation of pressure."[10] (Tests conducted by British Gas in the United Kingdom.)

Researchers who have studied case histories of accidental vapor cloud explosions have reached similar conclusions.

> "It is a necessary condition that obstacles or other forms of semi-confinement are present within the explosive region at the moment of ignition in order to generate an explosion."[11]

> "A common feature of vapor cloud explosions is that they have all involved ignition of vapor clouds, at least part of which have engulfed regions of repeated obstacles."[12]

Thus, the generation of overpressure levels that may be of a sufficient level to cause damage to equipment or injury to people is not possible in an open environment. Flammable vapors that are confined or trapped (such as a leak of propane or natural gas from a supply line to a furnace in a house basement) can produce higher overpressures due to the confinement and the subsequent restriction of expansion of combustion products. Thus, for releases in open areas, the potential for overpressure impacts is small compared to other potential impacts such as fire radiation form pool or torch fires, or impacts due to flash fires.

[10] Johnson, D. M., P. Sutton, and M. J. Wickens (1991), "Scaled Experiments to Study Vapour Cloud Explosions." IChemE Symposium Series No. 124, *Hazards XI*, *New Directions in Process Safety*, Manchester, United Kingdom, April, 1991: pp. 67-85.

[11] Wiekema, B. J. (1984), "Vapour Cloud Explosions—An Analysis Based on Accident" (Part I & II). *Journal of Hazardous Materials*, Vol. 8, 1984: pp. 285-311, 313-329.

[12] Harris, R. J., and M. J, Wickens (1989), *Understanding Vapour Cloud Explosions—An Experimental Study*. The Institution of Gas Engineers, Communication No. 1408, 1989.

6. WIND SPEEDS FOR FIRE RADIATION CALCULATIONS

Quest modeled fire radiation with a wind speed of 20 mph. Questions arose whether or not 20 mph produced the worst case fire radiation consequence. 49 CFR 193.2057(b), the US Federal Code (CFR = Code of Federal Regulations), that has to do with siting of LNG (liquefied natural gas) facilities, states the following.

§193.2057 Thermal radiation protection.

Each LNG container and LNG transfer system must have a thermal exclusion zone in accordance with section 2.2.3.2 of NFPA-59A-2001 (incorporated by reference, *see* §193.2013) with the following exceptions:

(a) The thermal radiation distances must be calculated using Gas Technology Institute's (GTI) report or computer model GTI-04/0032 LNGFIRE3: A Thermal Radiation Model for LNG Fires (incorporated by reference, *see* §193.2013). The use of other alternate models which take into account the same physical factors and have been validated by experimental test data may be permitted subject to the Administrator's approval.

(b) In calculating exclusion distances, the wind speed producing the maximum exclusion distances shall be used except for wind speeds that occur less than 5 percent of the time based on recorded data for the area. (underlining added)

(c) In calculating exclusion distances, the ambient temperature and relative humidity that produce the maximum exclusion distances shall be used except for values that occur less than five percent of the time based on recorded data for the area.

The underlined part excludes wind speeds that occur less than 5% of the time from modeling. A review of 10 years of wind speed weather data for the Long Beach area[13], results in the pie chart shown in Figure 6. Winds greater than 20 mph occur less than 0.3 percent of the time. Thus, there is no precedent for using a wind speed greater than 20 mph in the fire radiation calculations without documentation supporting wind speeds greater than 20 mph at frequency levels greater than 5% of the time. In addition the wind speed that occurs less than 5% is between 10 mph and 15 mph. Thus, Quest's fire radiation analysis is conservative since 20 mph winds was used.

[13] https://www.ncdc.noaa.gov/cdo-web/

Attachment H

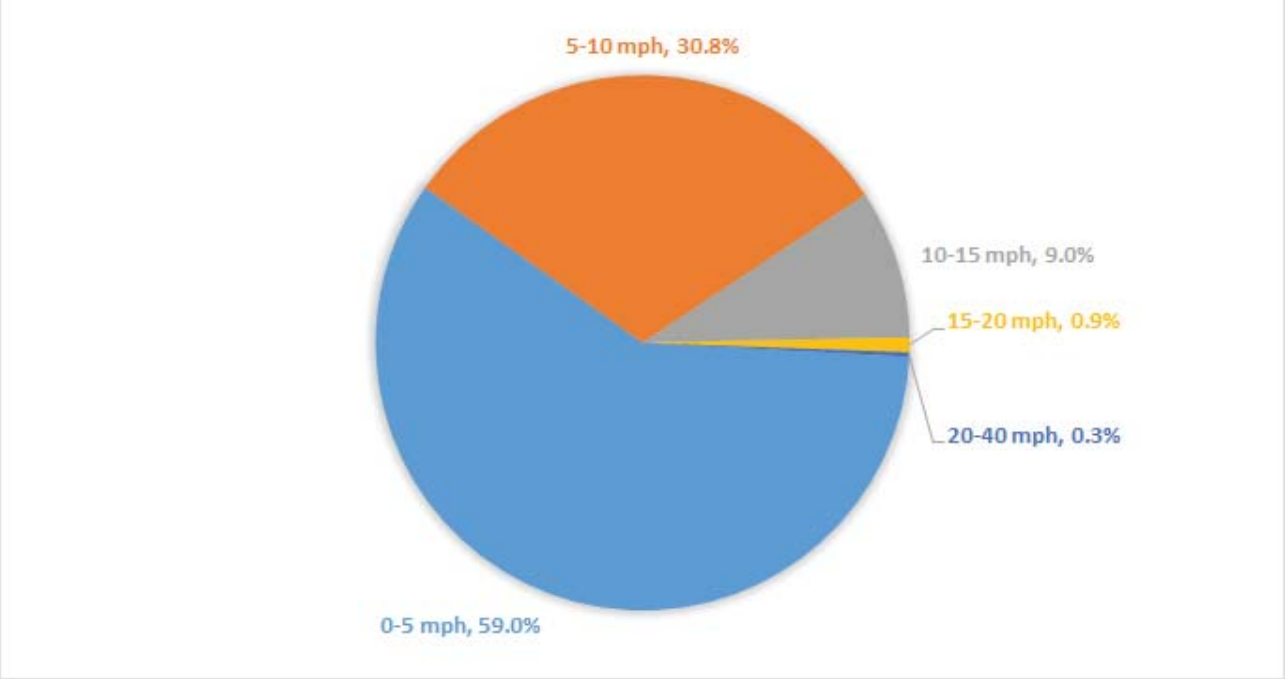


Figure 6
Wind Speed Data for the Long Beach Area from 2006 to 2016

MEMORANDUM

TO: Marcia Baverman
Environmental Audit Inc.

DATE: March 28, 2017

FROM: John B. Cornwell
Quest Consultants Inc.

SUBJECT: Additional Information

This memorandum is designed to complement Quest's previous memorandum dated January 9, 2017 and addressed to Marcia Baverman of Environmental Audit Inc. with respect to the Tesoro Los Angeles Refinery Integration and Compliance Project.

The memorandum explains how release scenarios (i.e., locations and type of event) were chosen for existing and proposed/modified units, how the "worst-case" hazard impact was identified for each proposed (new or modified) or existing process unit through the use of event trees, and why consequence-based analysis differs from and is more conservative than risk-based analysis.

Selection of Release Scenarios

In a refinery application, the fluids being transported, processed, or stored in a unit undergo a variety of thermophysical changes as they move through a refinery. These changes affect the way they can be released and how they behave in the surrounding atmosphere. For instance, for the fluids in the Carson and Wilmington Operations, a release could result in one or more of the following.

a. A gas release that could be involved in a torch fire, flash fire, or a toxic cloud (if not ignited)
b. An aerosol release (liquid droplets suspended in the flashed gas) that could be involved in a torch fire, flash fire, or toxic cloud (if not ignited)
c. A liquid release that forms a pool from which a vapor cloud evolves that could be involved in a pool fire, flash fire, or toxic cloud (if not ignited).
d. Combinations of a, b, and c for different fluids under different process, transport, or storage conditions.

In general, Quest considers the following factors when "choosing" where to simulate an accidental release. These parameters are not in any particular order of importance since the controlling parameters will depend on the particular situation.

a. Composition of the fluid (mixtures of materials behave differently than pure components).
b. Fluid pressure
c. Fluid temperature
d. Available inventory
e. Pipe diameter
f. Pipe length
g. Other case-specific factors (height of equipment, etc.)

When performing a risk analysis, Emergency Shut-Down (ESD) systems, if available, are considered to operate as designed to limit releases. In a consequence analysis, ESD systems are not considered at all.

Refinery units are complex configurations of vessels, piping, pumps/compressors, heaters, and other equipment. In addition to the type of release (i.e., gas, vapor, or liquid) and operating conditions (i.e., composition, temperature, pressure, etc.), the release hole size can vary from a pin-hole to a full line rupture. Table 1 presents the locations within the units that were evaluated for the proposed project based on the operating conditions present in each unit.

The release locations identified in Table 1 were selected when significant changes in fluid composition, inventory, pressure, temperature, and pipe size occur in the unit identified. While all the releases listed in Table 1 were evaluated, only the maximum consequence results for each unit were reported in Table 4-2 of Quest's report.

Identification of Worst-Case Impact Distances

CEQA generally requires that a hazard impacts analysis evaluate the potential worst-case hazard impacts associated with the proposed project. Therefore, the hazards analysis completed for the Tesoro Integration and Compliance Project focuses on the hazard scenario for each new or modified unit that produces the largest impacts. The largest impact distance for any proposed and existing process is reported in Table 4-2, Summary of Worst-Case Hazard Distances, included in Quest's report titled *Worst-Case Consequence Analysis for the Tesoro Los Angeles Refinery*. The methodology only focuses on the consequence (hazards) associated with an event, rather than looking at the type of event that may occur. Thus, for example, a pipeline may rupture as a result of an explosion or earthquake, or an industrial accident, or any other cause. The hazard analysis focuses on the hazard impact that results, and reports the largest single impact that could possibly occur, regardless of what caused the impact.

In order to demonstrate how the largest hazard distances were extracted from the data, an example of a simple event tree for one of the release events in Table 4-2 of Quest's report is presented in Figure 1 of this memorandum. The example release event is a release from the reactor effluent line in the proposed Carson HCU (hydrocracking unit). The largest impact associated with this release is the potential exposure to hydrogen sulfide (H_2S) in the released gas. Table 4-2 of the Quest report lists the distance to the toxic endpoint (30 ppm H_2S for this release scenario) as 1,245 feet (380 meters). The 380 meter figure is shown in bold as it is the largest distance presented in Figure 1 of this memorandum and in Table 4-2 of Quest's report for the HCU.

To illustrate the evaluation of the hazards associated with a process unit, a full event tree for release scenario for the Carson HCU was modeled and presented in Figure 1. As shown in Figure 1 of this memorandum, all other hazard impact distances associated with this release scenario for the Carson HCU (radiant, explosive, toxic) are smaller for all other hole sizes. Thus, the choice of 380 meters (1,245 feet) is the largest (worst-case) impact distance associated with this release from the proposed Carson HCU. Other releases in the proposed HCU were evaluated, but none produced any hazard (radiant, explosive or toxic) that was larger than 380 meters (1,245 feet). The tabular and graphical output for this worst-case release from the Carson HCU (rupture of reactor effluent line), and tracking the toxic component (H_2S), is provided at the end of this memorandum. As can be seen in Figure 1, a total of 25 scenarios were considered for the Carson HCU (five hole sizes and five hazard impact distances per hole size); however, only the worst-case hazard impact was reported for each proposed (new or modified) or existing process unit.

Quest has over 30 years of experience in conducting these types of studies enabling us to focus on the events that need to be modeled when searching for the worst-case hazard impacts. Since a full rupture creates the largest hazard impact, as exemplified in Figure 1, there is little benefit modeling the flash fire distance achieved by a release from a 0.25-inch diameter hole in the reactor effluent line (flash fire distance = 4 meters) when model output has always shown that the flash fire distance from a rupture of the very same line yields a greater distance (i.e., 64 meters). In this example, the larger release (rupture) would require modeling and the release from the 0.25 inch diameter hole would not because it is clearly a much smaller release. Quest's experience guides us to the portion(s) of the event tree that require evaluation when identifying the worst-case impacts.

As described in Quest's Worst-Case Consequence Analysis for the Tesoro Los Angeles Refinery, our memorandum dated January 9, 2017, and this current memorandum, sufficient data were evaluated to demonstrate the worst-case hazard impacts associated with the proposed Tesoro project.

Consequence-Based versus Risk-Based Analysis

Comments have suggested frequency must be included in a hazards analysis especially for transportation. The process employed by the SCAQMD follows is a "worst-case consequence analysis" for accidental releases of acutely hazardous materials. Within this type of analysis, the frequency (or probability) of the worst-case occurring is assumed to be 100% (or 1.0 if using probability). This is an extremely conservative approach since large (e.g., worst-case) releases do not happen frequently, although they can generate a large impact, while small (e.g., pin-hole leaks) happen more frequently, but do not generate any significant hazard to the public. To compound the conservatism incorporated into the SCAQMD approach, injury, not lethality, thresholds are used as the modeling "endpoint." What this means is that the worst-case releases are modeled to an injury level which by simple common sense would extend further than the lethal level for the same release and hazard. The result of the worst-case analysis is a representation (presented as a circle around the release point) of the largest extent of an injury impact (radiant, explosive, or toxic) for any release that could occur within the process being evaluated (e.g., process unit, pipeline, etc.).

A true quantitative risk analysis (QRA) would couple, or pair, each possible release event, including the worst-case, with its associated frequency of occurrence. In addition, all international risk criteria are based on lethality, not injury. A full QRA of the Wilmington and Carson Tesoro facilities would produce risk impacts to the public that are smaller, not larger, than the worst-case injury circles produced by the current SCAQMD modeling approach. Thus, Quest defines the analysis as required by SCAQMD to be conservative in nature. In short, the AQMD approach overestimates the "risk" to the public since it assumes the worst-case consequence will occur and does not calculate the true risk since the methodology does not incorporate frequency.

