

Attachment

Item 1



Primarily prepared and edited by
Tait Environmental Services, Inc.
In Cooperation with the
Contra Costa Health Services
Hazardous Materials Programs

HAZARDOUS MATERIALS COMMODITY FLOW STUDY WITH SPECIAL FOCUS ON SEA LEVEL RISE AND FLOOD RISK CONTRA COSTA COUNTY CALIFORNIA

Contra Costa Health Services
Hazardous Materials Programs
Tait Environmental Services, Inc.
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1.0 Introduction

The project consisted of the completion of an initial Hazardous Materials Commodities Flow Study (Flow Study), the results of which were utilized to prepare a Community Risk Assessment for Hazardous Materials (CRA) for Contra Costa Health Services, Hazardous Materials Programs (CCHSMP). The project was restricted to the coastal areas of the Contra Costa County in areas affected by rising tides.

1.1 Project Objectives

The proposed overall structure for the completion of the project covered two (2) distinct areas of focus. An initial Flow Study was completed, and the results of the Flow Study were utilized to prepare a CRA for the coastal areas of Contra Costa County. The objective of the Flow Study portion of this project was to determine the potential effects/consequences of a chemical spill on critical and vulnerable populations and facilities in the coastal cities of Contra Costa County. The primary focus of the Flow Study was to look at this with respect to rail transport of hazardous chemicals through the County, and particularly within areas of the county where the rail lines may be susceptible to rising tides and flooding risks from changes in our climate. Chemical data from industries in the County helped to determine what types of hazardous chemicals were being transported through the County via rail. Three chemicals of concern (COCs) were determined from the railroad data, and these chemicals (ammonia/anhydrous ammonia, propane, and sulfuric acid) were used in the plume analysis in the CRA portion of this report.

Utilization of this information allowed for the study to focus on and determine a series of vulnerable points ("pinch points"), primarily along the rail lines. Additional information used to locate the pinch points consisted of a review potential flooding due to rising tides, with information available from the Adapting to Rising Tides Program, locations of critical facilities and vulnerable populations, areas of high probability of liquefaction resulting from earthquakes, and specific arterial roads that could be affected by disruption of rail transport of hazardous materials. Once specific pinch points were located, a comprehensive CRA was performed to assess worst-case scenarios related to a COCs incident at these locations. The pinch points were not industry specific, as the focus was on the existing transportation infrastructure.

The objective of the CRA portion of the project was to utilize the data obtained from the Flow Study to determine the potential impacts of a hazardous materials accident/incident to the most vulnerable populations and critical facilities (vulnerability zones) within the hazardous materials transportation corridors in Contra Costa County. The data from the Flow Study and the CRA were somewhat overlapping and have been combined herein within a single comprehensive report with conclusions regarding projected trends in the transportation of hazardous materials through the county relative to projected sea level rise and flood risk, as well as provide guidance to the CCHSMP and Region II LEPC with respect to equipment and training to allow emergency responders to proactively respond to a hazardous materials accident/incident/disaster within coastal Contra Costa County.

1.2 Project Background

In November 2016, a two-year project sponsored by San Francisco Bay Conservation and Development Commission titled Adapting to Rising Tides (ART) was completed. The ART Program conducted a climate adaptation planning effort in Contra Costa County, which built understanding of projected risk due to sea level rise and developed planning objectives for the diverse challenges and opportunities presented by adapting to sea level rise in the County. This project included areas of the county that interface with the San Francisco Bay, which include areas extending from Richmond to Bay Point.

After the completion of the initial Contra Costa County Adapting to Rising Tides program, it was clear that the County must act to identify risks that exist within the shoreline, specifically in regard to hazardous materials. This project, titled Hazardous Materials Commodity Flow Study with Special Focus on Sea Level Rise and Flood Risk, was needed to foster a greater understanding on how major hazardous materials transportation, such as our rail system, can be impacted by sea level rise/flooding and how that can increase our risk for hazardous materials incidents that can affect the health and safety of our community. Understanding how transportation disruptions can impact the County-wide system will benefit hazardous materials emergency response planning and overall shoreline planning as the actions from the ART project are implemented.

This project will interface with the overall goals of the County's Hazardous Materials Programs. The CAER (Community Awareness Emergency Response) organization will be engaged to obtain collaboration with our industry partners in the County to get needed input and data regarding their current transportation contingency planning for flooding. This also will maximize the benefit of the project as well as maximize cooperation with needed resources. CCHS-HMP is currently participating in the Bay Area Wide Adapting to Rising Tides program, as a hazardous materials representative, along with Michael Kent the Hazardous Materials Ombudsman, as well as the East Contra Costa County program, which is slated to conclude at the end of 2019. With the conclusion of these additional ART programs, all areas of Contra Costa County will be addressed. Data from these additional programs, while not fully completed at the time of the Flow Study competition, have been utilized as part of the project analysis.

Goals of the project include identifying risks from hazardous materials release due to possible disruption of transportation due to sea level rise/flooding as predicted by the Adapting to Rising Tides program. Identifying these issues will help the County to better address and plan for hazardous materials releases in order to protect and promote health, safety, and wellbeing of Contra Costa residents.

The final project report will be published and made available for hazardous materials emergency planning as well as the Bay Area wide Adapting to Rising Tides program and other applicable transportation related planning.

2.0 Historical Information

Background historical information used in preparing both the Flow Study and CRA portions of this project was obtained from the following sources:

- Hazardous Materials Transportation Study for Contra Costa County, 2005; and
- Highway flow study data from Marin and Solano Counties.

2.1 Hazardous Materials Transportation Study 2005

A Hazardous Materials Transportation Study was performed on the County in 2004 and 2005. The reference for the study is as follows:

Contra Costa Health Services, Hazardous Materials Programs and California Department of Health Services, Environmental Health Investigations Branch, 2005, *Hazardous Materials Transportation Study for Contra Costa County, CA*, 71 p.

The study was a two-part investigation, which included a railroad transportation survey, and a highway transportation survey. Details of these surveys are outlined in the sections below.

2.1.1 Railroad Data

Two railroads are the primary transportation railroads in Contra Costa County, Union Pacific Railroad (UP), and Burlington Northern and Santa Fe Railway (BNSF). Railway data from UP covered the period from January through December 2004, and the data from BNSF covered the period from April 1, 2004 through March 31, 2005. Most of the hazardous materials loads were carried on the following rail segments:

- UP
 - Martinez-Davis
 - Martinez-Tracy
 - Oakland-Martinez
- BNSF
 - Richmond-Port Chicago
 - Port Chicago-Pittsburg
 - Pittsburg-Stockton

The data covering the maximum loads via any Contra Costa rail shipment is contained in Table 14 of the study, and is listed under the Standard Transportation Commodity Code (STCC), which is specific to rail transportation, and is shown below.

Table 14: Hazardous Materials by STCC number - Maximum Loads - any Contra Costa
Rail Segment *

STCC #	Description	Max Loads	STCC #	Description	Max Loads
490130	FLAMMABLE LIQUIDS, N.O.S.	10773	491002	ALCOHOLIC BEVERAGES	72
490152	PETROLEUM GASES, LIQUEFIED	5639	491110	CARTRIDGES FOR WEAPONS	71
490160	FLAMMABLE LIQUIDS, N.O.S.	3757	491223	VINYL ACETATE, STABILIZED	68
490182	ALCOHOLS, N.O.S.	2990	491305	2-(2-AMINOETHOXY) ETHANOL	87
490190	SULFURIC ACID	2228	491337	SILICATES, AQ. SOLN, N.O.S.	69
490197	CARTRIDGES FOR WEAPONS	1570	491421	PAINT	65
490203	CHLORINE	850	491477	GASOLINE	81
490223	BUTANE	794	491505	CORROSIVE LIQUIDS, N.O.S.	99
490228	ELEVATED TEMP. LIQUID, N.O.S.	796	491517	FLAMMABLE LIQUIDS, N.O.S.	57
490231	PROPYLINES	747	491524	LIQUEFIED PETROLEUM GAS	53
490240	SODIUM HYDROXIDE SOLUTION	701	491528	PHOSPHORIC ACID, LIQUID	52
490241	PROPANE	663	491535	PETROLEUM DISTILLATES, N.O.S.	49
490242	HYDROCHLORIC ACID	634	491544	BATTERIES, WET, FILLED WITH ACID	48
490243	CARBON DIOXIDE, REFRIG. LIQUID	347	491548	PICOLINES	46
490244	METHANOL	345	491558	PHENOL, MOLTEN	46
490245	ETHYL ALCOHOL	372	491559	HYDROGEN PEROXIDE, STABILIZED	45
490246	SULFURIC ACID, SPENT	307	491565	FLAMMABLE LIQUIDS, N.O.S.	44
490247	FERRIC CHLORIDE SOLUTION	263	491566	FLUOROSILICIC ACID	42
490248	CHARGES, PROPELLING, FOR CANNON	208	491567	SULFURIC ACID	42
490249	STYRENE MONOMER, INHIBITED	183	491568	FLAMMABLE LIQUIDS, N.O.S.	41
490250	BUTYL ACRYLATES, STABILIZED	171	491569	ROCKET MOTORS	41
490251	BOULDER	174	491570	ISOPROPANOL	40
490252	AMMONIA, ANHYDROUS	173	491571	NITRIC ACID	40
490253	ENV. HZ. SUBSTANCES, SOLID, N.O.S.	171	491572	MIXED LOADS, MILITARY IMPEDIMENTA	40
490254	METHYL METHACRYLATE, STABIL.	156	491573	AMMUNITION, ILLUMINATING	38
490255	WASTE FLAMMABLE LIQUIDS, N.O.S.	145	491574	DICHLOROPENTADIENE	38
490256	ROCKETS	132	491575	ALCOHOLS, N.O.S.	36
490257	WASTE FLAMMABLE LIQ., TOXIC, N.O.S.	120	491576	COMBUSTIBLE LIQUID, N.O.S.	36
490258	PENTANES	117	491577	PESTICIDES, LIQUID, TOXIC, FLAM	35
490259	PHOSPHORIC ACID, LIQUID	116	491578	HYDROGEN FLUORIDE, ANHYDROUS	34
490260	BUTADIENES, STABILIZED	112	491579	PETROLEUM DISTILLATES, N.O.S.	33
490261	METHANOL	98	491580	SULFUR DIOXIDE	33
490262	ETHYL ALCOHOL	97	491581	CALCIUM CARBIDE	30
490263	BUTANE	96	491582	CORROSIVE SOLIDS, N.O.S.	29
490264	ARGON, REFRIGERATED LIQUID	94	491583	COMBUSTIBLE LIQUID, N.O.S.	27
490265	CORROSIVE SOLID, ACIDIC, MORG	90	491584	FEROUS CHLORIDE SOLUTION	27
490266	CHARGES, DESOLVATION	87	491585	AMINES, LIQUID, CORROSIVE, N.O.S.	27
490267	ELEVATED TEMP. LIQUID, N.O.S.	86	491586	HAZARDOUS WASTE, LIQUID, N.O.S.	24
490268	POTASSIUM HYDROXIDE SOL. N.	81	491587	COMBUSTIBLE LIQUID, N.O.S.	24
490269		75	491588	METHYL BROMIDE	24
490270			491589	TETRAHYDROFURAN	23

Table 14, continued

STCC #	Description	Max Loads	STCC #	Description	Max Loads
491228	CHLOROPICRIN	23	491229	PETROLEUM DISTILLATES, N.O.S.	12
491229	ACRYLONITRILE-INHIBITED	22	491230	HYDROGEN PEROXIDE, AQ. SOLN	12
491230	CARTRIDGES FOR WEAPONS	21	491231	ACRYLAMIDE	12
491231	TOLUENE DISOCYANATE	21	491232	CORROSIVE LIQUID, BASIC, INORGANIC	12
491232	PICOLINES	20	491233	ETHANOLAMINE	12
491233	AMMONIUM NITRATE	20	491234	POLYMERIC BEADS, EXPANDABLE	12
491234	AMMUNITION, ILLUMINATING	19	491235	ENGINES, INTERNAL COMBUSTION	12
491235	HEXANES	19	491236	CHARGES, PROPELLING, FOR CANNON	11
491236	CORROSIVE LIQUIDS, N.O.S.	19	491237	PETROLEUM DISTILLATES, N.O.S.	11
491237	FUSES, DETONATING	18	491238	WASTE SODIUM HYDROXIDE SOLUTION	10
491238	BUTYLENE	18	491239	COMBUSTIBLE LIQUID, N.O.S.	10
491239	Oxidizing Solid, N.O.S.	18	491240	ACETIC ACID SOLUTION	10
491240	ISOBUTANE	17			
491241	ETHANOL	17			
491242	FLAMMABLE LIQUIDS, CORROSIVE	17			
491243	FLAMMABLE LIQUIDS, CORROSIVE	16			
491244	GASOLINE (AVIATION GASOLINE, LEADED	16			
491245	METHANOL	16			
491246	ADHESIVES	16			
491247	FLAMMABLE LIQUID, OTHER REGULATED SUBSTANCE	16			
491248	TETRAHYDROFURAN	15			
491249	AMMUNITION, SMOKE	14			
491250	FIREWORKS	14			
491251	DICHLOROPROPENES	13			
491252	PENTAFLUOROETHANE	13			
491253	ETHYL METHYL KETONE	13			
491254	FLAMMABLE LIQUIDS, N.O.S.	13			
491255	MATERIAL NOT CLASSIFIABLE	13			
491256	CARTRIDGES FOR WEAPONS	12			
491257	PROPYLENE	12			
491258	FLAMMABLE LIQUIDS, N.O.S.	12			

STCC - Standard Transportation Commodity Code (specific to rail transportation)
Max loads - The maximum number of loads for each material (each STCC code) carried on any one rail segment in Contra Costa County over a 12 month period (2004-2005). Note: This method avoids duplicate counting of loads carried from one rail segment to the other (a common occurrence) but probably underestimates the total number of loads transported in the county in a year.

*N.O.S. - not otherwise specified.
Note: Material descriptions were provided by the railroads as the "one-liners" shown above. In some cases worded descriptions are the same although the STCC codes are different. These are different types of the generic material(s) that could not be described on one text line. More information on STCC codes is available at URL: <https://www.stccrtrails.com/index.asp> (click on "product codes").

In addition to the above total shipping data for hazardous materials via the railroad in this study, information concerning "Toxic by Inhalation" Rail Hazardous Materials, is contained within Table 16 of the survey. Those data are shown below.

Table 16: "Toxic by Inhalation" Rail Hazardous Materials

Max Loads - Any Rail Segment	STCC #	UN #	"TIH" Materials
850	4920523	1017	Chlorine
173	4904210	1005	Ammonia, Anhydrous
34	4930024	1052	Hydrogen Fluoride, Anhydrous
33	4920508	1079	Sulfur Dioxide
24	4920518	1062	Methyl Bromide
23	4921414	1580	Chloroform
3	4916323	1285	Trichloroethylene *
2	4921405	1595	Dimethyl Sulfide
2	4920369	1955	Liquidified Gas, Toxic, N.O.S.
1	4916305	1397	Aluminum Phosphide *
1	4920346	1082	Trifluorochloroethylene, inhibited
1	4921475	2810	Toxic Liquids, Organic, N.O.S.
1	4925275	2810	Toxic Liquids, Organic, N.O.S.

1. Toxic by Inhalation (TIH) - 2004 Emergency Response Guidebook (DOT, 2004).
2. Max loads - any rail segment: The maximum number of loads of the material on any rail segment in Contra Costa County over a 12 month period (2004-2005). Note: This method avoids duplicate counting of loads carried from one rail segment to the other (a common occurrence) but probably underestimates the total number of loads reported in the county in a year.
3. STCC #: Standard Transportation Commodity Code number (railway).
4. UN #: United Nations corresponding four-digit hazardous material number.
5. * Pyrophoric water-reactive material - produces toxic gas on contact with water
6. N.O.S. - Not otherwise specified.

Additional railroad data are contained within the 2005 report.

2.1.2 Highway Data

Highway placard survey data was collected for the 2005 report from both the fall of 2004 and summer of 2005. The data were collected from the following survey locations:

- Highway 580-Richmond/San Rafael toll bridge plaza;
- Highway 160-Antioch toll bridge plaza;
- Highway 4-Oakley Street intersection;
- Highway 680-Walnut Creek weigh station;
- Highway 80-Carquinez toll bridge plaza;
- Highway 4-Pittsburg train Bay Area Rapid Transit (BART) station; and
- Highway 580-Livermore weigh station.

Data from the highway placard survey is compiled in the report in various tables. Table 4 shows all of the United Nations (UN) chemical identification numbers from all data from the highway placard survey and is shown below.

Table 4: All UN Numbers Recorded from Hazardous Material Trucks during Entire Survey *

UN number	Material	Frequency	Percent
1203	Gasoline	1,084	33.92
3287	Elevated temp. liquid, nos	336	10.42
1075	Liquidified petroleum gas, e.g., propane, butane,	274	8.50
1993	Combustible liquid, nos	256	7.94
2448	Sulfur, molten	189	5.88
1791	Hypochlorite solution	116	3.60
2187	Carbon dioxide, refig. liquid	104	3.22
1977	Nitrogen, refig. liquid	100	3.10
1824	Sodium hydroxide solution	97	3.01
3284	Corrosive liquid, acidic, inorganic nos	58	1.80
1073	Oxygen, refig. liquid	55	1.71
1987	Alcohols, nos	40	1.24
1930	Sulfuric acid	35	1.09
3082	Environ. hazardous liquid or haz. waste, liquid nos	32	0.99
1283	Paint/solvent material	26	0.81
1951	Argon, refig. liquid	25	0.78
2672	Ammonia/ammonium hydroxide solution	25	0.78
2693	Bisulfites, aqueous solution	23	0.71
1789	Hydrochloric acid	21	0.65
1883	Fuel, aviation	21	0.65
No ID	(UN number not identified)	20	0.62
3077	Environ. hazardous solid or haz. waste, solid, nos	15	0.47
1780	Corrosive liquid, nos	14	0.43
2682	Ferroc chloride solution	11	0.34
1017	Chlorine	10	0.31
3286	Corrosive liquid, basic, inorganic nos	10	0.31
1005	Ammonia, anhydrous	8	0.28
1049	Hydrogen	9	0.28
1905	Phosphoric acid	8	0.25
2031	Nitric acid	8	0.25
2798	Battery fluid, sulfuric acid	8	0.25
1046	Helium	7	0.22
1888	Resin solution	7	0.22
2426	Ammonium nitrate, hot concentrated solution	7	0.22
3267	Corrosive liquid, basic, organic, nos	7	0.22
partial ID	("corrosive" placard)	7	0.22
1090	Acetone	8	0.19

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2014	Hydrogen peroxide, aqueous solution (20-60%)	6	0.19
1701	Xylol bromide	5	0.16
1778	Fluorosilicic acid	5	0.16
2209	Formaldehyde solution	5	0.16
2843	Ammonium sulfide solution	5	0.16
2191	Sulfuryl fluoride	4	0.12
2348	Butyl acrylate(s)	4	0.12
3065	Alcoholic beverages	4	0.12
1030	Difluoroethane	3	0.09
1078	Sulfur dioxide	3	0.09
1170	Ethanol	3	0.09
1219	Isopropanol	3	0.09
1287	Rubber solution	3	0.09
1814	Caulic potash / potassium hydroxide solution	3	0.09
3285	Corrosive liquid, acidic, organic, nos	3	0.09
1172	Ethylene glycol monoethyl ether acetate	2	0.06
1230	Methanol	2	0.06
1267	Petroleum crude oil	2	0.06
1268	Petroleum distillates/products, nos	2	0.06
1270	Petroleum oil	2	0.06
1276	n-Propyl acetate	2	0.06
1307	Xylenes	2	0.06
1328	Hexamethylenetetramine	2	0.06
1719	Caulic alkali liquid, nos	2	0.06
1731	Antimony pentachloride, solution	2	0.06
1790	Hydrofluoric acid	2	0.06
1942	Ammonium nitrate	2	0.06
1972	Liquefied natural gas or methane, refig. liquid	2	0.06
1999	Asphalt or liquid tars	2	0.06
3108	Organic peroxide type F, liquid	2	0.06
3190	Self-healing acid, inorganic, nos	2	0.06
partial ID	("miscellaneous" placard)	2	0.06
1072	Oxygen	1	0.03
1193	Methyl ethyl ketone	1	0.03
1197	Extracts, flavoring, liquid	1	0.03
1202	Fuel oil, e.g. diesel	1	0.03
1234	Methylal	1	0.03
1264	Paraldehyde	1	0.03
1294	Toluene	1	0.03
1325	Flammable solid, nos	1	0.03

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1648	Acetonitrile	1	0.03
1708	Toluidines	1	0.03
1741	Boron trichloride	1	0.03
1759	Corrosive solid, nos	1	0.03
1803	Phenolulfonic acid, liquid	1	0.03
1831	Sulfuric acid, fuming	1	0.03
1832	Sulfuric acid, spent	1	0.03
1888	benzylidene chloride	1	0.03
1906	Acid sludge	1	0.03
1907	Soda lime	1	0.03
1908	Chlorite solution	1	0.03
1866	Hydrogen, refig. liquid	1	0.03
1978	Propene	1	0.03
1992	Flammable liquid, toxic, nos	1	0.03
2055	Styrene monomer, stabilized	1	0.03
2078	Toluene diisocyanate	1	0.03
2201	Nitrous oxide, refig. liquid	1	0.03
2272	n-Ethylaniline	1	0.03
2315	Polychlorinated biphenyls	1	0.03
2491	Ethandamine	1	0.03
2502	Valeryl chloride	1	0.03
2505	Ammonium fluoride	1	0.03
2734	Alkylpolyamines, liquid, corrosive, flammable	1	0.03
2794	Batteries, wet, filled with acid	1	0.03
2785	Batteries, wet, filled with alkali	1	0.03
2810	Poisonous/toxic liquid	1	0.03
2862	Vanadium pentoxide	1	0.03
2822	Corrosive liquid, toxic or sodium hydrosulfide solution	1	0.03
2824	Flammable liquid corrosive, nos	1	0.03
3095	Corrosive solid, self-healing, nos	1	0.03
3139	Oxidizing liquid, nos	1	0.03
3291	Medical waste, nos	1	0.03
3295	Hydrocarbons, liquid, nos	1	0.03
partial ID	("flammable" placard)	1	0.03

*All survey locations, all times
nos – not otherwise specified
Frequency is for UN numbers (bulk loads), rather than trucks. (Some trucks carry more than one load/UN number.)

Additional tables from the 2005 report show the most common UN numbers from the highway placard survey (Table 5), the frequency of hazardous materials worded placards (Table 6), and the "Toxic by Inhalation" trucked materials (Table 12). These three (3) tables are reproduced below.

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Table 5: Comparison of Most Common UN numbers from Fall 2004 and Summer 2005 Truck Surveys*

Hazardous Material	UN number	Fall 2004	Summer 2005
Gasoline	1203	35%	27%**
Hot liquid	3257	12%	15%
Liquid petroleum	1075	6%	10%
gases	2448	7%	5%
Molten sulfur	1993	8%	5%
Combustible liquid	1791	2%	4%
nos (diesel)	2187	2%	4%
Hypochlorite solution	1824	3%	4%
Carbon dioxide, refrigerated liquid	1977	3%	4%
Sodium hydroxide	3264	2%	2%
Nitrogen, refrigerated liquid	1073	2%	2%
Acidic corrosive liquid, inorganic, nos			
Oxygen, refrigerated liquid			
total		84%	82%

*Same counting locations (Figure 1 locations 3-5: Hwy 680, Hwy 80, Hwy 4 BART), day of the week (Monday, Wednesday, Thursday) and hours (8:00-11:00am)
 ** Statistically significant difference between fall and summer truck frequencies for this chemical (p=0.0215, Chi-square test for difference)
 nos = not otherwise specified

Hazardous Materials Commodity Flow Study with
Special Focus on Sea Level Rise and Flood Risk
Contra Costa County, California
August 2019
TAIT Environmental Services, Inc.

Table 6: Frequency of Hazardous Material Worded Placards* for All Trucks Counted in Fall 2004 and Summer 2005 Surveys

Hazard Type	Hazard division number	Frequency	Percent
Flammable/Combustible			
gases	2.1	90	11
liquids	3	114	14
solids	4.1, 4.2	4	1
partial identification		17	2
Inhalation Hazard			
gases, poisons	2.3, 5.1	29	4
Poison (except inhalation)			
toxic or infectious materials	6, 6.2	19	2
Oxidizer			
oxidizing substances	5.1	31	4
organic peroxides	5.2	9	1
Nonflammable gases			
oxygen	2.2	23	3
other nonflammable gases	2.2	216	27
Other hazardous materials			
explosives	1.4	1	0
dangerous when wet	4.3	7	1
radioactive	7	2	0
corrosive	8	159	20
miscellaneous	9	9	1
dangerous**	D	52	7
Missing Identification		18	2
TOTAL		800	100

*Worded placards signify smaller loads than placards with a UN number.
 **A vehicle containing nonbulk packaging with two or more types of hazardous materials may use one "dangerous" placard if each material load weighs less than 2,205 lbs.

Table 12: "Toxic by Inhalation" (TIH) Trucked Materials

Total Loads	UN #	TIH Materials
10	1017	Chlorine
9	1005	Ammonia, anhydrous
4	2151	Sulfuryl fluoride
3	1079	Sulfur dioxide
1	1741	Boron trichloride
1	1831	Sulfuric acid, fuming
1	2810	Poisonous/Toxic liquid

*Toxic by Inhalation (TIH) - 2004 Emergency Response Guidebook (DOT, 2004)

Additional highway placard data are contained in the 2005 report.

2.2 Highway Flow Study Data from Marin and Solano Counties

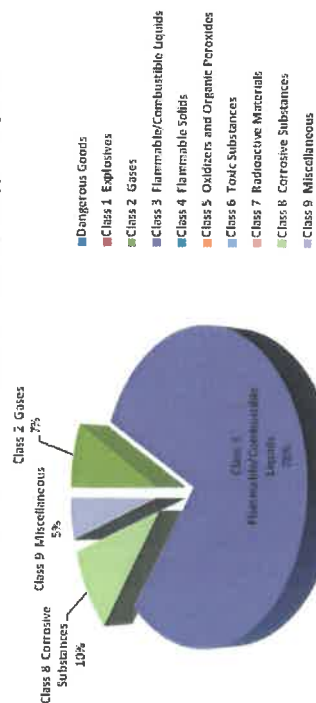
Hazardous Materials Commodity Flow Study reports were prepared for the Marin County Department of Public Works in September 2014, and for the Solano County Department of Resource Management, Environmental Health Division in May 2016. Both the Marin County and Solano County agencies were contacted to request the use of the highway placard data from those reports as it applies to the current Contra Costa County Flow Study. The relevant data includes highway transportation of hazardous materials at the locations where it enters Contra Costa County. The data from Marin and Solano County are detailed in the following sections.

2.2.1 Marin County Flow Study Data 2014

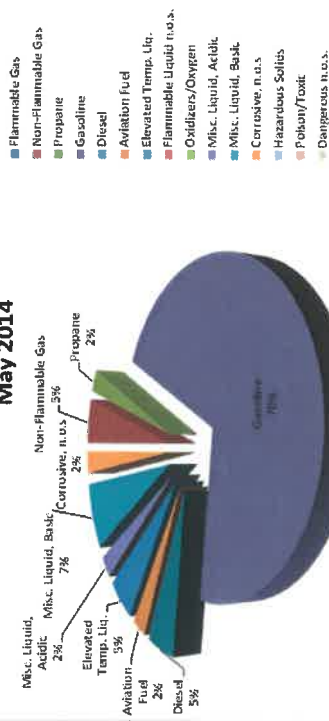
Highway placard survey data from the Marin County Flow Study was obtained for Interstate-580 where it flows in both north and south directions through the Richmond-San Rafael Bridge. The results of that study are presented below.

MARIN COUNTY: HIGHWAY PLACARD SURVEY DATA COMPILATION TABLE				
Survey Location	Placard Class	Placard No.	Common Name	No. of Trucks
5.800 (Eastbound: inbound to Contra Costa County via Richmond-San Rafael Bridge)				
	2.1	1075	Propane	1
	2.2	N/A	Non Flammable Gas	2
	3	1263	Gasoline	29
	3	1863	Aviation Fuel	2
	3	1993	Diesel Fuel	2
	4	1760	Corrosive Liquid n.o.s.	2
	6	1795	Hydrochloric Solutions	1
	6	2582	Amic Chloride	0.5
	8	1814	Formaldehyde	0.5
	8	1824	Sodium Hydroxide	2
	9	2557	Elevated Temperature Liquid	2
Subtotal Placarded Trucks				41
Subtotal Trucks Not Placarded				815
TOTAL TRUCKS				856
5.801 (Westbound: outbound from Contra Costa County via Richmond-San Rafael Bridge)				
	2.1	1575	Propane	1
	2.2	2127	Carbon Dioxide	1
	2.1	N/A	Flammable Gas	2
	2.2	N/A	Non Flammable Gas	2
	3	2205	Gasoline	25
	3	1863	Aviation Fuel	1
	3	1993	Diesel Fuel	2
	4	1791	Hydrochloric Solutions	1
	6	1824	Sodium Hydroxide	1
	9	2557	Elevated Temperature Liquid	2
Subtotal Placarded Trucks				41
Subtotal Trucks Not Placarded				945
TOTAL TRUCKS				986
All Data				
Subtotal Placarded Trucks				82
Subtotal Trucks Not Placarded				1790
TOTAL TRUCKS				1872

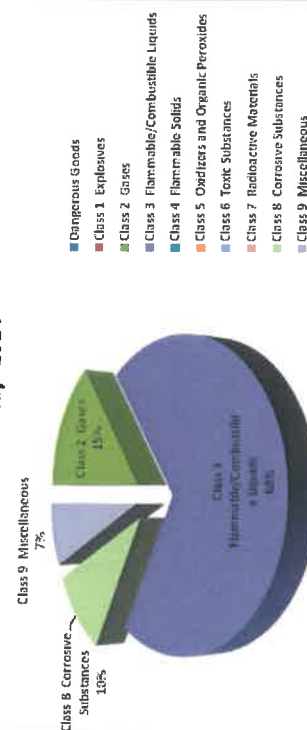
HAZMAT CLASS I - 580 (Eastbound to Contra Costa County): May 2014



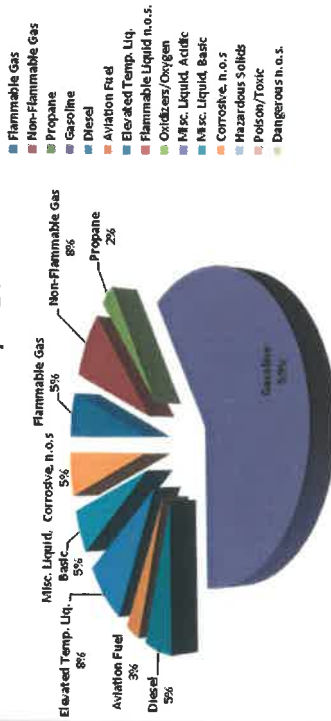
HAZMAT COMMODITIES I - 580 (Eastbound to Contra Costa County) May 2014



HAZMAT CLASS I - 580 (Westbound from Contra Costa County): May 2014



HAZMAT COMMODITIES Interstate 580 (Westbound from Contra Costa County) May 2014



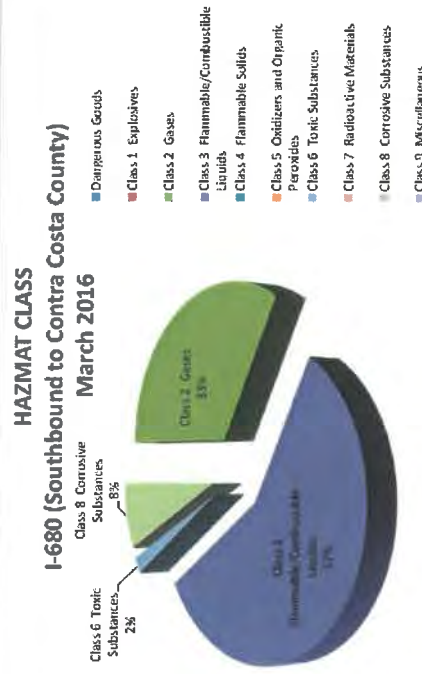
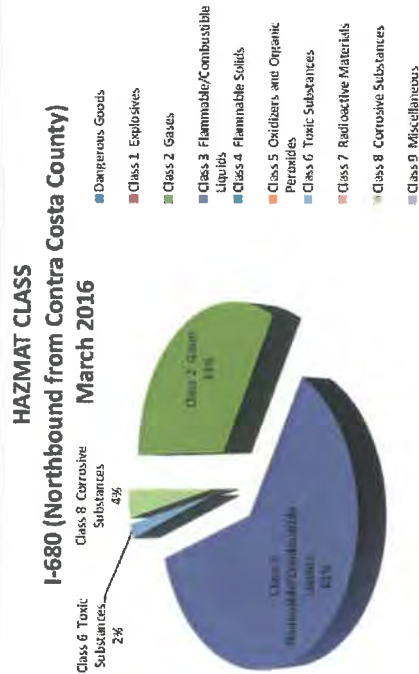
2.2.2 Solano County Flow Study Data 2016

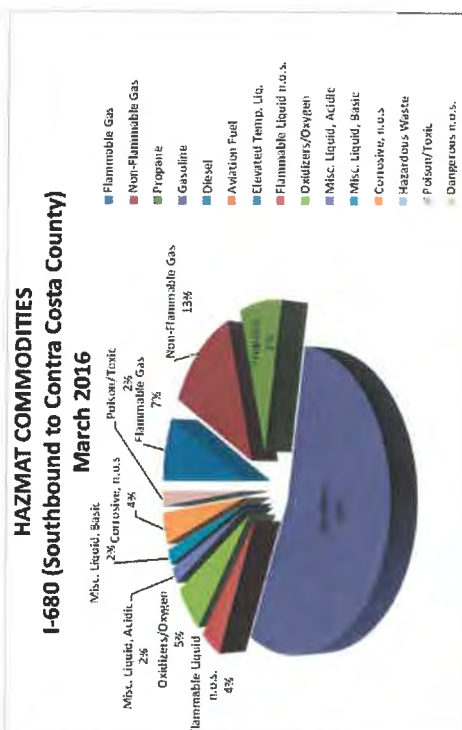
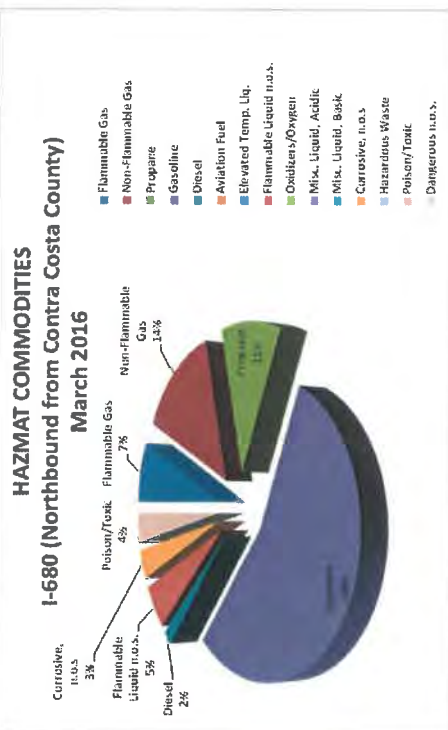
Highway placard survey data from the Marin County Flow Study was obtained for Interstate 580 where it flows in both directions through the following points:

- Interstate 80 at the Carquinez Bridge
- Interstate 680 at the Benicia-Martinez Bridge

The results of that study are presented below.

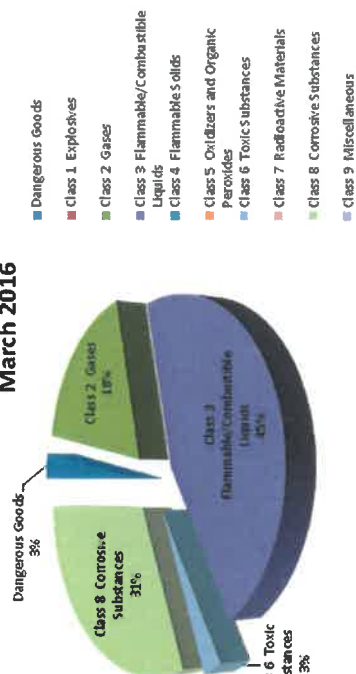
SOLANO COUNTY: HIGHWAY PLACARD SURVEY DATA COMPILED TABLE					
March 2016					
Survey Location	Placard Class	Placard No.	Common Name	No. of Trucks	
I-680 Northbound: Inbound to Contra Costa County via Benicia-Martinez Bridge	2.1	N/A	Flammable Gas	4	
	2.2	N/A	Non-Flammable Gas	3	
	2.3	1025	Coal Gas	1	
	2.11	1075	Propane	6	
	2.12	1077	Liquid Nitrogen	3	
	2.2	2157	Carbon Dioxide	2	
	3	1205	Gasoline	51	
	3	1207	Alcohol, n.o.s.	2	
	3	1208	Flammable Liquids, toxic, n.o.s.	2	
	3	1209	Flammable Liquids, n.o.s.	1	
	3	1210	Flammable Liquids, n.o.s.	1	
	3	1211	Flammable Liquids, n.o.s.	1	
	3	1212	Flammable Liquids, n.o.s.	1	
	3	1213	Flammable Liquids, n.o.s.	1	
I-680 Southbound: Inbound to Contra Costa County via Benicia-Martinez Bridge	2.1	N/A	Flammable Gas	3	
	2.2	N/A	Non-Flammable Gas	5	
	2.3	1075	Oxygen, refrigerated liquid	3	
	2.11	1075	Propane	4	
	2.12	2157	Carbon Dioxide	2	
	2.1	1049	Hydrogen, compressed	1	
	3	1205	Gasoline	29	
	3	1207	Petroleum Distillates	2	
	3	1210	Toxic, liquid, organic, n.o.s.	1	
	3	1211	Toxic, liquid, organic, n.o.s.	1	
	3	1212	Toxic, liquid, organic, n.o.s.	1	
	3	1213	Toxic, liquid, organic, n.o.s.	1	
	3	1214	Toxic, liquid, organic, n.o.s.	1	
	3	1215	Toxic, liquid, organic, n.o.s.	1	
Subtotal Placarded Trucks				681	
Subtotal Trucks Not Placarded				795	
TOTAL TRUCKS				1476	



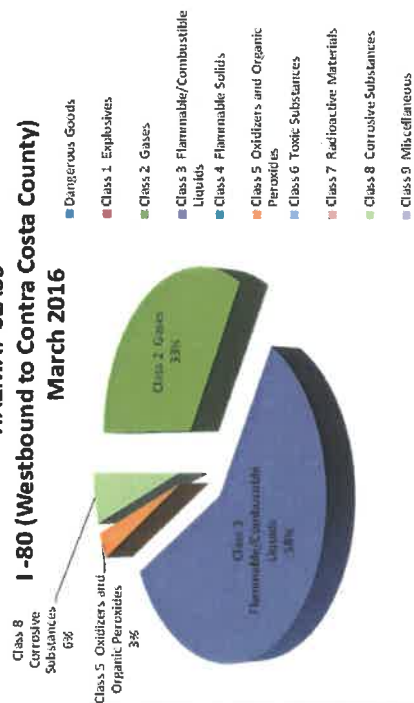


SOLANO COUNTY: HIGHWAY PLACARD SURVEY DATA COMPILATION TABLE					
March 2016					
Survey Location	Placard Class	Placard No.	Common Name	No. of Trucks	
I-80 Eastbound: outbound from Contra Costa County via Chagrinier Bridge	2.1	N/A	Flammable Gas	2	
	2.2	N/A	Non Flammable Gas	1	
	2.2	1066	Nitrogen, compressed	1	
	2.1	1076	Propane	1	
	2.2	2187	Carbon Dioxide	1	
	3	1203	Gasoline	13	
	3	1867	Alcohol, n.o.s.	2	
	3	1955	Diesel Fuel	4	
	6.1	N/A	Poison	4	
	6	N/A	Corrosive	4	
	8	2728	Acrylonitrile, stabilized	1	
	8	2778	Fluoroacetic Acid	1	
	6	1751	Hydrochloric Solution	1	
	6	1826	Sodium Hydroxide	3	
6	1853	Isobutane	3		
8	2080	Corrosive solid, acidic, inorganic, n.o.s.	1		
N/A	N/A	Chaperlain	1		
Subtotal Placarded Trucks Subtotal Trucks Not Placarded TOTAL TRUCKS				36	
				996	
				1032	
I-80 Westbound: inbound to Contra Costa County via Chagrinier Bridge	2.1	N/A	Flammable Gas	4	
	2.2	N/A	Non Flammable Gas	3	
	2.1	1075	Propane	3	
	2.2	1573	Chlorodifluoromethane and chloropentafluoroethane mixture	1	
	2.2	1877	Liquid Nitrogen	2	
	2.2	2187	Carbon Dioxide	1	
	3	1203	Gasoline	17	
	3	1248	Petroleum Distillates	1	
	3	1853	Diesel	3	
	5.1	2656	Ammonium nitrate, liquid	1	
	6	1751	Hydrochloric Solution	1	
	8	1850	Sulfuric Acid with more than 51% acid	1	
	Subtotal Placarded Trucks Subtotal Trucks Not Placarded TOTAL TRUCKS				36
					996
				1032	
All Sites				185	
				3148	
				3333	

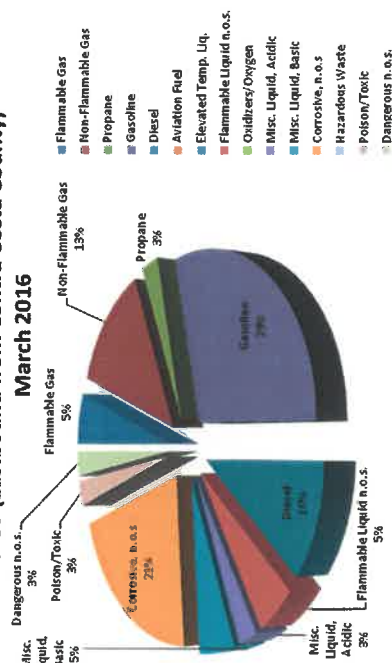
HAZMAT CLASS I-80 (Eastbound from Contra Costa County) March 2016



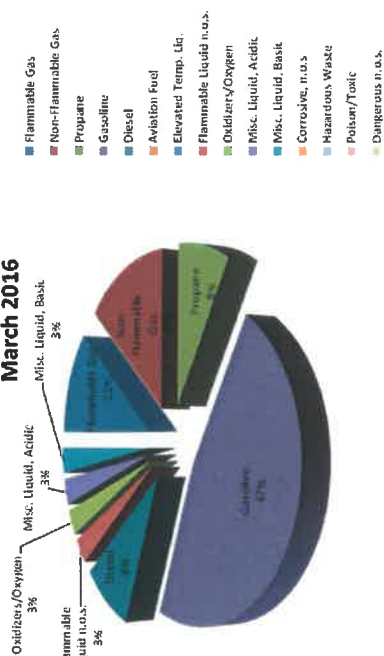
HAZMAT CLASS I-80 (Westbound to Contra Costa County) March 2016



HAZMAT COMMODITIES I-80 (Eastbound from Contra Costa County) March 2016



HAZMAT COMMODITIES I-80 (Westbound to Contra Costa County) March 2016



3.0 Commodity Flow Study

The data for the commodities Flow Study was obtained from the UP and BNSF Railroads and from industry chemical data. Data from hazardous materials transport via pipeline are included in this section. Historical data concerning rail, roadway, and pipeline hazardous materials incidents is also contained in this section. Utilization of Google Earth and Google Maps for base maps to portray the various data occur throughout this section and the remainder of the report.