One scenario raised in comments is the increase in the number of rail cars received by the facility. When assessing the consequence of a release from a railcar, the hazard impact zone around a single railcar sitting on the track is determined to be an oval around the railcar that is the same distance from the railcar in all directions (see Figure 2, Illustration A). If for example, there is one LPG railcar on a train, the hazard zone becomes elongated but remains the same distance from the railcar perpendicular to the track (shown in Figure 2, Illustration B as the lines parallel to the track). This elongation occurs because the hazard event could occur anywhere along the track as the railcar travels down the track. If multiple identical railcars are on a single train, each railcar would have the same hazard impact zone (see Figure 2,

Illustration C) and when traveling down the track, would produce the same elongated impact zone as one railcar traveling down the track (see Figure 2, Illustration D).

Rail accident data available from the Federal Railroad Administration provides some statistics related to train derailments and the hazardous materials released. However, the detailed information necessary to produce pertinent statistics related to the number of railcars on a train involved in a derailment that had a release involving multiple railcars that generated a specific hazard event at the same location is not available. Without detailed data on historical derailments, it is not possible to assign a probability to multiple railcars failing concurrently in a derailment.

However, to provide context to the frequency of train derailments that involve releases of hazardous materials, Table 3.3-2 of the FEIR provided accident data and presented the number of accidents per million miles traveled in Section 3.3.3.2 of the FEIR. As explained above, the consequences of an event are the same as the existing consequences because the Refinery currently receives shipments of LPG by rail.

A similar conclusion can be reached for transport by truck.

Table 1
Tesoro Release Locations Evaluated

Facility	Unit	Release Description
Carson	No. 51 Vacuum Unit/Dehexanizer	Release from dehexanizer line to No. 51 vacuum tower
		Release from vacuum 51 tower line to dehexanizer feed
		Release from dehexanizer feed line
	Alkylation	Release from propylene feed line to contactor
		Release from olefin feed line leaving surge drums
		Release from isoButane recycle line to amylene feed coalescer
		Release from amylene line leaving amylene feed coalescer
		Release from line leaving depropanizer overhead accumulator
	HCU	Release from line feeding reactor R-1
		Release from effluent line leaving reactor R-1
		Release from effluent line leaving reactor R-3 / R-4
		Release from gas line leaving high pressure separator and feeding compressors
		Release from line feeding reactor R-2
		Release from effluent line leaving reactor R-3
		Release from liquid line leaving reboiler on distillate hydrocracker stripper
		Release from pumped liquid line to distillate hydrocracker
		Release from fractionator bottoms
	Mid-Barrel Hydrotreater	Release from line leaving reactor
		Release from line leaving stabilizer overhead accumulator
		Release from stabilizer overhead line
		Release from line entering off gas scrubber inlet
		Release from fresh feed line to reactor
	Naphtha HDS	Release from feed line to feed surge drum
		Release from liquid line leaving feed surge drum
		Release from liquid line feeding hydrogen knock out pot
		Release from line entering reactor feed heater
		Release from feed line to reactor
		Release from line feeding diolefin saturator
		Release from diolefin reactor effluent line

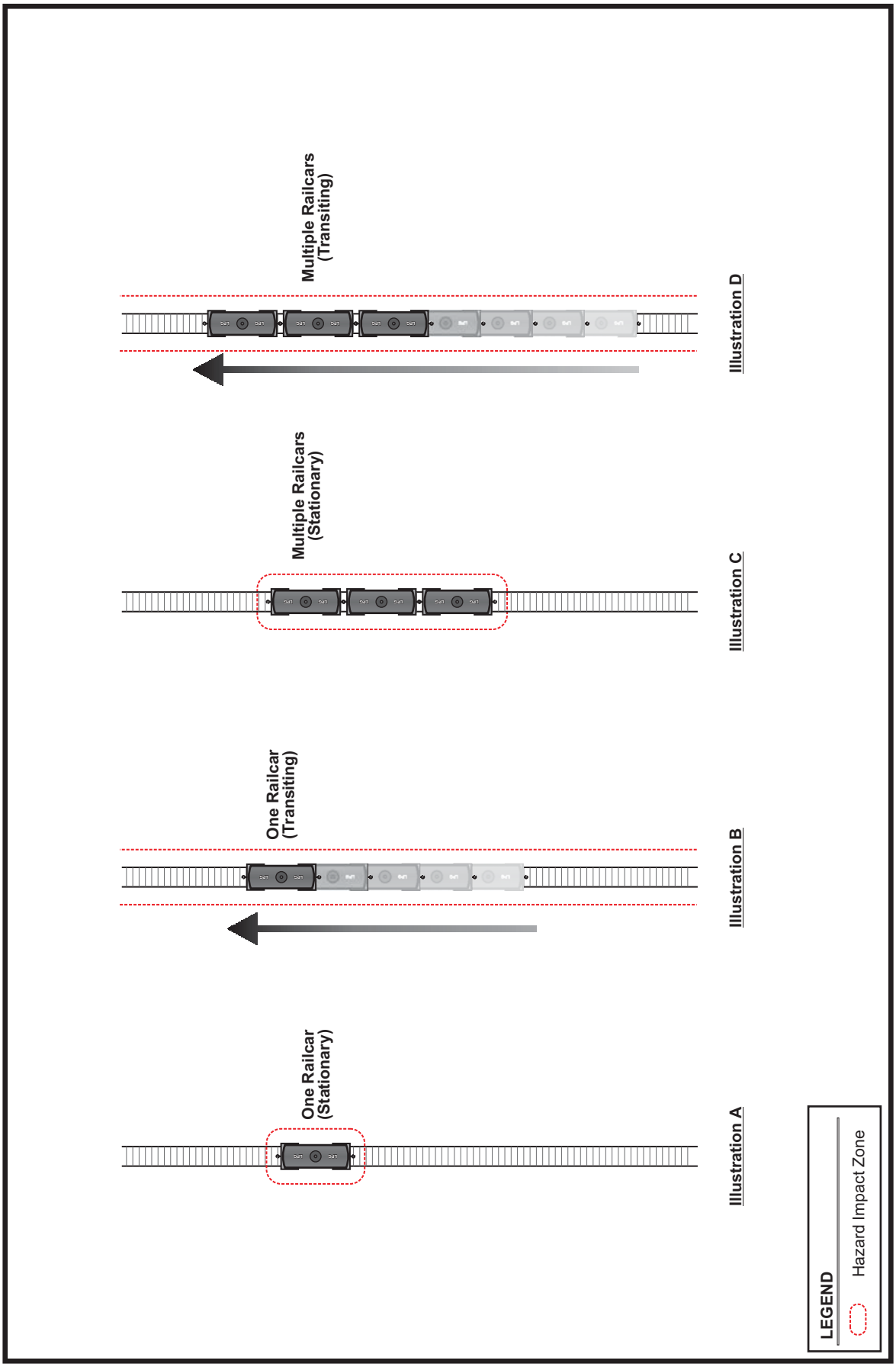
Facility	Unit	Release Description
Wilmington	Naphtha Isomerization	Release from feed line to naphtha isomerization tower
		Release from liquid line leaving hot flash drum
		Release from cooled vapor line leaving hot flash drum
		Release from cooled liquid line leaving hot flash drum
		Release from flash scrubber overhead line
		Release from scrubber overhead
	LHU	Release from hydrogen line entering furnace
		Release from line leaving feed surge drum
		Release from line leaving furnace and entering Reactor No. 1
		Release from liquid line to stabilizer column leaving flash drum
		Release from liquid line leaving stabilizer bottoms and entering stabilizer reboiler
		Release from line entering stabilizer from overhead condenser
		Release from stabilizer overhead line overhead accumulator
		Release from liquid line leaving stabilizer overhead accumulator
	Wet Jet Treater	Release from untreated jet fuel line to V-1 and V-2
		Release from jet fuel line after V-2
		Release from jet fuel line entering reactors V-4A, V-4B, V-5A, and V-5B
	New Crude Tanks	Fully involved tank top fire (500,000 bbl.)
	FCCU	Shutdown - no calculations needed
	HTU 1/2	Release from liquid line leaving feed surge drum
		Release from line charging preheater
		Release from line leaving preheater
		Release from liquid line leaving hydrotreater reactor
		Release from feed line to stripper
	HTU 4	Modifications for HTU 4 do not change vulnerability zones
	CRU 3	Release from liquid line leaving bottom of feed surge drum
		Release from liquid line leaving bottom of depropanizer
		Release from vapor line leaving top of depropanizer
		Release from liquid line leaving depropanizer accumulator

Facility	Unit	Release Description
		Release from liquid line leaving debutanizer accumulator
		Release from liquid line leaving debutanizer accumulator on the way to HCU
	PSTU	Release from vapor line leaving top of amine treating tower
		Release from liquid line entering amine treating tower
		Release from line leaving KOH dryers
	HCU	Release from liquid line leaving first stage surge drum
		Release from bottom of reactor No. 1
		Release from bottom of reactor No. 2
		Release from combined liquid lines leaving low pressure separator and DEA contactor
		Release from liquid line leaving 2nd stage charge surge drum
		Release from liquid line leaving fractionator tower
		Release from liquid line leaving fractionator reflux accumulator
		Release from liquid line leaving medium naphtha stripper tower
		Release from liquid line leaving heavy naphtha stripper tower
	SARP	Release from vapor line leaving final scrubber/disengagement tank to gas cooling tower
		Release from vapor line leaving drying tower acid drum to cold exchanger
	Replace Crude Tanks	Fully involved tank top fire (80,000 bbl.)
		Fully involved tank top fire (300,000 bbl.)
	Replace Portion of Crude Transfer Pipeline	Release from 12-inch crude oil pipeline
		Release from 24-inch crude oil pipeline
Other	Interconnecting Pipeline	Release from 6-inch butane pipeline
		Release from 4-inch propylene pipeline
		Release from 4-inch butylene pipeline
		Release from 10-inch blend components pipeline
		Release from 10-inch 51 Vac/LCO liquid pipeline
	Rail Car Unloading	Boiling Liquid Expanding Vapor Explosion (BLEVE) of butane rail car
		BLEVE of propane rail car

	Release Hole Size	Ignition Timing	Outcome	Maximum Distance (meters) to: Radiant Heat Exposure (1,600 Btu/hr-ft^2)	Explosion Overpressure (1 psi)	Flash Fire (LFL)	Toxic Gas Exposure (ERPG-2): SO_2 (3 ppm)	SO_3 (2.5 ppm)	H_2S (30 ppm)
Release from a Reactor Effluent in HCU	Rupture	Immediate Ignition	Torch Fire	137					
		Delayed Ignition	Flash Fire/Torch Fire/VCE	115	198	64			
		No Ignition	Dissipation/Toxic				DNE	DNE	**380**
	6 inch	Immediate Ignition	Torch Fire	129					
		Delayed Ignition	Flash Fire/Torch Fire/VCE	114	188	60			
		No Ignition	Dissipation/Toxic				DNE	DNE	360
	2 inch	Immediate Ignition	Torch Fire	64					
		Delayed Ignition	Flash Fire/Torch Fire/VCE	64	89	29			
		No Ignition	Dissipation/Toxic				DNE	DNE	210
	0.75 inch	Immediate Ignition	Torch Fire	27					
		Delayed Ignition	Flash Fire/Torch Fire/VCE	27	33	11			
		No Ignition	Dissipation/Toxic				DNE	DNE	94
	0.25 inch	Immediate Ignition	Torch Fire	12					
		Delayed Ignition	Flash Fire/Torch Fire/VCE	12	11	4			
		No Ignition	Dissipation/Toxic				DNE	DNE	34

Figure 1
Worst-Case Event Tree for the Release from Reactor Effluent in HCU (Proposed Carson Modification)

* DNE – Does not exist in fluid stream.



Environmental Audit, Inc.

COMPARISON HAZARD IMPACT ZONES OF SINGLE AND MULTIPLE RAILCARS

Figure 2

Project No. 2844

N:\2844\Railcars\Railcars (rev.1).cdr

Attachment H

```
+------------------------------------------------------------+
|                  CANARY by Quest - Version 4.5             |
|                        CANARY Case Input                   |
|                     Case Name - HCC08t5h0                  |
|                    Wed Mar 08 16:04:16 2017                |
|          Quest Consultants Inc., Norman, Oklahoma, USA     |
|         www.questconsult.com     canary@questconsult.com   |
|          telephone (405) 329-7475    fax (405) 329-7734    |
+------------------------------------------------------------+

TITLE: HCU-Carson (proposed) - reactor effluent

Type of calculation is vapor dispersion.

TITLE MENU
Title for this run  : HCU-Carson (proposed) - reactor effluent
User id             : jbc
Project number      : 6950
Filename            : HCC08t5h0
Type of units       : Metric units

MATERIAL MENU
Materials Released  :  number  formula  name                        fraction
Component number  1 :    51 = H2       Hydrogen(equilibrium)       [redacted]
Component number  2 :     1 = CH4      Methane
Component number  3 :     2 = C2H6     Ethane
Component number  4 :     3 = C3H8     Propane
Component number  5 :     4 = C4H10    Isobutane
Component number  6 :     6 = C5H12    Isopentane
Component number  7 :    18 = H2S      Hydrogen Sulfide
Component number  8 :    10 = C8H18    n-Octane
Component number  9 :
Component number 10 :
Temperature (deg C) :  [redacted]
Pressure (kPa)      :
The material is GAS

ENVIRONMENT MENU
Wind speed (m/s    )                                    2
Wind speed reference height (meters)                   10
Stability class <A-F>                                   F
Percent relative humidity                              70
Air temperature (deg C)                            18.333
Surface temperature (deg. C)                       18.333
Spill surface                          High density concrete
  Thermal conductivity (W/m*K)                      3.8075
  Density (kg/m^3)                                    2405
  Heat Capacity (J/kg*K)                           652.93
  Delay time (s)                                        0
Surrounding terrain                    Wooded area or urban area

RELEASE MENU
Type of release: Unregulated, Continuous release
Release duration (minutes)                             60
Normal flow rate ( kg / sec.)                     67.2696
Duration of normal flow (minutes)                      5
Volume of vessel (cu. meters)                     109.869
Percent of vessel volume filled with liquid           50
Liquid head above release point (meters)               3
Pipe diameter (meters)                            0.3334
Release area (hole size) (sq. meters)          0.0873013
Pipe length upstream of break (meters)                 5
Height of release point (meters)                     1.1
Angle of release from horizontal (deg.)                0
```

Attachment H

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+-------------------------------------------------------------+
|                 CANARY by Quest - Version 4.5               |
|                       CANARY Case Input                     |
|                    Case Name - HCC08t5h0                    |
|                  Wed Mar 08 16:04:16 2017                   |
|          Quest Consultants Inc., Norman, Oklahoma, USA      |
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|          telephone (405) 329-7475    fax (405) 329-7734     |
+-------------------------------------------------------------+

TITLE: HCU-Carson (proposed) - reactor effluent


IMPOUNDMENT MENU
Unconfined

VDVE MENU
Vapor generation and dispersion - Toxic calculation
Tracking a component =   18 = H2S       Hydrogen Sulfide
Concentration limit ( ppm )                          30
Concentration limit ( ppm )                          30
Concentration limit ( ppm )                          30
Dispersion coefficient averaging time (min)          60
```

Attachment H

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+-------------------------------------------------------------+
|                CANARY by Quest - Version 4.5                |
|             General Release Model 4.5GW UPSTREAM            |
|                    Case Name - HCC08t5h0                    |
|                 Wed Mar 08 16:04:16 2017                    |
|        Quest Consultants Inc., Norman, Oklahoma, USA        |
|       www.questconsult.com     canary@questconsult.com      |
|        telephone (405) 329-7475    fax (405) 329-7734       |
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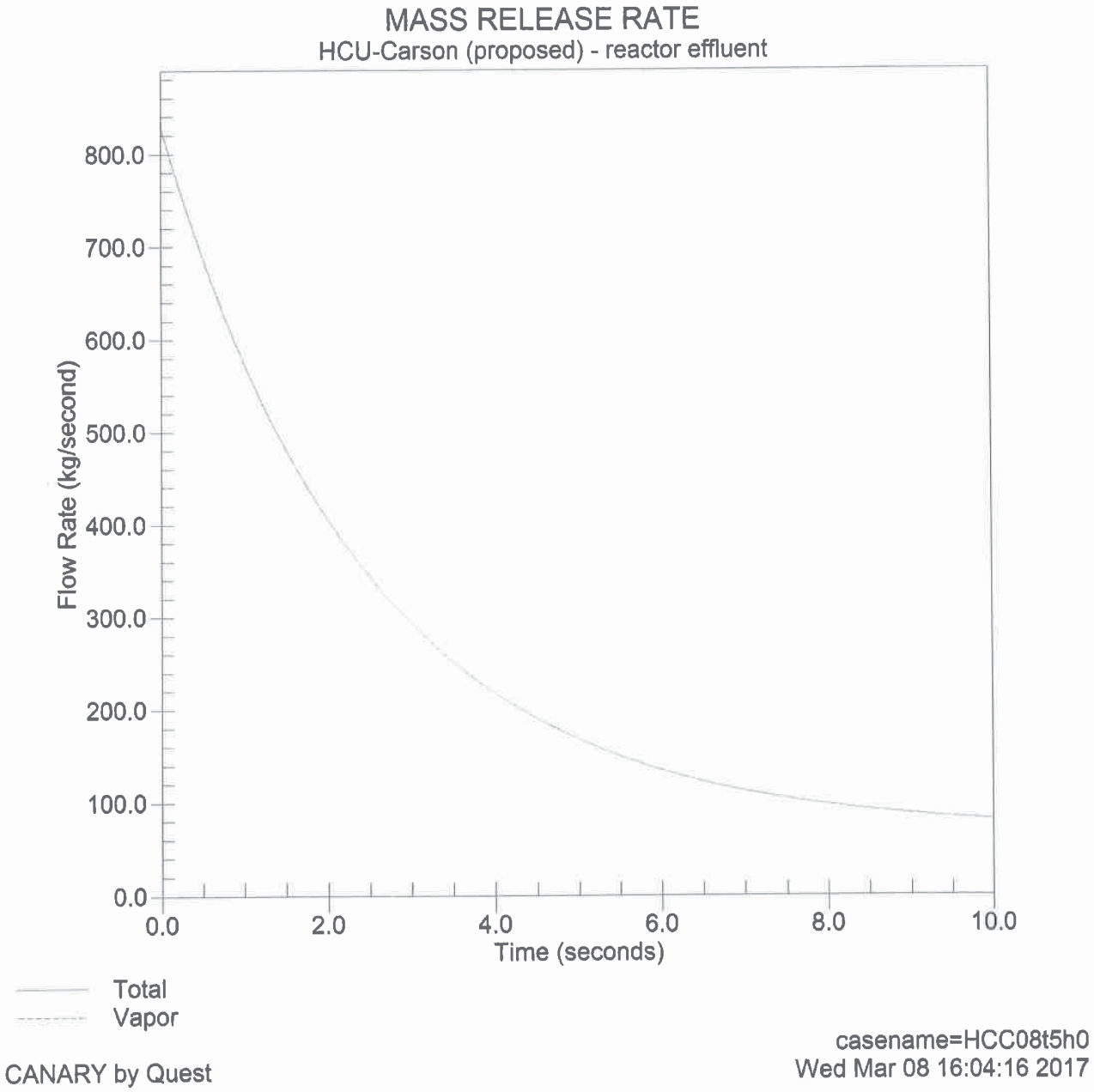
```

TITLE: HCU-Carson (proposed) - reactor effluent

Time (sec)	Vapor (kg/sec)	Aerosol Rate (kg/sec)	Liquid Rate (kg/sec)	Total Rate (kg/sec)
0.000000	847.4314	0.000000	0.000000	847.4317
0.1000000	799.2742	0.000000	0.000000	799.2745
0.3000000	741.9023	0.000000	0.000000	741.9025
0.5000000	689.1817	0.000000	0.000000	689.1819
0.7000000	639.9040	0.000000	0.000000	639.9042
1.000000	574.1392	0.000000	0.000000	574.1395
3.000000	292.6149	0.000000	0.000000	292.6150
5.000000	167.6831	0.000000	0.000000	167.6832
7.000000	111.8328	0.000000	0.000000	111.8328
10.00000	80.23138	0.000000	0.000000	80.23141
15.00000	68.89381	0.000000	0.000000	68.89384
20.00000	67.45664	0.000000	0.000000	67.45666
25.00000	67.28308	0.000000	0.000000	67.28310
30.00000	67.26957	0.000000	0.000000	67.26960
40.00000	67.26957	0.000000	0.000000	67.26960
50.00000	67.26957	0.000000	0.000000	67.26960
60.00000	67.26957	0.000000	0.000000	67.26960
70.00000	67.26957	0.000000	0.000000	67.26960
80.00000	67.26957	0.000000	0.000000	67.26960
100.0000	67.26957	0.000000	0.000000	67.26960
120.0000	67.26957	0.000000	0.000000	67.26960
140.0000	67.26957	0.000000	0.000000	67.26960
160.0000	67.26957	0.000000	0.000000	67.26960
180.0000	67.26957	0.000000	0.000000	67.26960
200.0000	67.26957	0.000000	0.000000	67.26960
220.0000	67.26957	0.000000	0.000000	67.26960
240.0000	67.26957	0.000000	0.000000	67.26960
270.0000	67.26957	0.000000	0.000000	67.26960
300.0000	67.26957	0.000000	0.000000	67.26960
336.0000	0.000000	0.000000	0.000000	0.000000
Totals (kg)	22478.57	0.000000	0.000000	22478.58

Reason for Ending: Pressure Near Atmospheric

Attachment H



Attachment H

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+-------------------------------------------------------------+
|                CANARY by Quest - Version 4.5                |
|                 Release Stream Compositions                 |
|                    Case Name - HCC08t5h0                    |
|                  Wed Mar 08 16:04:16 2017                   |
|          Quest Consultants Inc., Norman, Oklahoma, USA      |
|         www.questconsult.com     canary@questconsult.com    |
|          telephone (405) 329-7475    fax (405) 329-7734     |
+-------------------------------------------------------------+

TITLE: HCU-Carson (proposed) - reactor effluent
```

Component Number	Component Name, Formula
51	Hydrogen(equilibrium), H2
1	Methane, CH4
2	Ethane, C2H6
3	Propane, C3H8
4	Isobutane, C4H10
6	Isopentane, C5H12
18	Hydrogen Sulfide, H2S
10	n-Octane, C8H18

Composition (Mole Fraction) of Fluid Streams

Comp. No.	Feed Stream	Momentum Jet Stream				Liquid Pool Stream
		Flashed Vapor	Evaporated Vapor	Aerosol Liquid	Total Stream	Liquid to Ground
51	[redacted]	[redacted]	0.000000	0.000000	[redacted]	0.000000
1			0.000000	0.000000		0.000000
2			0.000000	0.000000		0.000000
3			0.000000	0.000000		0.000000
4			0.000000	0.000000		0.000000
6			0.000000	0.000000		0.000000
18			0.000000	0.000000		0.000000
10			0.000000	0.000000		0.000000
	1.000000	1.000000	0.000000	0.000000	1.000000	0.000000

Attachment H