3.1 Railroad Data

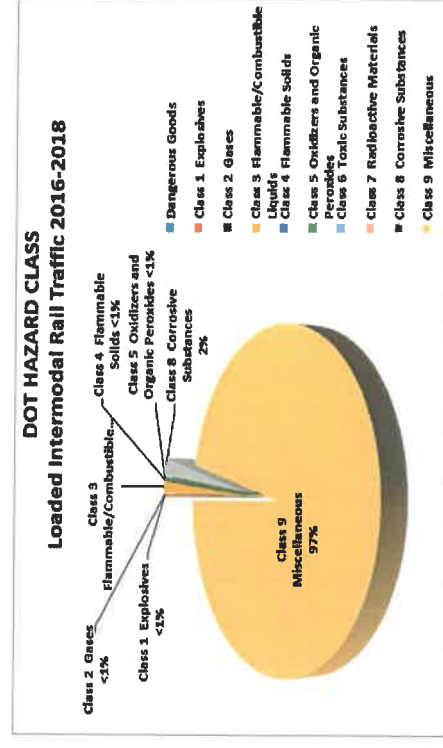
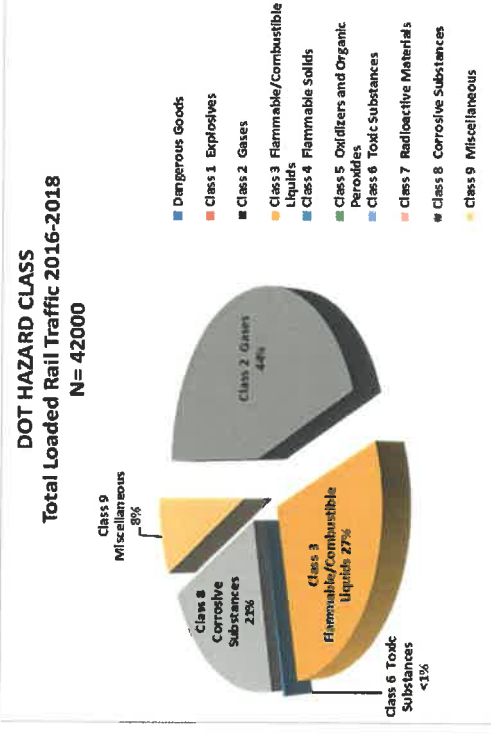
Railroad commodity data was obtained and managed by CCHSHMP from both UP and BNSF from the years 2016-2018. Obtained data is used solely for and by a bona fide emergency planning and response organization for the expressed purpose of emergency and contingency planning. All Sensitive Security Information was managed as such by CCHSHMP and detailed information regarding obtained rail data is not included as part of this report.

The following collection of data provides a comprehensive overview of the total rail traffic through Contra Costa County during the years analyzed. Charts in the following sections summarize the overall data with respect to the following:

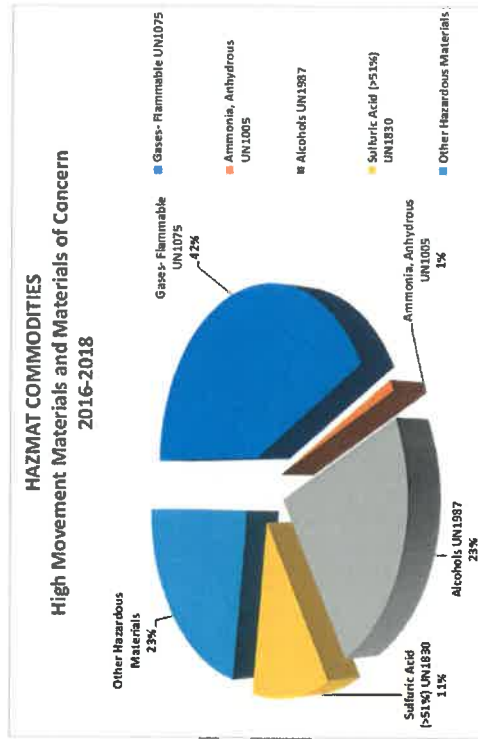
- Total loaded rail traffic;
- Loaded intermodal rail traffic; and
- High movement of materials and materials of concern.

The Total loaded rail traffic consisted primarily of gases, flammable and combustible liquids, and corrosive substances, with lesser amounts of toxic substances and miscellaneous hazardous materials.

Loaded intermodal rail traffic was predominantly miscellaneous hazardous materials with less than 3% explosives, gases, flammable/combustible liquids, flammable solids, oxidizers and organic peroxides, and corrosive substances.



Based on the data, it was determined that the major materials of concern were Propane (UN1075), Sulfuric Acid (UN1830), and Anhydrous Ammonia (UN1005).



3.2 Industry Chemical Data

CCHSHMP gained support from the Community Awareness Emergency Response (CAER) group as an emergency response agency and as a leader in community health and safety. The mission of CAER is to actively enhance public health and safety. CAER leadership believes this Flow Study supports this mission and identifies emerging threats in our community. Following the results of the Adapting to Rising Tides program, which is supported by both the Hazardous Materials Commission and the Contra Costa County Board of Supervisors, a gap in understanding of the impacts of hazardous materials transportation was identified. CAER believes that this Flow Study will help to fill the gap in understanding and address planning needs for sea level rise and flooding issues that are predicted to occur in the San Francisco Bay Area.

CAER holds representation from a majority of the large industrial facilities located in Contra Costa County. In order to further validate and identify chemicals of concerns, as determined from railroad data, an Industry Questionnaire was developed and distributed to the members of CAER. This questionnaire addressed hazardous materials transported to and from the facilities, approximate volumes, issues with flooding and other disruptions, as well as alternative arrangements made to ship hazardous materials. The hope was to gain a better

understanding of what impacts would be possible directly relating from industry due to a disruption of rail transportation.

Unfortunately, the results of the Industry Questionnaire were not obtained as part of this project.

3.3 Pipeline Data

Information concerning underground pipelines in Contra Costa County was obtained from the website of the National Pipeline Mapping System (NPMS) at <https://www.npms.dot.gov/>. A map showing the pipelines in Contra Costa County is shown below. Most of the pipelines in the County are located in the coastal areas, and in many locations, they are co-located with the railroad lines.



Due to the large number of pipelines in the County, the coastal part of the County was subdivided into four (4) areas. Detailed maps showing the hazardous liquid pipelines and gas transmission lines in these areas are shown in the following sections. Details concerning the hazardous liquid pipelines are contained in Appendix A. The numbers on the hazardous liquid pipeline maps refer to the detailed pipeline data listed in Appendix A.

Maps showing the gas transmission lines are also shown, but the various pipelines have not been detailed. The primary constituent of the gas transmission lines is natural gas.

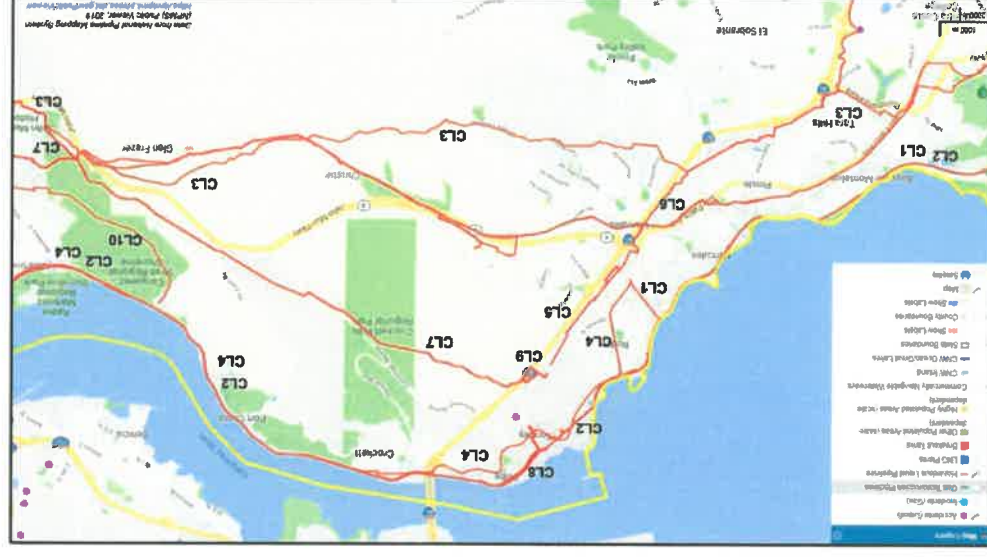
3.3.1 Richmond Area Pipeline Data

The gas transmission pipelines and hazardous liquid pipelines for the Richmond area are shown in the following maps. Details for the hazardous liquid pipelines are contained in Appendix A-1.



3.3.2 Crockett Area Pipeline Data

The gas transmission pipelines and hazardous liquid pipelines for the Crockett area are shown in the following maps. Details for the hazardous liquid pipelines are contained in Appendix A-2.



3.3.3 Martinez Area Pipeline Data

The gas transmission pipelines and hazardous liquid pipelines for the Martinez area are shown in the following maps. Details for the hazardous liquid pipelines are contained in Appendix A-3.



3.3.4 Pittsburg-Antioch Area Pipeline Data

The gas transmission pipelines and hazardous liquid pipelines for the Pittsburg-Antioch area are shown in the following maps. Details for the hazardous liquid pipelines are contained in Appendix A-4.



3.4 Hazardous Materials Incidents

Data involving hazardous materials transportation incidents were reviewed from available sources, generally publicly available resources. Hazardous Materials incident data were available for rail and roadway transportation through the County. In addition, pipeline incidents involving both hazardous liquids and gases in the Coastal areas of the County are also discussed.

3.4.1 Railroad Incidents

Data concerning hazardous materials incidents involving the railroads in Contra Costa County were obtained from the following sources:

Federal Railroad Administration, on line at <https://fractis.fra.dot.gov/bisfrsafety/>

Federal Railroad Administration, Office of Safety Analysis, on line at <https://safetydata.fra.dot.gov/OfficeofSafety/publicsite/Query/AccidentByStateRailroad.aspx>

Contra Costa County Railroad Accident Timeline, on line at http://www.marreport.com/nalwest/balnews/citysubtopics/contra_costa_county-4-.html

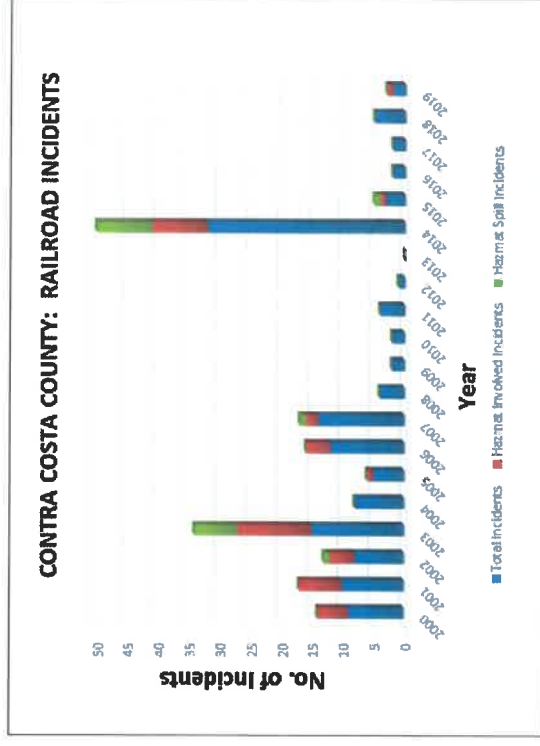
In addition, information was utilized from California Office of Emergency Services (CalOES), as well as various on-line news articles related to rail incidents.

Rail incident data from 2000 through 2019 were used for this report. It should be noted that some of the rail incidents may include release of hazardous materials from other than a rail car, particularly in the event of a train accident with a vehicle carrying hazardous materials. These have not been differentiated in the data.

Three general categories were reviewed and they are as follows:

- Total number of railroad incidents (140);
- Number of railroad incidents where hazardous materials were involved (46); and
- Number of railroad incidents where hazardous materials were spilled (19).

A summary table of the railroad incidents in Contra Costa County over the period of 2000 through 2019 is as follows.



A large number of rail incidents, including a somewhat higher percentage of rail incidents involving hazardous materials occurred between 2000 and 2007, with a major spike in 2014. With the exception of the number of incidents in 2014, the number of incidents in the last 10 years has generally declined from the early 2000s.

Chemicals involved in the railroad incidents are listed in the following chart. Three of these chemicals, anhydrous ammonia, propane, and sulfuric acid were used as the chemicals of concern for plume analysis in the CRA portion of this report.

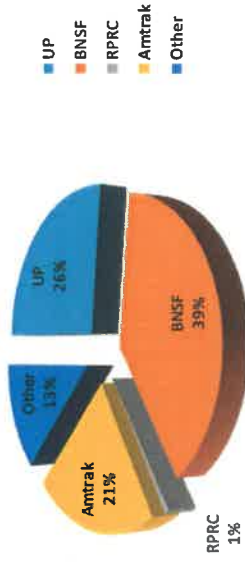
Chemicals Involved in Incidents	Number of Incidents
Anhydrous Ammonia	1
Propane	1
Sulfuric Acid	2
Hydrochloric Acid	1
Diesel/Gasoline	6
Ethanol	1
Oils/Sludge	3
Herbicide	1
Powdered Aluminum	1
Bleach	2
Total	19

Each of the above three general categories was further subdivided into the following subcategories:

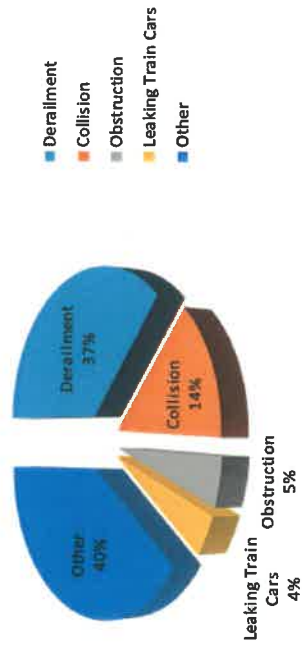
- Number of incidents by railroad company;
- Number of incidents by cause of incident; and
- Number of incidents by city.

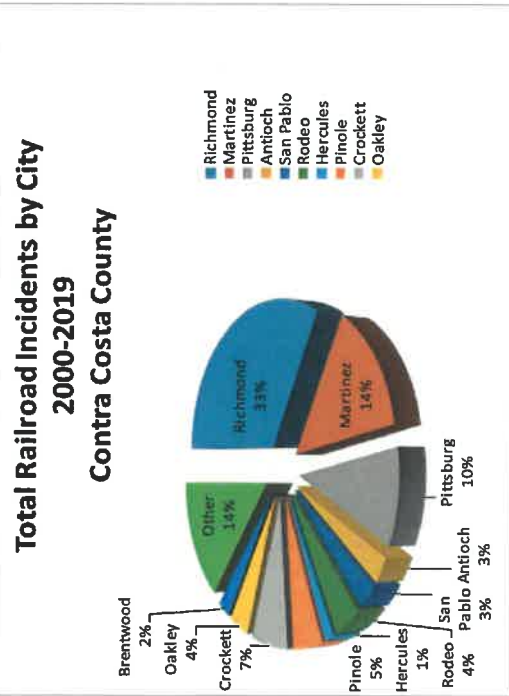
The total number of incidents (140), both hazardous and non-hazardous, occurring on the railroads in Contra Costa County from the period from 2000 through 2019 are illustrated in the following charts.

Total Railroad Incidents 2000-2019 Contra Costa County

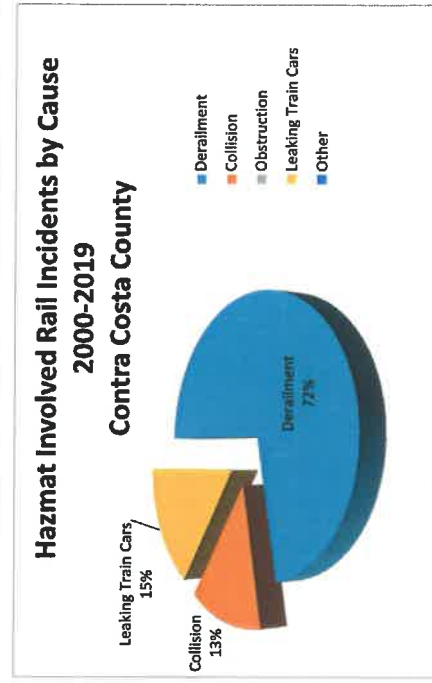
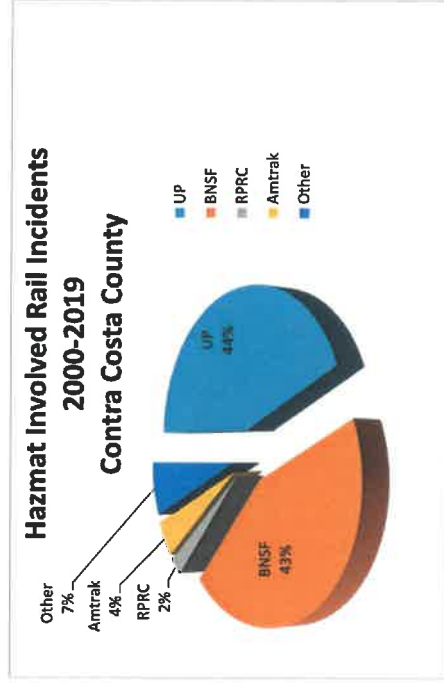


Total Railroad Incidents by Cause 2000-2019 Contra Costa County

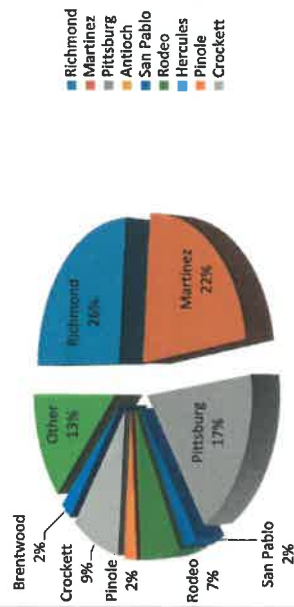




The number of railroad incidents involving hazardous materials (46 incidents) occurring in Contra Costa County from the period from 2000 through 2019 are illustrated in the following charts.



Hazmat Involved Rail Incidents by City 2000-2019 Contra Costa County

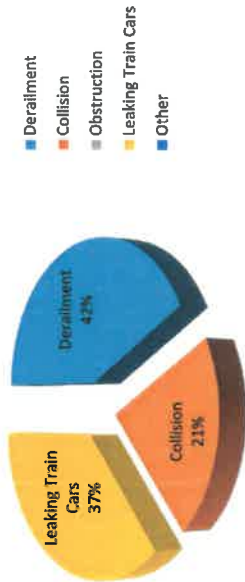


The number of railroad incidents resulting in hazardous materials spills (19 incidents) occurring in Contra Costa County from the period from 2000 through 2019 are illustrated in the following charts.

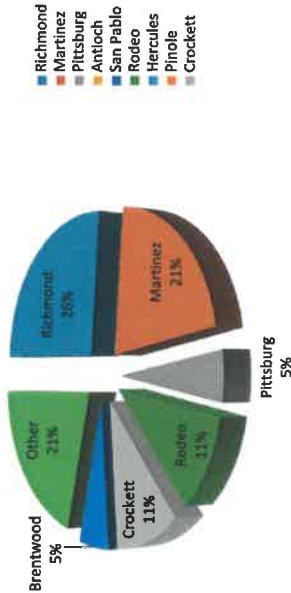
Hazmat Spill Rail Incidents 2000-2019 Contra Costa County



Hazmat Spill Rail Incidents by Cause 2000-2019 Contra Costa County



Hazmat Spill Rail Incidents by City 2000-2019 Contra Costa County



A review of the above data indicates the following trends:

- Major cause of total rail incidents is derailment;
- Major causes of hazardous materials spill incidents are derailment, leaking train cars, and collision;
- Both UP and BNSF lines contained the major portion of the total rail incidents, as these are the major rail lines in the area;
- UP had a higher percentage of hazardous materials spill incidents than BNSF;
- Total rail incidents were located primarily in the cities of Richmond, Martinez, Pittsburg, Rodeo, and Crockett; and,
- Hazardous materials spill incidents were located primarily in Richmond, Martinez, Rodeo, and Crockett.

3.4.2 Highway Incidents

Data concerning hazardous materials incidents involving the highway and roadways in Contra Costa County were obtained from the following sources:

California Highway Patrol (CHP).

PHMSA Data Mart Hazardous Materials, on line at <https://portal.phmsa.dot.gov/analyticsSOAP/saw.dll?Dashboard>.

The California Highway Patrol provided general data for the years 2016 through 2018.

CHP DATA	Hazardous Materials Count of collisions		
	Fatal	Injury	PDO
Collision Year			
2016	10	305	376
2017	5	287	377
2018	7	278	450
TOTALS	22	870	1203

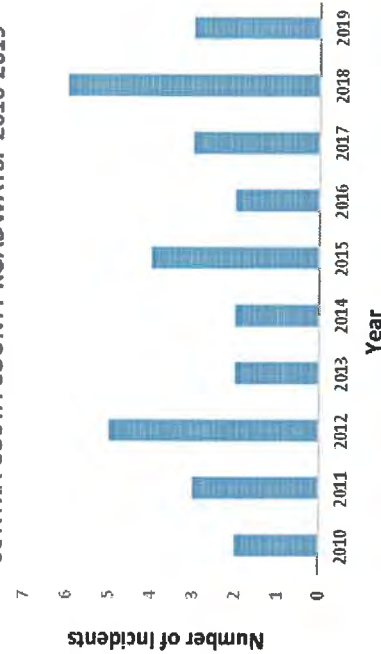
Data from PHMSA were obtained for the years 2010 through 2019. Many of the hazardous materials incidents in the PHMSA data involved small quantities of released materials. The data are summarized in the following table.

HAZARDOUS MATERIALS HIGHWAY AND ROADWAY RELEASES IN CONTRA COSTA COUNTY: 2010-2019									
Incident Street Address	City	Date	Carrier	Chemical Name	UN ID#	Hazard Class	Quantity Released (gallons)	Vehicle Type	Cause of Release
1801 Alsea Road	San Pablo	5/25/2010	United Parcel Service, Inc.	Petroleum Distillates	1208	3	0	N/A	Preexisting failure
1801 Alsea Road	San Pablo	7/17/2020	United Parcel Service, Inc.	Agrochemical	1210	3	0.26418	N/A	Human Error
East Bay Blvd	El Cerrito	8/26/2011	Quality Carriers, Inc.	Caustic Soda	1824	8	0.119525	Cargo Tank Motor Vehicle	Human Error
1801 Alsea Road	Richmond	12/22/2011	United Parcel Service, Inc.	Chloroform	1808	6	0.25419	Non-Bulk	Human Error
Unknown	Richmond	12/22/2011	Quality Carriers, Inc.	Sodium Hypochlorite, Solution	1791	6	40	Cargo Tank Motor Vehicle	Human Error
1801 Alsea Road	Richmond	2/1/2012	Quality Carriers, Inc.	Hypochlorite Solutions with 15% or more	1791	6	10	Cargo Tank Motor Vehicle	N/A
1801 Alsea Road	Richmond	3/1/2012	Chemical Transfer Company, Inc.	Comminuted Liquid N.O.S.	1903	3	2	Cargo Tank Motor Vehicle	Human Error
East Bay Blvd	El Cerrito	5/1/2012	Quality Carriers, Inc.	Caustic Soda	1824	8	0.227406	Cargo Tank Motor Vehicle	Human Error
Unknown	Richmond	6/26/2012	Sea Services & Environmental Solutions	Hydrochloric Acid, Solution	2481	8	10	Cargo Tank Motor Vehicle	Human Error
Unknown	Richmond	11/22/2012	Quality Carriers, Inc.	Hypochlorite Solutions	1791	6	8.0025	Cargo Tank Motor Vehicle	Human Error
1460 Canal Blvd.	Richmond	5/22/2013	Quality Carriers, Inc.	Sodium Hydroxide, Solution	1206	6	20	Cargo Tank Motor Vehicle	Human Error
1601 Alsea Road	Richmond	7/31/2013	Quality Carriers, Inc.	Permethrin Liquid, N.O.S.	1903	3	20	Cargo Tank Motor Vehicle	Human Error
1601 Alsea Road	Richmond	9/30/2014	Quality Carriers, Inc.	Hypochlorite Solutions	1791	6	N/A	Cargo Tank Motor Vehicle	Human Error
111 Sycamore Way	Walbridge	10/10/2014	MAO West, LLC	Water, Sealed	1844	4.1	N/A	In Bulk	N/A
105 Embarcadero Avenue	Richmond	4/23/2015	Quality Carriers, Inc.	Caustic Soda	1203	3	15	Cargo Tank Motor Vehicle	Vehicle Crash or Accident Damage
Unknown	Richmond	4/27/2015	Quality Carriers, Inc.	Sodium Hypochlorite, Solution	1791	6	0.03125	Cargo Tank Motor Vehicle	Contamination or Aging
1801 Alsea Road	San Pablo	7/12/2015	United Parcel Service, Inc.	Hydrochloric Acid, Solution	2883	6	0.007812	Cargo Tank Motor Vehicle	Contamination or Aging
1801 Alsea Road	San Pablo	1/6/2016	United Parcel Service, Inc.	Corrosive Liquid, Acidic, Inorganic, N.O.S.	1790	8	0.20373	Non-Bulk	Human Error
1801 Alsea Road	San Pablo	6/1/2016	United Parcel Service, Inc.	Corrosive Liquid, Acidic, Inorganic, N.O.S.	2884	6	4	Non-Bulk	Improper Packaging for Transportation
1801 Alsea Road	San Pablo	6/1/2016	United Parcel Service, Inc.	Corrosive Liquid, Acidic, Inorganic, N.O.S.	2885	6	0.1879	Non-Bulk	Human Error
1801 Alsea Road	San Pablo	6/1/2017	United Parcel Service, Inc.	Mercury, Plammable	1900	2.2	0.16629	Non-Bulk	Improper Packaging for Transportation
1801 Alsea Road	San Pablo	9/6/2017	United Parcel Service, Inc.	Isopropyl Alcohol	1900	3	0.007812	Non-Bulk	Human Error
1000 Olympia Drive	Richmond	11/20/2017	Quality Carriers, Inc.	Sodium Hydroxide, Solution	1206	6	3	Cargo Tank Motor Vehicle	Improper Packaging for Transportation
1801 Alsea Road	San Pablo	11/9/2018	United Parcel Service, Inc.	Hypochlorite Solutions	1791	3	0.1879	Non-Bulk	Dropped

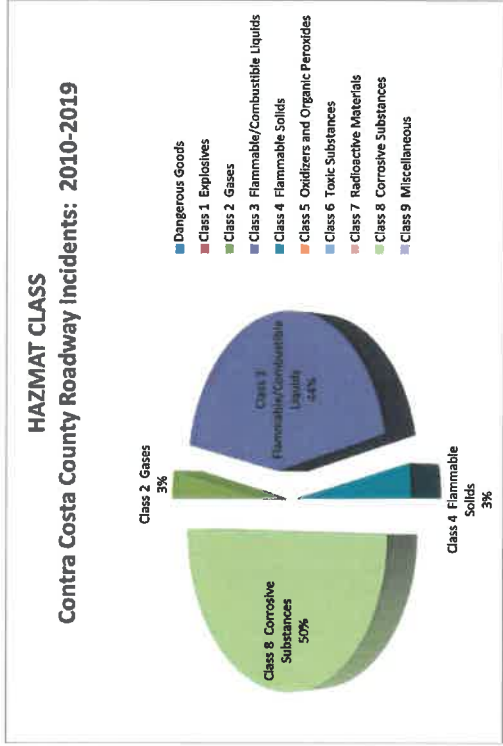
HAZARDOUS MATERIALS HIGHWAY AND ROADWAY RELEASES IN CONTRA COSTA COUNTY: 2010-2019									
Incident Street Address	City	Date	Carrier	Chemical Name	UN ID#	Hazard Class	Quantity Released (gallons)	Vehicle Type	Cause of Release
1801 Alsea Road	San Pablo	11/16/2018	United Parcel Service, Inc.	Hypochlorite Solutions	1791	3	0.1879	Non-Bulk	Dropped
1801 Alsea Road	San Pablo	9/17/2018	United Parcel Service, Inc.	Phenol, N.O.S.	1900	3	1	Non-Bulk	Accident
1801 Alsea Road	San Pablo	1/9/2019	United Parcel Service, Inc.	Mercury	1206	3	0.00046	Non-Bulk	Human Error
1801 Alsea Road	San Pablo	1/16/2019	United Parcel Service, Inc.	Corrosive Liquid, Acidic, Inorganic, N.O.S.	2884	3	0.00046	Non-Bulk	Improper Packaging for Transportation
1801 Alsea Road	San Pablo	1/16/2019	United Parcel Service, Inc.	Corrosive Liquid, Acidic, Inorganic, N.O.S.	2884	3	0.00046	Non-Bulk	Improper Packaging for Transportation
4000 North Canyon Road	San Ramon	1/16/2019	United Parcel Service, Inc.	Acetone	1900	3	0.00046	Non-Bulk	Dropped
4000 North Canyon Road	San Ramon	2/21/2019	United Parcel Service, Inc.	Phenol, N.O.S.	1900	3	0.00046	Non-Bulk	Improper Packaging for Transportation
4000 North Canyon Road	San Ramon	2/21/2019	United Parcel Service, Inc.	Phenol, N.O.S.	1900	3	0.00046	Non-Bulk	Improper Packaging for Transportation
4000 North Canyon Road	San Ramon	2/21/2019	United Parcel Service, Inc.	Sodium Bisulfite, Solution	2885	6	50	Cargo Tank Motor Vehicle	Human Error

Based on the data shown above, the incident rate per year (2019 not yet completed) is shown in the following chart.

NUMBER OF HAZARDOUS MATERIALS INCIDENTS CONTRA COSTA COUNTY ROADWAYS: 2010-2019



Several different hazardous materials classes are represented in the releases as shown in the following chart.



Information concerning hazardous materials incidents on a nationwide basis was available from the following publications:

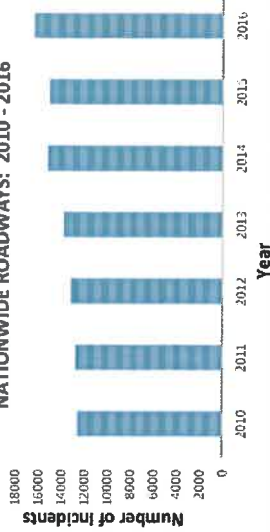
U.S. Department of Transportation, Bureau of Transportation Statistics, March 15, 2018, Facts and Figures 2017.

U.S. Department of Transportation, Bureau of Transportation Statistics, January 1, 2015, Facts and Figures 2015.

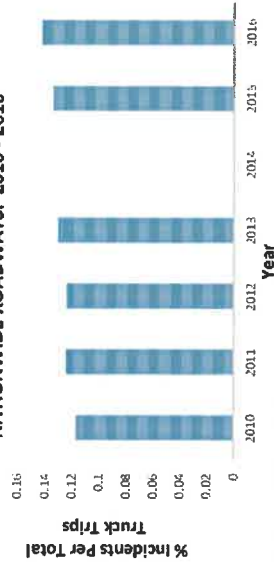
Information from the Bureau of Transportation Statistics (BTS) included data concerning total truck trips and total truck hazardous materials incidents for the years from 2010 through 2016. The information is summarized in the following table and charts.

Nationwide Hazardous Materials Trucking Incidents: 2010-2016				
Year	Total Truck Traffic Trips on Highways	Truck Traffic as % of Total Highway Traffic	Hazardous Materials Trucking Incidents	Hazardous Materials Trucking Incidents as % of Total Truck Traffic
2010	10,770,064	4.3	12,851	0.1175%
2011	10,270,063	4.1	12,812	0.1247%
2012	10,059,350	4.2	13,255	0.1244%
2013	10,317,356	4.1	13,862	0.1315%
2014	N/A	N/A	15,284	N/A
2015	11,253,184	4.2	16,120	0.1430%
2016	11,469,581	4.3	16,001	0.1435%

NUMBER OF HAZARDOUS MATERIALS INCIDENTS
NATIONWIDE ROADWAYS: 2010 - 2016



PERCENT HAZARDOUS MATERIALS INCIDENTS (RATE)
NATIONWIDE ROADWAYS: 2010 - 2016



The above data indicate that throughout the period from 2010 through 2016, the number of nationwide incidents resulting from highway transportation of hazardous materials cargo has increased from 2010 through 2016. In addition, the rate of the hazardous materials incidents has also increased. In general, the number of hazardous materials incidents occurs in about 12 to 14 times per 10,000 total truck trips. These numbers can be extrapolated to Contra Costa County, although there may be an increase in the frequency/rate of the incidents due to the following:

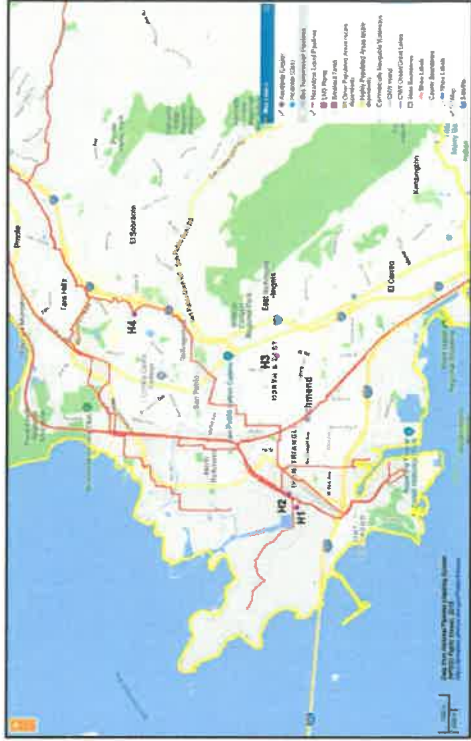
- High traffic volumes in a heavily populated urban area;
- Increased frequency of transportation of hazardous materials along arterial roadways; and
- Increased number of incidents because of flooding due to rising tides.

3.4.2 Pipeline Incidents

Release incidents can occur along pipelines that can endanger populations located adjacent to the pipelines, as well as those in downstream areas from the pipelines. This is particularly true with the natural gas pipelines, and was evidenced in the 2010 San Bruno PG&E natural gas pipeline explosion and fires. In order to mitigate any negative results due to a release incident along the pipelines, Contra Costa County should coordinate with the pipeline operators to immediately isolate the affected lines. Isolation will ensure that a minimal amount of the population is affected by the incident. In addition, evacuation procedures should be in place to quickly and efficiently remove the affected populations from the areas impacted by the incident.

Most of the data available from the National Pipeline Mapping System (NPMS) at <https://www.npms.phmsa.dot.gov/> covered releases from hazardous liquid pipelines with few releases listed from the gas transmission lines. Maps showing the locations of the pipeline incidents in the coastal area of Contra Costa County and accompanying details of the incidents are shown below for the Richmond, Crockett, Martinez, and Pittsburg-Antioch areas.

Hazardous liquid pipeline data for the Richmond area are shown in the following map and table. There was no information available for gas transmission line incidents in the Richmond area.



Location	Date	Pipeline Operator	Commodity Released	Loss (lb/gal)	Recovered (lb/gal)	Cause
H1	5/22/2008	SFPPLP	Gasoline	4.0	1.0	Corrosion
H2	1/12/2015	SFPPLP	Refined and/or Petroleum Products	58.9	58.9	Material vessel/equipment failure
H3	1/27/2002	SFPPLP	Gasoline	4.0	0.0	Material vessel/equipment failure
H4	9/17/2014	Phillips 66 Pipeline, LLC	Refined and/or Petroleum Products	2.1	2.1	Material vessel/equipment failure

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Hazardous liquid pipeline data for the Crockett area are shown in the following map and table. There was no information available for gas transmission line incidents in the Crockett area.



Crocker Area: Hazardous Liquid Pipeline Incident Data						
Location	Date	Pipeline Operator	Commodity Released	Loss (bbls)	Recovered (bbls)	Cause
1-1	01/17/2014	Phillips 66 Pipeline, LLC	Refined and/or Petroleum Products	2.1	2.1	Maintenance/Regulation Failure
2	02/12/2004	Nasir Terminals Operations	Refined and/or Petroleum Products	37.0	37.0	Incorrect Operation

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Hazardous liquid pipeline data for the Martinez area are shown in the following map and table. Information was also available for gas transmission line incidents in the Martinez area.



Maritime Area: Hazardous Liquid Pipeline Incident Data						
Location	Date	Pipeline Operator	Connectivity Released	Loss (bbls)	Recovered (bbls)	Cause
A1	7/17/2012	Shell Pipeline Co., LP	Refined and/or Petroleum Products	13.0	13.0	Material Work/development failure
A2	7/17/2012	Shell Pipeline Co., LP	Refined and/or Petroleum Products	0.85	0.48	Incorrect Operation
A3	6/11/2004	BP Pipeline Co., LP	Refined and/or Petroleum Products	0.35	0.35	Incorrect Operation
A4	4/24/2004	Pacific Atlantic Terminals, LLC	Hydrotreated Heavy Oil Mixtures	20.0	20.0	Material Work/development failure
A5	8/16/2007	Pacific Atlantic Terminals, LLC	Gasohol/Reformate	188.0	23.0	Incorrect Operation
A6	4/6/2007	Tessco Logistics Operations	Refined and/or Petroleum Products	1.5	1.5	Incorrect Operation
A7	11/16/2009	Petco Marketing, LP	Diesel	4.0	0.0	Corrosion
A8	11/16/2009	Chesron Marketing, LP	Refined and/or Petroleum Products	15.5	15.5	Material Work/development failure
A9	11/16/2009	Chesron Marketing, LP	Refined and/or Petroleum Products	1.4	1.4	Material Work/development failure
A10	11/16/2009	Chesron Marketing, LP	Refined and/or Petroleum Products	1.4	1.4	Material Work/development failure
A11	6/7/2004	BP Pipeline Co., LP	Refined and/or Petroleum Products	7.2	0.0	Material Work/development failure
A12	6/7/2004	BP Pipeline Co., LP	Refined and/or Petroleum Products	7.2	0.0	Material Work/development failure
A13	9/21/2018	BP Pipeline Co., LP	Refined and/or Petroleum Products	1.5	12.8	Incorrect Operation
A14	9/21/2018	BP Pipeline Co., LP	Refined and/or Petroleum Products	0.4	0.4	Material Work/development failure
A15	11/27/2017	BP Pipeline Co., LP	Refined and/or Petroleum Products	0.35	0.35	Material Work/development failure
A16	9/29/2004	BP Pipeline Co., LP	Gasohol/Distillate Mixtures	3.0	0.0	Material Work/development failure
A17	9/30/2003	BP Pipeline Co., LP	Gasoline	1.43	0.71	Incorrect Operation
A18	9/30/2003	BP Pipeline Co., LP	Gasoline	0.71	0.0	Incorrect Operation
A19	3/29/2003	BP Pipeline Co., LP	Turbine Fuel	0.48	0.0	Material Work/development failure
A20	3/29/2003	BP Pipeline Co., LP	Turbine Fuel	0.48	0.0	Material Work/development failure
A21	8/16/2008	BP Pipeline Co., LP	Turbine Fuel	0.48	0.0	Incorrect Operation
A22	4/14/2003	BP Pipeline Co., LP	Terramite	725.0	485.0	Corrosion
A23	3/23/2018	BP Pipeline Co., LP	Refined and/or Petroleum Products	2.18	2.19	Corrosion
A24	4/17/2013	BP Pipeline Co., LP	Gasoline	530.0	499.0	Material Work/development failure
A25	4/17/2002	BP Pipeline Co., LP	Diesel	13.0	0.0	Incorrect Operation
A26	4/17/2002	BP Pipeline Co., LP	Diesel	13.0	0.0	Incorrect Operation
A27	4/17/2002	BP Pipeline Co., LP	Gasoline	4.0	0.0	Material Work/development failure
A28	4/17/2002	BP Pipeline Co., LP	Gasoline	4.0	0.0	Material Work/development failure
A29	7/14/2002	Equilon Pipeline Co., LLC	Crude Oil	0.24	0.0	Material Work/development failure
A30	11/17/2011	Conoco Phillips	Crude Oil	45.0	0.0	Corrosion

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Martinez Area: Gas Transmission Pipeline Incident Data							
	Location	Date	Pipeline Operator	Commodity Released	Loss (bbls)	Recovered (bbls)	Cause
1	3/8/2012	Standard Pacific Gas Inc. Inc.	Natural Gas	N/A	N/A	N/A	Excavation Damage

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Hazardous liquid pipeline data for the Pittsburg-Antioch area are shown in the following map and table. There was no information available for gas transmission line incidents in the Pittsburg-Antioch area.



Pittsburg-Antioch Area: Hazardous Liquid Pipeline Incident Data						
Location	Date	Pipeline Operator	Commodity Released	Loss (bbls)	Recovered (bbls)	Cause
H1	8/5/2018	SEPP, LP	Refined and/or Petroleum Products	75.0	75.0	Motorist washing equipment failure
H2	10/22/2018	SEPP, LP	Refined and/or Petroleum Products	12.02	12.02	Motorist washing equipment failure

4.0 Community Risk Assessment for Hazardous Materials

This Community Risk Assessment for Hazardous Materials (CRA) is developed to further refine and define the areas of increased risk within the coastal area of Contra Costa County that are vulnerable to a significant hazardous materials release from railroad, roadway, or pipeline incident. Data from the Flow Study outlined above in Section 3 of this report was used to aid in the identification of major toxic chemicals or COCs that could present a danger to vulnerable areas of the County during a release incident. In addition, the Flow Study data aided in the determination of the pinch points or the locations most susceptible to a hazardous materials incident as well as vulnerable populations and critical facilities affected by an incident. This analysis and determination of pinch points will be aided by available data from the Adapting to Rising tides program. The CRA presented herein will allow for first responders to plan the incident response in advance of the incident, and to provide additional information toward the planning needs of Contra Costa County.

Potential hazardous materials incidents within Contra Costa County can be generally classified as follows:

- **Spill or Release:** Exposure to toxic vapors, gases, liquids, and solids, requiring County residents and business to undertake protective actions, such as evacuation or shelter-in-place. Secondary risk to the environment is possible including contamination of subsurface drinking water sources, soil contamination, and danger to the health of wildlife.
- **Fire:** Toxic chemicals may be produced when hazardous materials burn creating inhalation and skin adsorption issues from toxic clouds and plumes, and it may require County residents and business to undertake protective actions such as evacuation or shelter in place. Fires related to hazardous materials tend to be focused around industrial areas and transportation corridors.
- **Explosion:** Explosions can occur with fires at hazardous materials sites, and represent a physical hazards as well as a chemical hazard. As with fires related to hazardous materials, explosions tend to occur in industrial areas and along transportation corridors. Boiling Liquid Expanding Vapor Explosions (BLEVEs) and may also pose an immediate threat to County residents and businesses.

The following are examples of the critical facilities that could be impacted by a hazardous materials incident:

- City, County, State, and Federal Buildings, including public safety and public works buildings;
- Fire Stations;
- Hospitals, Emergency Care, and other Medical Facilities;
- Nursing and Convalescent Homes;
- Community Centers and Shelters; and
- Colleges, Schools, and Preschools.

Other general assets that could be affected by a hazardous materials incident are:

- Vulnerable Populations; and
- Residential Building Stock.

Vulnerable populations are often present in close proximity to major transportation corridors. Many of these areas are relatively high-density residential areas, and from a demographic standpoint, they tend to be lower-income areas.

The scope of work for the completion of the CRA was focused on the following areas:

- Hazardous materials producers/users/transporters located within the coastal areas of Contra Costa County;
- Transportation routes of hazardous materials along the UP and BNSF Railroads in the coastal and near-coastal areas of Contra Costa County;
- Evaluation and determination of the five (5) pinch points based on the locations where a hazardous incident is more likely to occur and the effects on critical facilities and vulnerable populations is at higher risk;
- Land use in high-risk areas (commercial, industrial, residential);
- Demographics;
- Utilization of CalARP data for Contra Costa County;
- Incorporation of ALOHA/CAMEO/MARPLLOT data and ERG data into the CRA for high-risk areas;
- Potential impacts in high-risk areas; and
- Evaluation of the vulnerability of specific areas.

4.1 Determination of Pinch Points

Five pinch points were determined during this study for extended analysis in the event that a hazardous materials incident/accident occurred at these locations. The pinch points were located as follows:

Richmond #1:	I-580 at Meade Street
Richmond #2:	Richmond Parkway South of MacDonald Avenue
Marinez #3:	Shell Avenue and Marina Vista Avenue
Bay Point #4:	Nichols Road North of Port Chicago Highway
Antioch #5:	End of Arco Lane

The locations of the 5 pinch points are shown on the map below.



The determination of the pinch points was dependent in part on the following parameters, which were used to perform the CRA:

- Rising Tides data and areas most susceptible to rising tides and sea level rise;
- California Healthy Places Index indicating vulnerable populations;
- Liquefaction Susceptibility data;
- Location of CalARP Facilities;
- Locations of Critical Facilities;
- Chemicals of Concern;
- Weather data;
- Railroad Locations; and
- Critical Arterial Road Locations.