```
+-------------------------------------------------------------+
|                CANARY by Quest - Version 4.5                |
|             Momentum Jet Vapor Dispersion Model             |
|                    Case Name - HCC08t5h0                    |
|                  Wed Mar 08 16:04:16 2017                   |
|        Quest Consultants Inc., Norman, Oklahoma, USA        |
|       www.questconsult.com     canary@questconsult.com      |
|        telephone (405) 329-7475    fax (405) 329-7734       |
+-------------------------------------------------------------+
```

TITLE: HCU-Carson (proposed) - reactor effluent

concentration limits

concentration 3 (highest) = 30.000 ppm
concentration 2 (middle) = 30.000 ppm
concentration 1 (lowest) = 30.000 ppm

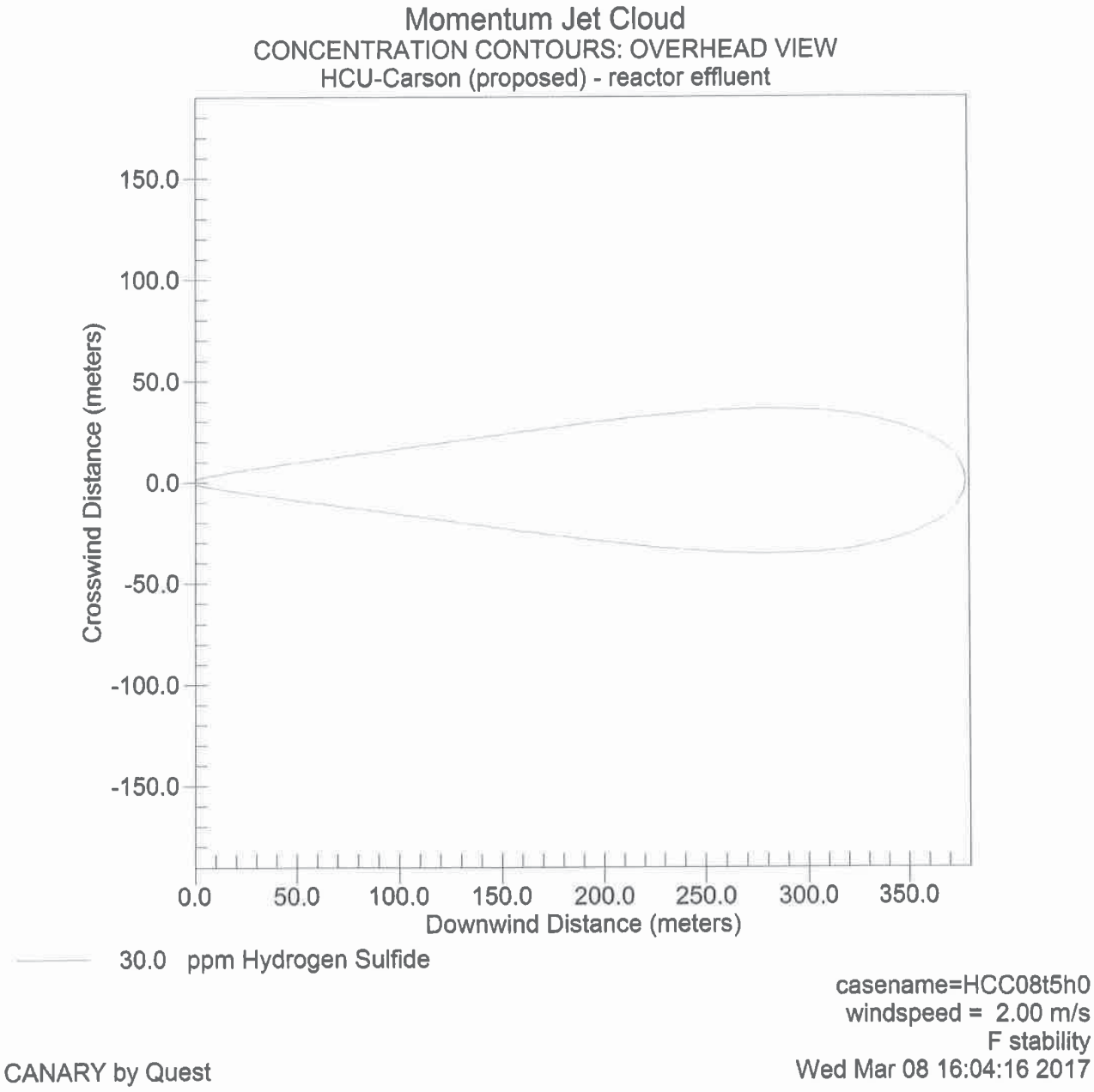
downwind distance x(m)	centerline conc. c(ppm)	ground conc. c(ppm)	y(c1) 1/2 width (m)	y(c2) 1/2 width (m)	y(c3) 1/2 width (m)	centerline height (m)
0	18100.000	0.000	1.1	1.1	1.1	1.1
5	5446.576	1334.753	2.3	2.3	2.3	1.1
10	3123.086	1664.360	3.3	3.3	3.3	1.1
15	2189.617	1520.140	4.2	4.2	4.2	1.1
20	1690.988	1322.410	5.0	5.0	5.0	1.1
25	1377.595	1147.150	5.8	5.8	5.8	1.2
30	1161.341	1003.869	6.5	6.5	6.5	1.2
35	1002.698	886.244	7.2	7.2	7.2	1.3
40	881.219	789.672	7.9	7.9	7.9	1.4
45	785.186	709.659	8.7	8.7	8.7	1.5
50	706.824	642.329	9.3	9.3	9.3	1.6
55	641.869	583.564	10.0	10.0	10.0	1.7
60	586.326	533.442	10.7	10.7	10.7	1.9
65	538.795	489.423	11.4	11.4	11.4	2.0
70	497.831	450.813	12.1	12.1	12.1	2.2
75	461.543	416.293	12.8	12.8	12.8	2.4
80	429.503	385.376	13.4	13.4	13.4	2.7
85	400.944	357.604	14.1	14.1	14.1	2.9
90	374.946	332.200	14.8	14.8	14.8	3.2
95	351.934	309.543	15.5	15.5	15.5	3.5
100	330.381	288.292	16.2	16.2	16.2	3.8
105	310.732	268.943	16.9	16.9	16.9	4.1
110	293.171	251.514	17.6	17.6	17.6	4.5
115	276.716	235.364	18.3	18.3	18.3	4.9
120	261.389	220.306	19.0	19.0	19.0	5.2
125	247.485	206.802	19.7	19.7	19.7	5.7
130	234.824	194.497	20.4	20.4	20.4	6.1
135	222.246	182.533	21.1	21.1	21.1	6.5
140	210.901	171.910	21.8	21.8	21.8	7.0
145	200.213	162.194	22.5	22.5	22.5	7.4
150	190.593	153.459	23.2	23.2	23.2	7.9
155	181.217	145.146	23.9	23.9	23.9	8.4
160	172.458	137.411	24.6	24.6	24.6	8.9
165	164.451	130.361	25.2	25.2	25.2	9.3
170	156.923	123.910	25.9	25.9	25.9	9.8

Attachment H

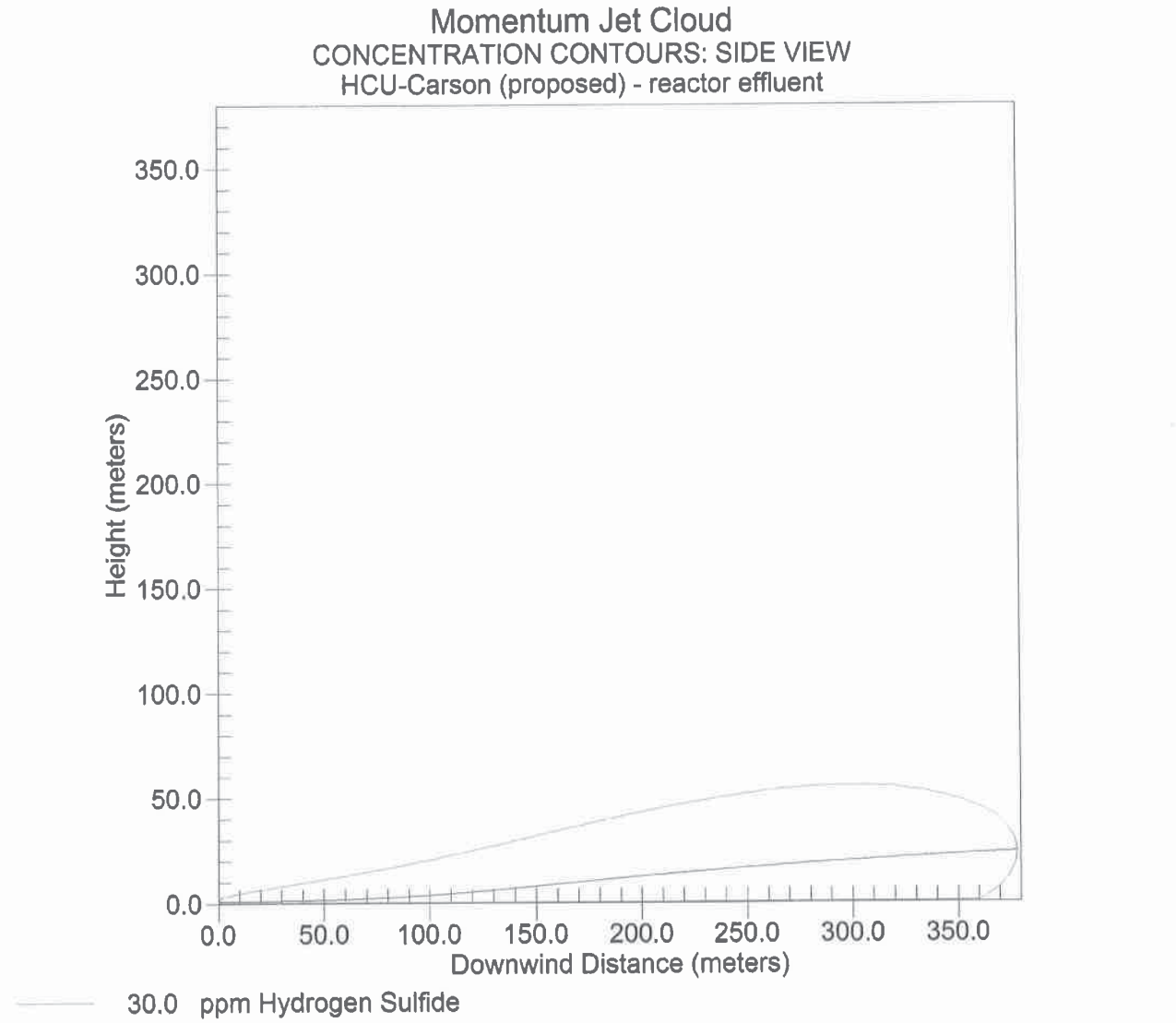
downwind distance x (m)	centerline conc. c (ppm)	ground conc. c (ppm)	y(c1) 1/2 width (m)	y(c2) 1/2 width (m)	y(c3) 1/2 width (m)	centerline height (m)
175	150.161	118.227	26.6	26.6	26.6	10.3
180	143.205	112.508	27.3	27.3	27.3	10.7
185	136.831	107.324	27.9	27.9	27.9	11.2
190	130.899	102.585	28.5	28.5	28.5	11.6
195	125.368	98.244	29.2	29.2	29.2	12.0
200	120.202	94.218	29.8	29.8	29.8	12.5
205	115.178	90.337	30.4	30.4	30.4	12.9
210	110.398	86.713	30.9	30.9	30.9	13.3
215	105.744	83.175	31.5	31.5	31.5	13.7
220	101.471	79.964	32.0	32.0	32.0	14.1
225	97.460	76.962	32.5	32.5	32.5	14.6
230	93.618	74.115	33.0	33.0	33.0	14.9
235	90.100	71.515	33.4	33.4	33.4	15.3
240	86.594	68.927	33.9	33.9	33.9	15.7
245	83.263	66.464	34.2	34.2	34.2	16.1
250	80.124	64.151	34.6	34.6	34.6	16.5
255	77.161	61.968	34.9	34.9	34.9	16.8
260	74.362	59.922	35.2	35.2	35.2	17.2
265	71.687	57.950	35.4	35.4	35.4	17.5
270	69.161	56.093	35.7	35.7	35.7	17.9
275	66.744	54.319	35.8	35.8	35.8	18.2
280	64.118	52.349	35.8	35.8	35.8	18.5
285	61.556	50.427	35.8	35.8	35.8	18.8
290	59.184	48.650	35.7	35.7	35.7	19.2
295	56.908	46.936	35.5	35.5	35.5	19.5
300	54.776	45.330	35.3	35.3	35.3	19.8
305	52.758	43.804	35.0	35.0	35.0	20.1
310	50.845	42.354	34.6	34.6	34.6	20.4
315	49.002	40.955	34.1	34.1	34.1	20.6
320	47.243	39.607	33.6	33.6	33.6	20.9
325	45.352	38.145	32.8	32.8	32.8	21.2
330	43.547	36.739	31.8	31.8	31.8	21.5
335	41.870	35.432	30.7	30.7	30.7	21.7
340	40.236	34.154	29.4	29.4	29.4	22.0
345	38.718	32.964	28.0	28.0	28.0	22.3
350	37.278	31.829	26.4	26.4	26.4	22.5
355	35.910	30.750	24.5	24.5	24.5	22.7
360	34.611	29.720	22.2	22.2	22.2	23.0
365	33.376	28.738	19.6	19.6	19.6	23.2
370	32.200	27.799	16.3	16.3	16.3	23.4
375	30.895	26.745	10.2	10.2	10.2	23.7
380	29.651	25.734	0.0	0.0	0.0	23.9

The downwind distance to c3 is 378.57 m after about 33 seconds
The downwind distance to c2 is 378.57 m after about 33 seconds
The downwind distance to c1 is 378.57 m after about 33 seconds

Attachment H



Attachment H



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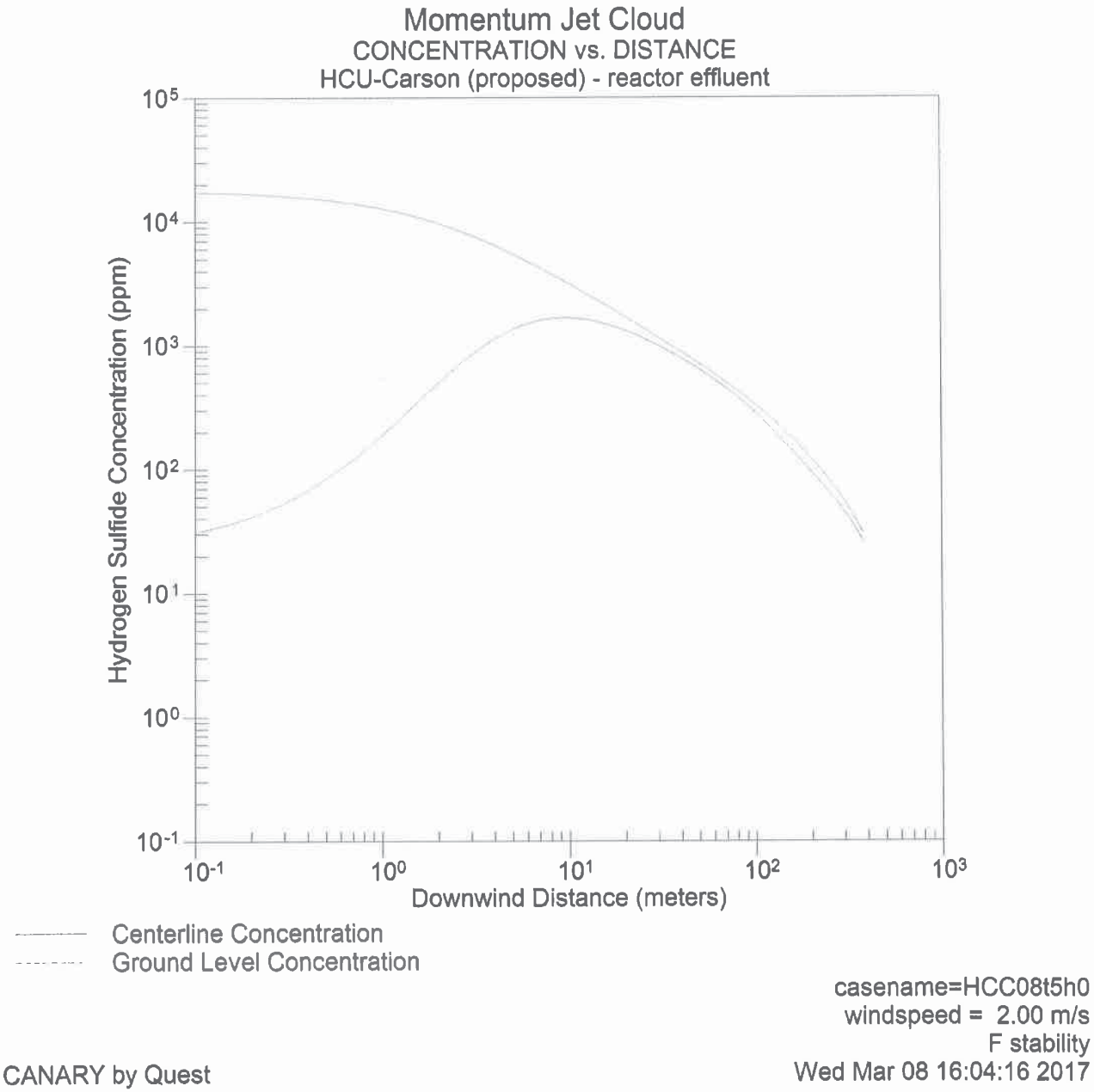

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ATTACHMENT I

SIMMONS ENERGY CONFERENCE SLIDES

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Transformation through Distinctive Performance

Simmons Energy Conference

February 27, 2014

Forward Looking Statements

- This Presentation includes forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. These statements relate to, among other things:
  - The execution and effects of our strategic priorities, including achieving improvements in operational efficiency and effectiveness including safety performance, developing commercial excellence, and maintaining financial discipline and a high performing culture;
  - The market outlook, including expectations regarding crude oil production growth, feedstock costs, differentials, spreads, import and export opportunities, the Tesoro index and the anticipated costs of crude movements;
  - The timing, value and type of expected synergies from our acquisition of BP's Southern California refining and marketing business in June 2013 and the capital expenditures needed to realize such synergies, as well as our California emissions and the impact of the California regulatory environment;
  - Tesoro's competitive position and competitive advantages, including its advantaged feedstock position, the costs, benefits and timing of projects designed to enhance gross margin capture, earnings diversification and marking optimization through brand expansion and growth;
  - West Coast logistics development, transportation advantages and refining system opportunities;
  - The timing and results of Tesoro's disciplined improvement program;
  - The results of Tesoro's logistics growth strategy, including plans for Tesoro Logistics LP ("TLLP"), the potential value of possible future asset sales to TLLP, TLLP's organic growth opportunities, the value to Tesoro of distributions from TLLP, the implied enterprise value of TLLP and the value of Tesoro's stake in TLLP;
  - Maintenance of Tesoro's financial priorities, including balance sheet strength, Tesoro's target debt capitalization, and TLLP's target debt to EBITDA level;
  - Capital expenditures, turnaround spending, and the cost, timing and return on capital projects, including expectations regarding incremental EBITDA improvements;
  - Expectations regarding free cash flow, the implementation of Tesoro's cash strategy and the return of excess cash flow to shareholders through dividends and share repurchases; and
  - Growth opportunities for both Tesoro and TLLP.
- We have used the words "anticipate", "believe", "could", "estimate", "expect", "intend", "may", "plan", "predict", "project", "should", "will" and similar terms and phrases to identify forward-looking statements in this Presentation.
- Although we believe the assumptions upon which these forward-looking statements are based are reasonable, any of these assumptions could prove to be inaccurate and the forward-looking statements based on these assumptions could be incorrect. Our operations and anticipated transactions involve risks and uncertainties, many of which are outside our control, and any one of which, or a combination of which, could materially affect our results of operations and whether the forward-looking statements ultimately prove to be correct.
- Actual results and trends in the future may differ materially from those suggested or implied by the forward-looking statements depending on a variety of factors which are described in greater detail in our filings with the SEC. All future written and oral forward-looking statements attributable to us or persons acting on our behalf are expressly qualified in their entirety by the previous statements. We undertake no obligation to update any information contained herein or to publicly release the results of any revisions to any forward-looking statements that may be made to reflect events or circumstances that occur, or that we become aware of, after the date of this Presentation.
- We have included various estimates of EBITDA and free cash flow, each of which are non-GAAP financial measures, throughout the presentation. Please see Appendix for the definition and reconciliation of these EBITDA and free cash flow estimates.

Tesoro

Key Metrics	2010	2013
Enterprise Value ($ billions)	3.5	10.5
Market Cap ($ billions)	2.0	7.7
Refining Capacity (MBD)	665	850
Refining Complexity	9.8	11.5
Branded Retail Stations	880	2,264
Marketing Integration (%)	53	87
Employees	5,300	7,000
Retail Sales (4Q13 MBD)	87	266

As of 3/31/10 and 12/31/2013

Tesoro Logistics LP

	Key Metrics
Enterprise Value ($ billions)	4.0
Market Cap ($ billions)	2.9
Crude Oil and Refined Product Pipelines	1,570 miles
High Plains Pipeline Throughput	90+ MBD
High Plains Trucking Volume	45 MBD
Marketing Terminal Capacity	636 MBD
Marine Terminal Capacity	795 MBD
Rail Terminal Capacity	50 MBD
Dedicated Storage Capacity	7,700 MBBLS

As of 12/31/2013

TLLP growing rapidly into a premier Western US logistics provider

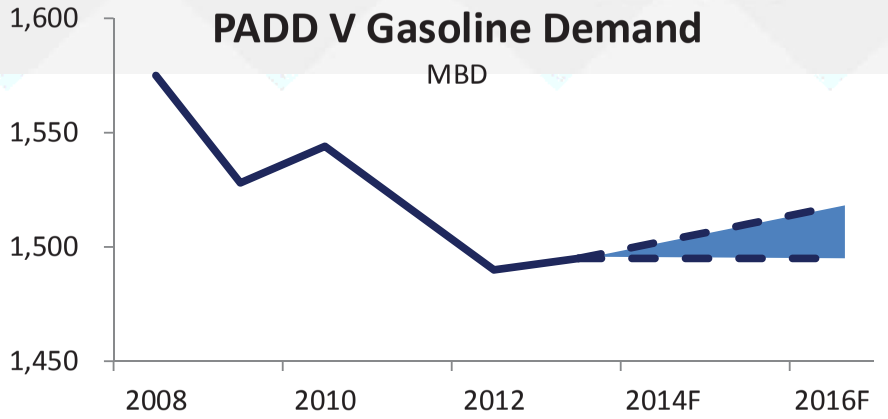
Market Outlook - Overview

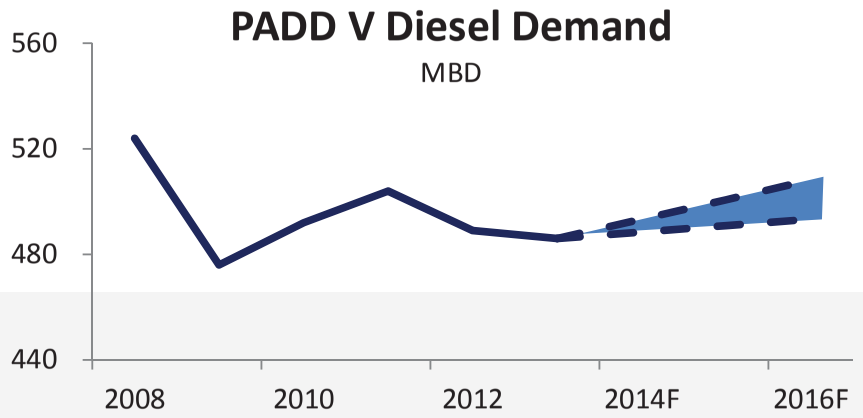
Key Drivers	Tesoro's View
Global Economic Outlook	Moderate growth
U.S. Economic Outlook	2 – 2.5% GDP growth
Global Refining Capacity	Capacity exceeds demand
U.S. Refining Utilization	High due to low feedstock and natural gas prices