These parameters are described in detail in the following sections and are tabulated in the various parts of Section 5 of this report.

4.1.1 Rising Tides Data

A critical aspect of the determination of pinch points is an analysis of flooding due to rising tides and sea level rise, including king tides and storm surges. These critical aspects will be summarized in this section based on the data available from the following sources:

Contra Costa County ART Project, March 14, 2017, *Adapting to Rising Tides: Contra Costa County Assessment and Adaptation Project*, 188 p.

Adapting to Rising Tides Bay Shoreline Flood Explorer, 2019, San Francisco Bay Conservation and Development Commission's Adapting to Rising Tides Program, on line at <https://explorer.adapttorisingtides.org/home>.

Adapting to Rising Tides East Contra Costa Shoreline Flood Explorer, 2019, San Francisco Bay Conservation and Development Commission's Adapting to Rising Tides Program.

Flooding due to rising tides and sea level rise can have a significant impact on the ground transportation of goods, including hazardous chemicals, as well as commuters, and the ability of first responders to respond to emergency situations. Impacted transportation routes include railroads, roadways, and pipelines.

Two major rail lines are located in the coastal areas of Contra Costa County. Union Pacific Railroad (UP) operates along the shoreline area of the County from Richmond to past I-680 through Martinez, where it is directed easterly toward Pittsburg, and then southeasterly toward Tracy. Burlington Northern and Santa Fe Railroad (BNSF) operates from Richmond along the coast to Pinole where it heads inland to Martinez where it joins the UP line. BNSF is directed easterly toward Pittsburg, and then on to Stockton. Richmond Pacific Railroad Company (RPRC) leases about 11 miles of UP track in the western part of Richmond. The UP rail line is also used by passenger/commuter trains.

The effect of rising tides on the rail lines can be summarized as follows:

- Rail lines located along the shorelines serve as a first line of defense against inland flooding, also known as ad hoc flood protection;
- Disruption of rail line transportation can have significant impacts on the movement of goods through Contra Costa County, particularly alternate transportation along roadways;
- In the event of flooding, the stability of the rail lines in some areas (ballast and track bed materials) may be at risk of becoming structurally unsound;
- Groundwater table rise due to climate change could also result in the instability of the rail lines due to the potential damage to track bed and ballast materials; and
- Certain areas of the rail lines are in areas at risk of high to very high liquefaction in the event of an earthquake.

In Contra Costa County, a total of 14 miles of rail is within the 100-year floodplain, including the coastal floodplain and the tidal creeks and channels. The information contained in the ART report includes only the area of the County from Richmond to Bay Point. Data from the East County ART was not available at the time of the completion of the Flow Study. This is shown in the following chart which is noted as Table 29 in the Contra Costa County ART Project document referenced above and is reproduced below.

Table 29. Miles of rail that could be exposed to sea level rise.

Rail Owner	Miles in the 100-year Floodplain	Miles exposed to Sea Level Rise					
		1'	2'	3'	4'	5'	6'
BNSF	2	2	2	2	4	5	7
Union Pacific	9	3	6	7	12	18	22
Unknown	2	2	3	4	5	8	10
Total	14	7	10	13	20	31	40

Roadways utilized in the transportation of hazardous chemicals in the coastal areas of Contra Costa County consist of Interstate highways, freeways or expressways, principal arterial roads, and major collector roads. Of the roadways evaluated in the coastal area of the County, 27.5 miles are within the 100-year floodplain, and 16.3 miles are potentially exposed to sea level rise. All 3 Interstate highways (I-580, I-80, and I-680) in the County carry high volumes of truck traffic throughout the area. The miles of roadways located within the current 100-year floodplain is shown in the following chart which is noted as Table 31 in the Contra Costa County ART Project document referenced above and is reproduced below.

Table 31. Roadways in the current 100-year floodplain and roadways that could be exposed to sea level rise.

Type of Road*	Total miles in project area	Miles in the current 100- year Flood	Miles exposed to Sea Level Rise					
			1'	2'	3'	4'	5'	6'
Interstate	22.7	3.3	1.3	1.3	1.4	1.4	1.6	2.2
Freeway or Expressway	33.7	2.2	0.1	0.1	0.1	3.1	3.5	3.5
Principal Arterial	20.3	2.1	0.0	0.1	0.1	0.1	0.2	0.2
Major Collector	124.9	19.9	0.8	1.1	1.4	1.9	6.9	10.4

*Note: there are no minor arterials in the project area

Table 32 from the same document shows the local streets and roads at risk of current or future flooding and is reproduced below.

Table 32. Local streets and roads at risk of current or future flooding.
Local Streets and Roads at Risk of Flooding*

Richmond		San Pablo	
Richmond Parkway		Rumrill Boulevard	
Castro Street		23 rd Street	
Rydin Road at Central Avenue		San Pablo Avenue at San Pablo Creek	
Pierce Street		Glint Road and Brookside Drive and numerous	
San Mateo Street at Belmont Avenue		local streets around Wildcat Creek and San Pablo	
Santa Clara Avenue at Yosemite Avenue		Creek	
Carlson Boulevard and Jacuzzi Street between the			
county line and Central Avenue			
Bayview Avenue and South 51st Street between E.			
Montgomery Avenue and I-580			
Hercules		Pinole	
Railroad Avenue at Santa Fe		Orleans Drive	
Bayfront Boulevard		Railroad Avenue	
Sanderling Drive		Tennant Avenue	
Martinez		Unincorporated County Areas	
Embarcadero Street		San Pablo Avenue, Parr Boulevard and Garden	
Joe DiMaggio Drive		Tract Road (North Richmond)	
North Court Street		San Pablo Avenue (Bayview-Montalvin)	
Marina Vista Avenue between Pine Street and		San Pablo and Parker Avenue (Rodeo)	
Alhambra Avenue		Dowdell Drive, Loring Avenue and Ralph Avenue	
Alhambra Avenue from HWY 4 to Marina Vista		(Crocket)	
Avenue, including adjacent local streets		Canyon Lake Drive (Port Costa)	
Pine Street at Escobar, and between Pacheco		Waterfront Road (from Martinez to Bay Point)	
Boulevard and Green		Solano and Monsanto Way	
Waterfront Road near I-680 to the county line		Main Street (Bay Point)	
Service Road and Waterbird Way			

*this is by no means exhaustive.

As with the railroads, portions of the freeways are susceptible to damage due to sea level rise or an elevation of the groundwater table. Also, in the event of disruption of transportation of commercial goods along the rail lines, significant stress will be placed on the roadways to move cargo and people through the area.

Numerous pipelines carry hazardous chemicals through the coastal areas of Contra Costa County. According to the Contra Costa County ART Project document, approximately pipelines carry 11% of transported goods, primarily liquid petroleum products through the County. Many of the pipelines are collocated with the rail lines, and issues due to rising tides and sea level rise could equally affect the pipelines, resulting in major chemical spills from the pipelines.

Using the Adapting to Rising Tides Bay Shoreline Flood Explorer, the project compiled data for three different scenarios:

- 12-Inch Sea Level Rise, Equivalent to King Tide with no Sea Level Rise;
- 24-Inch Sea Level Rise, Equivalent to 5-Year Storm Surge with no Sea Level Rise; and
- 36-Inch Sea Level Rise, Equivalent to 50-Year Storm Surge with no Sea Level Rise.

The above flooding scenarios were chosen due to various factors including likelihood of that flood event occurring. 12-Inch Sea Level Rise, for example, is equivalent to a King Tide, which is the highest predicted high tide of the year. A 5-Year Storm Surge has a one-in-five chance (20% chance) of occurring on any given year, and a 50-Year Storm Surge has a 2% chance.

Also, sea level rise probability predictions were considered. According to the State of California Sea Level Rise Guidance 2018 Update, sea level rise in the San Francisco area is predicted to be between six (6) to 10 inches by 2030 and 13 to 23 inches by 2050.

	Probability Distribution of Sea Level Rise (inches) by 2050					Risk Assessment	
	Median	50% probability of exceedance or exceeds	60% probability of exceedance or exceeds	5% probability of exceedance or exceeds	0.5% probability of exceedance or exceeds	1 in 100 chance	1 in 100 chance
High water table	0.4	0.3	0.5	0.6	0.8	10	18
Low water table	0.6	0.5	0.8	1.0	1.3	18	27
High water table	0.9	0.6	1.1	1.4	1.9	27	39
Low water table	1.0	0.6	1.3	1.6	2.4	39	52
High water table	1.1	0.8	1.5	1.8	2.6	52	66
Low water table	1.3	0.9	1.9	2.4	3.5	66	83
High water table	1.5	1.2	2.4	3.0	4.5	83	102
Low water table	1.7	1.4	2.9	3.6	5.7	102	
High water table	2.1	1.4	2.9	3.6	5.7		
Low water table	2.5	1.6	3.4	4.4	6.9		

For more information regarding probabilistic prediction, please see:
http://www.opc.ca.gov/webmaster/ftp/pdf/agenda_items/20180314/Item3_Exhibit-A_OPC_SLR_Guidance-rd3.pdf

For purposes of the CRA, only the 12-inch Sea Level Rise, equivalent to a King Tide with no Sea Level Rise will be used in the Chemical Plume analysis section of this report (Section 5).

These three scenarios for Richmond and Martinez areas of Contra Costa County are shown in the following three maps. Detailed maps covering the 12-inch Sea Level Rise,

equivalent to a King Tide with no Sea Level Rise will be provided with the various pinch point locations discussed in Section 5.





These three scenarios for the eastern portion of Contra Costa County were obtained from the Adapting to Rising Tides Eastern Contra Costa Shoreline Flood Explorer, and they are compiled in the following three maps. Detailed maps covering the 12-inch Sea Level Rise, equivalent to a King Tide with no Sea level Rise will be provided with the various pinch point locations discussed in Section 5.





4.1.2 California Healthy Places Index

The California Healthy Places Index (HPI) was used as an aid to determine more vulnerable populations for the CRA, including areas of lower income residential development. The HPI is available on line at <https://map.healthplacesindex.org/>. The HPI indicators were developed using the following data:

- Economic;
- Education;
- Transportation;
- Social;
- Clean Environment;
- Housing; and
- Healthcare Access.

The HPI Indicators are supported by a number of Decision Support Layers as follows:

- Health Outcomes;
- Health Risk Behaviors;
- Climate Change-Exposures;
- Climate Change-Social Vulnerability;
- Climate Change-Adaptive Capacity;
- Other Indices of Disadvantage;
- Other Decision Support Layers; and
- Race/Ethnicity.

Based on the above data, each area is given a percentile score which fall within the following parameters from "less" to "more" healthy conditions as follows:

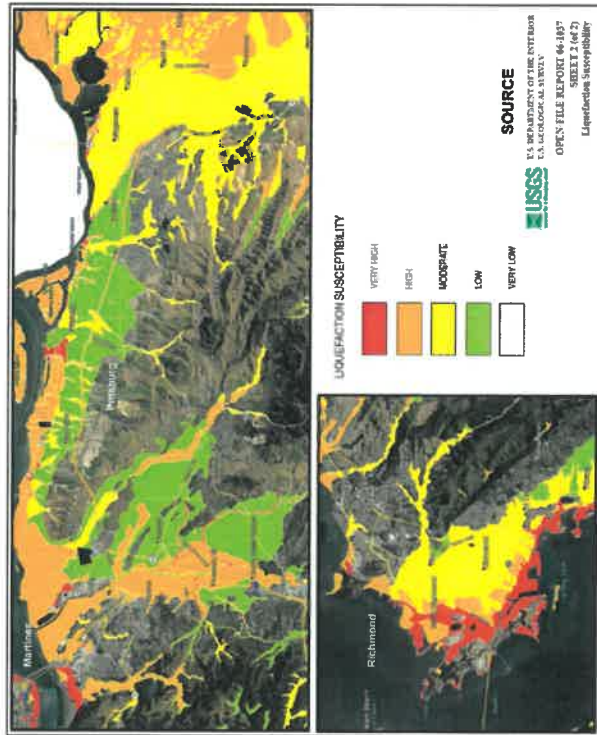
- 0-25 (least);
- 25-50;
- 50-75; or
- 75-100 (most).

A generalized map of Contra Costa County is shown below. Detailed maps will be provided with the various pinch point locations.



4.1.3 Liquefaction Susceptibility

Large areas of high to very high susceptibility to liquefaction during a seismic event are located in the coastal areas of Contra Costa County. Liquefaction occurs where saturated sand and silt assume the characteristics of a liquid during an intense shaking during an earthquake. These areas are considered to be vulnerable to disruption of rail and road traffic, as a result of an incident during an earthquake. Information on liquefaction susceptibility in Contra Costa County was obtained from the US Geological Survey on line data at <https://earthquake.usgs.gov/learn/topics/geologicmaps/liquefaction.php>. A generalized map of high to very high liquefaction susceptibility in the County is shown below. Detailed maps will be provided with the various pinch point locations.



4.1.4 CalARP Facilities

Contra Costa Health Services provides an on-line listing of sites that are part of the California Accidental Release Prevention (CalARP) Program at <https://cchealth.org/hazmat/rmp/>. Locations of CalARP facilities added in the determination of the pinch points, as hazardous chemical from some of the CalARP sites were transported through the area along the railroads and roadways. Some of the CalARP facilities are considered to be critical operating facilities, as they include water treatment and energy generation /transfer facilities, as well as large economic centers.

In the event of rail incident resulting from derailment or other cause due to rising tides and subsequent flooding, major rail transport of manufactured goods, including hazardous materials via rail may be seriously disrupted for unspecified periods of time. Alternate shipping routes, including other rail lines, arterial roadways, and ports will be subjected to increased volumes of traffic, potentially resulting in increased transportation-related incidents along all transportation lines.

Currently, a Hazardous Materials Commodity Flow Study is being undertaken for 11 California deep water ports, including the Port of Richmond by Dr. George Lane of the Center for Catastrophic Risk Management of the University of California at Berkeley. This study is being funded by CalOES, and the results are separate from this project.

A map locating the CalARP facilities in the coastal areas of Contra Costa County is shown below.



4.1.5 Critical Facilities and Vulnerable Populations

The locations of critical facilities were used as an aid in determining the locations of the pinch points. Critical facilities located in the coastal areas of Contra Costa County can be summarized as follows:

- City, County, Federal Buildings
 - City Hall
 - Civic Centers
 - City Administrative Buildings
 - Local Police Departments
 - Public Libraries
 - Public Works
 - County Administrative Buildings
 - Sheriff Departments
 - Animal Shelters
- Fire Stations
- Hospitals and Emergency Medical Care
 - Hospitals
 - Clinics
 - Urgent Care
 - Surgical Services
- Nursing and Convalescent Homes
 - Nursing Homes
 - Residential Care
 - Assisted Living Centers
- Community Centers/Shelters
 - Community Centers
 - Rescue Missions
 - Homeless Shelters
- Schools
 - Colleges
 - High Schools
 - Middle Schools
 - Elementary Schools
 - Specialty Schools
 - Preschools

Many of these facilities are relevant to other hazards than the release of hazardous materials. As a result, and for the purposes of this CRA, critical facilities will refer to facilities that may contain vulnerable or essential emergency populations that will require mitigation/evacuation in the event of a hazardous materials release.

A list of these critical facilities, which are located within one to two miles of the pinch points is contained in Appendix B. Maps showing the critical facilities listed above are contained in the following pages.

The locations of critical facilities in relation to the identified pinch points was of primary concern. Other factors including location of railroads and arterial roadways, liquefaction potential, rising tides issues, and California Healthy Places also played a cumulative role in the determination of each of the pinch points.

Pinch Point Richmond #1 is located along a major north-south rail corridor in the city of Richmond. Most of the critical facilities for Pinch Point Richmond #1 are located east of the pinch point, which is equivalent to the prevailing downwind direction. Much of this area is in commercial and residential land use. Most of the area west and southwest of the pinch point is industrial.



Pinch Point Richmond #2 is located along a major north-south rail corridor and rail siding in the city of Richmond. Most of the critical facilities for Pinch Point Richmond #2 are located east of the pinch point, which is equivalent to the prevailing downwind direction. Much of this area is in commercial and residential land use. Downtown Richmond is located directly east of the pinch point. Most of the area west of the pinch point is industrial.



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Pinch Point Martinez #3 is located along the major UP rail line entering the Martinez area from the coast to the west. Most of the critical facilities for Pinch Point Martinez #3 are located southwest and south of the pinch point. Much of the area southwest of the pinch point is in commercial and residential land use and downtown Martinez is located in this direction. Most of the area to the south of the pinch point is residential. Industrial areas, including oil refineries, are located east of the pinch point, which is equivalent to the downwind direction. Industrial areas are also located north and west of the pinch point.

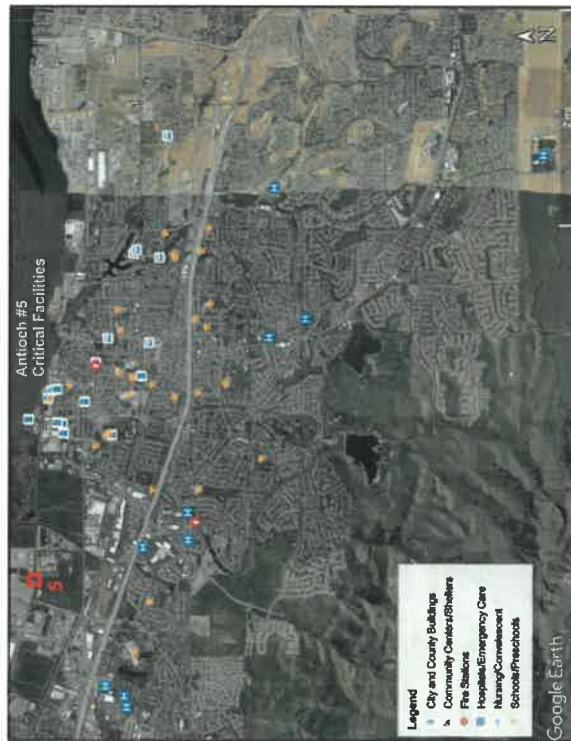


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Pinch Point Bay Point #4 is located at the intersection of the major UP and BNSF rail lines heading east from Martinez. Most of the critical facilities for Pinch Point Bay Point #4 are located east-southeast of the pinch point. The major portion of the cities of Bay Point and Pittsburg, including the commercial, residential, and downtown areas of these cities. These cities are partially downwind of the prevailing wind direction. The area directly west of the pinch point are primarily industrial and natural coastal areas.



Pinch Point Antioch #5 is along the BNSF rail heading east from Martinez. Most of the critical facilities for Pinch Point Antioch #5 are located east and east-southeast (downwind) of the pinch point and includes a major portion of the city of Antioch, including the commercial, residential, and downtown areas of the city. The area surrounding the pinch point are primarily industrial and natural coastal areas.



4.1.6 Chemicals of Concern

Based on the Flow Study from the railroads, it was determined that the following 3 chemicals of concern would be used in the CRA portion of this study to cover worst-case scenario situations at the pinch points in the event of a hazardous materials incident/accident:

- Ammonia/anhydrous ammonia: highly toxic;
- Propane: highly explosive and commonly transported along the railroads in Contra Costa County; and
- Sulfuric acid: commonly transported along the railroads in Contra Costa County.

These chemicals are discussed in detail in subsequent sections of this report.

4.1.7 Background Weather Data

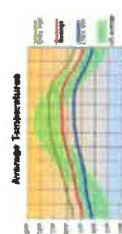
Background weather data for use in the plume diagrams were obtained from the following websites:

- Weather data for the city of Martinez was obtained from <http://www.city-data.com/>
- Detailed wind data were obtained from <https://weatherspark.com>

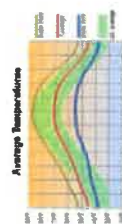
Weather for the coastal regions of Contra Costa County was available for several cities within the County. For the most part, weather patterns for the coastal cities are very similar, as shown by the weather data below. This information was used as the basis of the weather patterns for this study. Wind direction is a critical component of toxic plume analysis, as it determines the direction which the plume will travel over the land surface.

CONTRA COSTA COUNTY CITY WEATHER PATTERNS

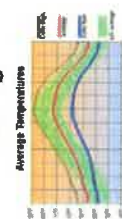
Richmond



Martinez



Pittsburg



The wind data for each of the 3 above cities is very similar and can be considered as representative of the coastal area of Contra Costa County as a whole. Based on the wind data, the major wind directions for the County are from the west during the period from February through November, and from the north from November through February.

Based on the weather data above, it was determined that in that the major wind direction from the west occurred throughout most of the year. As a result, the plume analysis utilized in this report will cover an incident occurring in July.

4.1.8 Railroads

Railroads in Contra Costa County primarily of the following railroad lines:

- Union Pacific Railroad (UP);
- Burlington Northern and Santa Fe Railroad (BNSF);
- Richmond Pacific Railroad Company (RPRC); and
- Bay Area Rapid Transit (BART).

Detailed information on the railroads in Contra Costa County can be obtained from the following source:

U.S. Department of Transportation, Federal Railroad Administration, on line at <https://trails.fra.dot.gov/gis/frasafev/>

A generalized map showing the rail lines and freight stations for Contra Costa County was compiled from the above source and is shown below.



Two major rail lines are located in the coastal areas of Contra Costa County. UP operates along the shoreline area of the County from Richmond to past I-680 through Martinez, where it is directed easterly toward Pittsburg, and then southeasterly toward Tracy. BNSF operates from Richmond along the coast to Pinole where it heads inland to Martinez where it joins the UP line. BNSF is directed easterly toward Pittsburg, and then on to Stockton. RPRC leases about 11 miles of UP track in the western part of Richmond. The UP rail line is also used by passenger/commuter trains.

Many of the rail lines are co-located with underground pipelines, particularly along the coastal areas. Portions of the rail lines are located in areas of 12-inch (and greater) sea level rise, as well as in some areas of high to very high liquefaction which could be caused by earthquake events. Rail lines in these areas could become compromised, resulting in

potential hazardous materials incidents due to derailment or other causes. In addition, disruption of commercial rail traffic could result in significant increases in commodity flow along major arterial roadways and highways throughout the coastal areas of Contra Costa County. It is also important to note that the rail lines that act as ad hoc flood protection could result in more significant flooding in surrounding areas due to overtopping effects.

Each of the pinch points discussed in the CRA are located along or adjacent to railroad lines. These locations are considered to be higher risk, due to one or more factors discussed above in Sections 4.1.1 through 4.1.7.

4.1.9 Roadways

As discussed above in Section 4.1.8, disruption of commercial rail traffic could result in increased commodity flow via trucks along various arterial roads and highways in the vicinity of the pinch points. This also results in a higher risk of a hazardous materials incident occurring along the roadways. In addition, inundation of the areas of the pinch points by water, due to rising tides or disruption of rail traffic due to seismic events could also affect the ability to move commercial goods via roadways.

In consideration of transporting hazardous materials via rail, primarily within rail tanker cars, it should be noted that one tanker car can generally contain 2 to 3 times the amount of commodity than one tanker truck. This will put significant pressure on trucking commodities through neighborhoods of vulnerable populations and critical facilities. It is also possible that highway transport may not be a viable option in areas of flooding, as the roadways themselves may also be closed.

Any increase in trucking of hazardous materials through vulnerable neighborhoods will increase the potential for hazardous materials incidents to occur. Due to the stress placed on the roadways, and the potential for less-than-ideal road conditions during flooding activities, the increase in highway related hazardous materials transportation incidents may be additionally increased.

Based on the comparison of the amount of trucks that would be required to transport specific hazardous materials, such as sulfuric acid, which would normally be transported by rail would be dependent on the amount of rail cars that would be disrupted on a time-dependent basis. Unless, materials can be transported on still-operating rail lines or through the ports, then the additional stress in highway transport will be significant. In the event of a large rail incident scenario, a major disruption of commerce through the County could result in a cessation of manufacturing operations for an unspecified amount of time.

The major arterial roads and highways, which could be subject to increased truck traffic, including increased hazardous materials transport for each of the pinch points are as follows:

ARTERIAL ROADS AND HIGHWAYS	
PINCH POINT LOCATION	ARTERIAL ROADS AND HIGHWAYS
Richmond #1	I-580
	Carlson Blvd.
	Potrero Ave.
	Regatta Blvd.
Richmond #2	I-580
	Richmond Parkway
	Barrett Ave.
	McDonald Ave.
	W. Ohio Ave.
Martinez #3	I-680
	Marina Vista Ave.
	Shell Ave.
	Pacheco Blvd
	CA-4
Bay Point #4	CA-4
	Kinney Blvd.
	Port Chicago Highway
Antioch #5	CA-4
	W. 10th Street

4.2 Release Plume Analysis

Plume diagrams for release of hazardous materials from the pinch points are contained in this section. The plume diagrams are determined using the CAMEO suite of programs created by the U.S. Environmental Protection Agency (EPA). The CAMEO suite consists of CAMEO chemicals, ALOHA plume modeling through various release scenarios, and MARPLOT, which assists in plotting the information onto various map bases, such as Google Earth.

The plume diagrams are utilized in determining the extent of threat zones based on the release of a particular chemical. Three threat zones are mapped for each chemical release:

- Red zone: Highest threat level
- Orange Zone: Moderate threat level
- Yellow Zone: Low threat level

The following information was also utilized in the preparation of the plume maps:

- Assumed weather conditions at the time of release;
- Identity and amount of chemical released;
- The amount of the chemical entering the vapor phase (air);
- Location of the release; and
- Time and date of release.

4.2.1 Background Plume Analysis Parameters

The following information was obtained from the National Oceanic and Atmospheric Administration (NOAA), Office of Response and Restoration guidelines concerning Levels of Concern (LOCs), which are available on line at:

<https://response.restoration.noaa.gov/oil-and-chemical-spills/chemical-spills/resources/levels-concern.html>

A Toxic LOC will determine what level (threshold concentration) of inhalation exposure to a chemical would be injurious if inhaled over a defined length of time (exposure duration). In general, the lower the Toxic LOC value, the more toxic the substance is by inhalation.

ALOHA (Areal Locations of Hazardous Atmospheres) is used for emergency response or planning situations to assess the threat posed to the general public by a chemical release. ALOHA utilizes public exposure guidelines to predict how members of the general public would be affected if they are exposed to a particular hazardous chemical in an emergency response scenario.

ALOHA preferentially uses Acute Exposure Guideline Levels (AEGLs), as they are considered to be the best public exposure Toxic LOCs. As of mid-2016, AEGLs had been finalized for about 175 chemicals. ALOHA uses only the AEGL values for a 60-minute exposure duration.

AEGLs are subdivided into 3 tiers which correspond to specific health effects. The AEGL tiers and their corresponding threat levels are as follows:

- AEGL-3: Red Threat Zone Level
- AEGL-2: Orange Threat Zone Level
- AEGL-1: Yellow Threat Zone Level

A more detailed discussion of the AEGLs is copied from the NOAA data at <https://response.restoration.noaa.gov/oil-and-chemical-spills/chemical-spills/resources/acute-exposure-guideline-levels-aeqls.html> as follows.

What are AEGLs? • top

AEGLs estimate the concentrations at which most people—including sensitive individuals such as old, sick, or very young people—will begin to experience health effects if they are exposed to a hazardous chemical for a specific length of time (duration). For a given exposure duration, a chemical may have up to three AEGL values, each of which corresponds to a specific tier of health effects.

The three AEGL tiers are defined as follows:

- **AEGL-3** is the airborne concentration, expressed as parts per million (ppm) or milligrams per cubic meter (mg/m^3), of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.
- **AEGL-2** is the airborne concentration (expressed as ppm or mg/m^3) of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
- **AEGL-1** is the airborne concentration (expressed as ppm or mg/m^3) of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic non-necessary effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

All three tiers (AEGL-1, AEGL-2, and AEGL-3) are developed for five exposure periods: 10 minutes, 30 minutes, 60 minutes, 4 hours, and 8 hours. The table below shows how the Chlorine AEGL values vary with exposure duration.

Final AEGLs for chlorine (in parts per million)

	10 minutes	30 minutes	60 minutes	4 hours	8 hours
AEGL-1	0.50	0.50	0.50	0.50	0.50
AEGL-2	2.8	2.8	2.0	1.0	0.71
AEGL-3	50	28	20	10	7.1

Typically, the AEGL values will be different for each exposure duration (such as the AEGL-3 values in the table above). This is because the physical effects are typically related to dose (that is, concentration over exposure duration). However, in some cases, the AEGL values will be the same for all durations. This situation usually occurs at the AEGL-1 level (as in the table above), because it is a threshold for non-disabling effects; some effects (for example, whether people will be able to smell the chemical) depend only on concentration—not on the length of time people are exposed.

4.2.2 Chemicals of Concern for Plume Analysis

Based on the information contained in the Flow Study, the 3 most common chemicals defined as an inhalation hazard that were observed travelling through Contra Costa County via rail and highway that were of major concern from a release incident standpoint were anhydrous ammonia (UN ID #1005, STCC ID #4904210), propane (UN ID #1075, STCC ID #291211), and sulfuric Acid (UN ID #1830, STCC ID #2819314). In the event of a release of these chemicals, isolation and protective distances from the release point will need to be employed as outlined in the 2016 Emergency Response

Sulfuric acid 7664-93-9 (Interim)

	10 min	30 min	60 min	4 hr	8 hr
(mg/m ³) 11/20/06					
AEGL 1	0.20 mg/m ³	0.20 mg/m ³	0.20 mg/m ³	0.20 mg/m ³	0.20 mg/m ³
AEGL 2	8.7 mg/m ³	8.7 mg/m ³	8.7 mg/m ³	8.7 mg/m ³	8.7 mg/m ³
AEGL 3	270 mg/m ³	200 mg/m ³	160 mg/m ³	110 mg/m ³	93 mg/m ³

NOTE: THAT VALUES ARE IN mg/m³, NOT ppm.

IMPORTANT NOTE: Interim AEGLs are established following review and consideration by the National Advisory Committee for AEGLs (NAC/AEGL) of public comments on Proposed AEGLs. Interim AEGLs are available for use by organizations while awaiting NAC/NAS peer review and publication of Final AEGLs. Changes to Interim values and Technical Support Documents may occur prior to publication of Final AEGL values. In some cases, revised interim values may be posted on this Web site, but the revised Interim Technical Support Document for the chemical may be subject to change. (Further information is available through AEGL Process).

4.2.3 Basis for Plume Analysis

The plume analysis diagrams contained in Section 4 are based on the following parameters:

- Weather Conditions: Both January and July data represent 2 separate endpoints of weather conditions in Contra Costa County, and the following weather parameters are included in the analysis:
 - Differing wind directions
 - Wind speed
 - Temperature extremes. (The average high temperatures for January and July are used in the analysis)
 - Cloud cover
- COCs: Utilization of ammonia/anhydrous ammonia, propane, and sulfuric acid as the COCs.
- Worst-Case Scenario: Assumption that a worst-case scenario situation where a maximum amount of the COCs from railroad tanker car are released to the environment. By utilizing the worst-case scenario default situation, the plume analysis diagrams will allow for a more significant area of impact than may be encountered in a realistic scenario.

4.3 Ammonia Gas Summary

The release scenarios outlined above in Section 4.2 are considered to be a worst-case scenario in the case of a rail tank car holding 34,397 gallons of ammonia that has ruptured due to derailment due to flooding along the railroad or other cause. This has resulted in the release of a toxic cloud of liquefied ammonia from the pressurized tanks directly to the atmosphere. The ammonia quickly combines with moisture in the air, vaporizes, and forms a toxic cloud migrating downwind from the source.



Information concerning the characteristics of ammonia and anhydrous ammonia and the migration of an ammonia gas cloud is well represented in the literature, and the general information summarized here was obtained from the following references:

- Centers for Disease Control and Prevention (CDC), Ammonia Solution (UN3318): Ammonia, Anhydrous (UN1005): Lung Damaging Agent on line at https://www.cdc.gov/niosh/ershdb/emergencysresponsecard_29750013.html.
- United States Department of Labor, 2018, Ammonia Refrigeration Emergency Response, on line at https://www.osha.gov/SLTC/ebooks/ammonia_refrigeration/emergency/index.html.
- United States Department of Labor, 2018, Ammonia Refrigeration Properties of Ammonia, on line at https://www.osha.gov/SLTC/ebooks/ammonia_refrigeration/ammonia/index.html.

Illinois Fertilizer and Chemical Association, 2018, *Fertilizer's Role in Agriculture*, on line at
https://www.ifca.com/mediafiles/27_3.pdf.

Transcaer, Section 4, Anhydrous Ammonia Response, on line at
https://www.transcaer.com/docs/AA/Tour/Transcaer_Amonia_Training_2011Response_IG_rev14.pdf.

Airgas, February 15, 2018, Ammonia Safety Data Sheet, on line at
<https://www.airgas.com/msds/001003.pdf>.

Ammonia/anhydrous ammonia is one of the highest production chemicals in the United States. It is used in manufacturing, refrigeration, and as an agricultural fertilizer, and is common in household chemicals. Ammonia can be absorbed into the body by inhalation, ingestion, and by skin and eye contact. A poisonous and visible vapor cloud is produced when ammonia comes in contact with water. Ammonia is extremely corrosive, and when it mixes with air it forms an explosive mixture. Although anhydrous ammonia is classified by the U.S. Department of Transportation (USDOT) as nonflammable, ammonia vapor is flammable at concentrations of 15% to 28% by volume of air.

The odor threshold for ammonia is between 5 and 50 parts per million (ppm) of air, and the permissible exposure limit (PEL) is 50 ppm over an 8-hour time period. The USDOT summarizes the properties of ammonia as follows:

Summary of properties

Boiling Point	-28°F
Weight per gallon of liquid at -28°F	5.69 pounds
Weight per gallon of liquid at 60°F	5.15 pounds
Specific gravity of the liquid (water=1)	0.619
Specific gravity of the gas (air=1)	0.588
Flammable limits in air	16-25%
Ignition temperature	1204°F
Vapor pressure at 0°F	16 psi
Vapor pressure at 68°F	110 psi
Vapor pressure at 100°F	198 psi
One cubic foot of liquid at 60°F expands to	850 cubic foot of gas

Ammonia can be absorbed into the body by inhalation, ingestion, and by skin and eye contact. According to the CDC exposure to dangerous concentrations of ammonia may result in the following symptoms:

- Rapid eye irritation and burning sensation, and possible severe corrosive eye injury;
- Upon ingestion, nausea, vomiting abdominal pain and corrosive burns to the mouth, esophagus, and stomach;
- Skin inflammation, including blistering, tissue death, and deep penetrating burns; and
- Exposure to liquefied ammonia gas may lead to severe frostbite and burns.

Characteristics of ammonia/anhydrous ammonia are contained on an Airgas Safety Data Sheet (Appendix C).

Ammonia is generally transported via highway in high-pressure nurse tanks on trailers pulled by trucks, or truck cargo tankers. Each truck cargo and carry 20 tons of ammonia. Ammonia can be transported in pressurized rail cars containing 80 tons of ammonia. The majority of ammonia is transported by rail. Fixed facilities that use ammonia for refrigeration purposes may contain pressurized tanks of ammonia.

Ammonia gas is lighter than air, and when it comes in contact with moisture in the air, it will form an ammonia fog. Once it forms a fog, however, the fog is heavier than air and is likely to remain low to the ground. This fog or cloud is white in color. The ammonia fog can travel along the ground aided by wind in the direction of the prevailing wind. Higher temperatures will cause the ammonia cloud to move and disperse more rapidly than colder temperatures.



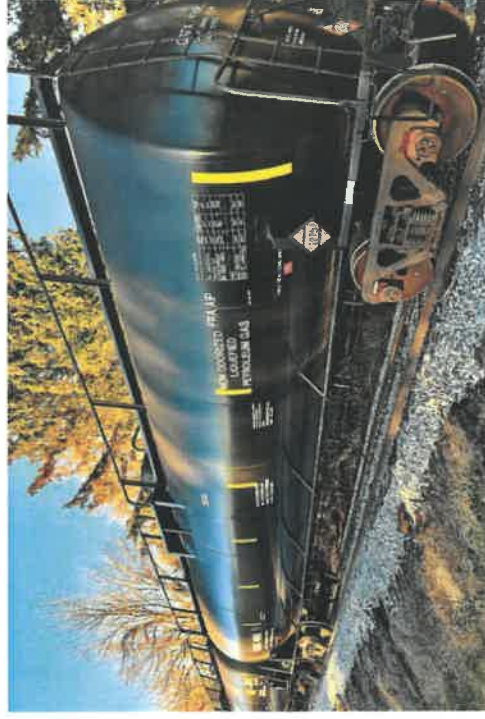
Emergency response to an ammonia release is covered in detail in the above-referenced CDC document and is summarized below:

- Red Zone: (generally corresponds to Red Zone of ALOHA plume designation): Personal Protective Equipment (PPE) in Level A or Level B should be used. In this zone, the exposure to chemical hazards, is above IDLH or greater than AEGL-2.

- **Yellow Zone** (generally corresponds to Orange Zone of ALOHA plume designation):
PPE in Level C, with canister-type gas mask for ammonia levels in air above AEGL-2,
and particulate cartridge/filter combination or a continuous flow respirator for ammonia
levels in air above AEGL-1.
 - **Green Zone** (Generally corresponds to Yellow Zone of ALOHA plume designation):
Level D when exposure limit is less than AEGL-1.
- In addition, the CDC recommends the following initial isolation and protective action distances:
- **When UN 1005 (anhydrous, liquefied), UN 2073 (35% to 50%), or UN 3318 (> 50%)** is involved in a tank, rail car, or tank truck fire:
 - Isolate it for 1 mi (1600 m) in all directions; also, consider initial evacuation for 1 mi (1600 m) in all directions.
 - **When UN 1005 (anhydrous, liquefied) or UN 3318 (> 50%)** is involved in small spills (involving the release of approximately 52.83 gallons (200 liters) or less):
 - First isolate in all directions: 100 ft (30 m).
 - Then protect persons downwind during the day: 0.1 mi (0.1 km).
 - Then protect persons downwind during the night: 0.1 mi (0.1 km).
 - **When UN 1005 (anhydrous, liquefied) or UN 3318 (> 50%)** is involved in large spills (involving quantities greater than 52.83 gallons (200 liters)):
 - First isolate in all directions: 200 ft (60 m).
 - Then protect persons downwind during the day: 0.4 mi (0.6 km).
 - Then protect persons downwind during the night: 1.4 mi (2.2 km).

4.4 Propane Summary

The release scenarios outlined above in Section 4.2 are considered to be a worst-case scenario in the case of a rail tank car holding 34,397 gallons of liquefied petroleum gas (propane) that has ruptured due to derailment along the railroad or other cause. This has resulted in the release of the contents of the tank car to the environment.



Information concerning the characteristics of propane and the mitigation of a propane release incident are summarized here, and the data were obtained from the following references:

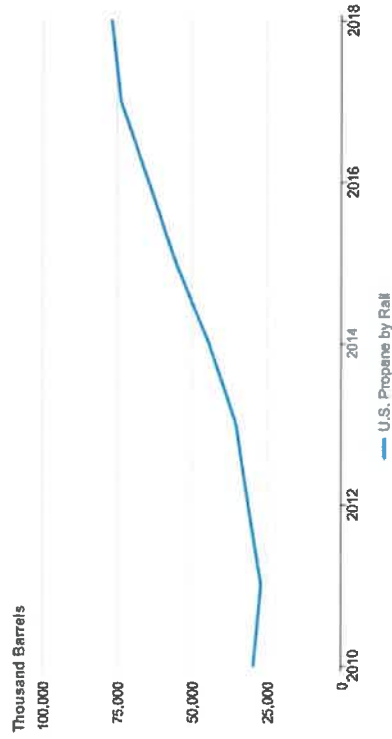
- Alternative Fuels Data Center, Propane Production and Distribution, U.S. Department of Energy, 2019, on line at https://afdc.energy.gov/fuels/propane_production.html.
- Linde, Industrial Gases, Propane, 2019, on line at https://www.linde-gas.com/en/products_and_supply/gases_fuel/propane.html.
- U.S. Energy Information Administration, Petroleum and Other Liquids, 2019, on line at https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pets&s=esm_epilpa_rail_nus-nus_mbb1&f=a.
- Ferrellgas (Blue Rhino), 2018, Safety Data Sheet, Propane, on line at https://www.ferrellgas.com/media/66083/sds_propane_12_18.pdf.

U. S. Department of Transportation, 2016 Emergency Response Guidebook.

Propane is a by-product of natural gas processing and crude oil refining and is produced from liquid components recovered during natural gas processing. Propane is a colorless, highly flammable liquefied gas and is one of the main components of liquid petroleum gas (LPG). Propane is used as a vehicle fuel, as well as for industrial and domestic heating. It is also a specialty gas employed as a refrigerant and an aerosol propellant.

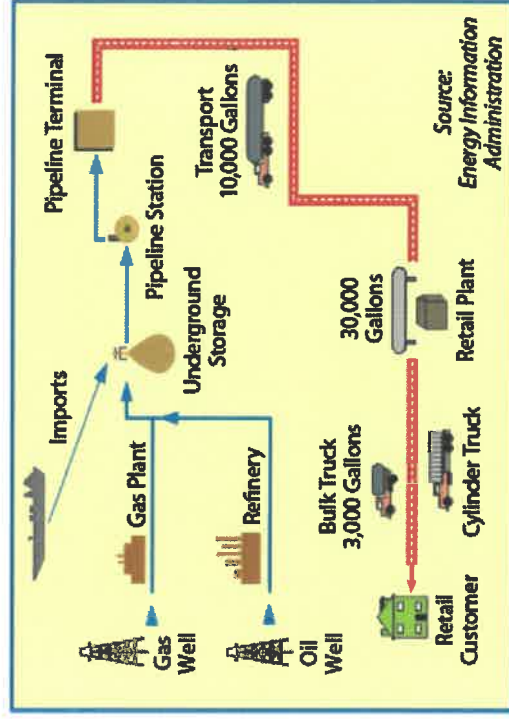
Propane production has increased over the last several years, and shipments by rail attained more than 75,000 thousand barrels in 2018 as shown below in the U.S. Energy Information Administration data:

U.S. Propane by Rail



 Source: U.S. Energy Information Administration

A typical propane distribution route from producer to consumer is contained in the Alternative Fuels Data Center information, and is shown as follows:



Schematic of a typical propane distribution route (Source: EIA (<https://www.eia.gov/>))

Propane is heavier than air and is identified under United Nations (UN) Guide in the Department of Transport Emergency Response Guidebook (ERG) as No. 1075. The details concerning transportation information from the Ferrellgas (Blue Rhino) Safety Data Sheet (SDS) are shown below:

U.S. Department of Transportation (DOT)
UN Number: 1975 or 1075
Proper shipping name: Propylene
Transport hazard class(es): 2; 3;
Packing group: None
DANGER: This product does not meet the DOT's HAZARDOUS criteria of a marine pollutant.
Special precautions for user: For domestic transportation only, UN 1975 may be substituted for the UN number shown as long as the substitution is consistent on package markings, shipping papers, and emergency response information. See 49 CFR 175.102 Subsection I(6).
Hazardous materials section: The hazardous materials section must be marked either "HOLD-COORIZED" or NOT COORIZED as of September 20, 2008 (49 CFR 175.301(a)(7), 358(c)(1) and 358(d)).
September 20, 2008 (49 CFR 175.301(a)(7), 358(c)(1) and 358(d))
Respond to bulk according to Annex 1 of MARPOL 73/78 and the IBC Code. Not applicable.

The railroad Standard Transportation Commodity Code (STCC) for propane is 2912111.

The summary of the physical properties of 93% sulfuric acid is reproduced from the Ferrellgas SDS and is as follows:

Appearance: Colorless
Physical Form: Liquid Gas
Odor: No distinct odor (or skunk, rotten egg or
garlic if odorant added)
Odor Threshold: No data
Vapor Pressure: 238 psia (Red VP) @ 100°F / 37.6°C
Flash Point: -156°F / -104°C
Upper Explosive Limits (vol % in air): >1
Lower Explosive Limits (vol % in air): 5.5
Vapor Density (air=1): 2.1
Evaporation Rate (nBuAc=1): >1
Particle Size: Not applicable
Solubility: No data
Flammability (solid, gas): Extremely Flammable
Stability: No data
Solubility in Water: Negligible

Propane is biodegradable, and will readily evaporate into the environment. Inhalation of propane in minor amounts is not considered toxic; however, large amounts of propane in the air can displace oxygen and act as an asphyxiant. Skin absorption and ingestion of propane is not anticipated, although contact with propane in the liquid phase may result in frostbite.