U.S. Crude Oil Supply	Strong growth in North American crude oil production
World Product Demand Growth	Gasoline ~1%; diesel ~2% per year
U.S. Product Demand Growth	Gasoline flat; diesel ~1% per year
U.S. Product Exports	Strong and growing supported by U.S. competitive position
Renewable Fuel Growth	Delays in development of advanced fuels
Regulatory Environment	Challenges and uncertainty

Source: Internal Tesoro estimates.

PADD V Fundamentals

- Gasoline demand expected to grow 0 to 0.5% annually through 2016
- Diesel demand expected to grow 1.0% annually
- Net clean product exports expected to remain 100-150 MBD
- California unemployment 8.7%, down from over 10% last year
- Tesoro's gasoline refining production is highly integrated with marketing





West Coast economy improved and demand stabilizing

Source: EIA monthly data, forecast based on internal Tesoro forecasts.

Keys to Distinction on the West Coast

- Operating cost advantage
- Flexible yield structure
- Access to cost-advantaged crude oil
- Integrated logistics infrastructure
- Secure and ratable refinery off-take
- Cost-advantaged regulatory compliance

Los Angeles acquisition transforms our capabilities

Strategic Priorities

- Operational efficiency and effectiveness
  - Safety and reliability
  - Cost leadership
  - System improvements
- Commercial excellence
- Financial discipline
- Value-driven growth
- High performing culture

Enduring commitment to execution

Execution of Strategic Priorities

Distinctive Performance: 2014 and 2015

- Deliver California synergies
- Enhance gross margin
- Improve the base
- Grow logistics
- Maintain financial discipline

Targeting $370 to $430 million of EBITDA improvements in 2014

Distinctive Performance Objectives

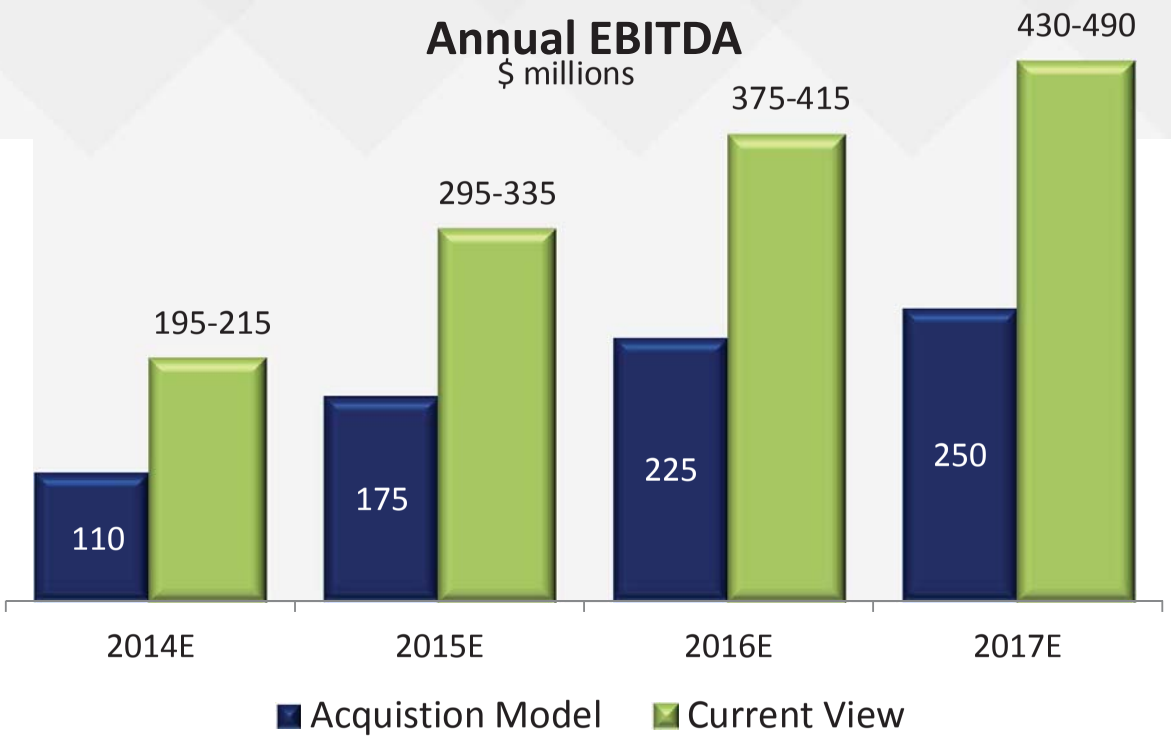
- Distinctive Performance Objectives

$ million	2014	2015
Deliver California Synergies	160 – 180	260 – 300
Enhance gross margin	140 – 160	250 – 290
Improve the base	70 – 90	80 – 120
Annual EBITDA Improvement[1]	**370 – 430**	**590 – 710**

- Grow logistics
  - Grow EBITDA by $200 million by 2015
  - Deliver incremental Tesoro shareholder value of $1 billion
- Maintain financial discipline
  - Maintain balance sheet strength, drive toward investment grade
  - Invest free cash flow in high-return capital projects
  - Return excess cash to shareholders

1) Improvements over 2013 results.

California Synergy EBITDA

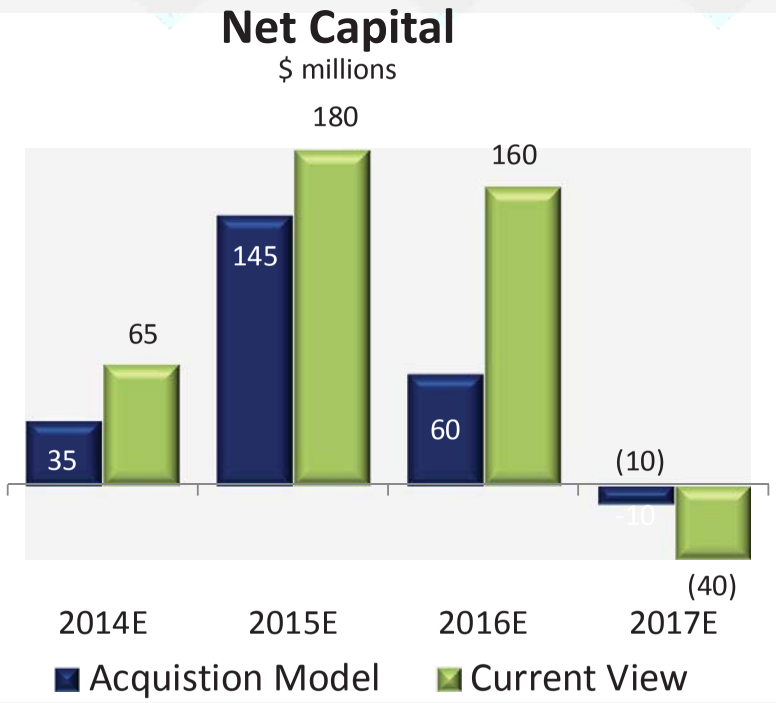


- Feedstock Advantage
- Logistics Optimization
- Production Optimization
- Operating Cost Improvements

Synergy value and pace of capture significantly improved

California Synergy Capital Expenditures

- **Los Angeles Refinery Integration Project**
  - Optimizes processing capability
  - Provides 30-40 MBD product flexibility
  - Reduces CO2 emission 500,000 tons per year
- **Logistics Projects**
  - Link logistics assets
  - Reduce third party fees
  - Provides feedstock and product optionality
- **Processing Projects**
  - Strengthen conversion capability
  - Provides feedstock flexibility
  - Improves product yields



Disciplined delivery of high return capital investments

Note: Net synergy capital of ~$375 MM (including savings beyond 2017, which are reflected in 2017E), capital plan net of capital avoidance, 2017 emissions estimate is subject to final project scope and detailed engineering.

Tesoro's Advantaged Feedstock Opportunity

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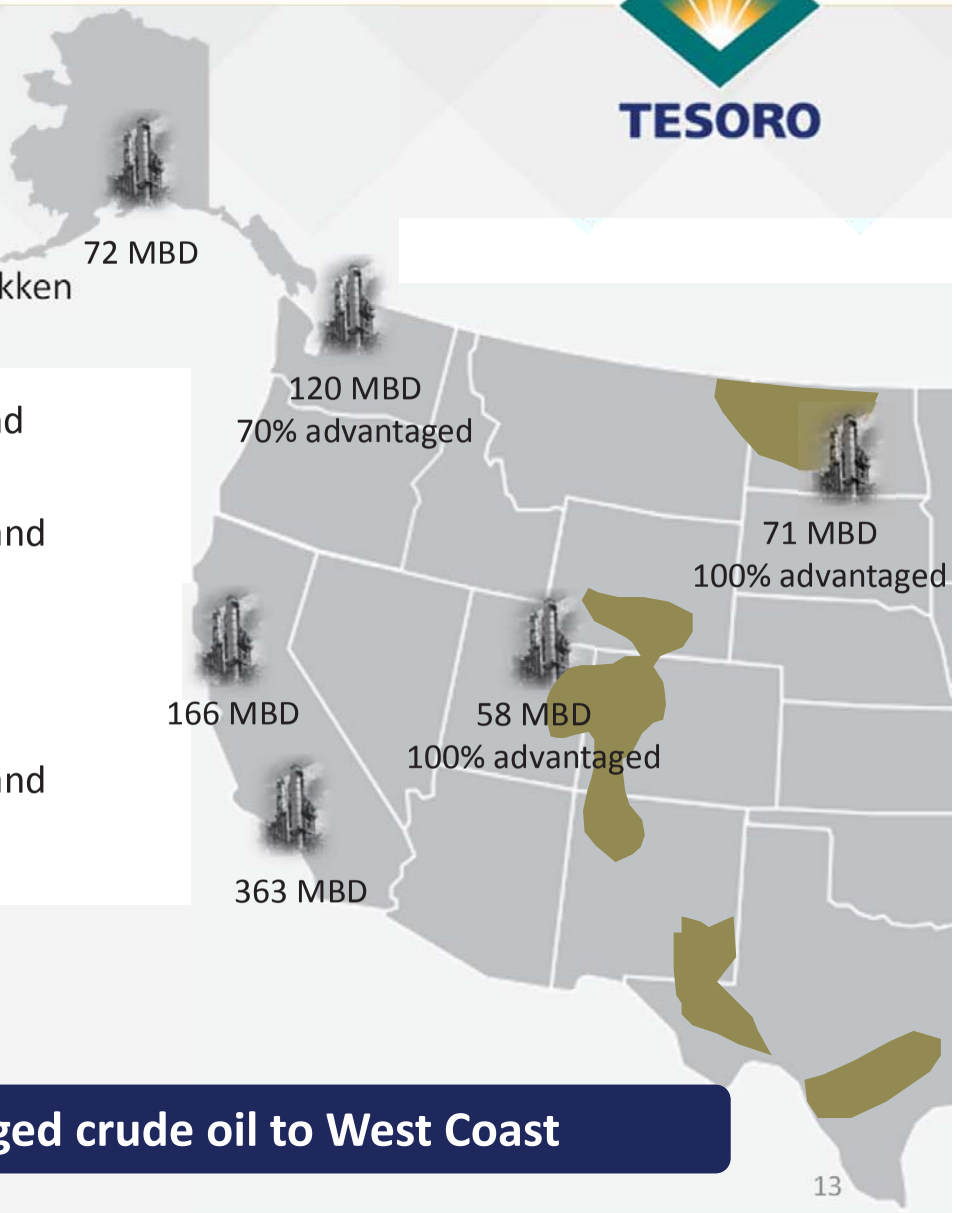
Opportunities by Refinery

- **Kenai**
  - Currently up to 25% Cook Inlet
  - Potentially up to 67% Cook Inlet and Bakken
- **Martinez**
  - Currently up to 45% California Heavy and Bakken
  - Potentially up to 67% California Heavy and Bakken
- **Los Angeles**
  - Currently up to 15% California Heavy
  - Potentially up to 50% California Heavy and Bakken

Potential impact on ANS crude oil

- Competitive pricing
- Relative refining value



Extending the advantaged crude oil to West Coast

13

Crude Oil Production Growth

Key Tesoro Markets

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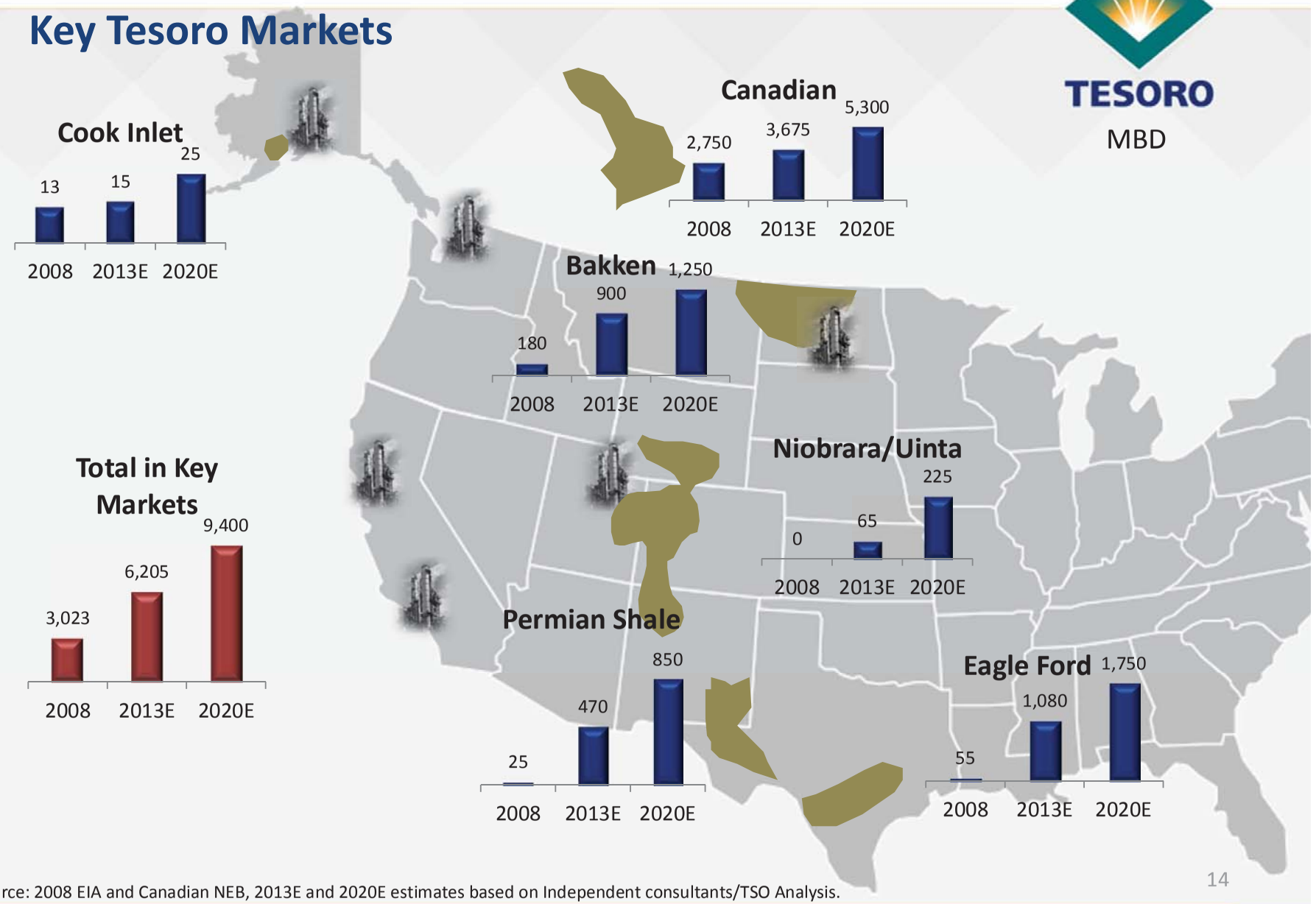
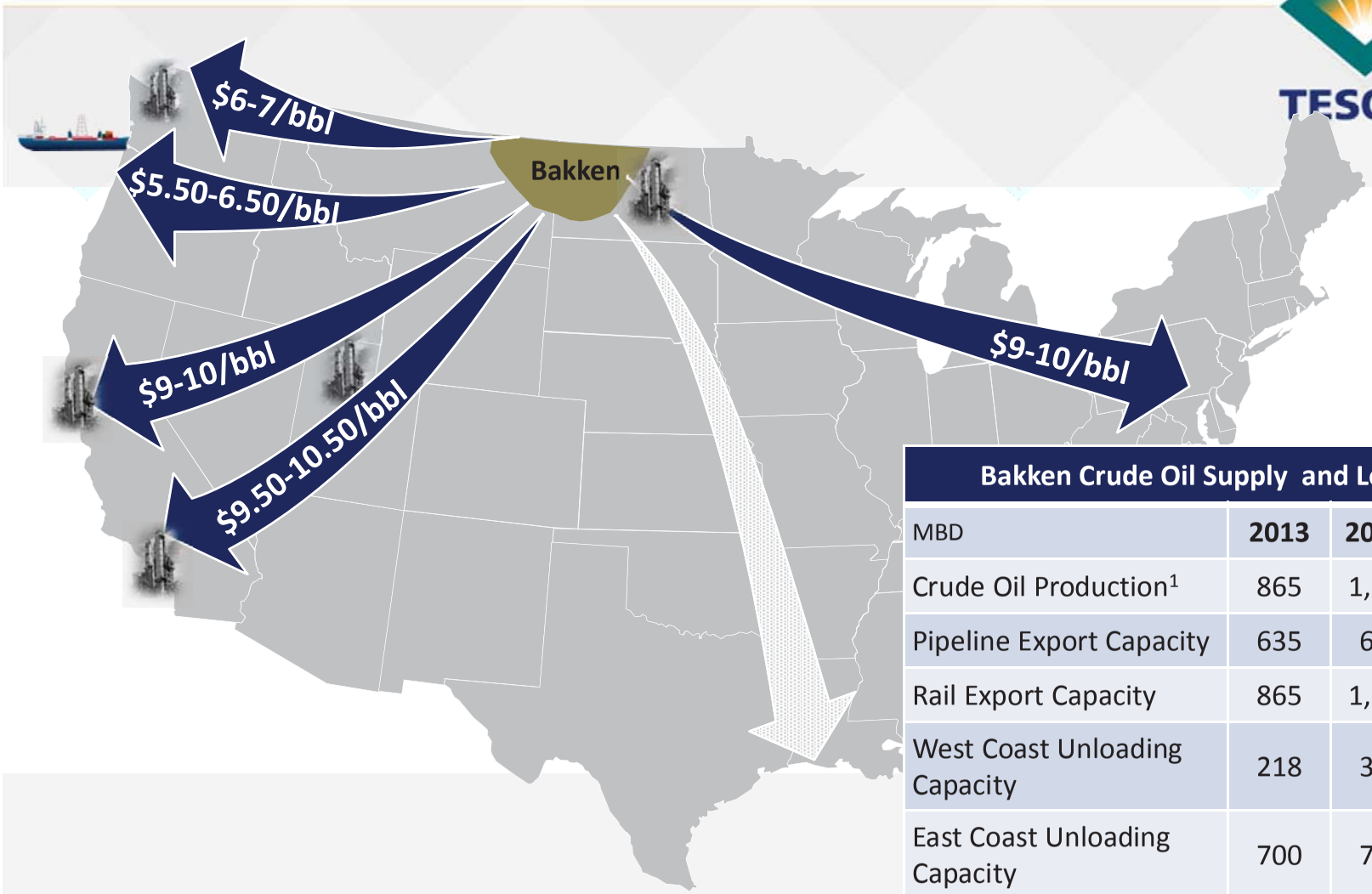
MBD



Source: 2008 EIA and Canadian NEB, 2013E and 2020E estimates based on Independent consultants/TSO Analysis.

Rail Costs to Clear Bakken



Bakken Crude Oil Supply and Logistics			
MBD	2013	2014E	2015E
Crude Oil Production[1]	865	1,000	1,200
Pipeline Export Capacity	635	685	685
Rail Export Capacity	865	1,015	1,015
West Coast Unloading Capacity	218	395	910
East Coast Unloading Capacity	700	780	780

West and East Coasts clearing destinations for Bakken crude oil

Note: Rail cost estimates include only the railroad tariff.

1) Average annual crude oil production, export capacity and price discount estimates based on industry consultant and Tesoro market outlook.