Propane is highly flammable and explosive, and spillages of large quantities of liquid propane will vaporize to propane gas. Propane vapors can travel considerable distances. An ignition source may cause propane to ignite, flash back, and explode. Propane explosions can result in Boiling Liquid Expanding Vapor Explosion (BLEVE). The U.S. Department of Transport Emergency Response Guidebook (ERG) has determined general evacuation distances to be undertaken in the event of propane-induced BLEVE, and they are outlined below.

WARNING: The data given are approximate and should only be used with extreme caution. These lines can vary from situation to situation. LPG levels have been known to BLEVE within minutes. Therefore, never risk life based on these lines.

BLEVE (USE WITH CAUTION)									
Capacity	Diameter	Length	Propane Mass	Minimum time to allow for evacuation (min)	Radius (feet)	Pressure (psi)	Energy (ft-lb)	Minimum evacuation distance (feet)	Propane evacuation distance (feet)
100 (24.6)	0.3 (1)	1.5 (4.3)	40 (80)	4	10 (3)	90 (25)	154 (50)	207 (100)	54.5
400 (104)	0.8 (2)	1.5 (4.3)	160 (320)	4	18 (5)	90 (25)	244 (81)	400 (195)	102.3
2000 (500)	0.8 (2)	3 (8.5)	800 (1600)	5	20 (6)	111 (34)	417 (138)	834 (375)	204
4000 (1000)	1 (2.5)	4.0 (12.3)	1600 (3200)	5	25 (7)	140 (44)	526 (173)	1050 (444)	262
8000 (2000)	1.25 (3.1)	5.5 (16.5)	2500 (5000)	6	32 (9)	170 (52)	681 (218)	1328 (484)	334
22000 (5500)	2.1 (5.3)	6.7 (20)	8800 (17600)	7	52 (15)	267 (81)	1026 (330)	1652 (607)	409
42000 (10500)	2.1 (5.3)	11.8 (35.7)	16800 (33600)	7	77 (22)	266 (80)	1148 (378)	2209 (720)	552
82000 (20500)	2.75 (7)	13.7 (41)	32800 (65600)	8	91 (26)	353 (107)	1538 (478)	2500 (726)	626
140000 (35000)	3.5 (10.8)	17.2 (52.4)	56000 (112000)	9	114 (33)	457 (140)	1915 (575)	3205 (726)	800

4.5 Sulfuric Acid Summary

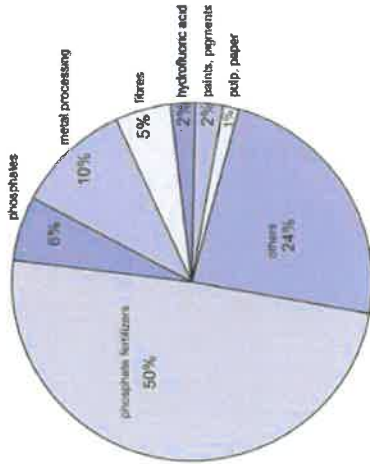
The release scenarios outlined above in Section 4.2 are considered to be a worst-case scenario in the case of a rail tank car holding 13,350 gallons of 93% sulfuric acid that has ruptured, and a release of the contents of the tank car to the environment has occurred following a derailment due to flooding along the railroad or other cause.



Information concerning the characteristics of 93% sulfuric acid and the mitigation of a spill are summarized here, and the data were obtained from the following references:

- Sulfuric Acid, The Essential Chemical Industry-online, 2019, on line at <http://www.essentialchemicalindustry.org/chemicals/sulfuric-acid.html>.
- Columbus Chemical Industries, Inc., January 22, 2015, Sulfuric Acid, 93% PC, Safety Data Sheet, on line at <https://www.columbuschemical.com/MSDS/SDS/Sulfuric%20Acid%2093%20PC%205665.pdf>.
- J. R. Simplot, July 28, 2017, Sulfuric Acid 93% Safety Data Sheet, on line at <https://sds.simplot.com/datasheets/16020.pdf>
- Deerpont Group, Inc., Material Safety Data Sheet, Sulfuric Acid 93%, on line at <https://assets.greenbook.net/M122570.pdf>
- U. S. Department of Transportation, 2016 Emergency Response Guidebook.

Sulfuric acid is one of the most important compounds manufactured by the chemical industry and is used to make hundreds of other compounds needed by other industries. Sulfuric acid is used widely in the manufacture of phosphoric acid in the fertilizer industry, as well as in the metal processing industry. Annual production of sulfuric acid in the United States is 37,000,000 metric tonnes. Uses of sulfuric acid are shown in the following diagram, which was reproduced from the Essential Chemistry on-line, is as follows:



Sulfuric acid is a highly corrosive material, and is identified under United Nations (UN) Guide in the Department of Transport Emergency Response Guidebook (ERG) as No. 1830. The details from the J.R. Simplot Safety Data Sheet (SDS) are shown below:

Department of Transportation (DOT)

In accordance with DOT

- Transport document description
UN-No.(DOT)
Proper Shipping Name (DOT)
Class (DOT)
Packing group (DOT)
Hazard labels (DOT)

- : UN1830 Sulfuric acid, 8, II
: UN1830
: Sulfuric acid
: 8 - Class 8 - Corrosive material 49 CFR 173.136
: II - Medium Danger
: 8 - Corrosive



The railroad Standard Transportation Commodity Code (STCC) for sulfuric acid is 49300040. The summary of the physical properties of 93% sulfuric acid is reproduced from the Columbus Chemical SDS and is as follows:

Appearance (physical state, color, etc.)	Clear, colorless liquid.
Odor	Odorless.
Odor threshold	Not Available
pH	Not Available
Melting point/freezing point	Not Available
Initial boiling point and boiling range	Not Available
Flash point	Not Available
Evaporation rate	Not Available
Flammability (solid, gas)	Not Flammable
Upper/lower flammability or explosive limit	Not Explosive
Vapor pressure	Not Available
Vapor density	Not Available
Density	1.8350 (water = 1)
Solubility (ies)	Soluble in water.
Partition coefficient: n-octanol/water	Not Available
Auto-ignition temperature	Not Available
Decomposition temperature	Not Available

Sulfuric acid is not considered to be harmful to aquatic organisms or to cause long-term effects to the environment. However, exposure to sulfuric acid can cause skin and eye burns, is destructive to the tissues of the upper respiratory tract if inhaled, and is harmful, and may be fatal, if ingested. The American Conference of Governmental Industrial Hygienists (ACGIH) and the Occupational Health and Safety Administration (OSHA) data for 93% sulfuric acid, as noted in the J. R. Simplot SDS is as follows:

Sulfuric Acid 93%	
ACGIH	ACGIH TWA (mg/m ³)
ACGIH	0.2
OSHA	ACGIH TWA (ppm)
OSHA	0.0485 ppm
OSHA	OSHA PEL (TWA) (mg/m ³)
OSHA	1
OSHA	OSHA PEL (TWA) (ppm)
OSHA	0.25

Spill cleanup of large spills of sulfuric acid should be undertaken by isolating the spill area with diking materials, including isolation from waterways. The acid can be treated with soda ash or lime, although neutralization will resolve a release of heat. Sulfuric acid is not flammable, but can be highly reactive with combustible materials.

Sulfuric acid spills are not considered as toxic, but can form a gray cloud. If sulfuric acid is mixed with water, it reacts vigorously forming an exothermic reaction. A vapor cloud of sulfuric acid can mix with water or water vapor to form a white cloud, which, based on the specific gravity is heavier than air.

Evacuation guidelines are contained with the ERG, and the isolation distance in the event that a fire is involved is ½ mile in all directions. The response guidelines in the ERG are shown below. Although there is no stated isolation distance in the event of a sulfuric acid spill, or a

spill into water, the ERG guidelines with respect to fire should be used as a basis for evacuation and mitigation.



5.0 Chemical Plume Analysis

This section contains plume analysis for Toxic LOCs for the COCs ammonia, propane, and sulfuric acid based on the input of specific parameters, as outlined above in Section 4.2.2. As noted above, these parameters have been determined to illustrate a worst-case scenario and/or probable scenario with respect to a major release of the COCs within Contra Costa County. As ALOHA data input requires a date input, the arbitrary date of July 18 is used.

The plume diagrams produced using the ALOHA modeling program for the 5 determined pinch points located within coastal area of Contra Costa County, and they are described in the following sections. In each section, the basis of the ALOHA plume maps are presented with the following summary data:

- **Text Summary:** the text summary describes the parameters under which the plume data were prepared. This includes:
 - Site Data which has been input specifically for the location.
 - Chemical Data for the specific chemical (in this case chlorine or ammonia), including AEG-1, AEG-2 and AEG-3 (60 minutes), other specific chemical characteristics, and the 'Immediately Dangerous to Life and Health (IDLH) concentration.
 - Atmospheric Data derived from the weather data for Contra Costa County for July. The prevailing wind direction for 10 months of the year (February through November) is from the west, and this direction will be used in the ALOHA modeling.
 - Source Strength, including quantity spilled/released into the atmosphere and conditions under which it was released.
 - Threat Zone, which defines the red, orange, and yellow threat zones.
- **Toxic Threat Zone:** This is a schematic of the plume size and shape with a summary of the threat zone.
- **Release Rate:** This is a graph of the data contained in the text portion under Source Strength.
- **Plume Diagram:** The plume diagram is superimposed on a Google Earth base. The 3 threat zones (red, orange, and yellow) are shown, as are the critical facilities receptors.

Site-specific parameters were applied to the plume modeling mapping discussed for each of the 5 pinch points in Sections 5.1 through 5.5.

Ammonia/Anhydrous Ammonia: ALOHA model plume mapping of an ammonia/anhydrous ammonia (UN ID# 1005) release is shown in the plume maps. Some of the major parameters used in plume development include:

- Incident occurs in mid-July with an internal tank temperature of 85°F;
- Wind is from the west at nine (9) miles per hour;
- Size of railroad tank car is 34,397 gallons;
- Tank diameter of 10.66 feet; and

- The rupture in the tank car is a 10-inch diameter hole located near the bottom of the tank car.

Detailed parameters are contained in Appendix C. Critical facilities within the plume are also shown on the maps.

Propane: ALOHA model plume mapping for a propane (UN ID# 1075) release is shown in the following maps. The first map in each section shows the extent of a propane plume release. The second map shows the area affected in the event that the tank car explodes in a BLEVE scenario. Some of the major parameters used in plume development include:

- Incident occurs in mid-July with an air temperature of 85°F;
- Wind is from the west at 9 miles per hour;
- Size of railroad tank car is 34,397 gallons;
- Tank diameter of 10.86 feet; and
- The rupture in the tank car is a 10-inch diameter hole located near the bottom of the tank car.

Detailed parameters are contained in Appendix C. Critical facilities within the plume are also shown on the maps.

Sulfuric Acid: Sulfuric acid is not considered a toxic material that will create a toxic vapor plume during a release. Nevertheless, it but can form a gray cloud, and when this cloud mixes with water vapor to form a white cloud, it is heavier than air. The mixing of sulfuric acid with water results in a highly exothermic reaction. A rail spill of sulfuric acid due to derailment caused by a flooding event is a realistic scenario in the coastal areas of Contra Costa County. Sulfuric acid can be neutralized with soda ash or lime.

Evacuation guidelines are contained with the ERG, and the isolation distance in the event that a fire is involved is ½ mile in all directions. Although there is no stated isolation distance in the event of a sulfuric acid spill, or a spill into water, the ERG guidelines with respect to fire should be used as a basis for evacuation and mitigation.

Some of the major parameters used development of the isolation distance map for sulfuric acid at each of the 5 pinch points are as follows:

- Incident occurs in mid-July with an internal tank temperature of 85°F;
- Size of railroad tank car is 13,350 gallons;
- Tank diameter of eight (8) feet; and
- The rupture in the tank car is a 10-inch diameter hole located near the bottom of the tank car.

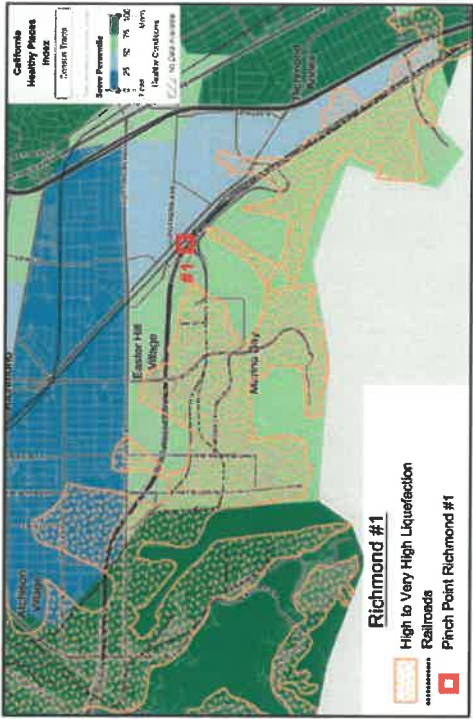
Critical facilities within the plume are also shown on the maps.

5.1 Pinch Point – Richmond #1

At the Richmond #1 pinch point, it will be assumed that the hazardous materials spill of a COC will result from an incident with a rail tank car holding 34,397 gallons of the ammonia/anhydrous ammonia (worst-case scenario), a rail tank car holding 34,397 gallons of propane as LPG (worst-case scenario), and 13,350 gallons of sulfuric acid (worst-case scenario). The individual details are contained in the sections below.

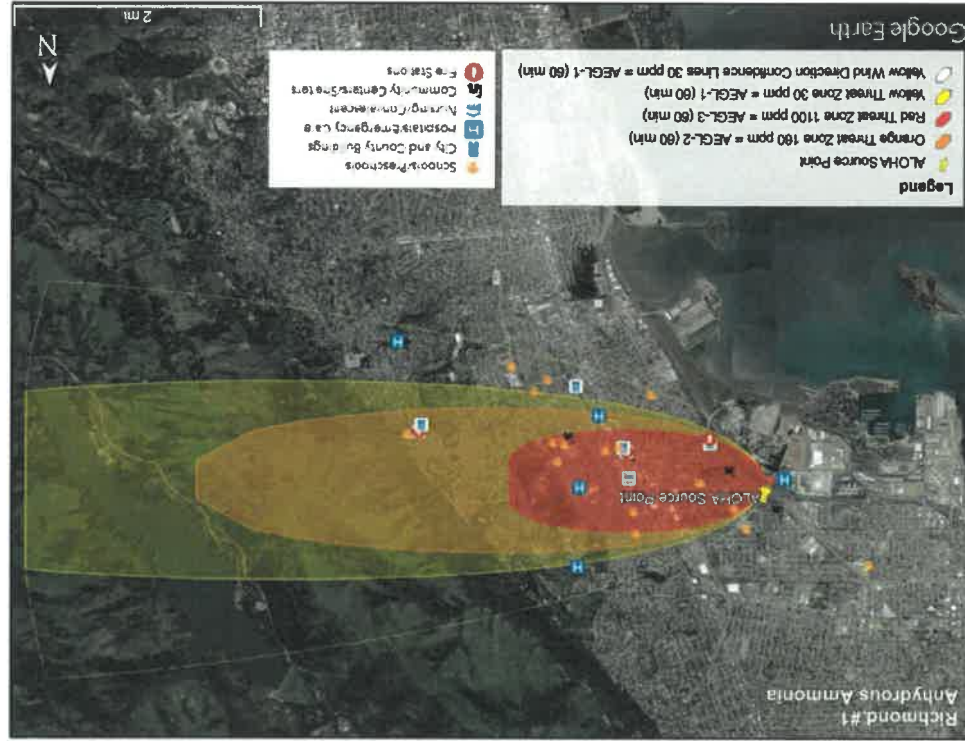
Criteria used in the identification of the pinch point are summarized in the table below. Maps showing some of the criteria used in the determination of the pinch point are shown following the table.

RICHMOND PINCH POINT #1 CRITERIA		
CRITERIA	DESCRIPTION	COMMENTS
Location	I-580 at Meeks Street	
Elevation (feet above sea)	36	Above 12" rising tide
Latitude	37.919638	
Longitude	-122.352671	
Railroads	UP (pinch point) RRPC (pinch point and west)	Pinch point along major rail line Pinch point along major rail line
Highways & Arterial Roads	I-580 Carson Blvd. Peters Ave. Regatta Blvd.	
Pipelines	Gas and hazardous liquid at pinch point along UP and RRPC line	Co-located with rail lines at pinch point
Nearby CALARP Facilities	Dinabach Enterprises, Messer Sillway Beverage Plant	
Surrounding Land Use	H-Industrial (low to moderate income) E-Industrial (low to moderate income) S-Industrial M-Industrial	Vulnerable population Vulnerable population
Healthy Places Index	25-50 (at pinch point and to east; 27.4 percentile)	Vulnerable population
Wind Direction (from)	D-55 (north of pinch point) 50-75 (west and south of pinch point)	
Rising Tides 12"	West (Feb-May); North (Nov-Feb)	
Liquidation (high to very high)	South of pinch point South, southeast, and west of pinch point	



5.1.1 Scenario 1: Ammonia

ALOHA model plume mapping at Pinch Point Richmond #1 for an ammonia/anehydrous ammonia (UN ID# 1005) release is shown in the following map. The ammonia plume is extensive and is over 6 miles long and up to 2 miles wide. The Red Threat Zone is approximately 2 miles long and up to a mile wide and covers a significant portion of the residential and commercial areas of east Richmond and El Cerrito. Although the prevailing wind direction is from the west, seasonal variations result in the wind direction coming from the north. This will place areas southeast and south at risk from an ammonia release. Areas to the southeast are also residential and commercial. Much of the area to the south is either industrial or part of San Francisco Bay.

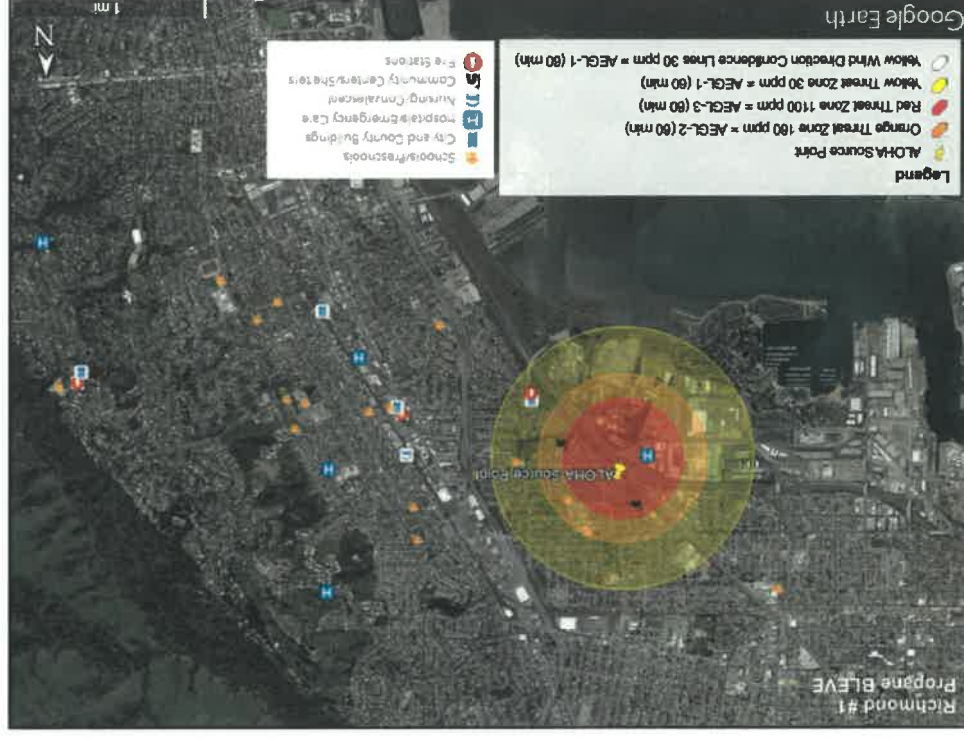
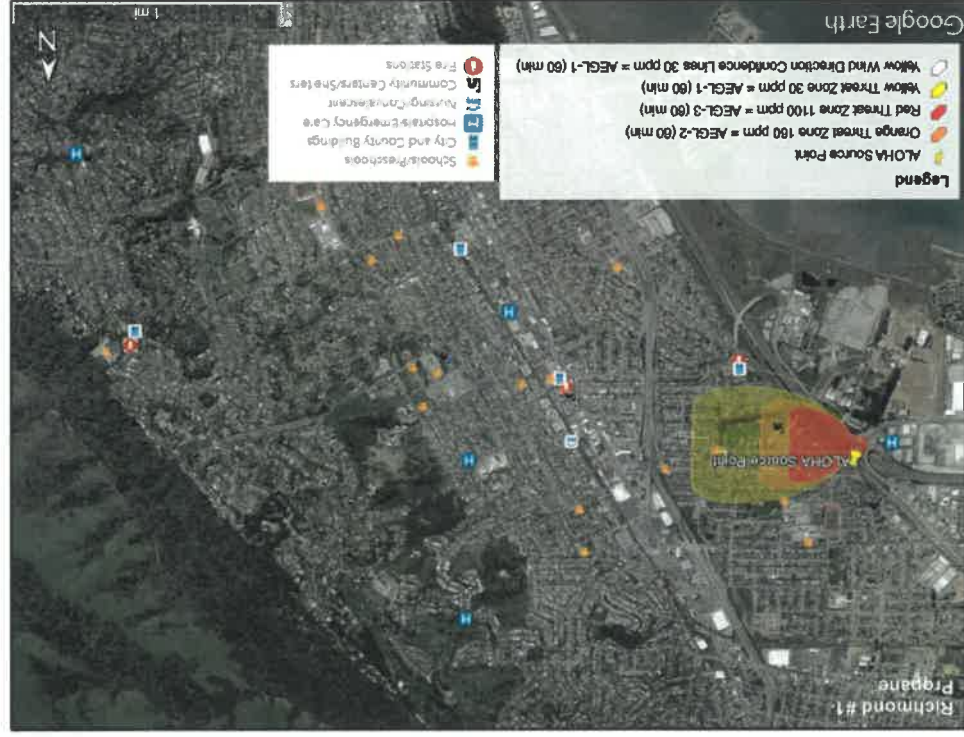


5.1.2 Scenario 2: Propane

ALOHA model plume mapping at Pinch Point Richmond #1 for propane (UN ID# 1075) release is shown in the following maps. The first map shows the extent of a propane plume release. The second map shows the area affected in the event that the tank car explodes in a BLEVE scenario.

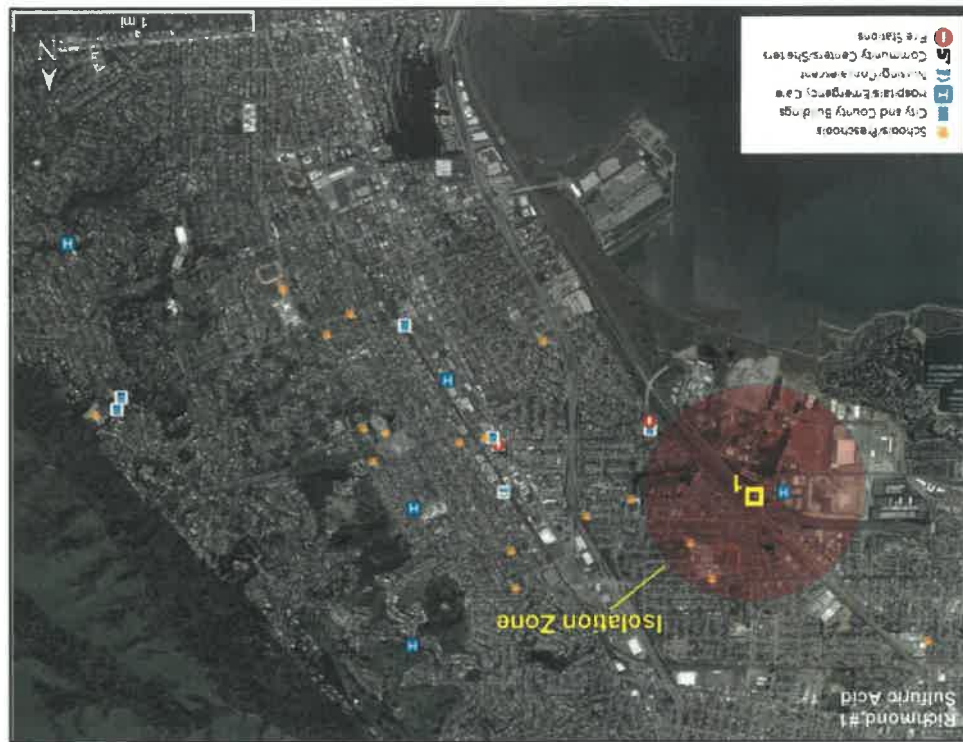
The propane plume is approximately 1 mile long and up to 1/2 mile wide. The Red Threat Zone is approximately 1/2 mile long and up to 1/4 mile wide. The entire plume covers a portion of the residential area of east Richmond and El Cerrito. Although the prevailing wind direction is from the west, seasonal variations result in the wind direction coming from the north. This will place a limited area southeast and south at risk from propane incident release. Areas to the southeast are also residential. Much of the area to the south is primarily industrial.

The second map shows the propane BLEVE scenario. In this scenario the area affected is known as the Thermal Radiation Threat Zone and is approximately 1/4 mile from the source, and the Red Threat Zone extends approximately 1/4 mile from the source. In general, areas to the northwest, north, east, and southeast are primarily residential areas to the west and south are industrial.



5.1.3 Scenario 3: Sulfuric Acid

The sulfuric acid (UN ID #1830) release isolation zone at Pinch Point Richmond #1 is shown in the following map. According to ERG guidelines, the isolation distance in the event that a fire is involved is $\frac{1}{2}$ mile in all directions. Although slightly less extensive in area, the isolation zone is similar to the Propane BLEVE scenario. In general, areas to the northwest, north, east, and southeast are primarily residential; areas to the west and south are industrial.



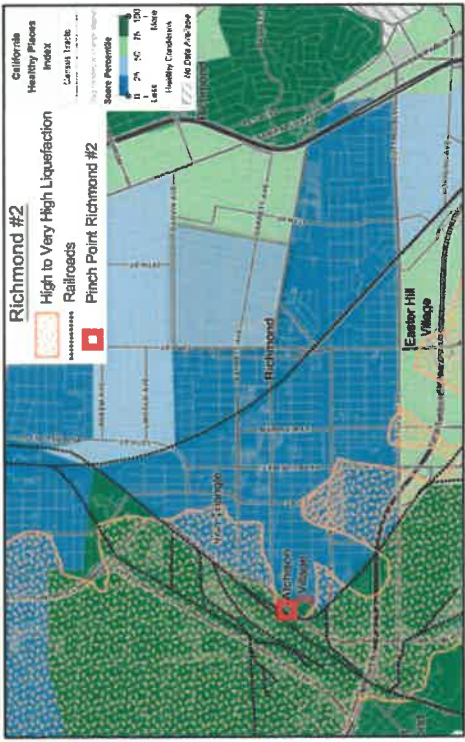
5.2 Pinch Point – Richmond #2

At the Richmond #2 pinch point, it will be assumed that the hazardous materials spill of a COC will result from an incident with a rail tank car holding 34,397 gallons of the ammonia/anhydrous ammonia (worst-case scenario), a rail tank car holding 34,397 gallons of propane as LPG (worst-case scenario), and 13,350 gallons of sulfuric acid (worst-case scenario). The individual details are contained in the sections below.

Criteria used in the identification of the pinch point are summarized in the table below. Maps showing some of the criteria used in the determination of the pinch point are shown following the table.

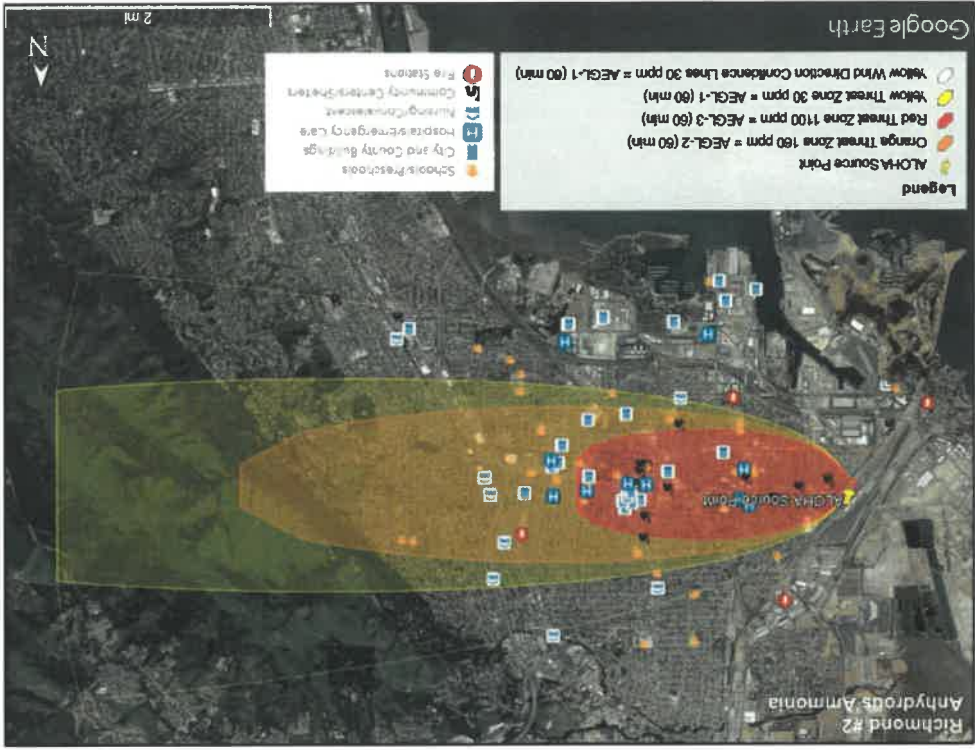
RICHMOND PINCH POINT #2 CRITERIA		
CRITERIA	DESCRIPTION	COMMENTS
Location	Richmond Parkway south of MacDonald Ave.	
Elevation (feet above sea)	14	Above 12' rising tide
Latitude	37.934993	
Longitude	-122.374823	
Railroads	BNSF (pinch point) UPRC (west) UP (east)	Pinch point is at major rail siding
Highways & Arterial Roads	I-580 Richmond Parkway Barnett Ave. MacDonald Ave. W. Ohio Ave.	
Pipelines	Hazardous liquid pipelines parallel railroad	Co-located with rail lines at pinch point
Nearby CalARP Facilities	Chemours Refinery Chemtrade West US	
Surrounding Land Use	Residential E-commerce/residential (low to moderate income) S-industrial W-industrial	Vulnerable population; critical facilities
Healthy Places Index	0.25 (east and southeast; 15.3 and 22.2 percentile)	Vulnerable population; critical facilities
Wind Direction (from)	West (Feb-Nov); North (Nov-Feb)	
Rising Tides 12"	North and south of pinch point	
Liquefaction (high to very high)	Pinch point and to north, south, and west	





5.2.1 Scenario 1: Ammonia

ALOHA model plume mapping at Pinch Point Richmond #2 for an ammonia/anyhdrous ammonia (UN ID# 1005) release is shown in the following map. The ammonia plume is extensive and is over 6 miles long and up to 2 miles wide. The Red Threat Zone is approximately 2 miles long and up to a mile wide and covers a significant portion of the residential and commercial areas of the central and downtown portion of the city of Richmond. Although the prevailing wind direction is from the west, seasonal variations result in the wind direction coming from the north. This will place areas southeast and south at risk from an ammonia release. Areas to the southeast are also residential and commercial with some industry. Much of the area to the south is either industrial or part of San Francisco Bay.



5.2.2 Scenario 2: Propane

ALOHA model plume mapping at Pinch Point Richmond #2 for propane (UN ID# 1075) release is shown in the following maps. The first map shows the extent of a propane plume release. The second map shows the area affected in the event that the tank car explodes in a BLEVE scenario.

The propane plume is approximately 1 mile long and up to ½ mile wide. The Red Threat Zone is approximately ½ mile long and up to ¼ mile wide. The entire plume covers a portion of the commercial and residential area of Richmond, including the downtown area. Although the prevailing wind direction is from the west, seasonal variations result in the wind direction coming from the north. This will place a limited area southeast and south at risk from a propane incident. Areas to the southeast are also residential. Much of the area to the south is primarily industrial.

The second map shows the Propane BLEVE scenario. In this scenario the area affected is known as the Thermal Radiation Threat Zone and is approximately ¼ mile from the source, and the Red Threat Zone extends approximately ¼ mile from the source. In general, areas to the northeast, east, and southeast are primarily commercial and residential; areas to the northwest, west, and south are industrial.





5.2.3 Scenario 3: Sulfuric Acid

The sulfuric acid (UN ID #1830) release isolation zone at Pinch Point Richmond #2 is shown in the following map. According to ERG guidelines, the isolation distance in the event that a fire is involved is ½ mile in all directions. Although slightly less extensive in area, the isolation zone is similar to the Propane BLEVE scenario. In general, areas to the northeast and east are primarily residential; areas to the west and south are industrial.

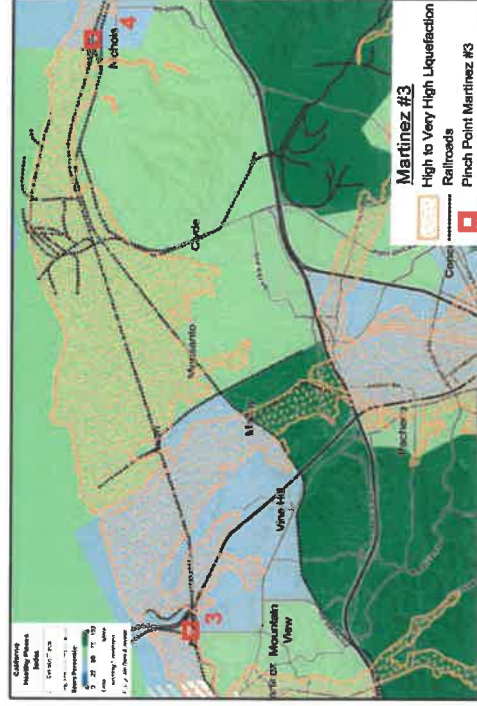
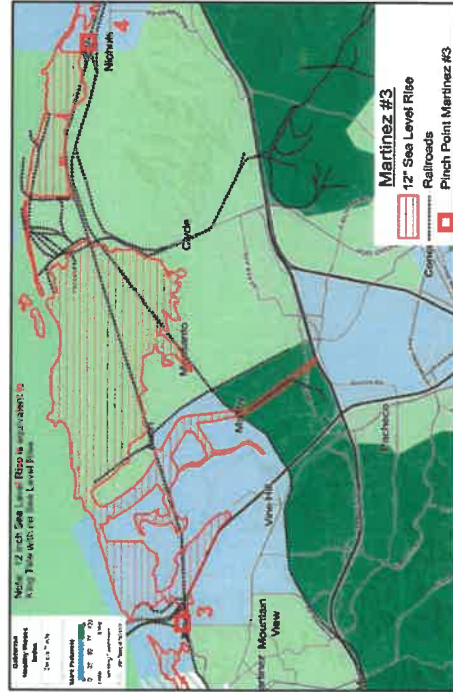
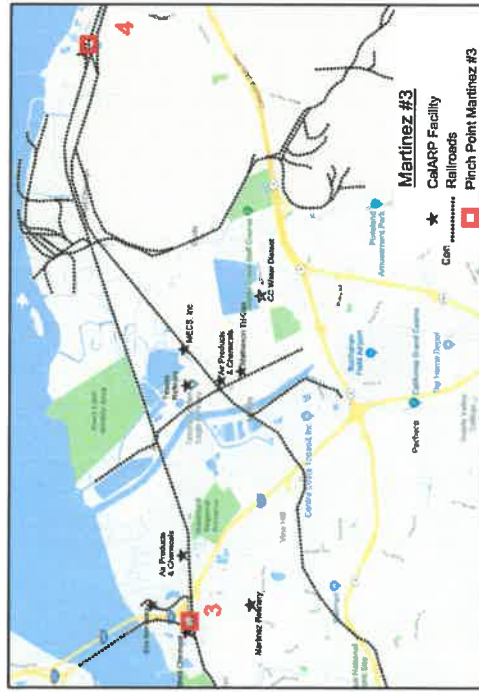


5.3 Pinch Point – Martinez #3

At the Martinez #3 pinch point, it will be assumed that the hazardous materials spill of a COC will result from an incident with a rail tank car holding 34,397 gallons of the ammoniacal/anhydrous ammonia (worst-case scenario), a rail tank car holding 34,397 gallons of propane as LPG (worst-case scenario), and 13,350 gallons of sulfuric acid (worst-case scenario). The individual details are contained in the sections below.

Criteria used in the identification of the pinch point are summarized in the table below. Maps showing some of the criteria used in the determination of the pinch point are shown following the table.

MARTINEZ PINCH POINT #3 CRITERIA		
CRITERIA	DESCRIPTION	COMMENTS
Location	Steel Ave. and Marina Vista Ave.	
Elevation (feet above sea)	13	Above 12" rising tide
Latitude	36.026136	
Longitude	-122.117599	
Railroads	UP (pinch point) BNSF (south)	Pinch point along major rail line
Highways & Arterial Roads	I-480	
	Marina Vista Ave	
	Steel Ave	
	Pacheco Blvd	
Pipelines	CA-4	
Nearby CalARP Facilities	Numerous crude oil, hazardous liquid, and gas pipelines	Co-located with rail lines at pinch point
	Steel Chemical	Immediate vicinity of pinch point
	Martinez Refinery	Close to pinch point
	Av Products & Chemicals (2 locations)	1 location close to pinch point
	Eco Service	Close to pinch point
	Tecoco Refinery	
	Matheron TII-Site	
	CS Water District	
	NECS, Inc.	
	N-Industrial	
Surrounding Land Use	Industrial	
	Commercial/Residential (low to moderate income)	Vulnerable population
	Commercial (downtown/residential moderate income)	Vulnerable population critical facilities
	25-50 (pinch point, N, E, and SE)	
Healthy Places Index	50-75 (S and W)	
Wind Direction (from)	West (Feb-Nov), North (Nov-Feb)	
Rising Tide 12"	East and west of pinch point	Rail lines in areas 12" rising tide
Lawbreakers (high to very high)	At pinch point, east and west of pinch point	Railroads in areas of liquefaction



5.3.1 Scenario 1: Ammonia

ALOHA model plume mapping at Pinch Point Martinez #3 for an ammonia/anyhydrous ammonia (UN ID# 1005) release is shown in the following map. The ammonia plume is extensive and is over 6 miles long and up to 2 miles wide. The Red Threat Zone is approximately 2 miles long and up to a mile wide and covers the industrial area northeast of the city of Martinez, including oil refineries. Although the prevailing wind direction is from the west, seasonal variations result in the wind direction coming from the north. This will place areas southeast and south at risk from an ammonia release. Areas to the southeast are also industrial. Much of the area to the south is partly industrial and partly residential.

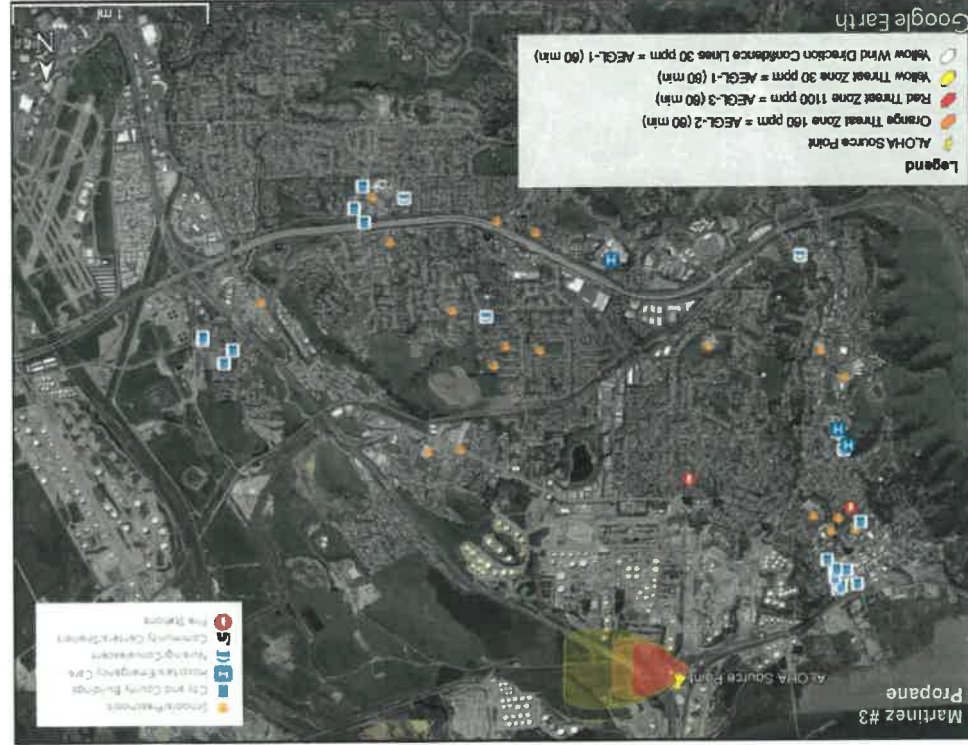
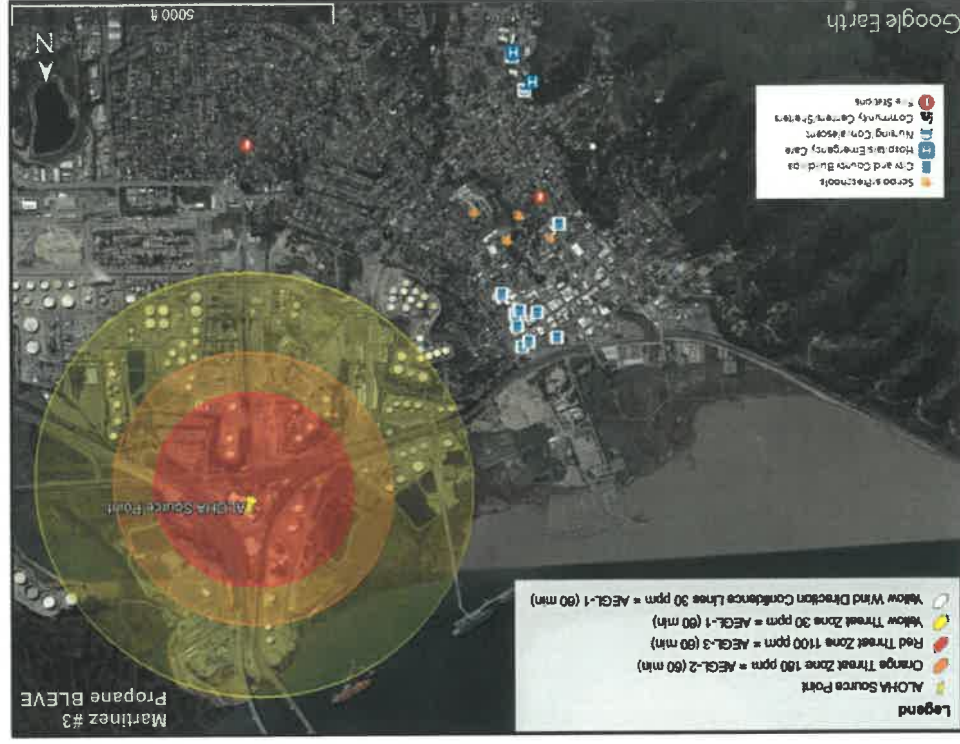


5.3.2 Scenario 2: Propane

ALOHA model plume mapping at Pinch Point Martinez #3 for propane (UN ID# 1075) release is shown in the following maps. The first map shows the extent of a propane plume release. The second map shows the area affected in the event that the tank car explodes in a BLEVE scenario.

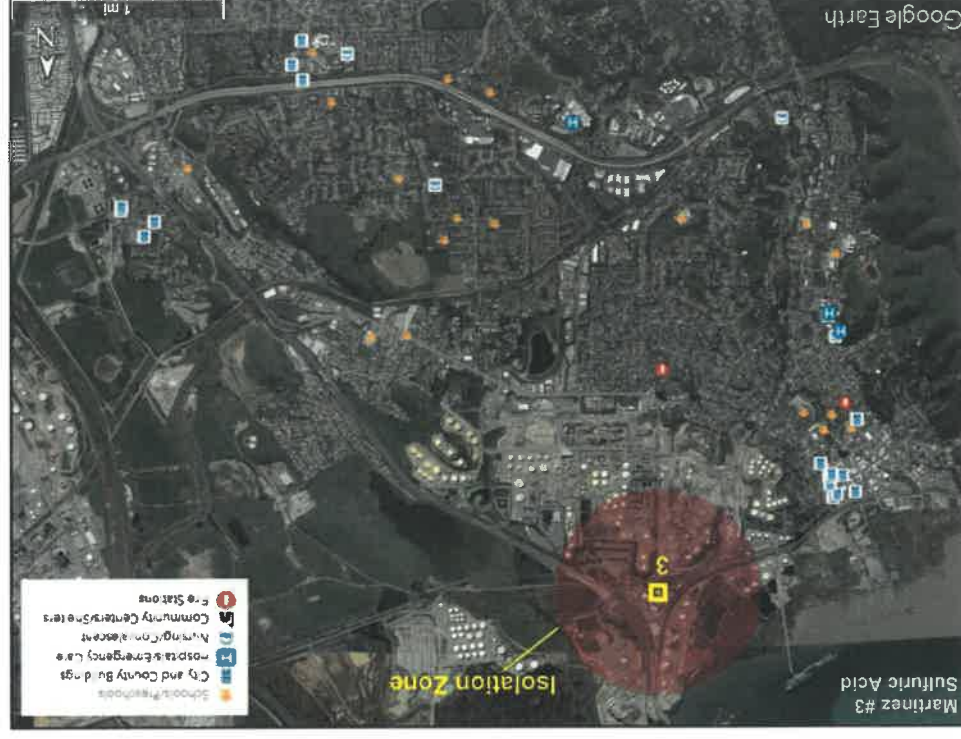
The propane plume is approximately 1 mile long and up to ½ mile wide. The Red Threat Zone is approximately ½ mile long and up to ¼ mile wide. The entire plume covers a portion of the industrial area in the northeastern part of Martinez. Although the prevailing wind direction is from the west, seasonal variations result in the wind direction coming from the north. This will place the industrial area south of the pinch point at risk from a propane incident.

The second map shows the Propane BLEVE scenario. In this scenario the area affected is known as the Thermal Radiation Threat Zone and is approximately ¼ mile from the source, and the Red Threat Zone extends approximately ¼ mile from the source. The entire area affected by this scenario is industrial, including oil refineries.



5.3.3 Scenario 3: Sulfuric Acid

The sulfuric acid (UN ID #1830) release isolation zone at Pinch Point Martinez #3 is shown in the following map. According to ERG guidelines, the isolation distance in the event that a fire is involved is 1/2 mile in all directions. Although slightly less extensive in area, the isolation zone is similar to the Propane BLEVE scenario. The entire isolation zone is industrial, including oil refineries.

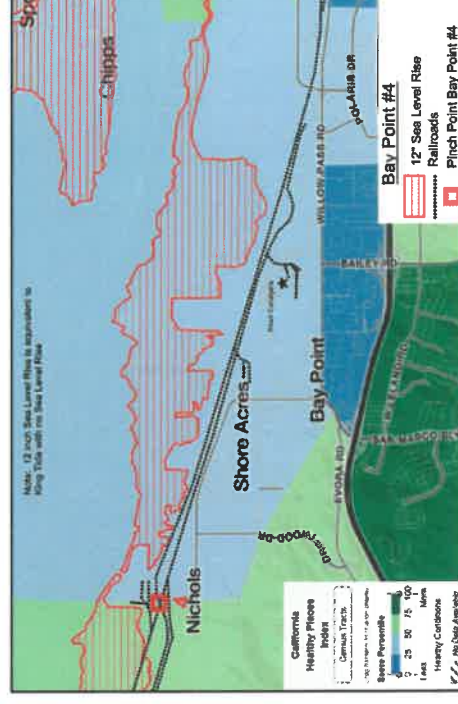
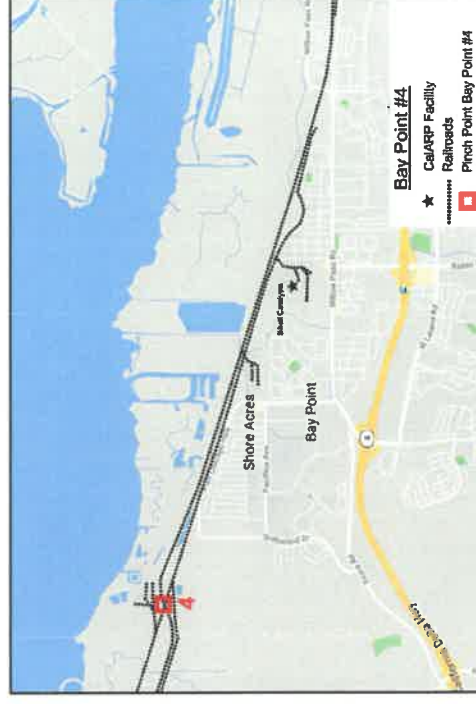


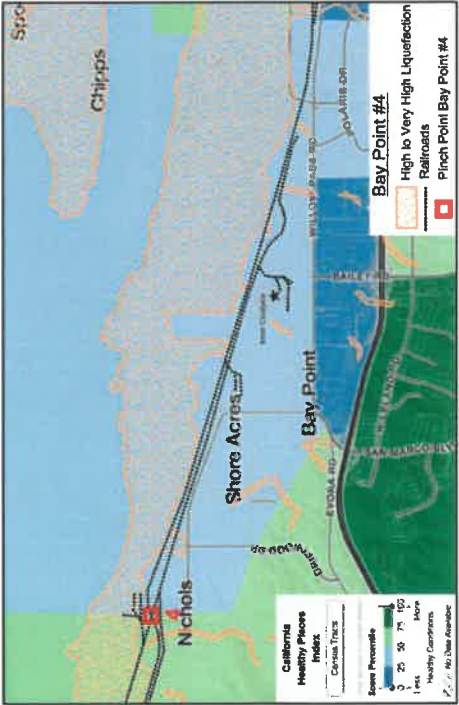
5.4 Pinch Point – Bay Point #4

At the Bay Point #4 pinch point, it will be assumed that the hazardous materials spill of a COC will result from an incident with a rail tank car holding 34,397 gallons of the ammonia/anhydrous ammonia (worst-case scenario), a rail tank car holding 34,397 gallons of the propane as LPG (worst-case scenario), and 13,350 gallons of sulfuric acid (worst-case scenario). The individual details are contained in the sections below.

Criteria used in the identification of the pinch point are summarized in the table below. Maps showing some of the criteria used in the determination of the pinch point are shown following the table.

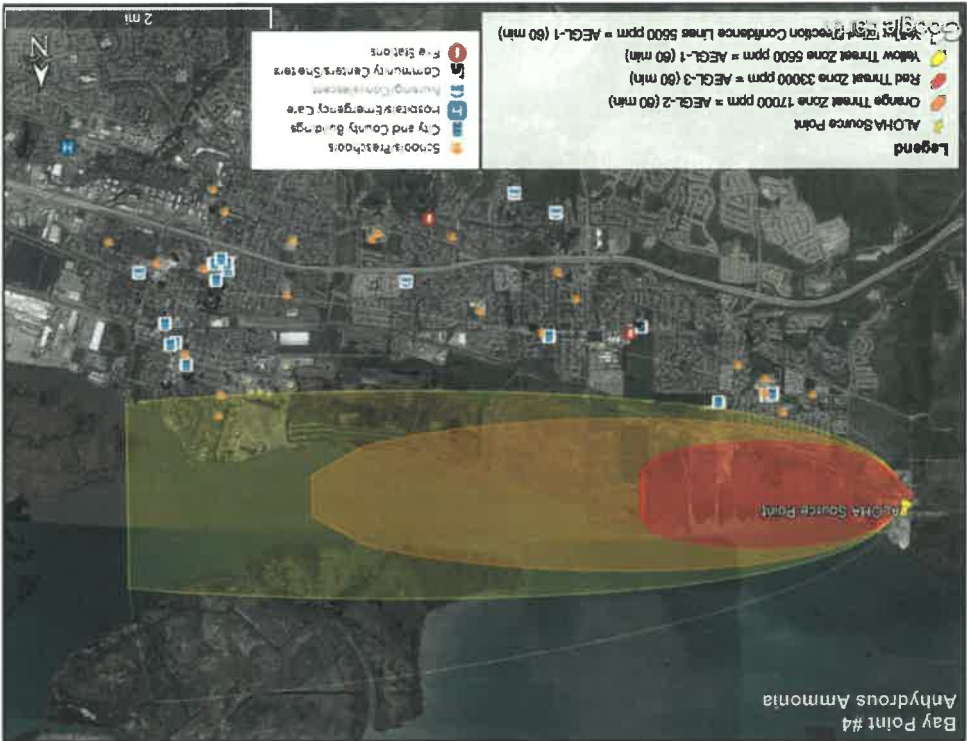
BAY POINT PINCH POINT #4 CRITERIA		
CRITERIA	DESCRIPTION	COMMENTS
Location	Nichols Rd. North of Port Chicago Highway	
Elevation (feet above sea level)	18	Above 12" rising tide
Latitude	35.045102	
Longitude	-121.987738	
Railroads	BNSF (pinch point) UP (pinch point)	Pinch point at railroad junction Pinch point at railroad junction
Highways & Arterial Roads	CA-4 Kinney Blvd. Port Chicago Highway	
Pipelines	Hazardous liquid and gas pipelines 3 miles southwest of pinch point	Partially co-located with rail lines at pinch point
Nearby CalARP Facilities	Tesoro Refinery	
	Alt Products and Chemical	
	Matheson Tri-Gas	
	MECS	
	CG Water District	
Surrounding Land Use	Shell Catalysts to east-northeast	
	N-Industrial/open land	
	E, S, W-open land/some industrial SE-residential (low to moderate income)	Vulnerable population
Healthy Places Index	25-50 (pinch point and east) 50-75 (pinch point and west)	
Wind Direction (from)	West (Feb-Nov) North (Nov-Feb)	
Rising Tides 12"	Northwest and northeast	Rail lines northwest in area of 12" rising tide
Liquefaction (high to very high)	Immediately north, northwest, and northeast	Rail lines partially in area of liquefaction





5.4.1 Scenario 1: Ammonia

ALOHA model plume mapping at Pinch Point Bay Point #4 for an ammonia/anhidrous ammonia (UN ID# 1005) release is shown in the following map. The ammonia plume is extensive and is over 6 miles long and up to 2 miles wide. The Red Threat Zone is approximately 2 miles long and up to a mile wide, and covers the industrial area and natural open land area along Suisun Bay north of the cities of Bay Point and Pittsburg. Although the prevailing wind direction is from the west, seasonal variations result in the wind direction coming from the north. This will place areas southeast and south at risk from an ammonia release. Areas to the southeast are within the commercial, residential, and downtown areas of both Bay Point and Pittsburg.

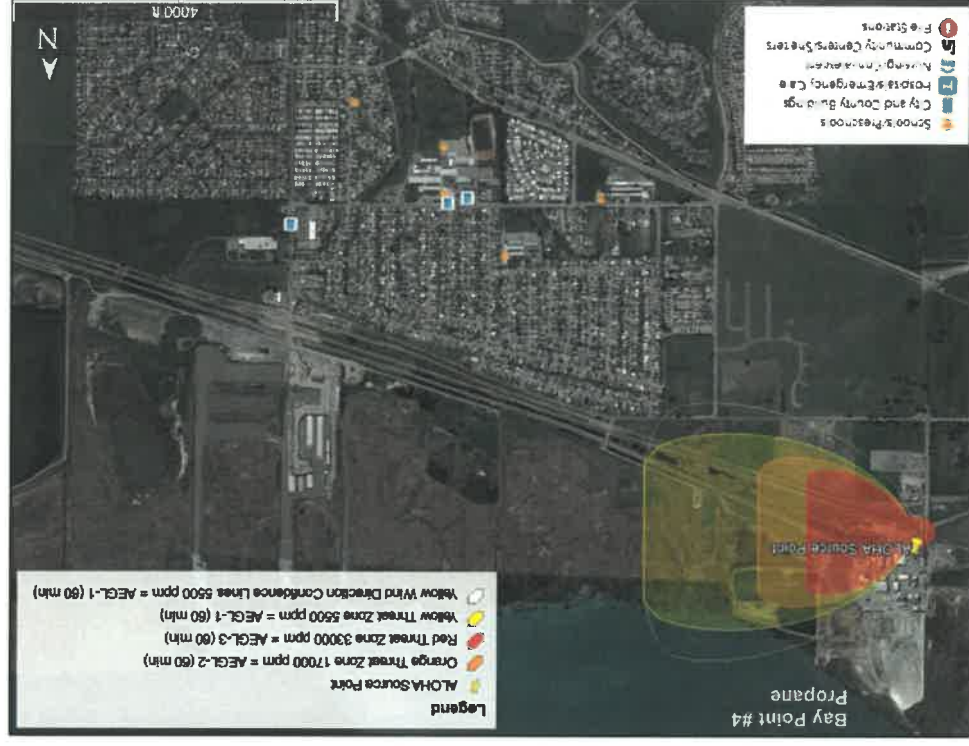


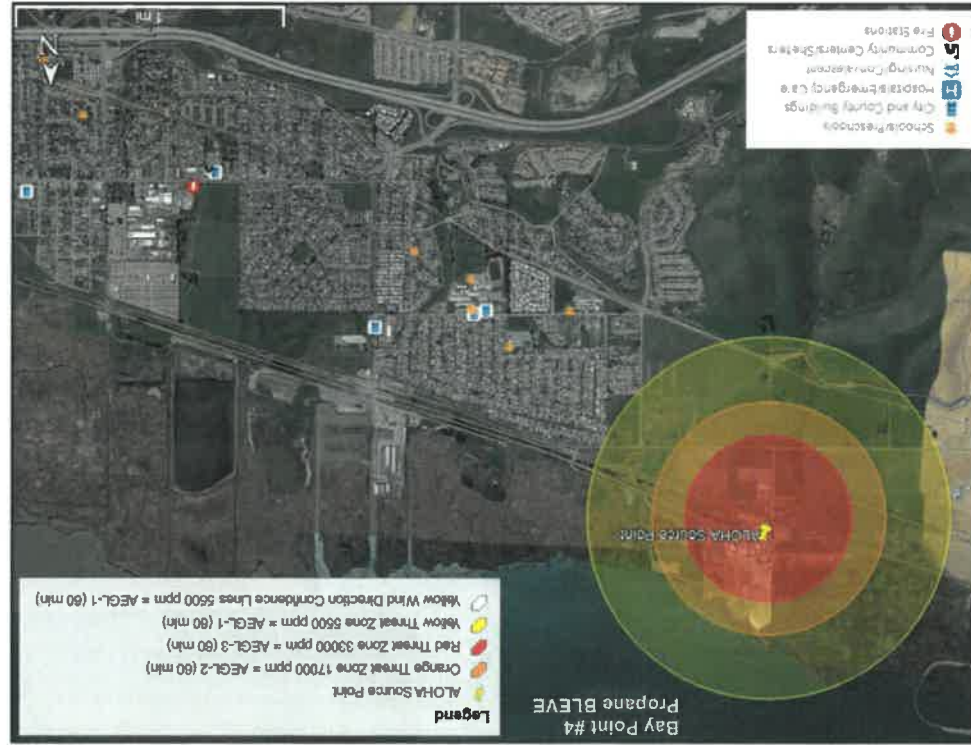
5.4.2 Scenario 2: Propane

ALOHA model plume mapping at Pinch Point Bay Point #4 for propane (UN ID# 1075) release is shown in the following maps. The first map shows the extent of a propane plume release. The second map shows the area affected in the event that the tank car explodes in a BLEVE scenario.

The propane plume is approximately 1 mile long and up to ¼ mile wide. The Red Threat Zone is approximately ½ mile long and up to ¼ mile wide. The entire plume covers the industrial and natural open land area north of the city of Bay Point. Although the prevailing wind direction is from the west, seasonal variations result in the wind direction coming from the north. This will place primarily industrial area to the southeast and south at risk from a propane incident. Areas beyond this zone to the southeast are residential.

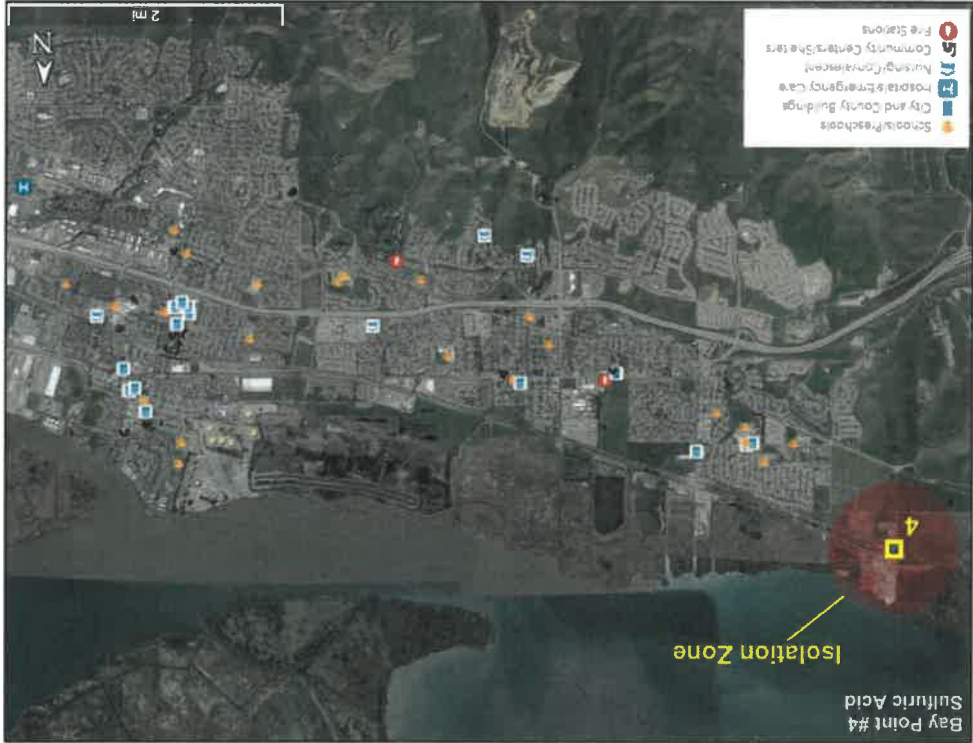
The second map shows the Propane BLEVE scenario. In this scenario the area affected is known as the Thermal Radiation Threat Zone and is approximately ¾ mile from the source, and the Red Threat Zone extends approximately ¼ mile from the source. In general, the entire area is either industrial, natural open lands, or part of Suisun Bay. Areas beyond this zone to the southeast are residential.





5.4.3 Scenario 3: Sulfuric Acid

The sulfuric acid (UN ID #1830) release isolation zone at Pinch Point Bay Point #4 is shown in the following map. According to ERG guidelines, the isolation distance in the event that a fire is involved is ½ mile in all directions. Although slightly less extensive in area, the isolation zone is similar to the Propane BLEVE scenario. The entire isolation zone in industrial and natural open land areas, including part of Suisun Bay.

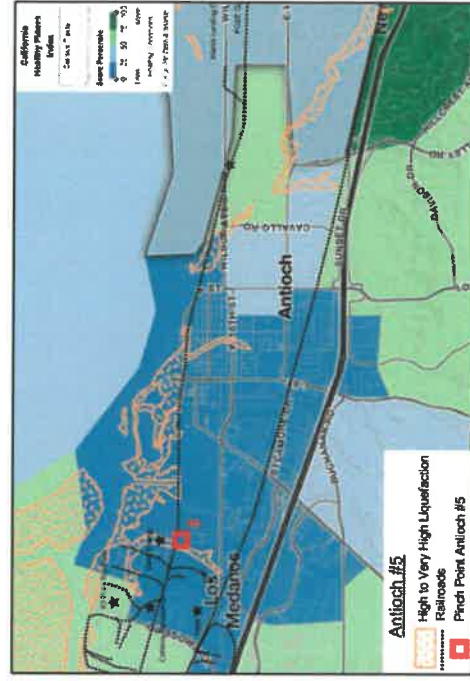


5.5 Pinch Point – Antioch #5

At the Antioch #5 pinch point, it will be assumed that the hazardous materials spill of a COC will result from an incident with a rail tank car holding 34,397 gallons of the ammonia/anhydrous ammonia (worst-case scenario), a rail tank car holding 34,397 gallons of propane as LPG (worst-case scenario), and 13,350 gallons of sulfuric acid (worst-case scenario). The individual details are contained in the sections below.

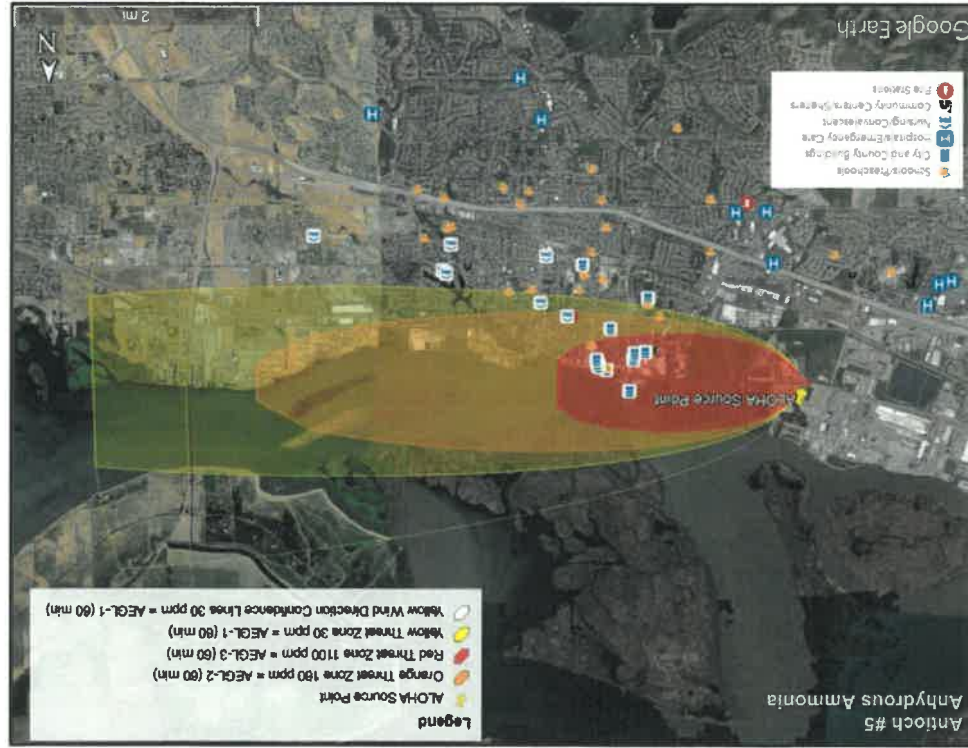
Criteria used in the identification of the pinch point are summarized in the table below. Maps showing some of the criteria used in the determination of the pinch point are shown following the table.

ANTIOCH PINCH POINT #5 CRITERIA		
CRITERIA	DESCRIPTION	COMMENTS
Location	End of Arroyo Lane	
Elevation (above sea)	17	Above 12' rising tide
Latitude	38.019184	
Longitude	-121.847427	
Railroads	BNR (pinch point) UP (north)	Pinch point along major rail line
Highways & Arterial Roads	CA-4 W. 4th Street	
Pipelines	Gas pipeline at pinch point. Hazardous liquid to south along UP line	Partially co-located with rail line at pinch point
Nearby Callout Facilities	Hesa	
	Delta Energy	
	Centra Agriculture	
	IC2 Pure Solutions	
Surrounding Land Use	City Energy Center	
	N and NE industrial land	
	E-open land/industrial	
	SE-commercial/residential beyond industrial	Vulnerable population, critical facilities
Health/Plume Index	S and SW-open land/industrial	
	W-industrial	
	25-50 (pinch point and immediate area, 23.6 percentile)	
	West (red-New North (Nov-Feb)	
Wind Direction (from)	North of pinch point along shoreline	
Rising Tides 12"	North of pinch point and nearby drainage to west	
Liquidation (high to very high)	Rail line partially in area of liquefaction	



5.5.1 Scenario 1: Ammonia

ALOHA model plume mapping at Pinch Point Antioch #5 for an ammonia/anhydrous ammonia (UN ID# 1005) release is shown in the following map. The ammonia plume is extensive and is over 6 miles long and up to 2 miles wide. The Red Threat Zone is approximately 2 miles long and up to a mile wide, and covers an industrial area, natural open lands area, and the northern part of the city of Antioch, including part of the downtown area, as well as part of Suisun Bay. Although the prevailing wind direction is from the west, seasonal variations result in the wind direction coming from the north. This will place areas southeast and south at risk from an ammonia release. Areas to the southeast are within the commercial, residential, and downtown areas of Antioch.

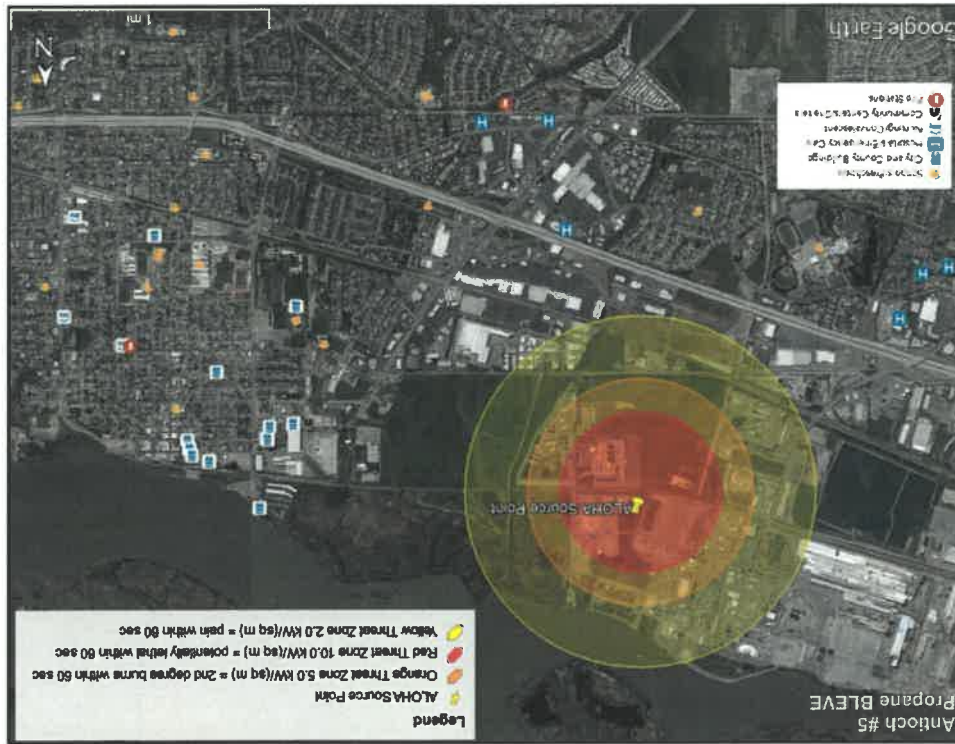


5.5.2 Scenario 2: Propane

ALOHA model plume mapping at Pinch Point Antioch #5 for propane (UN ID# 1075) release is shown in the following maps. The first map shows the extent of a propane plume release. The second map shows the area affected in the event that the tank car explodes in a BLEVE scenario.

The propane plume is approximately 1 mile long and up to ½ mile wide. The Red Threat Zone is approximately ½ mile long and up to ¼ mile wide. The entire plume covers the industrial and natural open land area northwest of the city of Antioch. Although the prevailing wind direction is from the west, seasonal variations result in the wind direction coming from the north. This will place primarily industrial area to the southeast and south at risk from a propane incident. Areas beyond this zone to the southeast are residential.

The second map shows the Propane BLEVE scenario. In this scenario the area affected is known as the Thermal Radiation Threat Zone and is approximately $\frac{3}{4}$ mile from the source, and the Red Threat Zone extends approximately $\frac{1}{4}$ mile from the source. In general, the entire area is either industrial, natural open lands, or part of Suisun Bay. Areas beyond this zone to the southeast are residential.



5.5.3 Scenario 3: Sulfuric Acid

The sulfuric acid (UN ID #1830) release isolation zone at Pinch Point Antioch #5 is shown in the following map. According to ERG guidelines, the isolation distance in the event that a fire is involved is 1/2 mile in all directions. Although slightly less extensive in area, the isolation zone is similar to the Propane BLEVE scenario. The entire isolation zone in industrial and natural open land areas, including part of Suisun Bay.



6.0 Integration of Data with GIS

Following this Flow Study, CCHSHP will be working to display hazardous materials related data, along with sea level rise and flood data, in a GIS format. GIS mapping will be used to further communicate, display, and identify areas of concern as it relates to hazardous materials and flooding.

7.0 Emergency Response and Mitigation

Data from the Commodity Flow Study portion of this project were used to determine the 5 pinch points which were used for chemical plume analysis. All of the pinch points were located along railroad lines in the coastal areas of Contra Costa County, and portions of the areas surrounding the pinch points are potentially subjected to rising tides. Determination of the pinch points was based on numerous criteria as outlined in Section 4.1 of this report, including the following:

- Rising Tides data and areas most susceptible to rising tides and sea level rise;
- California Healthy Places Index indicating vulnerable populations;
- Liquefaction Susceptibility data;
- Location of CalARP Facilities;
- Locations of Critical Facilities;
- Chemicals of Concern;
- Weather data;
- Railroad Locations; and
- Critical Arterial Road Locations.

In addition to the above criteria, vulnerable populations are located in the vicinity of many of the pinch points, and they typically contain lower and middle income housing, as well as numerous public buildings, medical facilities, shelters and community centers, and schools.

In addition, weather patterns indicate that the 2 major wind directions occur in the coastal cities of Contra Costa County. The major wind direction is from the west and occurs for 9 to ten (10) months of the year. The alternate wind direction is from the north and occurs for 2 to 3 months of the year. The chemical plume analysis utilized the predominant westerly wind direction; however, the plume footprints can change with the change in wind direction.

The ammonia/anhydrous ammonia plume is the most toxic plume that has been mapped at each of the pinch points. In the event that an evacuation is required due to an ammonia release incident, evacuations could be undertaken to remove vulnerable populations from the immediate incident area. Shelters could be set up, generally in areas outside the complete footprint of the plume in facilities such as schools, churches, and public buildings. In addition, shelter-in-place procedures may need to be implemented to protect the population in the area. Shelter in place may be critical in the event that the release has occurred in flooded areas, and evacuation is not practicable or possible.

An incident involving ammonia could have catastrophic effects on these populations. The best approach to mitigate such an incident is a proactive approach, which allows properly equipped and trained first responders to immediately respond to an incident and work to mitigate/terminate the source of the incident. This approach is paramount to preventing a massive reactive approach which would include movement and protection of a large vulnerable population.

The propane and sulfuric acid plumes cover a much smaller footprint than the ammonia plume and would be considered of lower toxicity than the ammonia plume. A propane explosion or BLEVE occurs almost instantaneously, and rapid emergency response, including evacuation, is necessary. Emergency response to a non-BLEVE propane release or a sulfuric acid release

should be similar to an ammonia release; however, evacuation may not be necessary depending upon the circumstances. The most important aspect of immediate response to a propane or sulfuric acid release is to allow properly equipped and trained first responder to proactively mitigate/terminate the source of the incident. Flooding in the release area may complicate the response actions.

The locations of the natural gas transmission pipelines and hazardous liquid pipelines within the coastal areas of Contra Costa County are known, and the major lines are often collocated along the railroad lines, particularly in the coastal areas. In order to mitigate any negative results due to a release incident along the pipelines, the first responders should coordinate with the pipeline operators to immediately isolate the affected lines. Isolation will ensure that a minimal amount of the population is affected by the incident. In addition, evacuation procedures should be in place to quickly and efficiently remove the affected populations from the areas impacted by the incident.

The vulnerable populations within and adjacent to each of the 5 pinch point locations are at high risk in the event of a major hazardous materials incident. Because of this situation, a proactive approach to initial response by first responders, is the best approach, as it reduces the need for an overarching reactive response. There are 3 elements to this approach:

- Proper protective and response equipment, which will allow first responders to react proactively, quickly, and efficiently to a major hazardous materials release incident.
- Comprehensive training, including focused training of first responders to act both proactively and reactively to a major hazardous materials release incident.
- Mutual aid agreements with local, and state agencies that can immediately provide additional manpower, equipment, and trained assistance to a major hazardous materials release incident.

A proactive approach in equipping and training first responders will serve to protect the vulnerable populations within the County in the event of a transportation-related hazardous material accident/incident. This approach will also minimize disruption of essential services, facilities, and infrastructure, and will ultimately save lives and property.

8.0 Summary

The goals and results of the Flow Study and Community Risk Assessment are summarized below.

The Flow Study reviewed rail transport of hazardous chemicals through the County, and particularly within areas of the county where the rail lines may be susceptible to rising tides and flooding risks from changes in our climate. Chemical data from industries in the County helped to determine what types of hazardous chemicals were being transported through the County via rail. Three chemicals of concern (COCs) were determined from the railroad data, and these chemicals (ammonia/anhydrous ammonia, propane, and sulfuric acid) were used in the plume analysis in the CRA portion of this report.

Based on the information obtained from the Flow Study, a series of vulnerable points ("pinch points") were determined from rising tides data and potential flooding, primarily along the rail lines, California Healthy Places data, liquefaction resulting from earthquakes, locations of CalARP facilities, specific COCs, background weather data, locations of railroads and critical arterial roadways, and locations of critical facilities including areas of vulnerable populations. Once specific pinch points were located, a comprehensive CRA, including a chemical plume analysis, was performed to assess worst-case scenarios related to a COC release incident at these locations.

The Flow Study and CRA were completed as a follow-on study to the San Francisco Bay Conservation and Development Commission Adaption to Rising Tides (ART) project. The current project titled Hazardous Materials Commodity Flow Study with Special Focus on Sea Level Rise and Flood Risk, fostered a greater understanding on how major hazardous materials transportation, such as Contra Costa County rail system, could be impacted by sea level rise/flooding and how the increased risk for hazardous materials incidents that could affect the health and safety of our community.

Goals of the project included identifying risks from hazardous materials release due to possible disruption of transportation due to sea level rise/flooding as predicted by the Adapting to Rising Tides program and the effect of a release of various portions of the County, including critical facilities and vulnerable populations through toxic plume mapping using ALOHA technology. Identifying these issues will help the County to better address and plan for hazardous materials releases in order to protect and promote health, safety, and wellbeing of Contra Costa residents.

Historical railroad and highway data were available from the "Hazardous Materials Transportation Study for Contra Costa County. Additional highway flow study data were also available from Marin County (2014) and Solano County (2016). The data used here from Marin and Solano Counties were compiled for the entry points from these counties into Contra Costa, specifically along Interstate Highways I-580 (Marin) and I-80 and I-680 (Solano).

The Flow Study also incorporated railroad commodity information from 2016 through 2018, which was made available from UP and BNSF. The railroad data aided in the identification of the COCs: ammonia/anhydrous ammonia, propane, and sulfuric acid.

Pipeline data, including identification and locations of hazardous liquid and gas transmission pipelines were also included as a reference in this report. In many areas, including the coastal areas, the pipelines are often co-located with the railroad lines. An incident along one of these transportation routes could potentially affect the other. Pipeline incidents dating from 2008 were listed and located on the pipeline maps.

Railroads in Contra Costa County consist primarily of the following railroad lines: UP, BNSF, RPRC, and BART. UP and BNSF transport the majority of commercial traffic, including hazardous materials throughout the coastal areas of Contra Costa County. Rail lines located along the shorelines serve as a first line of defense against inland flooding, also known as ad hoc flood protection. Disruption of rail line transportation can have significant impacts on the movement of goods through Contra Costa County, particularly alternate transportation along roadways. In the event of flooding due to rising tides, the stability of the rail lines in some areas (ballast and track bed materials) may be at risk of becoming structurally unsound. In addition, groundwater table rise due to climate change could also result in the instability of the rail lines due to the potential damage to track bed and ballast materials. Certain areas of the rail lines are in areas at risk of high to very high liquefaction in the event of an earthquake.

Railroad incidents involving hazardous materials were reviewed from the time period of 2000 through 2019. A review of the above data indicates the following trends:

- Major cause of total rail incidents is derailment;
- Major causes of hazardous materials spill incidents are derailment, leaking train cars, and collision;
- Both UP and BNSF lines contained the major portion of the total rail incidents, as these are the major rail lines in the area;
- UP had a higher percentage of hazardous materials spill incidents than BNSF;
- Total rail incidents were located primarily in the cities of Richmond, Martinez, Pittsburg, Rodeo, and Crockett; and,
- Hazardous materials spill incidents were located primarily in Richmond, Martinez, Rodeo, and Crockett.

Information concerning highway and roadway incidents was limited, but some Contra Costa County data were available from the period of 2010 through 2019, and nationwide data were available from 2010 through 2016. The nationwide data indicated that the number of hazardous materials incidents occurs in about 12 to 14 times per 10,000 total truck trips. These numbers can be extrapolated to Contra Costa County, although there may be an increase in the frequency/rate of the incidents due to the following:

- High traffic volumes in a heavily populated urban area;
- Increased frequency of transportation of hazardous materials along arterial roadways; and
- Increased number of incidents because of flooding due to rising tides.

Disruption of commercial rail traffic could result in increased commodity flow via trucks along various arterial roads and highways in the vicinity of the pinch points. This also results in a higher risk of a hazardous materials incident occurring along the roadways. In addition, inundation of

the areas of the pinch points by water, due to rising tides or disruption of rail traffic due to seismic events could also affect the ability to move commercial goods via roadways.

In consideration of transporting hazardous materials via rail, primarily within rail tanker cars, it should be noted that one tanker car can generally contain 2 to 3 times the amount of commodity than one tanker truck. Based on the comparison of the amount of trucks that would be required to transport specific hazardous materials, such as sulfuric acid, which would normally be transported by rail would be dependent on the amount of rail cars that would be disrupted on a time-dependent basis. Unless, materials can be transported on still-operating rail lines or through the ports, then the additional stress in highway transport will be significant. In the event of a large rail incident scenario, a major disruption of commerce through the County could result in a cessation of manufacturing operations for an unspecified amount of time. It is also possible that highway transport may not be a viable option in areas of flooding, as the roadways themselves may also be closed.

The 5 pinch points were determined during this study for extended analysis in the event that a hazardous materials incident/accident occurred at these locations. The pinch points, which are all positioned along railroad lines, were located as follows:

- Richmond #1: I-580 at Meade Street
- Richmond #2: Richmond Parkway South of MacDonald Avenue
- Martinez #3: Shell Avenue and Marina Vista Avenue
- Bay Point #4: Nichols Road North of Port Chicago Highway
- Antioch #5: End of Arcy Lane

The determination of the pinch points was dependent in part on the following parameters, which were used to perform the CRA:

- Rising Tides data and areas most susceptible to rising tides and sea level rise;
- California Healthy Places Index indicating vulnerable populations;
- Liquefaction Susceptibility data;
- Location of CalARP Facilities;
- Locations of Critical Facilities;
- Chemicals of Concern;
- Weather data;
- Railroad Locations; and
- Critical Arterial Road Locations.

A critical aspect of the determination of pinch points is an analysis of flooding due to rising tides and sea level rise, including king tides and storm surges. Data was compiled using the ART Shoreline Flood Explorer on-line maps for three different scenarios:

- 12-inch Sea Level Rise, Equivalent to King Tide with no Sea Level Rise;
- 24-inch Sea Level Rise, Equivalent to 5-Year Storm Surge with no Sea Level Rise; and
- 36-inch Sea Level Rise, Equivalent to 50-Year Storm Surge with no Sea Level Rise.

For purposes of the CRA, only the 12-inch Sea Level Rise, equivalent to a King Tide with no Sea Level Rise was used in the Chemical Plume Analysis section of this report.

As a note, levee failure was not included as a potential flood scenario in this project.

The California Healthy Places Index (HPI) was used as an aid to determine more vulnerable populations for the Community Risk Assessment, including areas of lower income residential development. Various HPI indicators and decision support layers were used to determine the HPI into the following categories ranging from "less" to "more" healthy conditions:

- 0-25 (least);
- 25-50;
- 50-75; or
- 75-100 (most).

Large areas of high to very high susceptibility to liquefaction during a seismic event are located in the coastal areas of Contra Costa County. Liquefaction occurs where saturated sand and silt assume the characteristics of a liquid during an intense shaking during an earthquake. These areas are considered to be vulnerable to disruption of rail and road traffic, as a result of an incident during an earthquake.

Locations of CalARP facilities aided in the determination of the pinch points, as hazardous chemical from some of the CalARP sites were transported through the area along the railroads and roadways. Some of the CalARP facilities are considered to be critical operating facilities, as they include water treatment and energy generation /transfer facilities, as well as large economic centers.

The locations of critical facilities were used as an aid in determining the locations of the pinch points. Many of these facilities are relevant to other hazards than the release of hazardous materials. As a result, and for the purposes of this CRA, critical facilities will refer to facilities that may contain vulnerable or essential emergency populations that will require mitigation/evacuation in the event of a hazardous materials release.

Critical facilities located in the coastal areas of Contra Costa County can be summarized as follows:

- City, County, Federal Buildings
- Fire Stations
- Hospitals and Emergency Medical Care
- Nursing and Convalescent Homes
- Community Centers/Shelters
- Schools

Based on the Flow Study data from the railroads, it was determined that the following 3 chemicals of concern would be used in the Chemical Plume Analysis in the CRA portion of this study to cover worst-case scenario situations at the pinch points in the event of a hazardous materials incident/accident :

- Ammonia/anhydrous ammonia: highly toxic;
- Propane: highly explosive and commonly transported along the railroads in Contra Costa County; and
- Sulfuric acid: commonly transported along the railroads in Contra Costa County.

Weather for the coastal regions of Contra Costa County was available for several cities within the County. For the most part, weather patterns for the coastal cities are very similar. This information was used as the basis of the weather patterns for this study. Wind direction is a critical component of toxic plume analysis, as it determines the direction which the plume will travel over the land surface. Based on the weather data, it was determined that in that the major wind direction from the west occurred throughout most of the year. As a result, the plume analysis utilized in this report covered an incident occurring in July.

Each of the pinch points discussed in the CRA are located along or adjacent to railroad lines. These locations are considered to be higher risk. Many of the rail lines are co-located with underground pipelines, particularly along the coastal areas. Portions of the rail lines are located in areas of 12-inch (and greater) sea level rise, as well as in some areas of high to very high liquefaction which could be caused by earthquake events. Rail lines in these areas could become compromised, resulting in potential hazardous materials incidents due to derailment or other causes. In addition, disruption of commercial rail traffic could result in significant increases in commodity flow along major arterial roadways and highways throughout the coastal areas of Contra Costa County. It is also important to note that the rail lines that act as ad hoc flood protection could result in more significant flooding in surrounding areas due to overtopping effects.

Plume diagrams for release of hazardous materials from the pinch points were determined using the CAMEO suite of programs created by the U.S. Environmental Protection Agency (EPA). The CAMEO suite consists of CAMEO chemicals, ALOHA plume modeling through various release scenarios, and MARPLOT, which assists in plotting the information onto various map bases, such as Google Earth.

The plume diagrams are utilized in determining the extent of threat zones based on the release of a particular chemical. Three threat zones were mapped for each chemical release:

- Red zone: Highest threat level
- Orange Zone: Moderate threat level
- Yellow Zone: Low threat level

Chemical Plume Analysis for the CRA was based on the following general parameters:

- Weather conditions;
- COCs; and
- Worst-case scenario conditions.

Ammonia/anhydrous ammonia is one of the highest production chemicals in the United States. It is used in manufacturing, refrigeration, and as an agricultural fertilizer, and is common in household chemicals. Ammonia can be absorbed into the body by inhalation, ingestion, and by

skin and eye contact. A poisonous and visible vapor cloud is produced when ammonia comes in contact with water. Ammonia is extremely corrosive, and when it mixes with air it forms an explosive mixture. Although anhydrous ammonia is classified by the U.S. Department of Transportation (USDOT) as nonflammable, ammonia vapor is flammable at concentrations of 15% to 28% by volume of air.

Propane is a by-product of natural gas processing and crude oil refining and is produced from liquid components recovered during natural gas processing. Propane is a colorless, highly flammable liquefied gas and is one of the main components of liquid petroleum gas (LPG). Propane is biodegradable, and will readily evaporate into the environment. Inhalation of propane in minor amounts is not considered toxic; however, large amounts of propane in the air can displace oxygen and act as an asphyxiant. Skin absorption and ingestion of propane is not anticipated, although contact with propane in the liquid phase may result in frostbite.