Anacortes Yield Comparison

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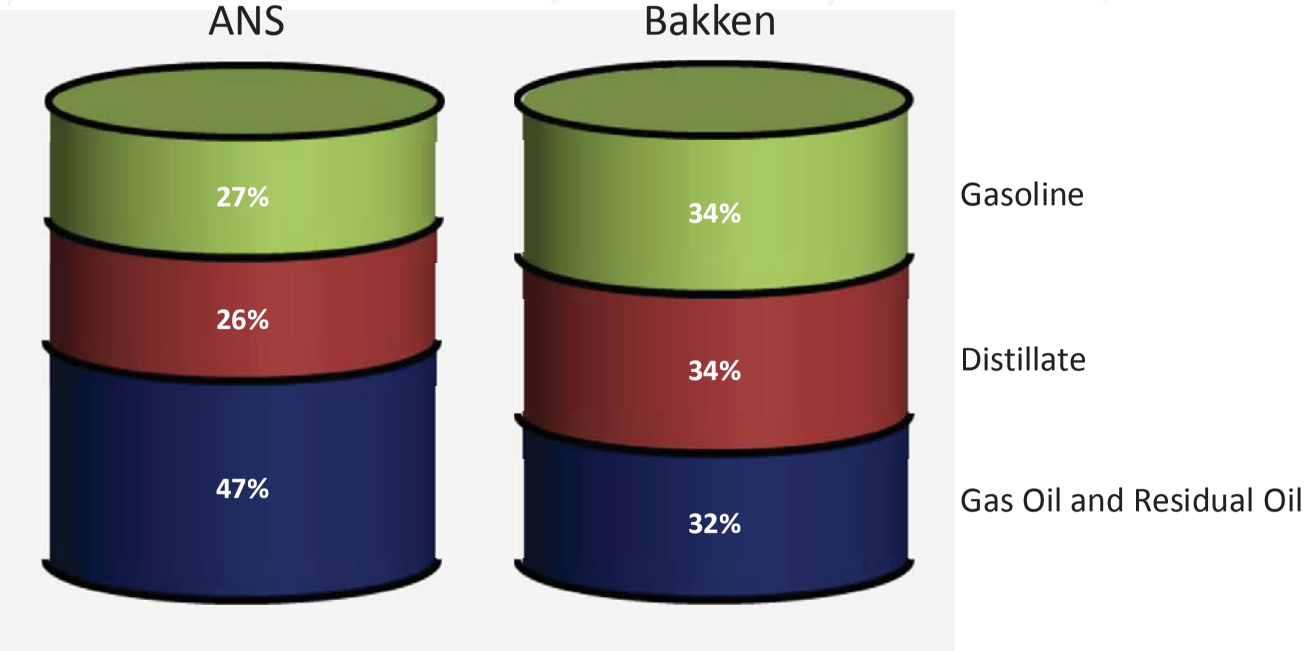
Crude Oil Yields



Bakken crude oil yields 14% to 16% more gasoline and distillate than ANS

Port of Vancouver

- Up to 300 MBD Rail-to-Marine Terminal
  - Joint venture with Savage Companies
- Port of Vancouver advantages
  - Flexibility to deliver to all West Coast refineries
  - Competitive with direct rail cost to California
  - Existing rail and marine infrastructure
- Port of Vancouver granted lease 3Q13

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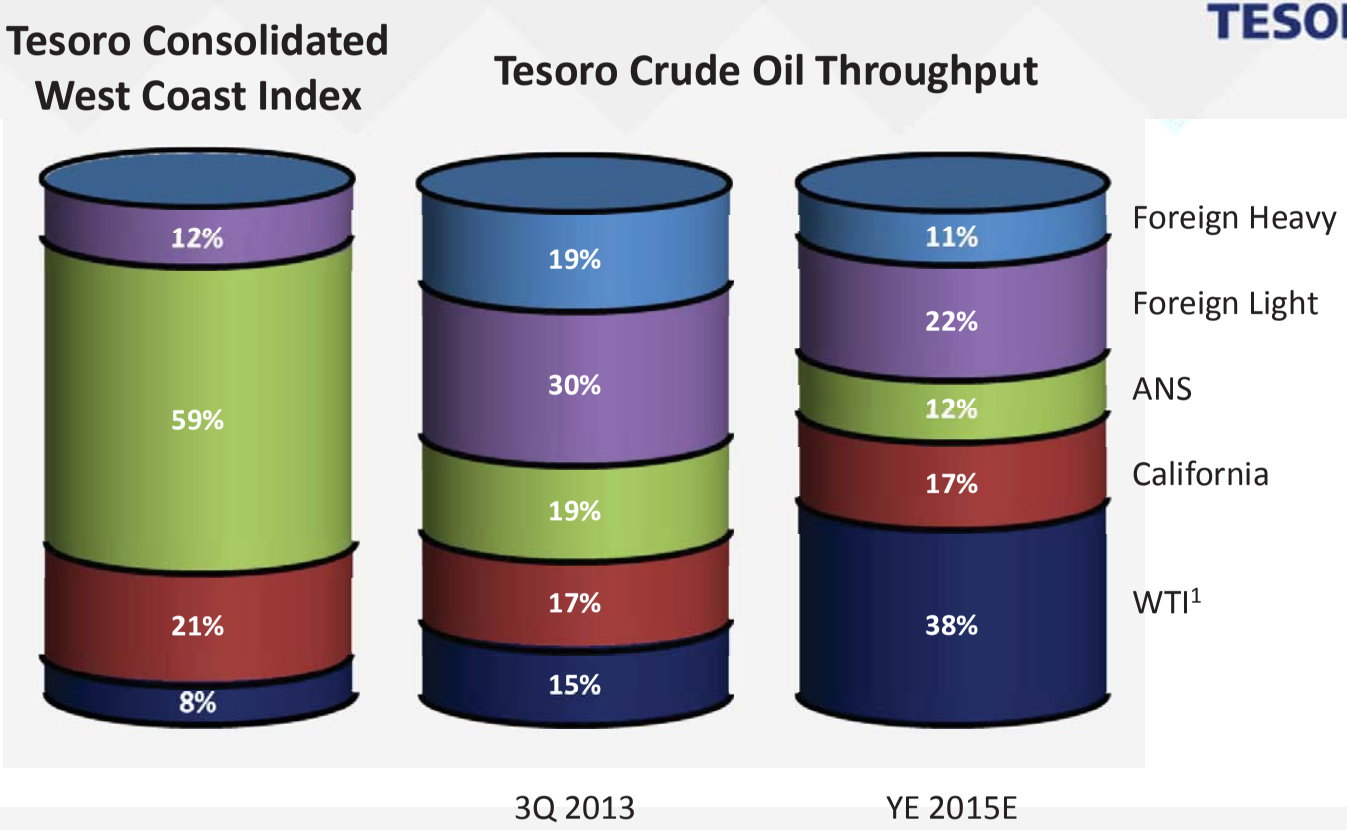
	Completed Facility
Capacity	Up to 300 MBD
Estimated Completion	4Q14 – 4Q15
Tesoro Initial Committed Capacity	60 MBD

A premier advantaged crude oil facility for the West Coast

West Coast Refining System Opportunity



Advantage crude oil strategy enhances realized margins

1) WTI crude oil includes all grades of N. American crude oil other than those stated in other categories.

Marketing Brands

- Deploy a premium and value branding strategy within each region
- New brands allow for site optimization and conversion
- Leverage Shell®, Exxon® and Mobil® premium brand value to improve marketing channels
- Leverage ARCO®, Tesoro and USA value brand proposition to drive high utilization

Emphasis on growing ARCO®, Shell®, Exxon® and Mobil® outlets

Solomon Based Cost Reductions

Total Operating Expense Gap (Non-energy)[1]

$/bbl	2010	2011	2012
California	1.70	1.10	0.85
Pacific Northwest	NA	0.05	0.30
Mid-Continent	0.30	0.15	1.10
Weighted Average	**1.15**	**0.55**	**0.75**

- Captured cost improvements in California, opportunities remain
- Mid-Continent performance reflects increased spending to strengthen long-term reliability
- Maintenance, personnel efficiency and improved reliability driving per barrel operating cost improvement

Targeting first tercile cost position in California

1) Versus Solomon Refinery Supply Corridor (RSC) 1st tercile, Pacific Northwest adjusted in 2010 and 2011 to exclude the impact of the Anacortes incident.

TLLP Strategic Drivers

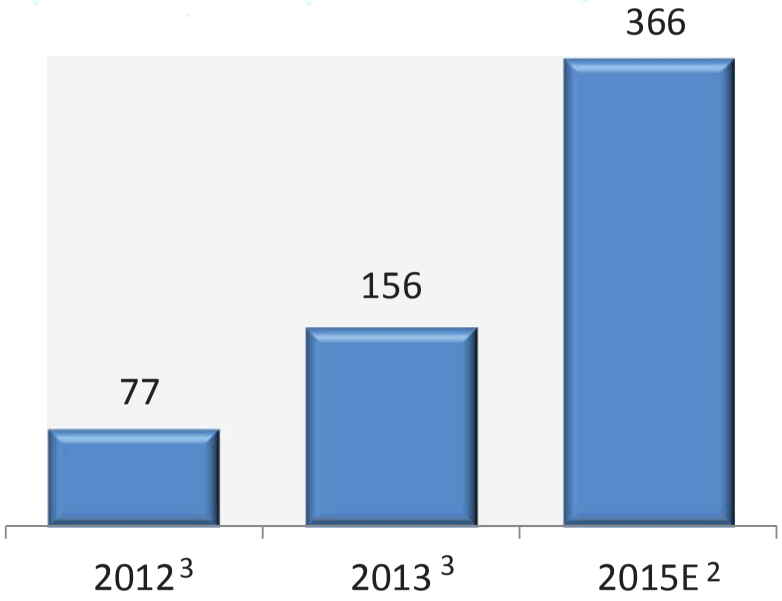
Focus on Stable, Fee-Based Business	▪ Fee-based committed businesses ▪ Maintain stable cash flow
Optimize Existing Asset Base	▪ Increase third-party volumes ▪ Consolidate Tesoro business into TLLP terminals
Pursue Organic Expansion Opportunities	▪ Execute growth projects ▪ Leverage low cost of capital
Grow Through Strategic Acquisitions	▪ Pursue acquisitions that fit Western-US footprint ▪ Strategic partner in Tesoro's growth plan

Increase EBITDA and cash distributions through fee-based logistics business model

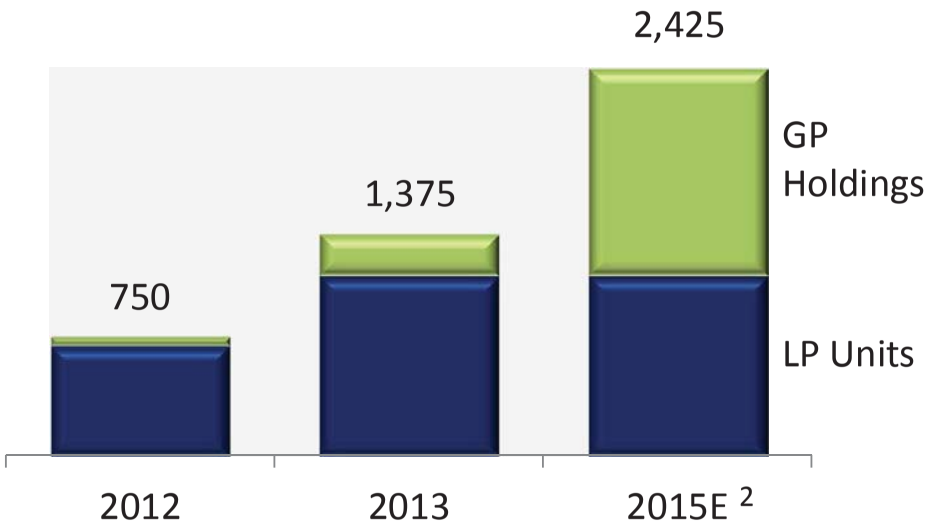
TLLP Value Proposition to Tesoro

$ millions

TLLP EBITDA



Tesoro's Implied Value of TLLP Ownership[1]



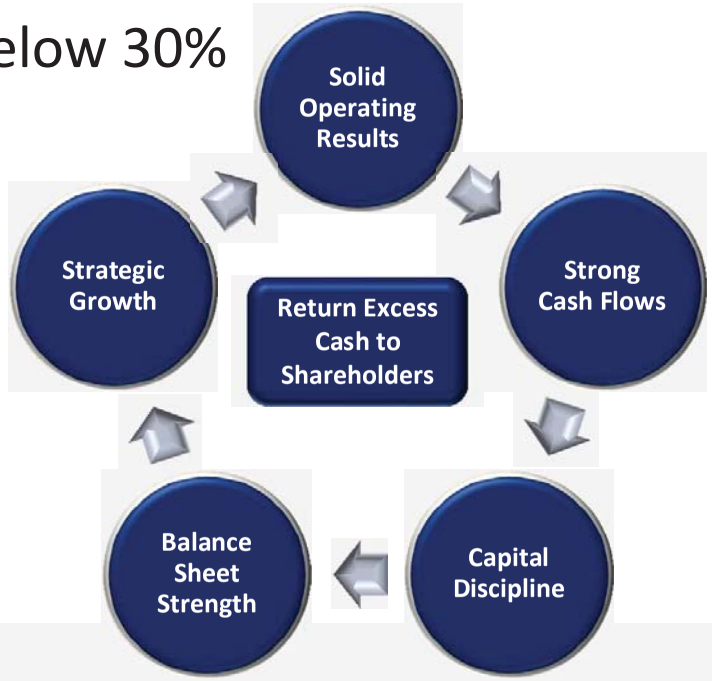
Implied value per Tesoro share	$5.50	$10.47	$17.20

TLLP's growth drives significant Tesoro shareholder value creation

1) TSO Market Cap as of 2/19/14, LP value based on market price, GP value based on 20X distributions.
2) Estimates based on TLLP first call consensus EBITDA figures as of 12/31/13.
3) Adjusted EBITDA, excludes predecessor results

Financial Priorities

- Maintain a minimum cash balance of $600 to $800 million
- Target TSO debt to capitalization[1] below 30%
- Target TLLP debt at 3x to 4x EBITDA
- Invest in growth opportunities to drive further value creation
- Return excess cash to shareholders
- Drive towards investment-grade credit rating



1) Excluding TLLP debt and equity.

Appropriate Leverage for Growth

$ millions	TSO[1]	TLLP[1]	Consolidated
Total Debt	1,665	1,164	2,829
Total Equity	4,302	1,183[3]	5,485
Debt to Total Capitalization	**28%**	50%	34%
Total Debt to EBITDA[2]	0.8x	**4.1x**	1.4x

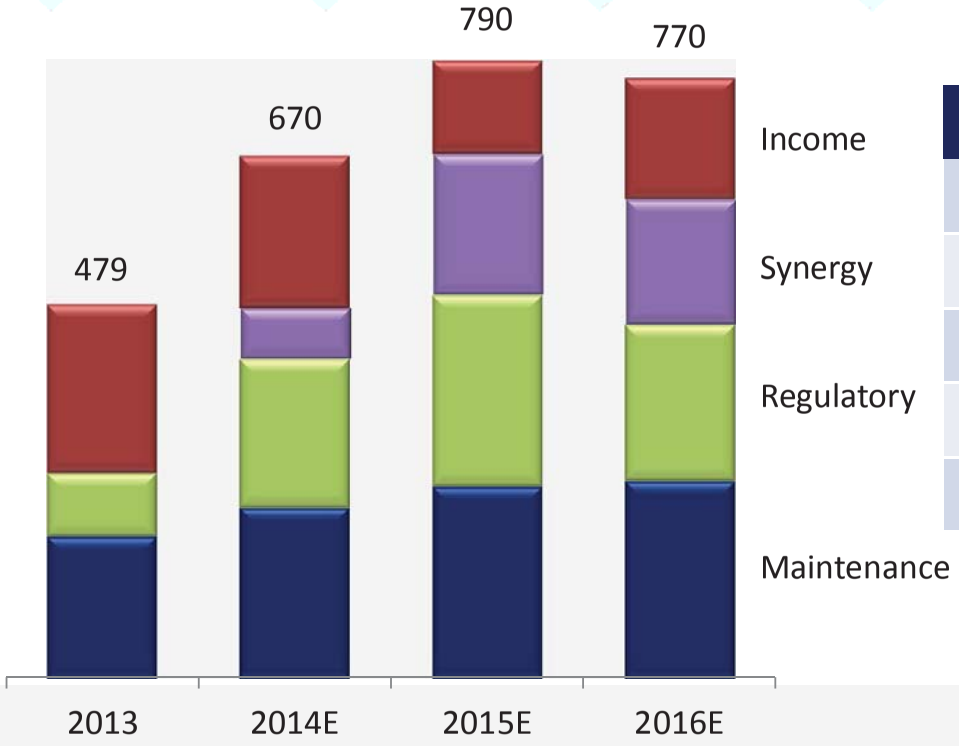
Tesoro leverage in target range less than 8 months after Los Angeles acquisition

1) As of December 31, 2013
2) EBITDA forecast based on latest 2014 consensus analyst research estimates of $2.0 billion for TSO and $287 million for TLLP
3) Represents non-controlling interest as of December 31, 2013

Summary Capital Spending

Tesoro Capital Spending[1]

$ in millions



Summary Capital Expenditures

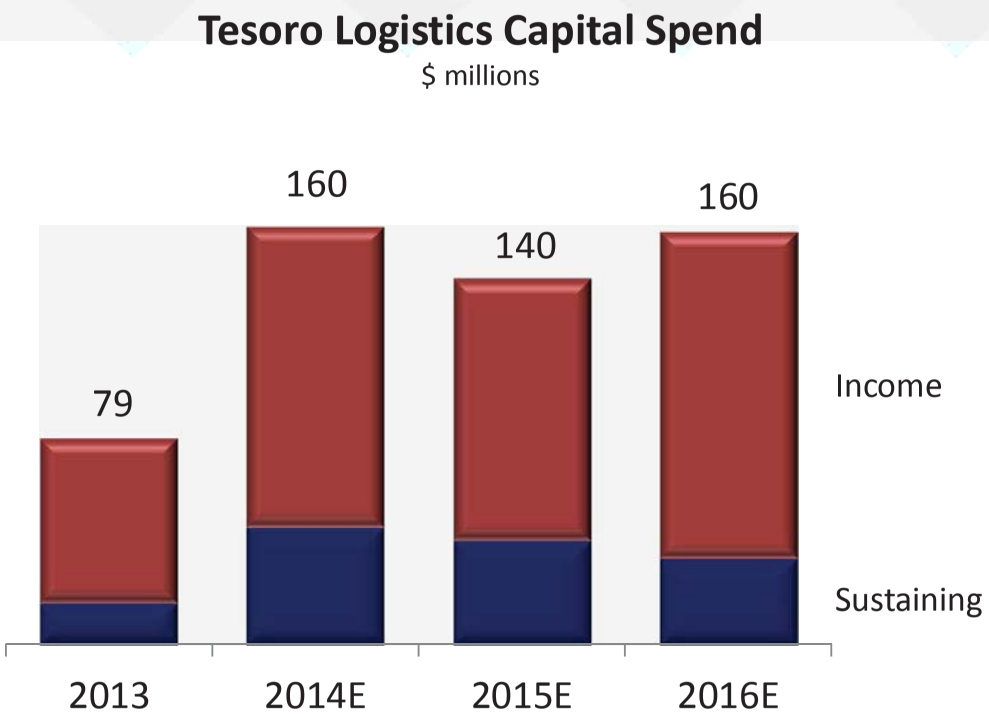
$ millions	2013	2014E	2015E	2016E
Maintenance	182	220	245	255
Regulatory	81	190	245	200
Synergy[2]	0	65	180	160
Income	216	195	120	155
Total	**479**	**670**	**790**	**770**

Capital spending plans well supported by strong and growing EBITDA

1) Excludes self-funded TLLP capital expenditures. All references to capital spending on this page are estimated.
2) Net synergy capital.

TLLP Capital Spending

- TLLP plans to spend about $100 million per year on income projects
- Typical project return of 15-25%
- Pursing opportunities to expand gathering system
- TLLP self funds capital