Propane is highly flammable and explosive, and spillages of large quantities of liquid propane will vaporize to propane gas. Propane vapors can travel considerable distances. An ignition source may cause propane to ignite, flash back, and explode. Propane explosions can result in Boiling Liquid Expanding Vapor Explosion (BLEVE). The U.S. Department of Transport Emergency Response Guidebook (ERG) has determined general evacuation distances to be undertaken in the event of propane-induced BLEVE.

Sulfuric acid is a highly corrosive material. Spill cleanup of large spills of sulfuric acid should be undertaken by isolating the spill area with diking materials, including isolation from waterways. The acid can be treated with soda ash or lime, although neutralization will resolve a release of heat. Sulfuric acid is not flammable, but can be highly reactive with combustible materials.

Sulfuric acid spills are not considered as toxic, but can form a gray cloud. If sulfuric acid is mixed with water, it reacts vigorously forming an exothermic reaction. A vapor cloud of sulfuric acid can mix with water or water vapor to form a white cloud, which, based on the specific gravity is heavier than air.

Evacuation guidelines for sulfuric acid are contained with the ERG, and the isolation distance in the event that a fire is involved is ½ mile in all directions. Although there is no stated isolation distance in the event of a sulfuric acid spill, or a spill into water, the ERG guidelines with respect to fire were used as a basis for evacuation and mitigation.

Plume diagrams were produced using the ALOHA modeling program for the 5 determined pinch points located within coastal area of Contra Costa County. At each of the pinch points, the ALOHA plume maps for ammonia and propane were produced based on the following data:

- Incident occurs in mid-July with an air temperature of 85°F;
- Wind is from the west at 9 miles per hour;
- Size of railroad tank care is 34,367 gallons;
- Tank diameter of 10.66 feet; and
- The rupture in the tank car is a 10-inch diameter hole located near the bottom of the tank car.

The ammonia plume is extensive and is over 6 miles long and up to 2 miles wide. The Red Threat Zone is approximately 2 miles long and up to a mile wide.

The propane plume is approximately 1 mile long and up to ½ mile wide. The Red Threat Zone is approximately ½ mile long and up to ¼ mile wide. In the BLEVE scenario, the area affected is known as the Thermal Radiation Threat Zone and is approximately ¼ mile from the source, and the Red Threat Zone extends approximately ¼ mile from the source.

Sulfuric acid is not considered a toxic material that will create a toxic vapor plume during a release, and the ALOHA modeling program could not be used for this chemical. Although there is no stated isolation distance in the event of a sulfuric acid spill, or a spill into water, the ERG guidelines with respect to fire were used as a basis for evacuation and mitigation. Some of the major parameters used development of the isolation distance map for sulfuric acid at each of the 5 pinch points are as follows:

- Incident occurs in mid-July with an internal tank temperature of 85°F;
- Size of railroad tank care is 13,350 gallons;
- Tank diameter of 8 feet; and
- The rupture in the tank car is a 10-inch diameter hole located near the bottom of the tank car.

Pinch Point Richmond #1

Pinch Point Richmond #1 is located along a major north-south rail corridor in the city of Richmond. Most of the critical facilities for Pinch Point Richmond #1 are located east of the pinch point, which is equivalent to the prevailing downwind direction. Much of this area is in commercial and residential land use. Most of the area west and southwest of the pinch point is industrial.

The ammonia plume is extensive and is over 6 miles long and up to 2 miles wide. The Red Threat Zone for the ammonia plume is approximately 2 miles long and up to a mile wide and covers a significant portion of the residential and commercial areas of east Richmond and El Cerrito. Although the prevailing wind direction is from the west, seasonal variations result in the wind direction coming from the north. This will place areas southeast and south at risk from an ammonia release. Areas to the southeast are also residential and commercial. Much of the area to the south is either industrial or part of San Francisco Bay.

The entire propane plume covers a portion of the residential area of east Richmond and El Cerrito. Although the prevailing wind direction is from the west, seasonal variations result in the wind direction coming from the north. This will place a limited area southeast and south at risk from propane incident release. Areas to the southeast are also residential. Much of the area to the south is primarily industrial.

Under the propane BLEVE scenario, the Thermal Radiation Threat Zone and is approximately ¼ mile from the source, and the Red Threat Zone extends approximately ¼ mile from the source. In general, areas to the northwest, north, east, and southeast are primarily residential; areas to the west and south are industrial.

The sulfuric acid release isolation zone, although slightly less extensive in area, is similar to the propane BLEVE scenario. In general, areas to the northwest, north, east, and southeast are primarily residential; areas to the west and south are industrial.

Pinch Point Richmond #2

Pinch Point Richmond #2 is located along a major north-south rail corridor and rail siding in the city of Richmond. Most of the critical facilities for Pinch Point Richmond #2 are located east of the pinch point, which is equivalent to the prevailing downwind direction. Much of this area is in commercial and residential land use. Downtown Richmond is located directly east of the pinch point. Most of the area west of the pinch point is industrial.

The ammonia plume is extensive and is over 6 miles long and up to 2 miles wide. The Red Threat Zone for the ammonia plume is approximately 2 miles long and up to a mile wide and covers a significant portion of the residential and commercial areas of the central and downtown portion of the city of Richmond. Although the prevailing wind direction is from the west, seasonal variations result in the wind direction coming from the north. This will place areas southeast and south at risk from an ammonia release. Areas to the southeast are also residential and commercial with some industry. Much of the area to the south is either industrial or part of San Francisco Bay.

The entire propane plume covers a portion of the commercial and residential area of Richmond, including the downtown area. Although the prevailing wind direction is from the west, seasonal variations result in the wind direction coming from the north. This will place a limited area southeast and south at risk from a propane incident. Areas to the southeast are also residential. Much of the area to the south is primarily industrial.

Under the propane BLEVE scenario, the Thermal Radiation Threat Zone and is approximately $\frac{1}{4}$ mile from the source, and the Red Threat Zone extends approximately $\frac{1}{4}$ mile from the source. In general, areas to the northeast, east, and southeast are primarily commercial and residential; areas to the northwest, west, and south are industrial.

The sulfuric acid release isolation zone, although slightly less extensive in area, is similar to the propane BLEVE scenario. In general, areas to the northwest, west, and south are primarily commercial and residential; areas to the northeast, east, and southeast are industrial.

Pinch Point Martinez #3

Pinch Point Martinez #3 is located along the major UP rail line entering the Martinez area from the coast to the west. Most of the critical facilities for Pinch Point Martinez #3 are located southwest and south of the pinch point. Much of the area southwest of the pinch point is in commercial and residential land use and downtown Martinez is located in this direction. Most of the area to the south of the pinch point is residential. Industrial areas, including oil refineries, are located east of the pinch point, which is equivalent to the downwind direction. Industrial areas are also located north and west of the pinch point.

The ammonia plume is extensive and is over 6 miles long and up to 2 miles wide. The Red Threat Zone for the ammonia plume is approximately 2 miles long and up to a mile wide and

covers the industrial area northeast of the city of Martinez, including oil refineries. Although the prevailing wind direction is from the west, seasonal variations result in the wind direction coming from the north. This will place areas southeast and south at risk from an ammonia release. Areas to the southeast are also industrial. Much of the area to the south is partly industrial and partly residential.

The entire propane plume covers a portion of the industrial area in the northeastern part of Martinez. Although the prevailing wind direction is from the west, seasonal variations result in the wind direction coming from the north. This will place the industrial area south of the pinch point at risk from a propane incident.

Under the propane BLEVE scenario, the Thermal Radiation Threat Zone and is approximately $\frac{1}{4}$ mile from the source, and the Red Threat Zone extends approximately $\frac{1}{4}$ mile from the source. The entire area affected by this scenario is industrial, including oil refineries.

The sulfuric acid release isolation zone, although slightly less extensive in area, is similar to the propane BLEVE scenario. The entire isolation zone is industrial, including oil refineries.

Pinch Point Bay Point #4

Pinch Point Bay Point #4 is located at the intersection of the major UP and BNSF rail lines heading east from Martinez. Most of the critical facilities for Pinch Point Bay Point #4 are located east-southeast of the pinch point. The major portion of the cities of Bay Point and Pittsburg, including the commercial, residential, and downtown areas of these cities. These cities are partially downwind of the prevailing wind direction. The area directly west of the pinch point are primarily industrial and natural coastal areas.

The ammonia plume is extensive and is over 6 miles long and up to 2 miles wide. The Red Threat Zone for the ammonia plume is approximately 2 miles long and up to a mile wide, and covers the industrial area and natural open land area along Suisun Bay north of the cities of Bay Point and Pittsburg. Although the prevailing wind direction is from the west, seasonal variations result in the wind direction coming from the north. This will place areas southeast and south at risk from an ammonia release. Areas to the southeast are within the commercial, residential, and downtown areas of both Bay Point and Pittsburg.

The entire propane plume covers the industrial and natural open land area north of the city of Bay Point. Although the prevailing wind direction is from the west, seasonal variations result in the wind direction coming from the north. This will place primarily industrial area to the southeast and south at risk from a propane incident. Areas beyond this zone to the southeast are residential.

Under the propane BLEVE scenario, the Thermal Radiation Threat Zone and is approximately $\frac{1}{4}$ mile from the source, and the Red Threat Zone extends approximately $\frac{1}{4}$ mile from the source. In general, the entire area is either industrial, natural open lands, or part of Suisun Bay. Areas beyond this zone to the southeast are residential.

The sulfuric acid release isolation zone, although slightly less extensive in area, is similar to the propane BLEVE scenario. The entire isolation zone in industrial and natural open land areas, including part of Suisun Bay.

Pinch Point Antioch #5

Pinch Point Antioch #5 is along the BNSF rail heading east from Martinez. Most of the critical facilities for Pinch Point Antioch #5 are located east and east-southeast (downwind) of the pinch point and includes a major portion of the city of Antioch, including the commercial, residential, and downtown areas of the city. The area surrounding the pinch point are primarily industrial and natural coastal areas.

The ammonia plume is extensive and is over 6 miles long and up to 2 miles wide. The Red Threat Zone is approximately 2 miles long and up to a mile wide, and covers an industrial area, natural open lands area, and the northern part of the city of Antioch, including part of the downtown area, as well as part of Suisun Bay. Although the prevailing wind direction is from the west, seasonal variations result in the wind direction coming from the north. This will place areas southeast and south at risk from an ammonia release. Areas to the southeast are within the commercial, residential, and downtown areas of Antioch.

The entire propane plume covers the industrial and natural open land area northwest of the city of Antioch. Although the prevailing wind direction is from the west, seasonal variations result in the wind direction coming from the north. This will place primarily industrial area to the southeast and south at risk from a propane incident. Areas beyond this zone to the southeast are residential.

Under the propane BLEVE scenario, the Thermal Radiation Threat Zone and is approximately ¾ mile from the source, and the Red Threat Zone extends approximately ¼ mile from the source. In general, the entire area is either industrial, natural open lands, or part of Suisun Bay. Areas beyond this zone to the southeast are residential.

The sulfuric acid release isolation zone, although slightly less extensive in area, is similar to the propane BLEVE scenario. The entire isolation zone in industrial and natural open land areas, including part of Suisun Bay.

9.0 Concluding Statement

A Commodity Flow Study was prepared from historical and currently available railroad and highway data. Based on the results of the Flow Study, 3 COCs were identified to be used in the Community Risk Assessment portion of this report. Based on the COCs and other criteria, including rising tide data from the ART program, California Healthy Places Index, liquefaction susceptibility, CalARP facilities, locations of critical facilities, weather conditions, railroad locations, and critical arterial road locations, 5 pinch points were located in the coastal areas of Contra Costa County.

The pinch points were used to prepare the Community Risk Assessment and chemical plume analysis to determine worst-case scenario effects of a release of the ammonia/anhydrous ammonia, propane, and sulfuric acid, which were designated as the most critical COCs.

Based on the results of the chemical plume analysis, general emergency response procedures were outlined to allow for emergency response to a chemical release incident. Emergency response covers proper protective and response equipment, comprehensive training for emergency responders, and in-place mutual agreements with local agencies to allow for merging and pooling of emergency response resources.

The addition of the potential flooding of low-lying coastal areas of the county, including residential, commercial, and industrial areas, may serve to complicate emergency response to an incident, and additional measures may need to be implemented to adequately respond to a flooding situation at the site of a release incident.

A proactive approach in equipping and training first responders will serve to protect the vulnerable populations within the County in the event of a transportation-related hazardous material accident/incident. This approach will also minimize disruption of essential services, facilities, and infrastructure, and will ultimately save lives and property.

The East Contra Costa and Bay Area Wide Adapting to Rising Tides projects are still ongoing at the time of the completion of this report. Both projects are anticipated to conclude in winter of 2019 and the final project reports and data will be available on the BCDC website www.adaptingtorisingtides.org/.

APPENDICES

APPENDIX A

Hazardous Liquid Pipeline Details

APPENDIX A-1
Richmond Area Pipeline Data

RL1. SFPP, LP Non-HVL Product Pipeline LS-70; (NIS) RICHMO

18092

Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	18092
OPERATOR NAME	SFPP, LP
SYSTEM NAME	SFPP_NORTH
SUBSYSTEM NAME	LS-70; (NIS) RICHMOND - POINT M...
PIPELINE ID	LS-70; (NIS) RICHMO*
MILES	2.40
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	NON HVL PRODUCT
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (unfilled)
REVISION DATE	06/21/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	PATRICK
LAST NAME	RIBAN
TITLE	MANAGER-ENGINEERING
ENTITY	
PHONE	(713) 420-5608
EMAIL	patrick_riban@kindermorgan.com
ADDRESS	1001 LOUISIANA ST
CITY	HOUSTON
STATE	TX
ZIP	77002

RL2. SFPP, LP Non-HVL Product Pipeline LS-71; LS-89 – RICH

18092	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	18092
OPERATOR NAME	SFPP, LP
SYSTEM NAME	SFPP_NORTH
SUBSYSTEM NAME	LS-71; LS 89 - RICHMOND 8"
PIPELINE ID	LS-71; LS 89 - RICH*
MILES	2.14
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	NON HVL PRODUCT
INTERSTATE DESIGNATION	Y
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	06/21/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	PATRICK
LAST NAME	RIBAN
TITLE	MANAGER-ENGINEERING
ENTITY	
PHONE	(713) 420-5606
EMAIL	patrick_riban@kindermorgan.com
ADDRESS	1001 LOUISIANA ST
CITY	HOUSTON
STATE	TX
ZIP	77002

RL3. Phillips 66 Pipeline, LLC, Non-HVL Product Pipeline 2258_35

31684	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	31684
OPERATOR NAME	PHILLIPS 66 PIPELINE LLC
SYSTEM NAME	RICHMOND PRODUCTS LINE
SUBSYSTEM NAME	RICHMOND TERM/RODEO REFINERY
PIPELINE ID	2258_35
MILES	6.32
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	02/22/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	Todd
LAST NAME	Tullio
TITLE	Manager, DOT Compliance
ENTITY	
PHONE	(832) 765-1636
EMAIL	Todd.L.Tullio@p66.com
ADDRESS	2331 Citywest Blvd HQ-08-S820-05
CITY	Houston
STATE	TX
ZIP	77043

RL4. SFPP, LP Non-HVL Product Pipeline LS-75; IMTT/TIME

18092	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	18092
OPERATOR NAME	SFPP, LP
SYSTEM NAME	SFPP_NORTH
SUBSYSTEM NAME	LS-75; IMTT / TIME - RICHMOND 8"3"
PIPELINE ID	LS-75; IMTT / TIME *
MILES	1.85
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	NON HVL PRODUCT
INTERSTATE DESIGNATION	Y
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	06/21/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	PATRICK
LAST NAME	RIBAN
TITLE	MANAGER-ENGINEERING
ENTITY	
PHONE	(713) 420-5608
EMAIL	patrick_riban@kindermorgan.com
ADDRESS	1001 LOUISIANA ST
CITY	HOUSTON
STATE	TX
ZIP	77002

RL5. SFPP, LP Non-HVL Product Pipeline LS-37; AMORCO-RIC

18092	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	18092
OPERATOR NAME	SFPP, LP
SYSTEM NAME	SFPP_NORTH
SUBSYSTEM NAME	LS-37; AMORCO - RICHMOND 12"
PIPELINE ID	LS-37; AMORCO - RIC*
MILES	20.83
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	NON HVL PRODUCT
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	06/21/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	PATRICK
LAST NAME	RIBAN
TITLE	MANAGER-ENGINEERING
ENTITY	
PHONE	(713) 420-5608
EMAIL	patrick_riban@kindermorgan.com
ADDRESS	1001 LOUISIANA ST
CITY	HOUSTON
STATE	TX
ZIP	77002

RL6. SFPP, LP Non-HVL Product Pipeline LS-8; RICHMOND-CO

18092	Attribute	Value
- Category: PIPELINE ATTRIBUTES		
OPERATOR ID	18092	
OPERATOR NAME	SFPP, LP	
SYSTEM NAME	SFPP_NORTH	
SUBSYSTEM NAME	LS-8; RICHMOND - CONCORD 8"	
PIPELINE ID	LS-8; RICHMOND - CO*	
MILES	22.42	
COMMODITY CATEGORY	Non-HVL Product	
COMMODITY DESCRIPTION	NON HVL PRODUCT	
INTERSTATE DESIGNATION	Y	
PIPELINE STATUS CODE	Active (filled)	
REVISION DATE	06/21/2018	
FRP SEQUENCE NUMBER		
- Category: GENERAL CONTACT		
FIRST NAME	PATRICK	
LAST NAME	RIBAN	
TITLE	MANAGER-ENGINEERING	
ENTITY		
PHONE	(713) 420-5608	
EMAIL	patrick_riban@kindermorgan.com	
ADDRESS	1001 LOUISIANA ST	
CITY	HOUSTON	
STATE	TX	
ZIP	77002	

RL7. Phillips 66 Pipeline, LLC Non-HVL Product Pipeline 2258_35

31684	Attribute	Value
- Category: PIPELINE ATTRIBUTES		
OPERATOR ID	31684	
OPERATOR NAME	PHILLIPS 66 PIPELINE LLC	
SYSTEM NAME	RICHMOND PRODUCTS LINE	
SUBSYSTEM NAME	RICHMOND TERM/RODEO REFINERY	
PIPELINE ID	2258_35	
MILES	6.32	
COMMODITY CATEGORY	Non-HVL Product	
COMMODITY DESCRIPTION		
INTERSTATE DESIGNATION	N	
PIPELINE STATUS CODE	Active (filled)	
REVISION DATE	02/22/2018	
FRP SEQUENCE NUMBER		
- Category: GENERAL CONTACT		
FIRST NAME	Todd	
LAST NAME	Tullio	
TITLE	Manager, DOT Compliance	
ENTITY		
PHONE	(832) 765-1636	
EMAIL	Todd.L.Tullio@p66.com	
ADDRESS	2331 Citywest Blvd HQ-J8-S620-05	
CITY	Houston	
STATE	TX	
ZIP	77043	

RL8. SFPP, LP Non-HVL Product Pipeline LS-46/41; RICHMOND

18092	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	18092
OPERATOR NAME	SFPP, LP
SYSTEM NAME	SFPP NORTH
SUBSYSTEM NAME	LS-46/41; RICHMOND - BRISBANE & ...
PIPELINE ID	LS-46/41; RICHMOND *
MILES	2.31
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	NON HVL PRODUCT
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	06/24/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	PATRICK
LAST NAME	RIEAN
TITLE	MANAGER-ENGINEERING
ENTITY	
PHONE	(713) 420-5608
EMAIL	patrick_riean@kindemorgan.com
ADDRESS	1001 LOUISIANA ST
CITY	HOUSTON
STATE	TX
ZIP	77002

RL9. Shell Pipeline Co., LP Non-HVL Product Pipeline 854529

31174	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	31174
OPERATOR NAME	SHELL PIPELINE CO., L.P.
SYSTEM NAME	SAN PABLO PIPELINE
SUBSYSTEM NAME	854529 - 12IN SAN PABLO
PIPELINE ID	854529
MILES	10.53
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	EMPTY
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (unfilled)
REVISION DATE	06/15/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	Pratik
LAST NAME	Bhakta
TITLE	Regulatory Engineer
ENTITY	
PHONE	(832) 762-2782
EMAIL	pratik.bhakta@shell.com
ADDRESS	P.O. BOX 2648
CITY	Houston
STATE	TX
ZIP	77252

RL10. Chevron Pipeline Co.; Non-HVL Product Pipeline CAL0001

2731	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	2731
OPERATOR NAME	CHEVRON PIPE LINE CO
SYSTEM NAME	BAY AREA PIPE LINE
SUBSYSTEM NAME	BAY AREA PRODUCTS LINE (BAPL)
PIPELINE ID	CAL0001
MILES	21.69
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	GASOLINE, DIESEL AND/OR JET
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	06/12/2016
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	Garrett
LAST NAME	Parker
TITLE	Regulatory Assurance Specialist
ENTITY	
PHONE	(832) 854-4556
EMAIL	PARKERG@chevron.com
ADDRESS	1500 Louisiana
CITY	Houston
STATE	TX
ZIP	77002

APPENDIX A-2

Crockett Area Pipeline Data

CL1. Shell Pipeline Co., LP Non-HVL Product Pipeline 854529

31174	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	31174
OPERATOR NAME	SHELL PIPELINE CO., L.P.
SYSTEM NAME	SAN PABLO PIPELINE
SUBSYSTEM NAME	854529 - 12IN SAN PABLO
PIPELINE ID	854529
MILES	10.53
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	EMPTY
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (unfilled)
REVISION DATE	06/15/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	Pratik
LAST NAME	Bhakta
TITLE	Regulatory Engineer
ENTITY	
PHONE	(832) 762-2782
EMAIL	pratik.bhakta@shell.com
ADDRESS	P.O. BOX 2649
CITY	Houston
STATE	TX
ZIP	77252

CL2. SFPP, LP Non-HVL Product Pipeline LS-37; AMORCO-RIC

18092	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	18092
OPERATOR NAME	SFPP, LP
SYSTEM NAME	SFPP_NORTH
SUBSYSTEM NAME	LS-37; AMORCO - RICHMOND 12"
PIPELINE ID	LS-37; AMORCO - RIC"
MILES	20.83
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	NON HVL PRODUCT
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	06/21/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	PATRICK
LAST NAME	RIBAN
TITLE	MANAGER-ENGINEERING
ENTITY	
PHONE	(713) 420-6608
EMAIL	patrick_riban@kindermorgan.com
ADDRESS	1001 LOUISIANA ST
CITY	HOUSTON
STATE	TX
ZIP	77002

CL3. SFPP, LP Non-HVL Product Pipeline LS-8; RICHMOND-CO

18092	Attribute	Value
- Category: PIPELINE ATTRIBUTES		
OPERATOR ID	18092	
OPERATOR NAME	SFPP, LP	
SYSTEM NAME	SFPP_NORTH	
SUBSYSTEM NAME	LS-8; RICHMOND - CONCORD 8"	
PIPELINE ID	LS-8; RICHMOND - CO*	
MILES	22.42	
COMMODITY CATEGORY	Non-HVL Product	
COMMODITY DESCRIPTION	NON HVL PRODUCT	
INTERSTATE DESIGNATION	Y	
PIPELINE STATUS CODE	Active (filled)	
REVISION DATE	06/21/2018	
FRP SEQUENCE NUMBER		
- Category: GENERAL CONTACT		
FIRST NAME	PATRICK	
LAST NAME	RIBAN	
TITLE	MANAGER-ENGINEERING	
ENTITY		
PHONE	(713) 420-5608	
EMAIL	patrick_riban@kindermorgan.com	
ADDRESS	1001 LOUISIANA ST	
CITY	HOUSTON	
STATE	TX	
ZIP	77002	

CL4. Shell Pipeline Co.; Non-HVL Product Pipeline 854214

31174	Attribute	Value
- Category: PIPELINE ATTRIBUTES		
OPERATOR ID	31174	
OPERATOR NAME	SHELL PIPELINE CO., L.P.	
SYSTEM NAME	SAN PABLO PIPELINE	
SUBSYSTEM NAME	854214 - 16IN SAN PABLO	
PIPELINE ID	854214	
MILES	24.17	
COMMODITY CATEGORY	Non-HVL Product	
COMMODITY DESCRIPTION	EMPTY	
INTERSTATE DESIGNATION	N	
PIPELINE STATUS CODE	Active (unfilled)	
REVISION DATE	06/15/2018	
FRP SEQUENCE NUMBER		
- Category: GENERAL CONTACT		
FIRST NAME	Pratik	
LAST NAME	Bhakta	
TITLE	Regulatory Engineer	
ENTITY		
PHONE	(832) 762-2762	
EMAIL	pratik.bhakta@shell.com	
ADDRESS	P.O. BOX 2648	
CITY	Houston	
STATE	TX	
ZIP	77252	

CL5. Phillips 66 Pipeline LLC Non-HVL Product Pipeline 2258_05

31694	Attribute	Value
- Category: PIPELINE ATTRIBUTES		
OPERATOR ID	31694	
OPERATOR NAME	PHILLIPS 66 PIPELINE LLC	
SYSTEM NAME	RICHMOND PRODUCTS LINE	
SUBSYSTEM NAME	RICHMOND TERM/RODEO REFINERY	
PIPELINE ID	2258_05	
MILES	1.30	
COMMODITY CATEGORY	Non-HVL Product	
COMMODITY DESCRIPTION		
INTERSTATE DESIGNATION	N	
PIPELINE STATUS CODE	Active (filled)	
REVISION DATE	02/22/2018	
FRP SEQUENCE NUMBER		
- Category: GENERAL CONTACT		
FIRST NAME	Todd	
LAST NAME	Tullio	
TITLE	Manager, DOT Compliance	
ENTITY		
PHONE	(832) 765-1636	
EMAIL	Todd.L.Tullio@p66.com	
ADDRESS	2331 Citywest Blvd HQ-08-S820-05	
CITY	Houston	
STATE	TX	
ZIP	77043	

CL6. Phillips 66 Pipeline LLC Non-HVL Product Pipeline 2258_15

31684	Attribute	Value
- Category: PIPELINE ATTRIBUTES		
OPERATOR ID	31684	
OPERATOR NAME	PHILLIPS 66 PIPELINE LLC	
SYSTEM NAME	RICHMOND PRODUCTS LINE	
SUBSYSTEM NAME	RICHMOND TERM/RODEO REFINERY	
PIPELINE ID	2258_15	
MILES	3.82	
COMMODITY CATEGORY	Non-HVL Product	
COMMODITY DESCRIPTION		
INTERSTATE DESIGNATION	N	
PIPELINE STATUS CODE	Active (filled)	
REVISION DATE	02/22/2018	
FRP SEQUENCE NUMBER		
- Category: GENERAL CONTACT		
FIRST NAME	Todd	
LAST NAME	Tullio	
TITLE	Manager, DOT Compliance	
ENTITY		
PHONE	(832) 765-1636	
EMAIL	Todd.L.Tullio@p66.com	
ADDRESS	2331 Citywest Blvd HQ-08-S820-05	
CITY	Houston	
STATE	TX	
ZIP	77043	

CL7. Phillips 66 Pipeline LLC Non-HVL Product Pipeline 2260_60

31684	Attribute	Value
- Category: PIPELINE ATTRIBUTES		
OPERATOR ID	31684	
OPERATOR NAME	PHILLIPS 66 PIPELINE LLC	
SYSTEM NAME	JUNCTION TO RODEO REFINERY	
SUBSYSTEM NAME	COALINGA PMP STARODEO REFIN...	
PIPELINE ID	2260_60	
MILES	7.22	
COMMODITY CATEGORY	Crude Oil	
COMMODITY DESCRIPTION		
INTERSTATE DESIGNATION	N	
PIPELINE STATUS CODE	Active (filled)	
REVISION DATE	02/22/2018	
FRP SEQUENCE NUMBER		
- Category: GENERAL CONTACT		
FIRST NAME	Todd	
LAST NAME	Tullio	
TITLE	Manager, DOT Compliance	
ENTITY		
PHONE	(832) 765-1636	
EMAIL	Todd.L.Tullio@p66.com	
ADDRESS	2331 Citywest Blvd HC-08-5620-05	
CITY	Houston	
STATE	TX	
ZIP	77043	

CL8. Nustar Terminals Operations Non-HVL Product Pipeline 775

26094	Attribute	Value
- Category: PIPELINE ATTRIBUTES		
OPERATOR ID	26094	
OPERATOR NAME	NUSTAR TERMINALS OPERATIONS ...	
SYSTEM NAME	SELBY PIPELINES	
SUBSYSTEM NAME	SELBY P5 PIPELINE	
PIPELINE ID	775	
MILES	1.06	
COMMODITY CATEGORY	Non-HVL Product	
COMMODITY DESCRIPTION	PRODUCTS	
INTERSTATE DESIGNATION	N	
PIPELINE STATUS CODE	Active (filled)	
REVISION DATE	06/14/2018	
FRP SEQUENCE NUMBER		
- Category: GENERAL CONTACT		
FIRST NAME	Kyle	
LAST NAME	Oppliger	
TITLE	VP Terminal Operations	
ENTITY		
PHONE	(800) 759-0033	
EMAIL	kyle.oppliger@nustarenergy.com	
ADDRESS	19003 IH-10 West	
CITY	San Antonio	
STATE	TX	
ZIP	78257	

CL9. Phillips 66 Pipeline LLC Crude Oil Pipeline 2260_65

31684	Attribute	Value
- Category: PIPELINE ATTRIBUTES		
OPERATOR ID	31684	
OPERATOR NAME	PHILLIPS 66 PIPELINE LLC	
SYSTEM NAME	JUNCTION TO RODEO REFINERY	
SUBSYSTEM NAME	COALINGA PMP STARODEO REFIN...	
PIPELINE ID	2260_65	
MILES	0.48	
COMMODITY CATEGORY	Crude Oil	
COMMODITY DESCRIPTION		
INTERSTATE DESIGNATION	N	
PIPELINE STATUS CODE	Active (filled)	
REVISION DATE	02/22/2018	
FRP SEQUENCE NUMBER		
- Category: GENERAL CONTACT		
FIRST NAME	Todd	
LAST NAME	Tullio	
TITLE	Manager, DOT Compliance	
ENTITY		
PHONE	(832) 765-1636	
EMAIL	Todd.L.Tullio@p66.com	
ADDRESS	2331 Citywest Blvd HC-08-S820-05	
CITY	Houston	
STATE	TX	
ZIP	77043	

CL10. DOD Defense Energy Support Non-HVL Product Pipeline 0064

31460	Attribute	Value
- Category: PIPELINE ATTRIBUTES		
OPERATOR ID	31460	
OPERATOR NAME	DOD DEFENSE ENERGY SUPPORT...	
SYSTEM NAME	OZOL	
SUBSYSTEM NAME	OZOL-8 INCH	
PIPELINE ID	0064	
MILES	7.45	
COMMODITY CATEGORY	Non-HVL Product	
COMMODITY DESCRIPTION		
INTERSTATE DESIGNATION	N	
PIPELINE STATUS CODE	Active (unfilled)	
REVISION DATE	06/13/2019	
FRP SEQUENCE NUMBER		
- Category: GENERAL CONTACT		
FIRST NAME	Todd	
LAST NAME	Williams	
TITLE	Facility Manager/COR, DFSP San Pedro	
ENTITY		
PHONE	(310) 241-2834	
EMAIL	Todd.williams@dia.mil	
ADDRESS	3171 N Gaffy Street	
CITY	San Pedro	
STATE	CA	
ZIP	90731	

APPENDIX A-3

Martinez Area Pipeline Data

ML1. Shell Pipeline Co., LP Non-HVL Product Pipeline 854214

31174	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	31174
OPERATOR NAME	SHELL PIPELINE CO., L.P.
SYSTEM NAME	SAN PABLO PIPELINE
SUBSYSTEM NAME	854214 - 16IN SAN PABLO
PIPELINE ID	854214
MILES	24.17
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	EMPTY
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (unfilled)
REVISION DATE	06/15/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	Pratik
LAST NAME	Bhakta
TITLE	Regulatory Engineer
ENTITY	
PHONE	(832) 762-2782
EMAIL	pratik.bhakta@shell.com
ADDRESS	P.O. BOX 2648
CITY	Houston
STATE	TX
ZIP	77252

ML2. SFPP, LP Non-HVL Product Pipeline LS-37; AMORCO-RIC

18092	Attribute	Value
- Category: PIPELINE ATTRIBUTES		
OPERATOR ID	18092	
OPERATOR NAME	SFPP, LP	
SYSTEM NAME	SFPP_NORTH	
SUBSYSTEM NAME	LS-37; AMORCO - RICHMOND 12"	
PIPELINE ID	LS-37; AMORCO - RIC"	
MILES	20.83	
COMMODITY CATEGORY	Non-HVL Product	
COMMODITY DESCRIPTION	NON HVL PRODUCT	
INTERSTATE DESIGNATION	N	
PIPELINE STATUS CODE	Active (filled)	
REVISION DATE	06/21/2018	
FRP SEQUENCE NUMBER		
- Category: GENERAL CONTACT		
FIRST NAME	PATRICK	
LAST NAME	RIBAN	
TITLE	MANAGER-ENGINEERING	
ENTITY		
PHONE	(713) 420-5608	
EMAIL	patrick_riban@kindermorgan.com	
ADDRESS	1001 LOUISIANA ST	
CITY	HOUSTON	
STATE	TX	
ZIP	77002	

ML3. Shell Pipeline Co., LP; Non-HVL Product Pipeline 305

31174	Attribute	Value
- Category: PIPELINE ATTRIBUTES		
OPERATOR ID	31174	
OPERATOR NAME	SHELL PIPELINE CO., L.P.	
SYSTEM NAME	BAY AREA PRODUCTS LINE	
SUBSYSTEM NAME	305 - 10IN BAY AREA PRODUCTS LI...	
PIPELINE ID	305	
MILES	2.41	
COMMODITY CATEGORY	Non-HVL Product	
COMMODITY DESCRIPTION	EMPTY	
INTERSTATE DESIGNATION	N	
PIPELINE STATUS CODE	Active (unfilled)	
REVISION DATE	06/15/2018	
FRP SEQUENCE NUMBER		
- Category: GENERAL CONTACT		
FIRST NAME	Pratik	
LAST NAME	Bhakta	
TITLE	Regulatory Engineer	
ENTITY		
PHONE	(832) 762-2782	
EMAIL	pratik.bhakta@shell.com	
ADDRESS	P.O. BOX 2648	
CITY	Houston	
STATE	TX	
ZIP	77252	

ML4. Shell Pipeline Co., LP; Non-HVL Product Pipeline 306

Attribute	Value
31174	
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	31174
OPERATOR NAME	SHELL PIPELINE CO., L.P.
SYSTEM NAME	BAY AREA PRODUCTS LINE
SUBSYSTEM NAME	306 - 10IN BAY AREA PRODUCT LIN...
PIPELINE ID	306
MILES	0.21
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	MULTIPLE PRODUCTS
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	06/15/2019
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	Pratik
LAST NAME	Bhakta
TITLE	Regulatory Engineer
ENTITY	
PHONE	(832) 762-2782
EMAIL	pratik.bhakta@shell.com
ADDRESS	P.O. BOX 2648
CITY	Houston
STATE	TX
ZIP	77252

ML5. DOD Defense Energy Support; Non-HVL Product Pipeline 0064

Attribute	Value
31460	
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	31460
OPERATOR NAME	DOD DEFENSE ENERGY SUPPORT...
SYSTEM NAME	OZOL
SUBSYSTEM NAME	OZOL-8 INCH
PIPELINE ID	0064
MILES	7.45
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (unfilled)
REVISION DATE	06/13/2019
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	Todd
LAST NAME	Williams
TITLE	Facility Manager/COR, DFSP San Pedro
ENTITY	
PHONE	(310) 241-2834
EMAIL	Todd.williams@cla.mil
ADDRESS	3171 N Gaffy Street
CITY	San Pedro
STATE	CA
ZIP	90731

ML6. Phillips 66 Pipeline, LLC; Crude Oil Pipeline 2260_60

31684	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	31684
OPERATOR NAME	PHILLIPS 66 PIPELINE LLC
SYSTEM NAME	JUNCTION TO ROGEO REFINERY
SUBSYSTEM NAME	COALINGA PMP STARODEO REFIN...
PIPELINE ID	2260_60
MILES	7.22
COMMODITY CATEGORY	Crude Oil
COMMODITY DESCRIPTION	
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	02/22/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	Todd
LAST NAME	Tullio
TITLE	Manager, DOT Compliance
ENTITY	
PHONE	(832) 765-1636
EMAIL	Todd.L.Tullio@p66.com
ADDRESS	2331 Citywest Blvd HC-08-S620-05
CITY	Houston
STATE	TX
ZIP	77043

ML7. Chevron Pipeline Co; Non-HVL Pipeline CAL0001

2731	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	2731
OPERATOR NAME	CHEVRON PIPE LINE CO
SYSTEM NAME	BAY AREA PIPE LINE
SUBSYSTEM NAME	BAY AREA PRODUCTS LINE (BAPL)
PIPELINE ID	CAL0001
MILES	21.69
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	GASOLINE, DIESEL AND/OR JET
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	06/12/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	Garrett
LAST NAME	Parker
TITLE	Regulatory Assurance Specialist
ENTITY	
PHONE	(832) 854-4596
EMAIL	PARKERG@chevron.com
ADDRESS	1500 Louisiana
CITY	Houston
STATE	TX
ZIP	77002

ML8. SFPP, LP; Non-HVL Pipeline LS-8; RICHMOND-CO

18092	Attribute	Value
- Category: PIPELINE ATTRIBUTES		
OPERATOR ID	18092	
OPERATOR NAME	SFPP, LP	
SYSTEM NAME	SFPP_NORTH	
SUBSYSTEM NAME	LS-8; RICHMOND - CONCORD 8"	
PIPELINE ID	LS-8; RICHMOND - CO"	
MILES	22.42	
COMMODITY CATEGORY	Non-HVL Product	
COMMODITY DESCRIPTION	NON HVL PRODUCT	
INTERSTATE DESIGNATION	Y	
PIPELINE STATUS CODE	Active (filled)	
REVISION DATE	06/21/2018	
FRP SEQUENCE NUMBER		
- Category: GENERAL CONTACT		
FIRST NAME	PATRICK	
LAST NAME	RIBAN	
TITLE	MANAGER-ENGINEERING	
ENTITY		
PHONE	(713) 420-5608	
EMAIL	patrick_riban@kindermorgan.com	
ADDRESS	1001 LOUISIANA ST	
CITY	HOUSTON	
STATE	TX	
ZIP	77002	

ML9. Phillips 66 Pipeline, LLC; Non-HVL Pipeline 2234_615

31684	Attribute	Value
- Category: PIPELINE ATTRIBUTES		
OPERATOR ID	31684	
OPERATOR NAME	PHILLIPS 66 PIPELINE LLC	
SYSTEM NAME	SFAR PRODUCTS LINE	
SUBSYSTEM NAME	VINE/COLLIER	
PIPELINE ID	2234_615	
MILES	8.39	
COMMODITY CATEGORY	Non-HVL Product	
COMMODITY DESCRIPTION		
INTERSTATE DESIGNATION	N	
PIPELINE STATUS CODE	Active (unfilled)	
REVISION DATE	02/22/2018	
FRP SEQUENCE NUMBER		
- Category: GENERAL CONTACT		
FIRST NAME	Todd	
LAST NAME	Tullio	
TITLE	Manager, DOT Compliance	
ENTITY		
PHONE	(832) 765-1636	
EMAIL	Todd.L.Tullio@p66.com	
ADDRESS	2331 Citywest Blvd HQ-08-S820-05	
CITY	Houston	
STATE	TX	
ZIP	77043	

ML10. Shell Pipeline Co., LP; Crude Oil Pipeline 490

31174	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	31174
OPERATOR NAME	SHELL PIPELINE CO., L.P.
SYSTEM NAME	VINE HILL
SUBSYSTEM NAME	490 - 10IN VINE HILL CRUDE
PIPELINE ID	490
MILES	1.25
COMMODITY CATEGORY	Crude Oil
COMMODITY DESCRIPTION	CRUDE
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	06/15/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	Pratik
LAST NAME	Bhakta
TITLE	Regulatory Engineer
ENTITY	
PHONE	(832) 762-2782
EMAIL	pratik.bhakta@shell.com
ADDRESS	P.O. BOX 2648
CITY	Houston
STATE	TX
ZIP	77252

ML11. SFPP, LP; Non-HVL Pipeline LS-72; RODEO-CONC

18092	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	18092
OPERATOR NAME	SFPP, LP
SYSTEM NAME	SFPP NORTH
SUBSYSTEM NAME	LS-72; RODEO - CONCORD 8"
PIPELINE ID	LS-72; RODEO - CONC*
MILES	12.94
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	NON HVL PRODUCT
INTERSTATE DESIGNATION	Y
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	06/21/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	PATRICK
LAST NAME	RIBAN
TITLE	MANAGER-ENGINEERING
ENTITY	
PHONE	(713) 420-5608
EMAIL	patrick_riban@kindermorgan.com
ADDRESS	1001 LOUISIANA ST
CITY	HOUSTON
STATE	TX
ZIP	77002

ML12. Valero Refining Co. CA; Crude Oil Pipeline TRANSBAY_20IN

32223	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	32223
OPERATOR NAME	VALERO REFINING COMPANY - CA...
SYSTEM NAME	SAV TRANSBAY CRUDE (CSFM 060...
SUBSYSTEM NAME	
PIPELINE ID	TRANSBAY_20IN
MILES	2.10
COMMODITY CATEGORY	Crude Oil
COMMODITY DESCRIPTION	
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	06/05/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	John
LAST NAME	Lazorik
TITLE	Staff Environmental Engineer
ENTITY	
PHONE	(707) 745-7660
EMAIL	john.lazorik@valero.com
ADDRESS	3400 E. 2nd St.
CITY	Benicia
STATE	CA
ZIP	94510

ML13. SFPP, LP; Non-HVL Pipeline LS-47; (NIS) CONCOR

18092	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	18092
OPERATOR NAME	SFPP, LP
SYSTEM NAME	SFPP_NORTH
SUBSYSTEM NAME	LS-47; (NIS) CONCOR - SUISUN J...
PIPELINE ID	LS-47; (NIS) CONCOR*
MILES	4.65
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	NON HVL PRODUCT
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (unfilled)
REVISION DATE	06/21/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	PATRICK
LAST NAME	RIBAN
TITLE	MANAGER-ENGINEERING
ENTITY	
PHONE	(713) 420-5608
EMAIL	patrick_riban@kindermorgan.com
ADDRESS	1001 LOUISIANA ST
CITY	HOUSTON
STATE	TX
ZIP	77002

ML14. SFPP, LP; Non-HVL Pipeline LS-130A; CONCORD-WA

18092	Attribute	Value
- Category: PIPELINE ATTRIBUTES		
OPERATOR ID	18092	
OPERATOR NAME	SFPP, LP	
SYSTEM NAME	SFPP_NORTH	
SUBSYSTEM NAME	LS-130; CONCORD - SACRAMENTO...	
PIPELINE ID	LS-130A; CONCORD-WA*	
MILES	3.47	
COMMODITY CATEGORY	Non-HVL Product	
COMMODITY DESCRIPTION	NON HVL PRODUCT	
INTERSTATE DESIGNATION	Y	
PIPELINE STATUS CODE	Active (filled)	
REVISION DATE	06/21/2018	
FRP SEQUENCE NUMBER		
- Category: GENERAL CONTACT		
FIRST NAME	PATRICK	
LAST NAME	RIBAN	
TITLE	MANAGER-ENGINEERING	
ENTITY		
PHONE	(713) 420-5608	
EMAIL	patrick_riban@kindermorgan.com	
ADDRESS	1001 LOUISIANA ST	
CITY	HOUSTON	
STATE	TX	
ZIP	77002	

ML15. Tesoro Logistics Operations; Non-HVL Pipeline 609

31874	Attribute	Value
- Category: PIPELINE ATTRIBUTES		
OPERATOR ID	31874	
OPERATOR NAME	TESORO LOGISTICS OPERATIONS ...	
SYSTEM NAME	GOLDEN EAGLE	
SUBSYSTEM NAME	8IN TESORO 203	
PIPELINE ID	609	
MILES	1.14	
COMMODITY CATEGORY	Non-HVL Product	
COMMODITY DESCRIPTION		
INTERSTATE DESIGNATION	N	
PIPELINE STATUS CODE	Active (filled)	
REVISION DATE	06/14/2018	
FRP SEQUENCE NUMBER		
- Category: GENERAL CONTACT		
FIRST NAME	Matthew	
LAST NAME	Marusich	
TITLE	Operations Area Manager	
ENTITY		
PHONE	(925) 335-3452	
EMAIL	Matthew.V.Marusich@andavor.com	
ADDRESS	150 Solano Way	
CITY	Martinez	
STATE	CA	
ZIP	94553	

ML16. Tesoro Logistics Operations; Crude Oil Pipeline 611

31874	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	31874
OPERATOR NAME	TESORO LOGISTICS OPERATIONS ...
SYSTEM NAME	GOLDEN EAGLE
SUBSYSTEM NAME	TESORO 63 CRUDE
PIPELINE ID	611
MILES	1.24
COMMODITY CATEGORY	Crude Oil
COMMODITY DESCRIPTION	
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	06/14/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	Matthew
LAST NAME	Manusich
TITLE	Operations Area Manager
ENTITY	
PHONE	(925) 335-3452
EMAIL	Matthew.V.Manusich@andavor.com
ADDRESS	150 Solano Way
CITY	Martinez
STATE	CA
ZIP	94553

ML17. Tesoro Logistics Operations; Crude Oil Pipeline 612

31874	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	31874
OPERATOR NAME	TESORO LOGISTICS OPERATIONS ...
SYSTEM NAME	GOLDEN EAGLE
SUBSYSTEM NAME	12IN TESORO 200 CRUDE
PIPELINE ID	612
MILES	1.26
COMMODITY CATEGORY	Crude Oil
COMMODITY DESCRIPTION	
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	06/14/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	Matthew
LAST NAME	Manusich
TITLE	Operations Area Manager
ENTITY	
PHONE	(925) 335-3452
EMAIL	Matthew.V.Manusich@andavor.com
ADDRESS	150 Solano Way
CITY	Martinez
STATE	CA
ZIP	94553

ML18. Plains Marketing, LP; Non-HVL Product Pipeline 14937

26085	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	26085
OPERATOR NAME	PLAINS MARKETING, L.P.
SYSTEM NAME	PLAINS PRODUCTS TERMINALS
SUBSYSTEM NAME	LINE 191
PIPELINE ID	14937
MILES	0.88
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	PRODUCTS
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (unfiled)
REVISION DATE	03/15/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	BRYAN
LAST NAME	FERGUSON
TITLE	MGR GIS/DATA INTEGRATION
ENTITY	
PHONE	(713) 646-4308
EMAIL	bferguson@psalp.com
ADDRESS	333 CLAY STREET SUITE 1600
CITY	HOUSTON
STATE	TX
ZIP	77002

ML19. Phillips 66 Pipeline, LLC; Crude Oil Pipeline 2260_50

31684	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	31684
OPERATOR NAME	PHILLIPS 66 PIPELINE LLC
SYSTEM NAME	JUNCTION TO RODEO REFINERY
SUBSYSTEM NAME	COALINGA PMP STARODEO REFIN...
PIPELINE ID	2260_50
MILES	3.36
COMMODITY CATEGORY	Crude Oil
COMMODITY DESCRIPTION	
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filed)
REVISION DATE	02/22/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	Todd
LAST NAME	Tulio
TITLE	Manager, DOT Compliance
ENTITY	
PHONE	(832) 765-1636
EMAIL	Todd.L.Tulio@p66.com
ADDRESS	2331 Citywest Blvd HQ-08-S920-05
CITY	Houston
STATE	TX
ZIP	77043

ML20. SFPP, LP; Non-HVL Product Pipeline LS-90/50/60; CONCOR

18092	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	18092
OPERATOR NAME	SFPP, LP
SYSTEM NAME	SFPP_NORTH
SUBSYSTEM NAME	LS-90/50/60; CONCORD - FRESNO 12"
PIPELINE ID	LS-90/50/60; CONCOR*
MILES	34.83
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	NON HVL PRODUCT
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	06/21/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	PATRICK
LAST NAME	RIBAN
TITLE	MANAGER-ENGINEERING
ENTITY	
PHONE	(713) 420-5608
EMAIL	patrick_riban@kindermorgan.com
ADDRESS	1001 LOUISIANA ST
CITY	HOUSTON
STATE	TX
ZIP	77002

ML21. SFPP, LP; Non-HVL Product Pipeline LS-27; MARTINEZ-C

18092	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	18092
OPERATOR NAME	SFPP, LP
SYSTEM NAME	SFPP_NORTH
SUBSYSTEM NAME	LS-27; MARTINEZ - CONCORD 12"
PIPELINE ID	LS-27; MARTINEZ - C*
MILES	5.24
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	NON HVL PRODUCT
INTERSTATE DESIGNATION	Y
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	06/21/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	PATRICK
LAST NAME	RIBAN
TITLE	MANAGER-ENGINEERING
ENTITY	
PHONE	(713) 420-5608
EMAIL	patrick_riban@kindermorgan.com
ADDRESS	1001 LOUISIANA ST
CITY	HOUSTON
STATE	TX
ZIP	77002

ML22. SFPP, LP; Non-HVL Product Pipeline LS-33; MOCOCO JCT

18092	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	18092
OPERATOR NAME	SFPP, LP
SYSTEM NAME	SFPP_NORTH
SUBSYSTEM NAME	LS-33; MOCOCO JCT - CONCORD 12"
PIPELINE ID	LS-33; MOCOCO JCT -*
MILES	4.65
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	NON HVL PRODUCT
INTERSTATE DESIGNATION	Y
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	06/21/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	PATRICK
LAST NAME	RIBAN
TITLE	MANAGER-ENGINEERING
ENTITY	
PHONE	(713) 420-5608
EMAIL	patrick_riban@kindemorgn.com
ADDRESS	1001 LOUISIANA ST
CITY	HOUSTON
STATE	TX
ZIP	77002

ML23. Shell Pipeline Co., LP; Crude Oil Pipeline 92

31174	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	31174
OPERATOR NAME	SHELL PIPELINE CO., L.P.
SYSTEM NAME	COALINGA-AVON
SUBSYSTEM NAME	92 - 16IN/20IN/24IN COALINGA TO A...
PIPELINE ID	92
MILES	2.92
COMMODITY CATEGORY	Crude Oil
COMMODITY DESCRIPTION	CRUDE
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	06/15/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	Pratik
LAST NAME	Bhakta
TITLE	Regulatory Engineer
ENTITY	
PHONE	(832) 762-2782
EMAIL	pratik.bhakta@shell.com
ADDRESS	P.O. BOX 2848
CITY	Houston
STATE	TX
ZIP	77252

ML24. Plains Marketing, LP; Non-HVL Pipeline 15588

Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	26085
OPERATOR NAME	PLAINS MARKETING, L.P.
SYSTEM NAME	PLAINS PRODUCTS TERMINALS
SUBSYSTEM NAME	LINE 191
PIPELINE ID	15588
MILES	2.68
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	PRODUCTS
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	03/15/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	BRYAN
LAST NAME	FERGUSON
TITLE	MGR GIS/DATA INTEGRATION
ENTITY	
PHONE	(713) 646-4308
EMAIL	bferguson@paalp.com
ADDRESS	333 CLAY STREET SUITE 1600
CITY	HOUSTON
STATE	TX
ZIP	77002

ML25. SFPP, LP; Non-HVL Pipeline LS-16; CONCORD-SA

Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	18092
OPERATOR NAME	SFPP, LP
SYSTEM NAME	SFPP_NORTH
SUBSYSTEM NAME	LS-16; CONCORD - SAN JOSE 10"
PIPELINE ID	LS-16; CONCORD - SA*
MILES	22.81
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	NON HVL PRODUCT
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	06/21/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	PATRICK
LAST NAME	RIBAN
TITLE	MANAGER-ENGINEERING
ENTITY	
PHONE	(713) 420-5608
EMAIL	patrick_riban@kindermorgan.com
ADDRESS	1001 LOUISIANA ST
CITY	HOUSTON
STATE	TX
ZIP	77002

ML26. Phillips 66 Pipeline, LLC; Crude Oil Pipeline 2260_42

31684	Attribute	Value
- Category: PIPELINE ATTRIBUTES		
OPERATOR ID	31684	
OPERATOR NAME	PHILLIPS 66 PIPELINE LLC	
SYSTEM NAME	JUNCTION TO RODEO REFINERY	
SUBSYSTEM NAME	COALINGA PMP STARODEO REFIN...	
PIPELINE ID	2260_42	
MILES	7.95	
COMMODITY CATEGORY	Crude Oil	
COMMODITY DESCRIPTION		
INTERSTATE DESIGNATION	N	
PIPELINE STATUS CODE	Active (filled)	
REVISION DATE	02/22/2018	
FRP SEQUENCE NUMBER		
- Category: GENERAL CONTACT		
FIRST NAME	Todd	
LAST NAME	Tullio	
TITLE	Manager, DOT Compliance	
ENTITY		
PHONE	(832) 765-1636	
EMAIL	Todd.L.Tullio@p66.com	
ADDRESS	2331 Citywest Blvd HQ-08-S&20-05	
CITY	Houston	
STATE	TX	
ZIP	77043	

ML27. SFPP, LP; Non-HVL Product Pipeline LS-9; CONCORD-BRADSHAW-10"

18092	Attribute	Value
- Category: PIPELINE ATTRIBUTES		
OPERATOR ID	18092	
OPERATOR NAME	SFPP, LP	
SYSTEM NAME	SFPP_NORTH	
SUBSYSTEM NAME	LS-9; CONCORD - BRADSHAW 10"	
PIPELINE ID	LS-9; CONCORD - BRA*	
MILES	32.60	
COMMODITY CATEGORY	Non-HVL Product	
COMMODITY DESCRIPTION	NON HVL PRODUCT	
INTERSTATE DESIGNATION	N	
PIPELINE STATUS CODE	Active (filled)	
REVISION DATE	06/21/2018	
FRP SEQUENCE NUMBER		
- Category: GENERAL CONTACT		
FIRST NAME	PATRICK	
LAST NAME	RIBAN	
TITLE	MANAGER-ENGINEERING	
ENTITY		
PHONE	(713) 420-5608	
EMAIL	patrick_riban@kindermorgan.com	
ADDRESS	1001 LOUISIANA ST	
CITY	HOUSTON	
STATE	TX	
ZIP	77002	

ML28. Shell Pipeline Co., LP; Crude Oil Pipeline 92

31174	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	31174
OPERATOR NAME	SHELL PIPELINE CO., L.P.
SYSTEM NAME	COALINGA-AVON
SUBSYSTEM NAME	92 - 16IN(20IN)24IN COALINGA TO A...
PIPELINE ID	92
MILES	22.49
COMMODITY CATEGORY	Crude Oil
COMMODITY DESCRIPTION	CRUDE
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	06/15/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	Pratik
LAST NAME	Bhaktar
TITLE	Regulatory Engineer
ENTITY	
PHONE	(832) 762-2762
EMAIL	pratik.bhaktar@shell.com
ADDRESS	P.O. BOX 2648
CITY	Houston
STATE	TX
ZIP	77252

ML29. Phillips 66 Pipeline, LLC; Crude Oil Pipeline 2260_40

31684	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	31684
OPERATOR NAME	PHILLIPS 66 PIPELINE LLC
SYSTEM NAME	JUNCTION TO RODEO REFINERY
SUBSYSTEM NAME	COALINGA PMP STARCODEO REFIN...
PIPELINE ID	2260_40
MILES	22.49
COMMODITY CATEGORY	Crude Oil
COMMODITY DESCRIPTION	
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	02/22/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	Todd
LAST NAME	Tullio
TITLE	Manager, DOT Compliance
ENTITY	
PHONE	(832) 765-1636
EMAIL	Todd.L.Tullio@p66.com
ADDRESS	2331 Citywest Blvd HQ-06-S820-05
CITY	Houston
STATE	TX
ZIP	77043

ML30. Chevron Pipeline, Co; Non-HVL Product Pipeline CAL0002-3

2731	Attribute	Value
- Category: PIPELINE ATTRIBUTES		
OPERATOR ID	2731	CHEVRON PIPE LINE CO
OPERATOR NAME		BAY AREA PIPE LINE
SYSTEM NAME		BAY AREA PRODUCTS LINE (BAPL)
SUBSYSTEM NAME		CAL0002-3
PIPELINE ID		3.53
MILES		Non-HVL Product
COMMODITY CATEGORY		GASOLINE, DIESEL AND/OR JET
COMMODITY DESCRIPTION		N
INTERSTATE DESIGNATION		Active (filled)
PIPELINE STATUS CODE		06/12/2018
REVISION DATE		
FRP SEQUENCE NUMBER		
- Category: GENERAL CONTACT		
FIRST NAME	Garrett	
LAST NAME	Parker	
TITLE	Regulatory Assurance Specialist	
ENTITY		
PHONE	(832) 854-4596	
EMAIL	PARKERG@chevron.com	
ADDRESS	1500 Louisiana	
CITY	Houston	
STATE	TX	
ZIP	77002	

ML31. Crimson Pipeline, LP; Crude Oil Pipeline 76

32103	Attribute	Value
- Category: PIPELINE ATTRIBUTES		
OPERATOR ID	32103	CRIMSON PIPELINE L.P.
OPERATOR NAME		LOS MEDANOS - VINE HILL
SYSTEM NAME		
SUBSYSTEM NAME		
PIPELINE ID		76
MILES		15.65
COMMODITY CATEGORY		Crude Oil
COMMODITY DESCRIPTION		
INTERSTATE DESIGNATION		N
PIPELINE STATUS CODE	Active (filled)	
REVISION DATE	08/10/2017	
FRP SEQUENCE NUMBER		
- Category: GENERAL CONTACT		
FIRST NAME	Mike	
LAST NAME	Romley	
TITLE	Operations Director	
ENTITY		
PHONE	(661) 343-3218	
EMAIL	mromley@crimsonpl.com	
ADDRESS	2459 Redondo Ave.	
CITY	Long Beach	
STATE	CA	
ZIP	90755	

ML32. New Operator Pending; Natural Gas Liquids Pipeline 0770

88888	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	88888
OPERATOR NAME	SOLD - PENDING NEW OPERATOR ...
SYSTEM NAME	RYER COMPRESSOR TO NICHOLS ...
SUBSYSTEM NAME	CONDENSATE
PIPELINE ID	0770
MILES	1.89
COMMODITY CATEGORY	Natural Gas Liquids
COMMODITY DESCRIPTION	
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	06/13/2013
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	
LAST NAME	
TITLE	
ENTITY	NPMS STAFF
PHONE	(703) 317-6254
EMAIL	npms@dcl.gov
ADDRESS	NA NA
CITY	NA
STATE	VA
ZIP	0

ML33. Chevron Pipeline Co.; Non-HVL Product Pipeline CAL00068

2731	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	2731
OPERATOR NAME	CHEVRON PIPE LINE CO
SYSTEM NAME	BAY AREA PIPE LINE
SUBSYSTEM NAME	BAY AREA PRODUCTS LINE (BAPL)
PIPELINE ID	CAL00068
MILES	1.24
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	GASOLINE, DIESEL AND/OR JET
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	06/12/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	Garrett
LAST NAME	Parker
TITLE	Regulatory Assurance Specialist
ENTITY	
PHONE	(832) 854-4596
EMAIL	PARKERG@chevron.com
ADDRESS	1500 Louisiana
CITY	Houston
STATE	TX
ZIP	77002

ML34. Tesoro Logistics Operations; Crude Oil Pipeline 1107

31874	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	31874
OPERATOR NAME	TESORO LOGISTICS OPERATIONS ...
SYSTEM NAME	GOLDEN EAGLE
SUBSYSTEM NAME	TESORO 63A CRUDE LINE
PIPELINE ID	1107
MILES	0.25
COMMODITY CATEGORY	Crude Oil
COMMODITY DESCRIPTION	
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	06/14/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	Matthew
LAST NAME	Marusich
TITLE	Operations Area Manager
ENTITY	
PHONE	(925) 335-3452
EMAIL	Matthew.V.Marusich@andaveavor.com
ADDRESS	150 Solano Way
CITY	Martinez
STATE	CA
ZIP	94553

ML35. Tesoro Logistics Operations; Crude Oil Pipeline 1107

31874	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	31874
OPERATOR NAME	TESORO LOGISTICS OPERATIONS ...
SYSTEM NAME	GOLDEN EAGLE
SUBSYSTEM NAME	12IN TESORO 200A CRUDE
PIPELINE ID	1108
MILES	0.25
COMMODITY CATEGORY	Crude Oil
COMMODITY DESCRIPTION	
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	06/14/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	Matthew
LAST NAME	Marusich
TITLE	Operations Area Manager
ENTITY	
PHONE	(925) 335-3452
EMAIL	Matthew.V.Marusich@andaveavor.com
ADDRESS	150 Solano Way
CITY	Martinez
STATE	CA
ZIP	94553

APPENDIX A-4
Pittsburg Area Pipeline Data

PL1. Crimson Pipeline, LP Crude Oil Pipeline 76

32103	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	32103
OPERATOR NAME	CRIMSON PIPELINE LP.
SYSTEM NAME	LOS MEDANOS - VINE HILL
SUBSYSTEM NAME	
PIPELINE ID	76
MILES	15.65
COMMODITY CATEGORY	Crude Oil
COMMODITY DESCRIPTION	
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	08/10/2017
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	Mike
LAST NAME	Romley
TITLE	Operations Director
ENTITY	
PHONE	(661) 343-3218
EMAIL	mromley@crimsonpl.com
ADDRESS	2459 Redondo Ave.
CITY	Long Beach
STATE	CA
ZIP	90755

PL2. SFPP, LP Non-HVL Product Pipeline LS-90/50/60; CONCOR

18092	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	18092
OPERATOR NAME	SFPP, LP
SYSTEM NAME	SFPP_NORTH
SUBSYSTEM NAME	LS-90/50/60; CONCORD - FRESNO 12"
PIPELINE ID	LS-90/50/60; CONCOR*
MILES	34.83
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	NON HVL PRODUCT
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	06/21/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	PATRICK
LAST NAME	RIBAN
TITLE	MANAGER-ENGINEERING
ENTITY	
PHONE	(713) 420-5608
EMAIL	patrick_riban@kindermorgan.com
ADDRESS	1001 LOUISIANA ST
CITY	HOUSTON
STATE	TX
ZIP	77002

PL3. Chevron Pipeline Co., Non-HVL Product Pipeline CAL0002-8

2731	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	2731
OPERATOR NAME	CHEVRON PIPE LINE CO
SYSTEM NAME	BAY AREA PIPE LINE
SUBSYSTEM NAME	BAY AREA PRODUCTS LINE (BAPL)
PIPELINE ID	CAL0002-8
MILES	19.60
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	GASOLINE, DIESEL AND/OR JET
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	06/12/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	Garrett
LAST NAME	Parker
TITLE	Regulatory Assurance Specialist
ENTITY	
PHONE	(832) 854-4596
EMAIL	PARKERG@chevron.com
ADDRESS	1500 Louisiana
CITY	Houston
STATE	TX
ZIP	77002

PL4. SFPP, LP; Non-HVL Product Pipeline LS-9; Concord-BRA

18092	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	18092
OPERATOR NAME	SFPP, LP
SYSTEM NAME	SFPP, NORTH
SUBSYSTEM NAME	LS-9; CONCORD - BRADSHAW 10"
PIPELINE ID	LS-9; CONCORD - BRA*
MILES	32.60
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	NON HVL PRODUCT
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	06/21/2018
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	PATRICK
LAST NAME	RIBAN
TITLE	MANAGER-ENGINEERING
ENTITY	
PHONE	(713) 420-5608
EMAIL	patrick_riban@kindemorgan.com
ADDRESS	1001 LOUISIANA ST
CITY	HOUSTON
STATE	TX
ZIP	77002

PL5. Crimson Pipeline, LP Crude Oil Pipeline 499

32103	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	32103
OPERATOR NAME	CRIMSON PIPELINE L.P.
SYSTEM NAME	LOS MEDANOS
SUBSYSTEM NAME	
PIPELINE ID	499
MILES	20.50
COMMODITY CATEGORY	Crude Oil
COMMODITY DESCRIPTION	
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	08/10/2017
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	Mike
LAST NAME	Romley
TITLE	Operations Director
ENTITY	
PHONE	(661) 343-3218
EMAIL	mromley@crimsonpl.com
ADDRESS	2459 Redondo Ave
CITY	Long Beach
STATE	CA
ZIP	90755

PL6. Abandoned Pittsburg-Antioch Pipeline 31590

Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	99999
OPERATOR NAME	ABANDONED
SYSTEM NAME	PITTSBURG-ANTIOCH PIPELINE
SUBSYSTEM NAME	PITTSBURG-ANTIOCH PIPELINE
PIPELINE ID	31590
MILES	8.40
COMMODITY CATEGORY	Empty Liquid
COMMODITY DESCRIPTION	
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Permanently Abandoned
REVISION DATE	03/26/2004
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	
LAST NAME	
TITLE	
ENTITY	NPMS STAFF
PHONE	(703) 317-6294
EMAIL	npms@dot.gov
ADDRESS	
CITY	NA NA
STATE	NA
ZIP	VA 0

APPENDIX B
Critical Facilities Data

APPENDIX B-1
CRITICAL FACILITIES: RICHMOND PINCH POINT #1

Critical Facility Category	Critical Facility	Street Address	City	State	Latitude	Longitude
City and County Buildings	El Cerrito Building Inspection	10890 San Pablo Ave.	El Cerrito	CA	37.915730	-122.311070
	El Cerrito Police Department	10900 San Pablo Ave.	El Cerrito	CA	37.916210	-122.311170
	Kensington Police Department	217 Arlington Ave.	Kensington	CA	37.913850	-122.300670
	Bayview Branch Public Library	5101 Harriet Ave.	Richmond	CA	37.918187	-122.323840
	El Cerrito Library - Contra Costa County Library	6503 Stockton Ave.	El Cerrito	CA	37.908488	-122.303860
Fire Stations	Kensington Library - Contra Costa County Library	6417 Arlington Ave.	Kensington	CA	37.918178	-122.301620
	Richmond Fire Department Station 64	4801 Bayview Ave.	Richmond	CA	37.914600	-122.323770
	El Cerrito Fire Department	10900 San Pablo Ave.	El Cerrito	CA	37.916210	-122.311070
	Kensington Fire District	217 Arlington Ave.	Kensington	CA	37.913850	-122.300670
	Celero Therapy Unit	1495 Lawrence St.	El Cerrito	CA	37.913390	-122.304560
Hospitals/Emergency Care	New MD & Urgent Care	10212 San Pablo Ave.	El Cerrito	CA	37.911350	-122.307100
	Kensington Clinic	302 Arlington Ave.	El Cerrito	CA	37.913850	-122.300670
	Kensington Physical Therapy	302 Arlington Ave.	Kensington	CA	37.903350	-122.317180
	UHS Surgical Services	3427 Arlington Blvd.	Richmond	CA	37.919381	-122.314670
	El Cerrito Royale	6510 Quincy Ave.	El Cerrito	CA	37.919320	-122.311930
Nursing/Convalescent	Blocker T. Anderson Community Center	960 S. 47th St.	Richmond	CA	37.916570	-122.310430
	Kensington Community Center	960 S. 47th St.	Richmond	CA	37.916570	-122.310430
	Wilson Elementary	7150 Portola Dr.	El Cerrito	CA	37.914170	-122.278950
	Stage Elementary	4949 Cypress Ave.	Richmond	CA	37.916570	-122.310430
	El Cerrito High School	540 Ashbury Ave.	El Cerrito	CA	37.916570	-122.310430
Community Centers/Daycare	Sunlight Public Schools	8600 Elm St.	El Cerrito	CA	37.916570	-122.310430
	Calder Beta Academy	4301 Berk Ave.	Richmond	CA	37.916570	-122.310430
	Kennedy High School	4300 Cutting Blvd.	Richmond	CA	37.916570	-122.310430
	Little House Preschool	4022 Florida Ave.	Richmond	CA	37.916570	-122.310430
	St. John's Episcopal Preschool	6619 Potrero Ave.	Richmond	CA	37.916570	-122.310430
Schools/Preschools	St. John's Episcopal School	1111 Bayville St.	El Cerrito	CA	37.917290	-122.301330
	Pride and Joy Preschool	1226 Berry St.	El Cerrito	CA	37.916570	-122.310430
	El Cerrito Preschool Co-op	7200 Mosier Ln.	El Cerrito	CA	37.916570	-122.310430
	Little Ind Daycare Preschool	1711 Carlton Blvd.	Richmond	CA	37.908480	-122.315100
	Ocean View Montessori Day Care	Everett and Eureka	El Cerrito	CA	37.907740	-122.299730

APPENDIX B-2
CRITICAL FACILITIES: RICHMOND PINCH POINT #2

Critical Facility Category	Critical Facility	Street Address	City	State	Latitude	Longitude
City and County Buildings	Richmond Police Department	1702 Regatta Blvd.	Richmond	CA	37.917180	-122.349500
	Richmond Police Commission	450 Civic Center Plaza	Richmond	CA	37.937990	-122.349510
	Richmond City Hall	450 Civic Center Plaza	Richmond	CA	37.937990	-122.349510
	Richmond Human Resources Department	2544 Barrett Ave.	Richmond	CA	37.935000	-122.349510
	Richmond Emergency Services Office	450 Civic Center Plaza	Richmond	CA	37.935000	-122.349510
	Richmond Memorial Convention Center	450 Civic Center Plaza	Richmond	CA	37.935000	-122.349510
	Richmond Private Industry Council	330 29th St.	Richmond	CA	37.935000	-122.349510
	Richmond City Recreation Complex	3300 MacDonald Ave.	Richmond	CA	37.934120	-122.349510
	Richmond Building Services	618th St.	Richmond	CA	37.931120	-122.356900
	Richmond Sewer Maintenance	3200 Regatta Blvd.	Richmond	CA	37.927550	-122.381800
Fire Stations	Richmond Fire Department Station 61	1401 Harbor Ave.	Richmond	CA	37.916570	-122.333100
	Richmond Fire Department Station 62	1065 7th St.	Richmond	CA	37.916570	-122.333100
	Richmond Fire Department Station 66	4400 Clinton Ave.	Richmond	CA	37.916570	-122.333100
	Richmond Fire Department	450 Civic Center Plaza	Richmond	CA	37.935000	-122.349510
	Port of Richmond Administration	1401 Harbor Ave.	Richmond	CA	37.916570	-122.333100
	UCLA Brookside Richmond Health Center	1030 Nevin Ave.	Richmond	CA	37.916570	-122.333100
	UCLA William Reins Health Center	150 Harbor Way	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Brazil H. Carter Health Center	2600 MacDonald Ave.	Richmond	CA	37.916570	-122.333100
	Neu House	3215 Nevin Ave.	Richmond	CA	37.916570	-122.333100
Hospitals/Emergency Care	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
Nursing/Convalescent	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
Community Centers/Daycare	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
Schools	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100
	UCLA Care Bay Area Richmond Clinic	258 24th St.	Richmond	CA	37.916570	-122.333100

APPENDIX B-3
CRITICAL FACILITIES: MARTINEZ PINCH POINT #3

Critical Facility Category	Critical Facility	Street Address	City	State	Latitude	Longitude
City and County Buildings	Martinez City Hall	525 Henrietta St.	Martinez	CA	38.114112	-122.133551
	Martinez Planning and Zoning	525 Henrietta St.	Martinez	CA	38.114112	-122.133551
	Martinez Police Department	525 Henrietta St.	Martinez	CA	38.114112	-122.133551
	Martinez Water Department	525 Henrietta St.	Martinez	CA	38.114112	-122.133551
	Martinez Demolition Office	2003 Ward St.	Martinez	CA	38.117912	-122.133154
	Martinez Traffic Signal Maintenance	2467 Wardbird Way	Martinez	CA	38.013568	-122.077035
	Contra Costa County Jail	801 Court St.	Martinez	CA	38.017169	-122.132197
	Contra Costa County Sheriff's Office	851 Pitts St.	Martinez	CA	38.018937	-122.138655
	Contra Costa County Sheriff-Criminalistics	1112 Escobar St.	Martinez	CA	38.019519	-122.138310
	Contra Costa County Sheriff	500 Court St.	Martinez	CA	38.019712	-122.138310
	Contra Costa County Sheriff Department	1899 Mull Rd.	Martinez	CA	38.019702	-122.138655
	Contra Costa County Sheriff Technical Services	20 Glacier Dr.	Martinez	CA	37.989742	-122.088620
	Contra Costa Public Works Services	30 Glenview Rd.	Martinez	CA	38.003688	-122.073851
	Contra Costa County Public Works Department	525 Henrietta St.	Martinez	CA	37.888076	-122.068651
	Contra Costa County Flood Control	2475 Wardbird Way	Martinez	CA	37.996225	-122.071139
	Contra Costa Animal Services Department	400 Thierff Pl.	Martinez	CA	37.996225	-122.154191
	Contra Costa County Library-Martinez Branch	740 Court Street	Martinez	CA	38.017960	-122.132627
	Contra Costa County Public Library	1020 Ward St.	Martinez	CA	38.018074	-122.132627
	Dugan Medical Library	2500 Alhambra Ave.	Martinez	CA	38.010091	-122.132743
	Contra Costa Fire Station 12	1240 Shell Ave.	Martinez	CA	38.010091	-122.118225
	Contra Costa Fire Station 14	521 Jones St.	Martinez	CA	38.012660	-122.142497
Hospitals/Emergency Care	Contra Costa Regional Medical Center	2500 Alhambra Ave.	Martinez	CA	38.007769	-122.132804
	Contra Costa County-Martinez Health Center	2500 Alhambra Ave.	Martinez	CA	38.007769	-122.132804
	Telacore Home House	300 Ilene St.	Martinez	CA	38.008029	-122.133843
	Kalcare Permanente	200 Mull Rd.	Martinez	CA	37.983657	-122.110355
	Alhambra Convalescent Hospital	351 Ilene St.	Martinez	CA	38.008579	-122.133590
Nursing/Convalescent	Tender Touch Residential Care	85 Midhill Dr.	Martinez	CA	37.979724	-122.088570
	Martinez Convalescent Home	4110 Alhambra Way	Martinez	CA	37.983374	-122.132853
	Lugan, Nursing and Rehab	1799 Mull Rd.	Martinez	CA	37.986973	-122.007679
Community Centers/Shelters	Northridge California Family Center	2400 Pacheco Blvd.	Martinez	CA	38.012707	-122.121070
	City of Martinez Senior Center	818 Green St.	Martinez	CA	38.016678	-122.134297
	Martinez Community and Economic Center	525 Henrietta St.	Martinez	CA	38.014112	-122.133551
	Shell Clubhouse	1655 Pacheco Blvd.	Martinez	CA	38.014692	-122.128655
	Martinez Junior High School	1591 Shell Ave.	Martinez	CA	38.013520	-122.118601
	Contra Costa County Care Group	1359 Arnold Dr.	Martinez	CA	37.992169	-122.095289
	Contra Costa County Adoption	2500 Arnold Dr.	Martinez	CA	37.992121	-122.078682
Schools	Martinez Unified School District	921 Susana St.	Martinez	CA	38.014415	-122.132498
	Martinez Early Intervention	921 Susana St.	Martinez	CA	38.014415	-122.132498
	Crescendio Montessori	1339 Esquivillo St.	Martinez	CA	38.013748	-122.131144
	St. Catherine of Siena School	604 Mullis St.	Martinez	CA	38.014694	-122.134687
	Martinez Junior High School	1600 Court St.	Martinez	CA	38.013582	-122.130683
	Alhambra High School	150 E St.	Martinez	CA	38.002629	-122.133726
	American Indian Cultural and Education Program	600 F St.	Martinez	CA	38.006612	-122.133028
	John Muir Elementary	205 Vista St.	Martinez	CA	38.002191	-122.102887
	International Mission-Higher Education	1117 Brittain, Hills Ct.	Martinez	CA	38.002584	-122.102887
	Moreno Park Elementary	1200 Morelo Park Dr.	Martinez	CA	38.011444	-122.098178
	Community Day Schools Program	3930 Pacheco Blvd.	Martinez	CA	38.00821	-122.085910
	Las Lunas Elementary	4105 Pacheco Blvd.	Martinez	CA	38.003772	-122.092140
	White Stone Christian Academy	1154 Polan	Martinez	CA	37.987156	-122.101722
	Electrical Trade School	1255 Mull Rd.	Martinez	CA	37.980772	-122.098469
	Mt. McKinley School	202 Glacier Dr.	Martinez	CA	37.988508	-122.097944

CRITICAL FACILITIES: BAY POINT PINCH POINT #4

Critical Facility Category	Critical Facility	Street Address	City	State	Latitude	Longitude
City and County Buildings	Pittsburgh Housing Rehabilitation	710 Black Diamond St.	Pittsburg	CA	38.020437	-121.885656
	Pittsburgh Community Access	915 Cumberland St.	Pittsburg	CA	38.028210	-121.885656
	Pittsburgh Housing Authority	916 Cumberland St.	Pittsburg	CA	38.028210	-121.884440
	Pittsburg Public Works Department	357 E. 12th St.	Pittsburg	CA	38.073582	-121.882688
	Pittsburg City Engineering	65 Civic Ave.	Pittsburg	CA	38.010803	-121.891780
	Pittsburg City Center	Center Dr.	Pittsburg	CA	38.019248	-121.891780
	Pittsburg Police Department	65 Civic Ave.	Pittsburg	CA	38.010803	-121.891780
	Contra Costa County Sheriff Department	659 Port Chicago Hwy.	Bay Point	CA	38.024690	-121.900043
	Contra Costa County Community Services	2430 Willow Pass Rd.	Bay Point	CA	38.027393	-121.900616
	Contra Costa County Community Services	3103 Willow Pass Rd.	Bay Point	CA	38.029323	-121.898126
Fire Stations	Contra Costa County Public Health	215 Pacific Ave.	Bay Point	CA	38.023705	-121.898126
	Contra Costa County Small Claims Court	1000 Center Dr.	Pittsburg	CA	38.019357	-121.898126
	Contra Costa County Municipal Court-Traffic Citations	405 Civic Ave.	Pittsburg	CA	38.021091	-121.898126
	Bay Point Library	45 Pacific Ave.	Bay Point	CA	38.023899	-121.899776
	Pittsburg Library-Contra Costa County Library	80 Power Avenue	Pittsburg	CA	38.055858	-121.880676
	Contra Costa County Public Law Library	1000 Center Drive	Pittsburg	CA	38.019272	-121.880642
	Contra Costa Fire Station 87	800 W. Leiland Ave.	Pittsburg	CA	38.014433	-121.916632
	Contra Costa Fire Station 86	300 Willow Pass Rd.	Pittsburg	CA	38.027008	-121.948060
	Pittsburg Health Center	2331 Lower Sage Rd.	Pittsburg	CA	38.008538	-121.886061
	Pittsburg Civic Center	535 School Street	Pittsburg	CA	38.020267	-121.879542
Housing/Emergency Care Nursing/Convalescent	Bozo's Garden	372 Ocean Drive	Pittsburg	CA	38.021284	-121.897174
	Westwood Residential Care	2242 Westwood Dr.	Pittsburg	CA	38.013770	-121.897322
	SMI Law Elderly Home Care	2242 Mt. Whittier Pl.	Pittsburg	CA	38.011681	-121.897176
	Amorose Recreation and Park District	3105 Willow Pass Rd.	Bay Point	CA	38.028873	-121.849188
	Teen Community Center	60 Civic Ave.	Pittsburg	CA	38.029567	-121.880048
	People Who Care Children Association Youth Center	2321 Railroad Ave.	Pittsburg	CA	38.013586	-121.888000
	Love-A-Child Mission/Homesies Recovery Shelter	300 Willow Pass Rd.	Bay Point	CA	38.028800	-121.934428
	Pittsburg Family Center	774 W. 6th St.	Pittsburg	CA	38.020069	-121.888121
	Pacific Community Services	2242 Railroad Ave.	Pittsburg	CA	38.030044	-121.898073
	Rio Vista Elementary	611 Pacific Ave.	Bay Point	CA	38.033776	-121.879384
Community Centers/Shelters	Gateway Middle-School	235 Pacific Ave.	Bay Point	CA	38.036860	-121.897174
	Garcia J. High School	235 Pacific Ave.	Bay Point	CA	38.038717	-121.897174
	New Jerusalem School	680 Anador Dr.	Bay Point	CA	38.026529	-121.933231
	Above and Beyond Academy	680 Anador Ct.	Bay Point	CA	38.023197	-121.940520
	Bel Air Elementary	653 Canal Rd.	Bay Point	CA	38.020228	-121.937827
	Willow Cove Elementary	1680 Hanlon Way	Pittsburg	CA	38.024652	-121.928921
	Rancho Medanos Junior High School	3301 Range Rd.	Pittsburg	CA	38.016620	-121.912716
	Shore Acres Elementary	351 Marine Rd.	Pittsburg	CA	38.035676	-121.890783
	Rancho Medanos Junior High School	2301 Range Rd.	Pittsburg	CA	38.016530	-121.911927
	Los Medanos Elements J. School	610 Crowley Ave.	Pittsburg	CA	38.016764	-121.900004
Schools	Paradise Elementary	985 W. 17th St.	Pittsburg	CA	38.022669	-121.890776
	Marina Vista	485 W. 4th St.	Pittsburg	CA	38.028231	-121.885880
	St. Peter Martyr School	500 E. 8th St.	Pittsburg	CA	38.028231	-121.885880
	Pittsburg School District Office	2400 Railroad Ave.	Pittsburg	CA	38.019804	-121.888079
	Child Nutrition Services Department	200 Harbor St.	Pittsburg	CA	38.019804	-121.888079
	Pittsburg High School	1750 Harbor St.	Pittsburg	CA	38.019804	-121.888079
	Contra Costa County Sacramento - Bay Point	2243 Willow Pass Rd.	Bay Point	CA	38.019410	-121.861826
	W. M. Learning Center	313 Civic Ave.	Pittsburg	CA	38.022671	-121.898477
	First Baptist Head Start	204 Odessa Ave.	Pittsburg	CA	38.015554	-121.891587
	Railroad Junction School	1600 Center Dr.	Pittsburg	CA	38.019839	-121.875333
Community Centers/Shelters	Pittsburg Pre-School and Community	150 E. Leiland Rd.	Pittsburg	CA	38.011037	-121.893535