Income capital expected to support significant organic growth

Note: Maintenance and regulatory capital before reimbursements. All references to capital spending on this page are estimated.

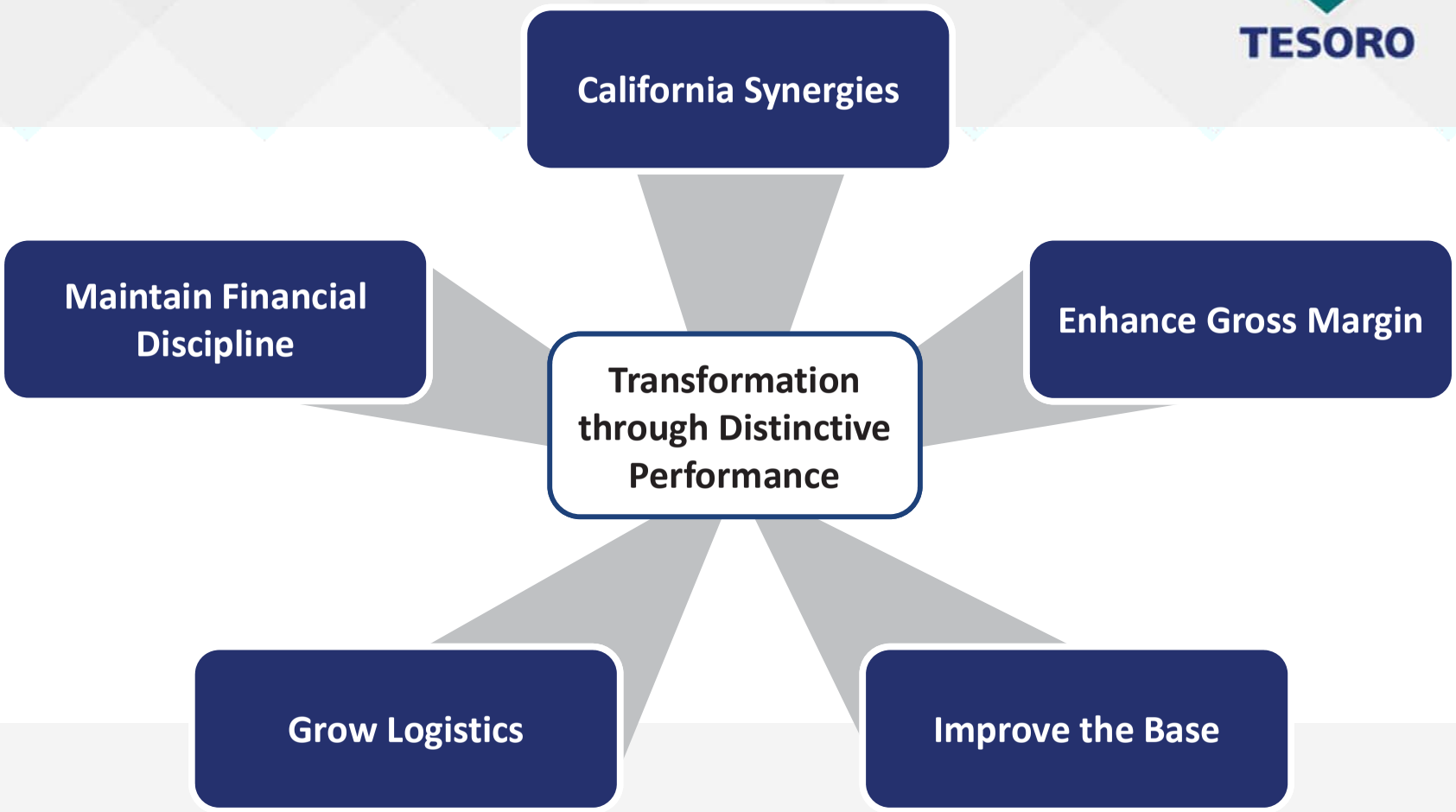
Delivering Free Cash Flow

- Expect to generate approximately $3.0 billion in free cash flow over next three years
- Before potential $1.5 billion of further logistics asset sales to TLLP
- Plan to spend less than a third on high-return income capital projects
- Tesoro well positioned for further growth and returning cash to shareholders

Strong financial position and significant free cash flow in 2014 and beyond

(1) Defined as EBITDA less cash interest and taxes, sustaining capital, turnaround spending and TLLP distributions. EBITDA estimates based on consensus analyst research estimates as of November 19, 2013 and incremental improvements in this presentation above base Los Angeles synergies announced at time of acquisition. Interest, taxes, sustaining capital, turnaround spending and TLLP distributions based on Tesoro's 2014 Business Plan.

Delivering Shareholder Value



Non-GAAP Financial Measures

EBITDA represents earnings before interest and financing costs, net, interest income, income taxes, and depreciation and amortization expense. We present EBITDA because we believe some investors and analysts use EBITDA to help analyze our cash flows including our ability to satisfy principal and interest obligations with respect to our indebtedness and to use cash for other purposes, including capital expenditures. EBITDA is also used by some investors and analysts to analyze and compare companies on the basis of operating performance and by management for internal analysis. EBITDA should not be considered as an alternative to net earnings, earnings before income taxes, cash flows from operating activities or any other measure of financial performance presented in accordance with accounting principles generally accepted in the United States of America. EBITDA may not be comparable to similarly titled measures used by other entities.

(In millions) Unaudited	California Synergy EBITDA - Acquisition Model			
	2014E	2015E	2016E	2017E
Projected net earnings	$ 67	$ 104	$ 133	$ 149
Add income tax expense	41	63	82	91
Add depreciation and amortization expense	2	8	10	10
EBITDA [(1)]	$ 110	$ 175	$ 225	$ 250

(In millions) Unaudited	California Synergy EBITDA - Current View			
	2014E	2015E	2016E	2017E
Projected net earnings	$ 127	$ 193	$ 239	$ 280
Add income tax expense	75	113	141	165
Add depreciation and amortization expense	3	9	15	15
EBITDA [(1)]	$ 205	$ 315	$ 395	$ 460

(1) When a range of estimated EBITDA has been disclosed and/or previously disclosed, we have included the EBITDA reconciliation for the mid-point range.

Non-GAAP Financial Measures

(In millions) Unaudited	Gross Margin Capture Improvements EBITDA	
	2014E	2015E
Projected net earnings	$ 88	$ 163
Add income tax expense	51	96
Add depreciation and amortization expense	11	11
EBITDA [(1)]	$ 150	$ 270

(In millions) Unaudited	Improve the Base EBITDA	
	2014E	2015E
Projected net earnings	$ 50	$ 63
Add income tax expense	30	37
Add depreciation and amortization expense	0	0
EBITDA [(1)]	$ 80	$ 100

(In billions) Unaudited	Free Cash Flow Reconciliation		
	2014E	2015E	2016E
Net Cash Flow from Operating Activities	$ 1.5	$ 1.5	$ 1.8
Less Sustaining Capital	0.4	0.5	0.5
Less TLLP Distributions	0.1	0.1	0.2
Free Cash Flow	$ 1.0	$ 0.9	$ 1.1

(1) When a range of estimated EBITDA has been disclosed and/or previously disclosed, we have included the EBITDA reconciliation for the mid-point range.
(2) TLLP EBITDA is not representative of Tesoro consolidated EBITDA as intercompany transactions between TLLP and Tesoro are eliminated upon consolidation.

Non-GAAP Financial Measures

(In millions) Unaudited	TLLP EBITDA December 31, 2012 [2]		
	Tesoro Logistics LP (Partnership)	Predecessor	Total Tesoro Logistics LP
Net earnings	$ 57	$ (1)	$ 56
Add interest and financing costs, net	9	0	9
Add depreciation and amortization expense	11	2	13
EBITDA	$ 77	$ 1	$ 78

(In millions) Unaudited	TLLP EBITDA December 31, 2013 [2]		
	Tesoro Logistics LP (Partnership)	Predecessor	Total Tesoro Logistics LP
Net earnings	$ 80	$ (38)	$ 42
Add interest and financing costs, net	40	-	40
Add depreciation and amortization expense	37	6	43
Less interest income	(1)	-	(1)
EBITDA	$ 156	$ (32)	$ 124

(In millions) Unaudited	TLLP Projected EBITDA [2]
	2015E
Net earnings	$ 215
Add interest and financing costs, net	75
Add depreciation and amortization expense	76
EBITDA	$ 366

(1) When a range of estimated EBITDA has been disclosed and/or previously disclosed, we have included the EBITDA reconciliation for the mid-point range.
(2) TLLP EBITDA is not representative of Tesoro consolidated EBITDA as intercompany transactions between TLLP and Tesoro are eliminated upon consolidation.