APPENDIX B-3
CRITICAL FACILITIES: ANTIOCH PINCH POINT #5

Critical Facility Category	Critical Facility	Street Address	City	State	Latitude	Longitude
City and County Buildings	Antioch City Hall	200 H St.	Antioch	CA	38.016712	-121.815191
	Antioch Building Inspection Division	200 H St.	Antioch	CA	38.016712	-121.815191
	Antioch City Marina	5 Marina Plaza	Antioch	CA	38.020070	-121.820228
	Antioch Engineering and Land	3001 S St.	Antioch	CA	38.016712	-121.820768
	Antioch Animal Services	3001 S St.	Antioch	CA	38.016192	-121.820768
	Antioch Public Works Department	1201 W. 4th St.	Antioch	CA	38.015400	-121.820893
	Antioch City Purchasing	1307 W. 4th St.	Antioch	CA	38.015308	-121.822000
	Antioch Lym House Gallery	809 W. 1st St.	Antioch	CA	38.017450	-121.816000
	Antioch City Human Resources	3rd St. and H St.	Antioch	CA	38.016231	-121.816042
	Antioch Police Department	3001 S St.	Antioch	CA	38.016162	-121.820768
Fire Stations	East Contra Veterans Resource Center	708 W. 2nd St.	Antioch	CA	38.017103	-121.816376
	East Contra Hearing Resource Center	901 W. 8th St.	Antioch	CA	38.017440	-121.817132
	Antioch County Event Center	1201 W. 10th St.	Antioch	CA	38.008752	-121.822240
	Antioch Library - Contra Costa County Library	1201 W. 18th Street	Antioch	CA	38.004716	-121.812869
	Contra Costa Fire Station 81	315 W. 8th St.	Antioch	CA	38.016706	-121.816022
	Contra Costa Fire Station 83	2717 Gent from Dr.	Antioch	CA	37.989732	-121.817602
	Kaiser Antioch	3400 Delta Fair Blvd.	Antioch	CA	38.004438	-121.84212
	Sutter Delta Medical Center	3901 Lone Tree Way	Antioch	CA	37.982569	-121.820091
	John Muir Primary Care	3440 Hillcrest Ave.	Antioch	CA	37.989844	-121.782003
	Kaiser Permanente Antioch Medical Center	5400 Hillcrest Ave.	Antioch	CA	37.950522	-121.77522
Hospitals/Emergency Care	ReitCare Bay Area	2210 Goodstone Rd.	Pittsburg	CA	38.009487	-121.880093
	Pittsburg Health Center	2311 Lovellville Rd.	Pittsburg	CA	38.009547	-121.890266
	La Clinica Medical	2240 Goodstone Rd.	Pittsburg	CA	38.008922	-121.887712
	Brighter Beginnings	2213 Buchanan Rd.	Antioch	CA	37.969834	-121.836101
	Contra Costa Industrial Medical Clinic	2339 Buchanan Rd.	Antioch	CA	37.969236	-121.840827
	Other Adult Care	5505 Lone Tree Way	Antioch	CA	37.989748	-121.809126
	Antioch Convalescent Hospital	1201 A Street	Antioch	CA	38.009286	-121.802541
	Independent Living Resource	301 W. 20th St.	Antioch	CA	38.016922	-121.810411
	Amayn's Home Resource	100 W. 20th St.	Antioch	CA	38.009569	-121.807226
	Amayn's Home	825 E. 18th St.	Antioch	CA	38.005412	-121.791095
Community Centers/Innkeepers	LightHouse Mentoring Center	1925 Garden Ct.	Antioch	CA	38.002307	-121.792408
	Country Place Assisted Living	1715 Olive Ln.	Antioch	CA	38.003609	-121.791071
	Vivis Residential Care Home	2129 Vera Ave.	Antioch	CA	38.001280	-121.771586
	East County Shelter	1401 W. 4th St.	Antioch	CA	38.015349	-121.823735
	East County Senior Coalition	901 W. 30th St.	Antioch	CA	38.016922	-121.810416
	Community Outreach Center	925 E. 18th St.	Antioch	CA	38.005377	-121.790808
	Shelter, Inc.	4553 Delta Fair Blvd.	Antioch	CA	38.002607	-121.854410
	East County Elementary Special Education	2027 Delta Fair Blvd.	Antioch	CA	38.003877	-121.851461
	Mission Elementary	1711 Mission Dr.	Antioch	CA	37.996817	-121.832163
	Park Middle School	1 Sperton Way	Antioch	CA	37.993191	-121.814011
Schools	Bedkew Elementary	2801 Roosevelt Ln.	Antioch	CA	37.999322	-121.800321
	The Child Day School	112 E. Tregallas Rd.	Antioch	CA	37.987345	-121.803201
	Marsh Elementary	2304 G St.	Antioch	CA	38.000119	-121.818368
	Blackwell Continuation High School	800 Gary Ave.	Antioch	CA	38.000097	-121.792389
	Antioch High School	700 W. 18th St.	Antioch	CA	38.008321	-121.815837
	Live Oak High School	1708 F St.	Antioch	CA	38.004915	-121.813065
	Antioch Middle School	1500 D St.	Antioch	CA	38.006683	-121.812074
	Fremont Elementary	1413 F St.	Antioch	CA	38.007605	-121.812212
	Holy Rosary Catholic School	25 E. 15th St.	Antioch	CA	38.007549	-121.804934
	Kimball Elementary	3925 Heideunde Way	Antioch	CA	38.007604	-121.801393
Innkeepers	Antioch Charter Academy	3925 Heideunde Way	Antioch	CA	37.998348	-121.800969
	Antioch Charter Academy II	1201 W. 10th St.	Antioch	CA	38.003609	-121.791071
	Prospect High School	820 W. 2nd St.	Antioch	CA	38.003468	-121.820889
	Antioch High School	1201 W. 10th St.	Antioch	CA	38.017147	-121.816797
	East Contra Veterans Resource Center	708 W. 2nd St.	Antioch	CA	38.014419	-121.814278
	East Contra Hearing Resource Center	901 W. 8th St.	Antioch	CA	38.013621	-121.824801
	Antioch County Event Center	1201 W. 10th St.	Antioch	CA	38.008752	-121.822240
	Antioch Library - Contra Costa County Library	1201 W. 18th Street	Antioch	CA	38.004716	-121.790835
	Contra Costa Fire Station 81	315 W. 8th St.	Antioch	CA	38.016706	-121.816022
	Contra Costa Fire Station 83	2717 Gent from Dr.	Antioch	CA	37.989732	-121.817602
Fire Stations	Kaiser Antioch	3400 Delta Fair Blvd.	Antioch	CA	38.004438	-121.84212
	Sutter Delta Medical Center	3901 Lone Tree Way	Antioch	CA	37.982569	-121.820091
	John Muir Primary Care	3440 Hillcrest Ave.	Antioch	CA	37.989844	-121.782003
	Kaiser Permanente Antioch Medical Center	5400 Hillcrest Ave.	Antioch	CA	37.950522	-121.77522
	ReitCare Bay Area	2210 Goodstone Rd.	Pittsburg	CA	38.009487	-121.880093
	Pittsburg Health Center	2311 Lovellville Rd.	Pittsburg	CA	38.009547	-121.890266
	La Clinica Medical	2240 Goodstone Rd.	Pittsburg	CA	38.008922	-121.887712
	Brighter Beginnings	2213 Buchanan Rd.	Antioch	CA	37.969834	-121.836101
	Contra Costa Industrial Medical Clinic	2339 Buchanan Rd.	Antioch	CA	37.969236	-121.840827
	Other Adult Care	5505 Lone Tree Way	Antioch	CA	37.989748	-121.809126
Nursing/Convalescent	Antioch Convalescent Hospital	1201 A Street	Antioch	CA	38.009286	-121.802541
	Independent Living Resource	301 W. 20th St.	Antioch	CA	38.016922	-121.810411
	Amayn's Home Resource	100 W. 20th St.	Antioch	CA	38.009569	-121.807226
	Amayn's Home	825 E. 18th St.	Antioch	CA	38.005412	-121.791095
	LightHouse Mentoring Center	1925 Garden Ct.	Antioch	CA	38.002307	-121.792408
	Country Place Assisted Living	1715 Olive Ln.	Antioch	CA	38.003609	-121.791071
	Vivis Residential Care Home	2129 Vera Ave.	Antioch	CA	38.001280	-121.771586
	East County Shelter	1401 W. 4th St.	Antioch	CA	38.015349	-121.823735
	East County Senior Coalition	901 W. 30th St.	Antioch	CA	38.016922	-121.810416
	Community Outreach Center	925 E. 18th St.	Antioch	CA	38.005377	-121.790808
Schools	East County Elementary Special Education	2027 Delta Fair Blvd.	Antioch	CA	38.003877	-121.851461
	Mission Elementary	1711 Mission Dr.	Antioch	CA	37.996817	-121.832163
	Park Middle School	1 Sperton Way	Antioch	CA	37.993191	-121.814011
	Bedkew Elementary	2801 Roosevelt Ln.	Antioch	CA	37.999322	-121.800321
	The Child Day School	112 E. Tregallas Rd.	Antioch	CA	37.987345	-121.803201
	Marsh Elementary	2304 G St.	Antioch	CA	38.000119	-121.818368
	Blackwell Continuation High School	800 Gary Ave.	Antioch	CA	38.000097	-121.792389
	Antioch High School	700 W. 18th St.	Antioch	CA	38.008321	-121.815837
	Live Oak High School	1708 F St.	Antioch	CA	38.004915	-121.813065
	Antioch Middle School	1500 D St.	Antioch	CA	38.006683	-121.812074
Innkeepers	Fremont Elementary	1413 F St.	Antioch	CA	38.007605	-121.812212
	Holy Rosary Catholic School	25 E. 15th St.	Antioch	CA	38.007549	-121.804934
	Kimball Elementary	3925 Heideunde Way	Antioch	CA	38.007604	-121.801393
	Antioch Charter Academy	3925 Heideunde Way	Antioch	CA	37.998348	-121.800969
	Antioch Charter Academy II	1201 W. 10th St.	Antioch	CA	38.003609	-121.791071
	Prospect High School	820 W. 2nd St.	Antioch	CA	38.003468	-121.820889
	Antioch High School	1201 W. 10th St.	Antioch	CA	38.017147	-121.816797
	East Contra Veterans Resource Center	708 W. 2nd St.	Antioch	CA	38.014419	-121.814278
	East Contra Hearing Resource Center	901 W. 8th St.	Antioch	CA	38.013621	-121.824801
	Antioch County Event Center	1201 W. 10th St.	Antioch	CA	38.008752	-121.822240
Fire Stations	Antioch Library - Contra Costa County Library	1201 W. 18th Street	Antioch	CA	38.004716	-121.790835
	Contra Costa Fire Station 81	315 W. 8th St.	Antioch	CA	38.016706	-121.816022
	Contra Costa Fire Station 83	2717 Gent from Dr.	Antioch	CA	37.989732	-121.817602
	Kaiser Antioch	3400 Delta Fair Blvd.	Antioch	CA	38.004438	-121.84212
	Sutter Delta Medical Center	3901 Lone Tree Way	Antioch	CA	37.982569	-121.820091
	John Muir Primary Care	3440 Hillcrest Ave.	Antioch	CA	37.989844	-121.782003
	Kaiser Permanente Antioch Medical Center	5400 Hillcrest Ave.	Antioch	CA	37.950522	-121.77522
	ReitCare Bay Area	2210 Goodstone Rd.	Pittsburg	CA	38.009487	-121.880093
	Pittsburg Health Center	2311 Lovellville Rd.	Pittsburg	CA	38.009547	-121.890266
	La Clinica Medical	2240 Goodstone Rd.	Pittsburg	CA	38.008922	-121.887712
Nursing/Convalescent	Brighter Beginnings	2213 Buchanan Rd.	Antioch	CA	37.969834	-121.836101
	Contra Costa Industrial Medical Clinic	2339 Buchanan Rd.	Antioch	CA	37.969236	-121.840827
	Other Adult Care	5505 Lone Tree Way	Antioch	CA	37.989748	-121.809126
	Antioch Convalescent Hospital	1201 A Street	Antioch	CA	38.009286	-121.802541
	Independent Living Resource	301 W. 20th St.	Antioch	CA	38.016922	-121.810411
	Amayn's Home Resource	100 W. 20th St.	Antioch	CA	38.009569	-121.807226
	Amayn's Home	825 E. 18th St.	Antioch	CA	38.005412	-121.791095
	LightHouse Mentoring Center	1925 Garden Ct.	Antioch	CA	38.002307	-121.792408
	Country Place Assisted Living	1715 Olive Ln.	Antioch	CA	38.003609	-121.791071
	Vivis Residential Care Home	2129 Vera Ave.	Antioch	CA	38.001280	-121.771586
Community Centers/Innkeepers	East County Shelter	1401 W. 4th St.	Antioch	CA	38.015349	-121.823735
	East County Senior Coalition	901 W. 30th St.	Antioch	CA	38.016922	-121.810416
	Community Outreach Center	925 E. 18th St.	Antioch	CA	38.005377	-121.790808
	Shelter, Inc.	4553 Delta Fair Blvd.	Antioch	CA	38.002607	-121.854410
	East County Elementary Special Education	2027 Delta Fair Blvd.	Antioch	CA	38.003877	-121.851461
	Mission Elementary	1711 Mission Dr.	Antioch	CA	37.996817	-121.832163
	Park Middle School	1 Sperton Way	Antioch	CA	37.993191	-121.814011
	Bedkew Elementary	2801 Roosevelt Ln.	Antioch	CA	37.999322	-121.800321
	The Child Day School	112 E. Tregallas Rd.	Antioch	CA	37.987345	-121.803201
	Marsh Elementary	2304 G St.	Antioch	CA	38.000119	-121.818368
Schools	Blackwell Continuation High School	800 Gary Ave.	Antioch	CA	38.000097	-121.792389
	Antioch High School	700 W. 18th St.	Antioch	CA	38.008321	-121.815837
	Live Oak High School	1708 F St.	Antioch	CA	38.004915	-121.813065
	Antioch Middle School	1500 D St.	Antioch	CA	38.006683	-121.812074
	Fremont Elementary	1413 F St.	Antioch	CA	38.007605	-121.812212
	Holy Rosary Catholic School	25 E. 15th St.	Antioch	CA	38.007549	-121.804934
	Kimball Elementary	3925 Heideunde Way	Antioch	CA	38.007604	-121.801393
	Antioch Charter Academy	3925 Heideunde Way	Antioch	CA	37.998348	-121.800969
	Antioch Charter Academy II	1201 W. 10th St.	Antioch	CA	38.003609	-121.791071
	Prospect High School	820 W. 2nd St.	Antioch	CA	38.003468	-121.820889
Innkeepers	Antioch High School	1201 W. 10th St.	Antioch	CA	38.017147	-121.816797
	East Contra Veterans Resource Center	708 W. 2nd St.	Antioch	CA	38.014419	-121.814278
	East Contra Hearing Resource Center	901 W. 8th St.	Antioch	CA	38.013621	-121.824801
	Antioch County Event Center	1201 W. 10th St.	Antioch	CA	38.008752	-121.822240
	Antioch Library - Contra Costa County Library	1201 W. 18th Street	Antioch	CA	38.004716	-121.790835
	Contra Costa Fire Station 81	315 W. 8th St.	Antioch	CA	38.016706	-121.816022
	Contra Costa Fire Station 83	2717 Gent from Dr.	Antioch	CA	37.989732	-121.817602
	Kaiser Antioch	3400 Delta Fair Blvd.	Antioch	CA	38.004438	-121.84212
	Sutter Delta Medical Center	3901 Lone Tree Way	Antioch	CA	37.982569	-121.820091
	John Muir Primary Care	3440 Hillcrest Ave.	Antioch	CA	37.989844	-121.782003
Hospitals/Emergency Care	Kaiser Permanente Antioch Medical Center	5400 Hillcrest Ave.	Antioch	CA	37.950522	-121.77522
	ReitCare Bay Area	2210 Goodstone Rd.	Pittsburg	CA	38.009487	-121.880093
	Pittsburg Health Center	2311 Lovellville Rd.	Pittsburg	CA	38.009547	-121.890266
	La Clinica Medical	2240 Goodstone Rd.	Pittsburg	CA	38.008922	-121.887712
	Brighter Beginnings	2213 Buchanan Rd.	Antioch	CA	37.969834	-121.836101
	Contra Costa Industrial Medical Clinic	2339 Buchanan Rd.	Antioch	CA	37.969236	-121.840827
	Other Adult Care	5505 Lone Tree Way	Antioch	CA	37.989748	-121.809126
	Antioch Convalescent Hospital	1201 A Street	Antioch	CA	38.009286	-121.802541
	Independent Living Resource	301 W. 20th St.	Antioch	CA	38.016922	-121.810411
	Amayn's Home Resource	100 W. 20th St.	Antioch	CA	38.009569	-121.807226
Community Centers/Innkeepers	Amayn's Home	825 E. 18th St.	Antioch	CA	38.005412	-121.791095
	LightHouse Mentoring Center	1925 Garden Ct.	Antioch	CA	38.002307	-121.792408
	Country Place Assisted Living	1715 Olive Ln.	Antioch	CA	38.003609	-121.791071
	Vivis Residential Care Home	2129 Vera Ave.	Antioch	CA	38.001280	-121.771586
	East County Shelter	1401 W. 4th St.	Antioch	CA	38.015349	-121.823735
	East County Senior Coalition	901 W. 30th St.	Antioch	CA	38.016922	-121.810416
	Community Outreach Center	925 E. 18th St.	Antioch	CA	38.005377	-121.790808
	Shelter, Inc.	4553 Delta Fair Blvd.	Antioch	CA	38.002607	-121.854410
	East County Elementary Special Education	2027 Delta Fair Blvd.	Antioch	CA	38.003877	-121.851461
	Mission Elementary	1711 Mission Dr.	Antioch	CA	37.996817	-121.832163
Schools	Park Middle School	1 Sperton Way	Antioch	CA	37.993191	-121.814011
	Bedkew Elementary	2801 Roosevelt Ln.	Antioch	CA	37.999322	-121.800321
	The Child Day School	112 E. Tregallas Rd.	Antioch	CA	37.987345	-121.803201
	Marsh Elementary	2304 G St.	Antioch	CA	38.000119	-121.818368
	Blackwell Continuation High School	800 Gary Ave.				

APPENDIX C
ALOHA Background Data

APPENDIX C-1
Pinch Point Richmond #1

Toxic Threat Zone

Time: July 18, 2019 1200 hours PDT (user specified)

Chemical Name: AMMONIA

Wind: 9 miles/hour from w at 3 meters

THREAT ZONE:

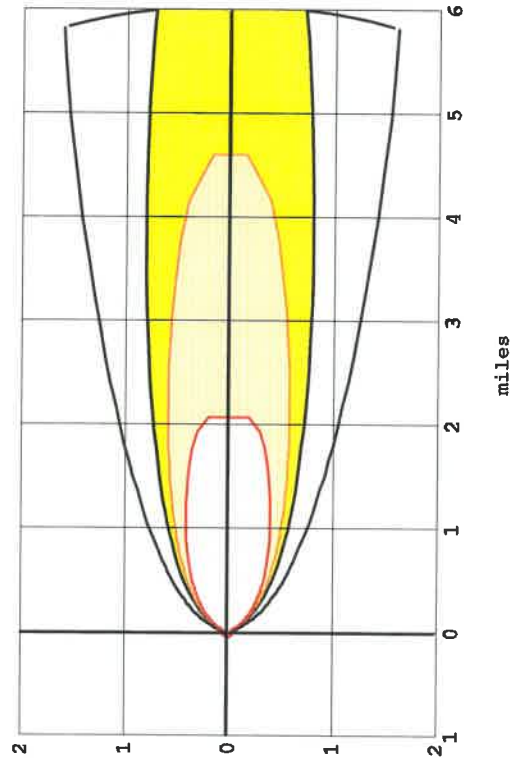
Model Run: Heavy Gas

Red : 2.1 miles --- (1100 ppm = AEGL-3 [60 min])

Orange: 4.6 miles --- (160 ppm = AEGL-2 [60 min])

Yellow: greater than 6 miles --- (30 ppm = AEGL-1 [60 min])

miles



- greater than 1100 ppm (AEGL-3 [60 min])
- greater than 160 ppm (AEGL-2 [60 min])
- greater than 30 ppm (AEGL-1 [60 min])
- wind direction confidence lines

Note: Threat zone picture is truncated at the 6 mile limit.

Source Strength (Release Rate)

Time: July 18, 2019 1200 hours PDT (user specified)

Chemical Name: AMMONIA

SOURCE STRENGTH:

Leak from hole in horizontal cylindrical tank

Flammable chemical escaping from tank (not burning)

Tank Diameter: 10.66 feet

Tank Volume: 34397 gallons

Tank contains liquid

Chemical Mass in Tank: 83.5 tons

Circular Opening Diameter: 10 inches

Opening is 5 inches from tank bottom

Release Duration: 2 minutes

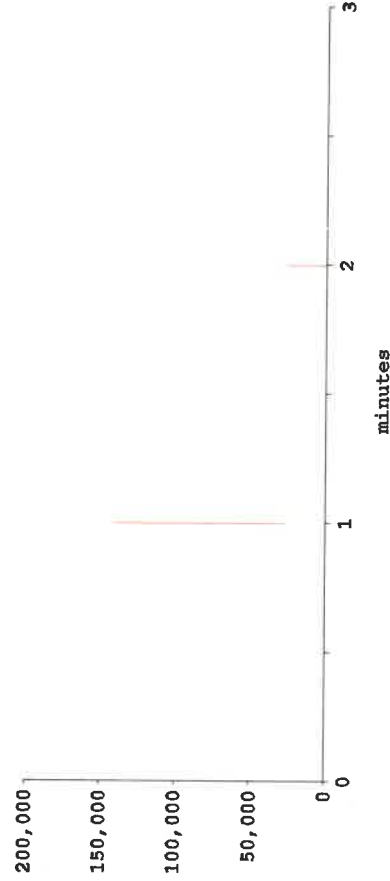
Max Average Sustained Release Rate: 140,000 pounds/min

(averaged over a minute or more)

Total Amount Released: 167,000 pounds

Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).

pounds/minute





Text Summary

SITE DATA:
Location: RICHMOND, CALIFORNIA
Building Air Exchanges Per Hour: 0.85 (unsheltered single storied)
Time: July 18, 2019 1200 hours PDT (user specified)

CHEMICAL DATA:
Chemical Name: AMMONIA
CAS Number: 7664-41-7
Molecular Weight: 17.03 g/mol
AEGL-1 (60 min): 30 ppm AEGL-2 (60 min): 1100 ppm
IDLH: 300 ppm LEL: 150000 ppm UEL: 280000 ppm
Ambient Boiling Point: -28.2° F
Vapor Pressure at Ambient Temperature: greater than 1 atm
Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

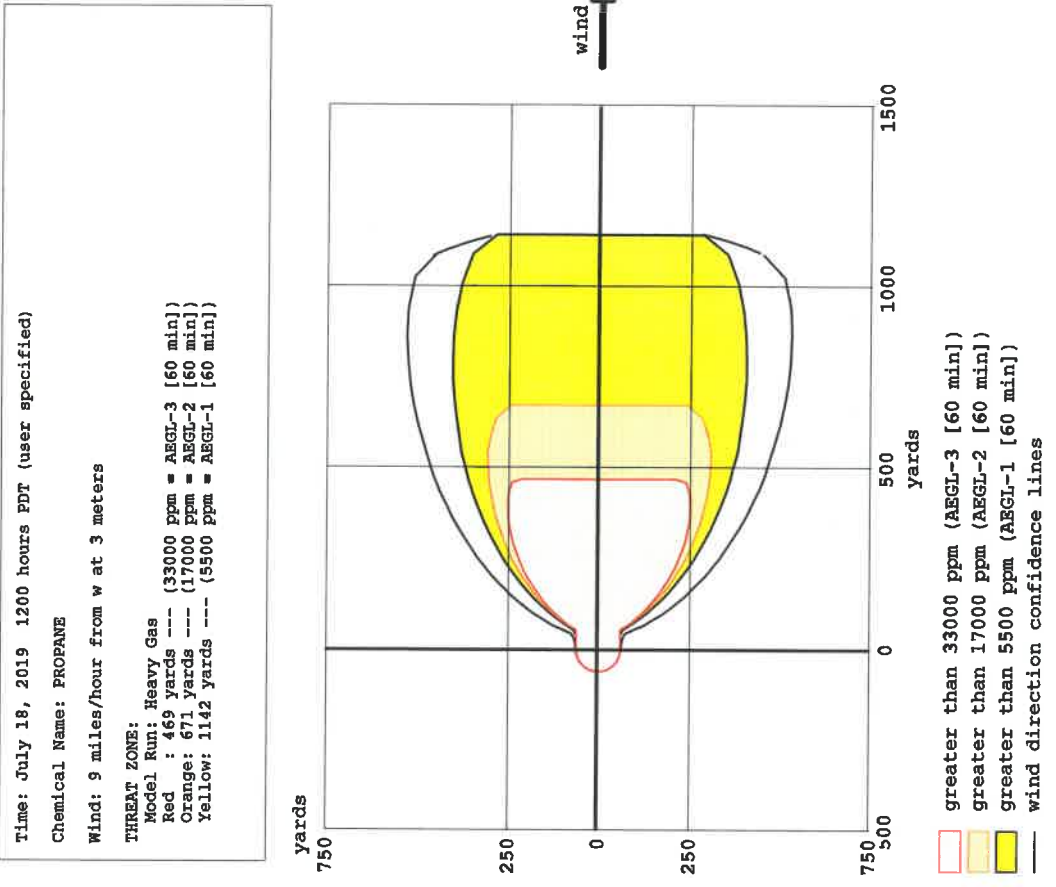
ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
Wind: 9 miles/hour from w at 3 meters
Ground Roughness: urban or forest
Air Temperature: 85° F
No Inversion Height
Cloud Cover: 5 tenths
Stability Class: D
Relative Humidity: 50%

SOURCE STRENGTH:
Leak from hole in horizontal cylindrical tank
Flammable chemical escaping from tank (not burning)
Tank Diameter: 10.66 feet
Tank Length: 51.5 feet
Tank Volume: 34397 gallons
Tank contains liquid
Internal Temperature: 85° F
Tank is 98% full
Chemical Mass in Tank: 83.5 tons
Circular Opening Diameter: 10 inches
Opening is 5 inches from tank bottom
Release Duration: 2 minutes
Max Average Sustained Release Rate: 140,000 pounds/min
(averaged over a minute or more)
Total Amount Released: 167,000 pounds
Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).

THREAT ZONE:
Model Run: Heavy Gas
Red : 2.1 miles --- (1100 ppm = AEGL-3 [60 min])
Orange: 4.6 miles --- (160 ppm = AEGL-2 [60 min])
Yellow: greater than 6 miles --- (30 ppm = AEGL-1 [60 min])



Toxic Threat Zone



Source Strength (Release Rate)

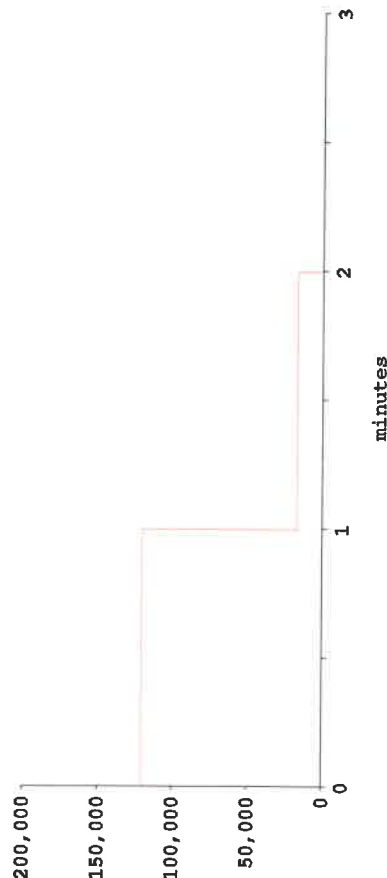
Time: July 18, 2019 1200 hours PDT (user specified)

Chemical Name: PROPANE

SOURCE STRENGTH:

Leak from hole in horizontal cylindrical tank
 Flammable chemical escaping from tank (not burning)
 Tank Diameter: 10.66 feet Tank Length: 51.5 feet
 Tank Volume: 34397 gallons Internal Temperature: 85° F
 Tank contains liquid Tank is 98% full
 Chemical Mass in Tank: 68.1 tons
 Circular Opening Diameter: 10 inches
 Opening is 5 inches from tank bottom
 Release Duration: 2 minutes
 Max Average Sustained Release Rate: 120,000 pounds/min
 (averaged over a minute or more)
 Total Amount Released: 136,200 pounds
 Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).

pounds/minute



Text Summary

SITE DATA:

Location: RICHMOND, CALIFORNIA
 Building Air Exchanges Per Hour: 0.85 (unsheltered single storied)
 Time: July 18, 2019 1200 hours PDT (user specified)

CHEMICAL DATA:

Chemical Name: PROPANE
 CAS Number: 74-98-6 Molecular Weight: 44.10 g/mol
 AEGL-1 (60 min): 5500 ppm AEGL-2 (60 min): 17000 ppm AEGL-3 (60 min): 33000 ppm
 IDLH: 2100 ppm LEL: 21000 ppm UEL: 95000 ppm
 Ambient Boiling Point: -43.7° F
 Vapor Pressure at Ambient Temperature: greater than 1 atm
 Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 9 miles/hour from w at 3 meters
 Ground Roughness: urban or forest
 Air Temperature: 85° F Cloud Cover: 5 tenths
 No Inversion Height Stability Class: D
 Relative Humidity: 50%

SOURCE STRENGTH:

Leak from hole in horizontal cylindrical tank
 Flammable chemical escaping from tank (not burning)
 Tank Diameter: 10.66 feet Tank Length: 51.5 feet
 Tank Volume: 34397 gallons
 Tank contains liquid Internal Temperature: 85° F
 Chemical Mass in Tank: 68.1 tons
 Circular Opening Diameter: 10 inches
 Opening is 5 inches from tank bottom
 Release Duration: 2 minutes
 Max Average Sustained Release Rate: 120,000 pounds/min
 (averaged over a minute or more)
 Total Amount Released: 136,200 pounds
 Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).

THREAT ZONE:

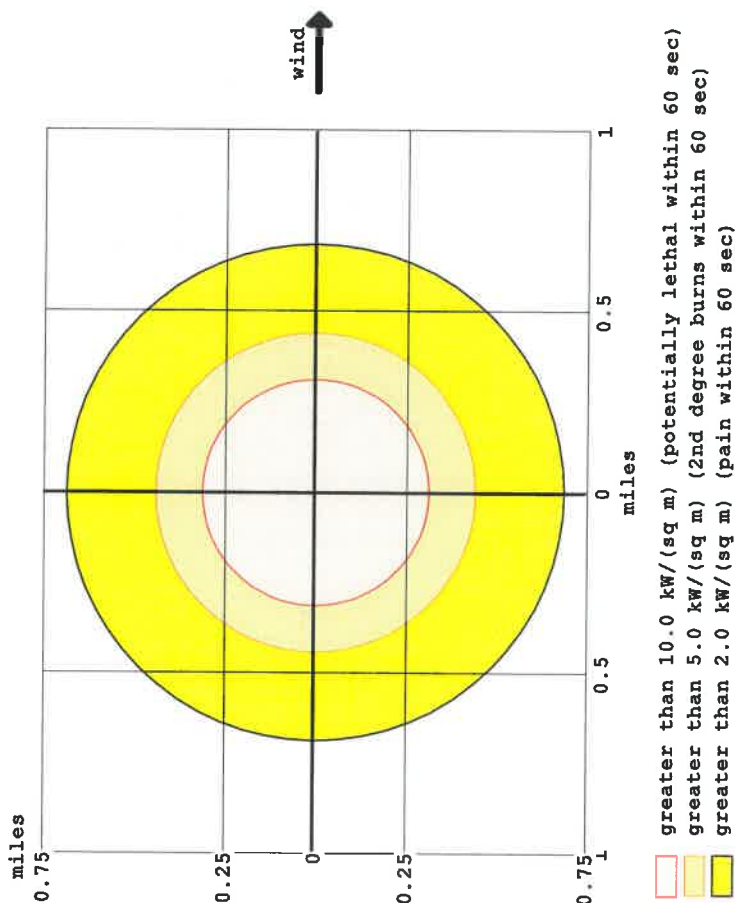
Model Run: Heavy Gas
 Red : 469 yards --- (33000 ppm = AEGL-3 [60 min])
 Orange: 671 yards --- (17000 ppm = AEGL-2 [60 min])
 Yellow: 1142 yards --- (5500 ppm = AEGL-1 [60 min])



Thermal Radiation Threat Zone

Time: July 18, 2019 1200 hours PDT (user specified)
Chemical Name: PROPANE
Wind: 9 miles/hour from w at 3 meters

THREAT ZONE:
Threat Modeled: Thermal radiation from fireball
Red : 549 yards --- (10.0 kW/(sq m) = potentially lethal within 60 sec)
Orange: 775 yards --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
Yellow: 1206 yards --- (2.0 kW/(sq m) = pain within 60 sec)



Text Summary

SITE DATA:
Location: RICHMOND, CALIFORNIA
Building Air Exchanges Per Hour: 0.85 (unsheltered single storied)
Time: July 18, 2019 1200 hours PDT (user specified)

CHEMICAL DATA:
Chemical Name: PROPANE
CAS Number: 74-98-6
Molecular Weight: 44.10 g/mol
AEGL-1 (60 min): 5500 ppm
AEGL-2 (60 min): 17000 ppm
AEGL-3 (60 min): 33000 ppm
IDLH: 2100 ppm
UEL: 95000 ppm
Ambient Boiling Point: -43.7° F
Vapor Pressure at Ambient Temperature: greater than 1 atm
Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
Wind: 9 miles/hour from w at 3 meters
Ground Roughness: urban or forest
Air Temperature: 85° F
No Inversion Height
Cloud Cover: 5 tenths
Stability Class: D
Relative Humidity: 50%

SOURCE STRENGTH:
BLEVE of flammable liquid in horizontal cylindrical tank
Tank Diameter: 10.66 feet
Tank Length: 51.5 feet
Tank Volume: 34397 gallons
Tank contains liquid
Internal Storage Temperature: 85° F
Chemical Mass in Tank: 68.1 tons
Percentage of Tank Mass in Fireball: 100%
Fireball Diameter: 251 yards
Tank is 98% full
Burn Duration: 14 seconds

THREAT ZONE:
Threat Modeled: Thermal radiation from fireball
Red : 549 yards --- (10.0 kW/(sq m) = potentially lethal within 60 sec)
Orange: 775 yards --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
Yellow: 1206 yards --- (2.0 kW/(sq m) = pain within 60 sec)



Toxic Threat Zone

Time: July 18, 2019 1200 hours PDT (user specified)

Chemical Name: AMMONIA

Wind: 9 miles/hour from w at 3 meters

THREAT ZONE:

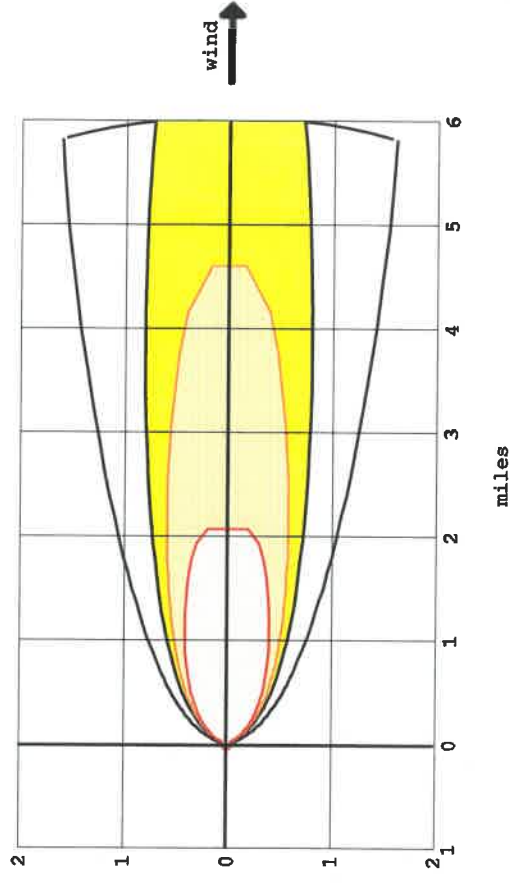
Model Run: Heavy Gas

Red : 2.1 miles --- (1100 ppm = AEGL-3 [60 min])

Orange: 4.6 miles --- (160 ppm = AEGL-2 [60 min])

Yellow: greater than 6 miles --- (30 ppm = AEGL-1 [60 min])

miles



- greater than 1100 ppm (AEGL-3 [60 min])
- greater than 160 ppm (AEGL-2 [60 min])
- greater than 30 ppm (AEGL-1 [60 min])
- wind direction confidence lines

Note: Threat zone picture is truncated at the 6 mile limit.

APPENDIX C-2 Pinch Point Richmond #2

Source Strength (Release Rate)

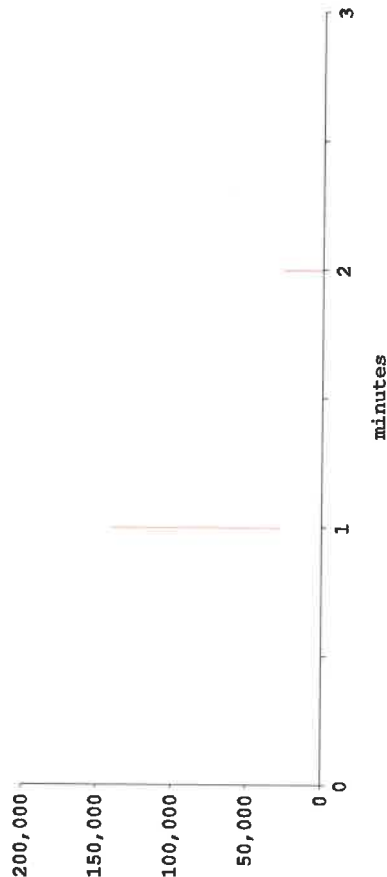
Time: July 18, 2019 1200 hours PDT (user specified)

Chemical Name: AMMONIA

SOURCE STRENGTH:

Leak from hole in horizontal cylindrical tank
 Flammable chemical escaping from tank (not burning)
 Tank Diameter: 10.66 feet
 Tank Volume: 34397 gallons
 Tank contains liquid
 Chemical Mass in Tank: 83.5 tons
 Circular Opening Diameter: 10 inches
 Opening is 5 inches from tank bottom
 Release Duration: 2 minutes
 Max Average Sustained Release Rate: 140,000 pounds/min
 (averaged over a minute or more)
 Total Amount Released: 167,000 pounds
 Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).

pounds/minute



Text Summary

SITE DATA:

Location: RICHMOND, CALIFORNIA
 Building Air Exchanges Per Hour: 0.85 (unsheltered single storied)
 Time: July 18, 2019 1200 hours PDT (user specified)

CHEMICAL DATA:

Chemical Name: AMMONIA
 CAS Number: 7664-41-7
 Molecular Weight: 17.03 g/mol
 AEGL-1 (60 min): 30 ppm
 AEGL-2 (60 min): 160 ppm
 AEGL-3 (60 min): 1100 ppm
 IDLH: 300 ppm
 LEL: 150000 ppm
 UEL: 280000 ppm
 Ambient Boiling Point: -28.2° F
 Vapor Pressure at Ambient Temperature: greater than 1 atm
 Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 9 miles/hour from w at 3 meters
 Ground Roughness: urban or forest
 Air Temperature: 85° F
 No Inversion Height
 Cloud Cover: 5 tenths
 Stability Class: D
 Relative Humidity: 50%

SOURCE STRENGTH:

Leak from hole in horizontal cylindrical tank
 Flammable chemical escaping from tank (not burning)
 Tank Diameter: 10.66 feet
 Tank Length: 51.5 feet
 Tank Volume: 34397 gallons
 Tank contains liquid
 Chemical Mass in Tank: 83.5 tons
 Internal Temperature: 85° F
 Circular Opening Diameter: 10 inches
 Opening is 5 inches from tank bottom
 Release Duration: 2 minutes
 Max Average Sustained Release Rate: 140,000 pounds/min
 (averaged over a minute or more)
 Total Amount Released: 167,000 pounds
 Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).

THREAT ZONE:

Model Run: Heavy Gas
 Red : 2.1 miles --- (1100 ppm = AEGL-3 [60 min])
 Orange: 4.6 miles --- (160 ppm = AEGL-2 [60 min])
 Yellow: greater than 6 miles --- (30 ppm = AEGL-1 [60 min])



ALOHA® 5.4.7

Toxic Threat Zone

Time: July 18, 2019 1200 hours PDT (user specified)

Chemical Name: PROPANE

Wind: 9 miles/hour from w at 3 meters

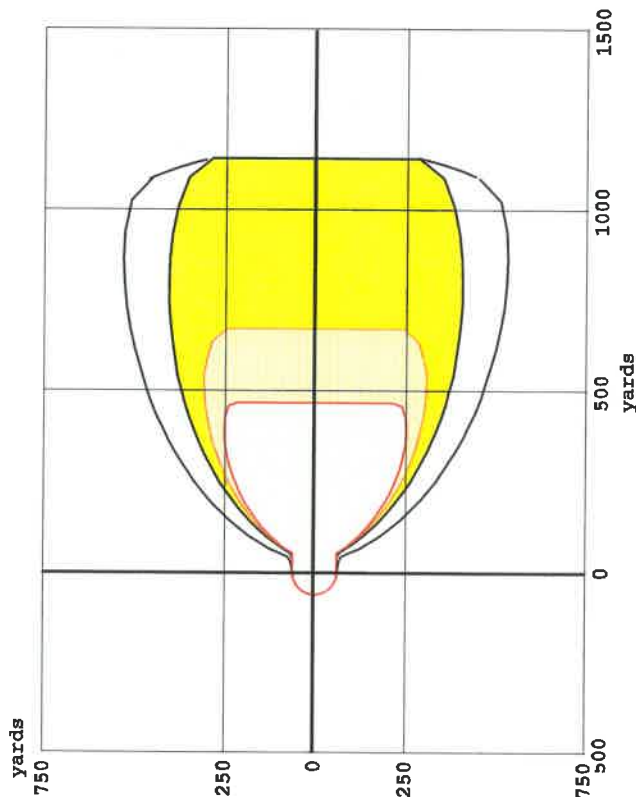
THREAT ZONE:

Model Run: Heavy Gas

Red : 469 yards --- (33000 ppm = AEGL-3 [60 min])

Orange: 671 yards --- (17000 ppm = AEGL-2 [60 min])

Yellow: 1142 yards --- (5500 ppm = AEGL-1 [60 min])



- greater than 33000 ppm (AEGL-3 [60 min])
- greater than 17000 ppm (AEGL-2 [60 min])
- greater than 5500 ppm (AEGL-1 [60 min])
- wind direction confidence lines



Source Strength (Release Rate)

Time: July 18, 2019 1200 hours PDT (user specified)

Chemical Name: PROPANE

SOURCE STRENGTH:

Leak from hole in horizontal cylindrical tank

Flammable chemical escaping from tank (not burning)

Tank Diameter: 10.66 feet

Tank Length: 51.5 feet

Tank Volume: 34397 gallons

Tank contains liquid

Chemical Mass in Tank: 68.1 tons

Circular Opening Diameter: 10 inches

Opening is 5 inches from tank bottom

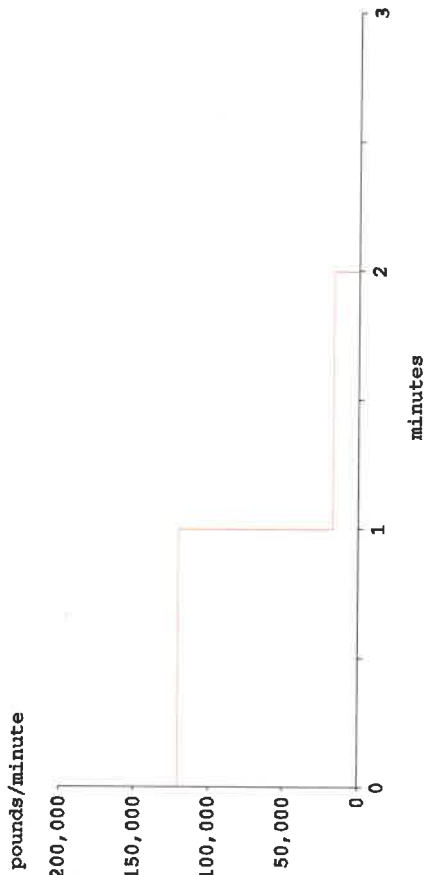
Release Duration: 2 minutes

Max Average Sustained Release Rate: 120,000 pounds/min

(averaged over a minute or more)

Total Amount Released: 136,200 pounds

Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).



Text Summary

SITE DATA:
Location: RICHMOND, CALIFORNIA
Building Air Exchanges Per Hour: 0.85 (unsheltered single storied)
Time: July 18, 2019 1200 hours PDT (user specified)

CHEMICAL DATA:
Chemical Name: PROPANE
CAS Number: 74-98-6
Molecular Weight: 44.10 g/mol
AEGL-1 (60 min): 5500 ppm AEGL-2 (60 min): 17000 ppm AEGL-3 (60 min): 33000 ppm
IDLH: 2100 ppm LEL: 21000 ppm UEL: 95000 ppm
Ambient Boiling Point: -43.78 F
Vapor Pressure at Ambient Temperature: greater than 1 atm
Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
Wind: 9 miles/hour from w at 3 meters
Ground Roughness: urban or forest
Air Temperature: 85° F
No Inversion Height
Cloud Cover: 5 tenths
Stability Class: D
Relative Humidity: 50%

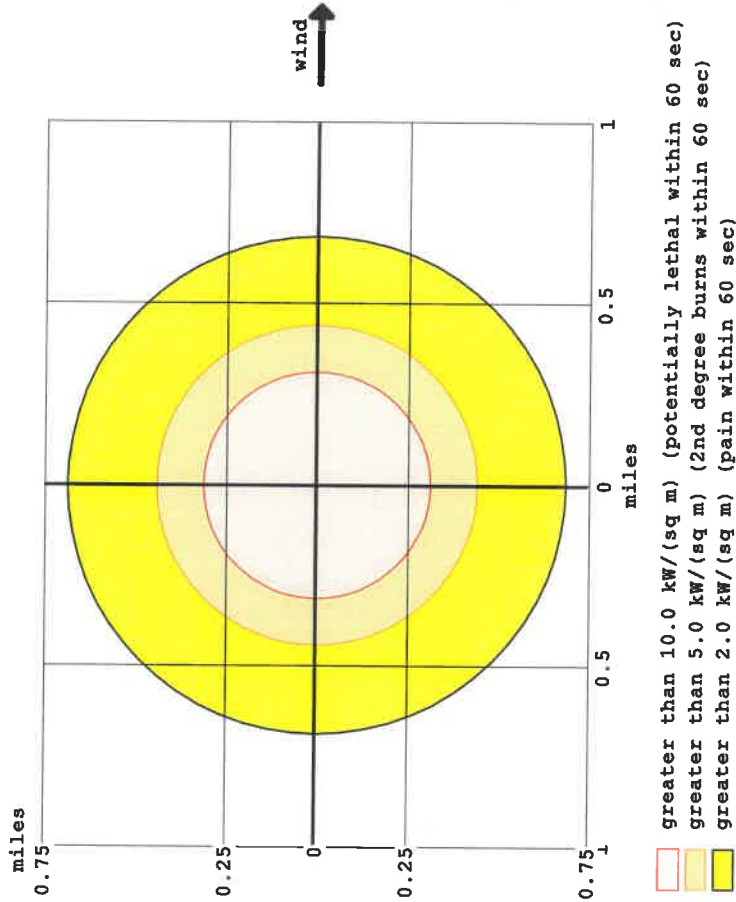
SOURCE STRENGTH:
Leak from hole in horizontal cylindrical tank
Flammable chemical escaping from tank (not burning)
Tank Diameter: 10.66 feet
Tank Length: 51.5 feet
Tank Volume: 34397 gallons
Tank contains liquid
Chemical Mass in Tank: 68.1 tons
Circular Opening Diameter: 10 inches
Opening is 5 inches from tank bottom
Release Duration: 2 minutes
Max Average Sustained Release Rate: 120,000 pounds/min
(averaged over a minute or more)
Total Amount Released: 136,200 pounds
Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).

THREAT ZONE:
Model Run: Heavy Gas
Red : 469 yards --- (33000 ppm = AEGL-3 [60 min])
Orange: 671 yards --- (17000 ppm = AEGL-2 [60 min])
Yellow: 1142 yards --- (5500 ppm = AEGL-1 [60 min])

Thermal Radiation Threat Zone

Time: July 18, 2019 1200 hours PDT (user specified)
Chemical Name: PROPANE
Wind: 9 miles/hour from w at 3 meters

THREAT ZONE:
Threat Modeled: Thermal radiation from fireball
Red : 549 yards --- (10.0 kW/(sq m) = potentially lethal within 60 sec)
Orange: 775 yards --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
Yellow: 1206 yards --- (2.0 kW/(sq m) = pain within 60 sec)





Text Summary

SITE DATA:

Location: RICHMOND, CALIFORNIA
Building Air Exchanges Per Hour: 0.85 (unsheltered single storied)
Time: July 18, 2019 1200 hours PDT (user specified)

CHEMICAL DATA:

Chemical Name: PROPANE
CAS Number: 74-98-6
AEGL-1 (60 min): 5500 ppm AEGL-2 (60 min): 17000 ppm AEGL-3 (60 min): 33000 ppm
IDLH: 2100 ppm LEL: 21000 ppm UEL: 95000 ppm
Ambient Boiling Point: -43.7° F
Vapor Pressure at Ambient Temperature: greater than 1 atm
Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 9 miles/hour from w at 3 meters
Ground Roughness: urban or forest
Air Temperature: 85° F
No Inversion Height
Cloud Cover: 5 tenths
Stability Class: D
Relative Humidity: 50%

SOURCE STRENGTH:

BLEVE of flammable liquid in horizontal cylindrical tank
Tank Diameter: 10.66 feet
Tank Volume: 34397 gallons
Tank contains liquid
Internal Storage Temperature: 85° F
Chemical Mass in Tank: 68.1 tons
Percentage of Tank Mass in Fireball: 100%
Fireball Diameter: 251 yards
Burn Duration: 14 seconds

THREAT ZONE:

Threat Modeled: Thermal radiation from fireball
Red : 549 yards --- (10.0 kW/(sq m) = potentially lethal within 60 sec)
Orange: 775 yards --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
Yellow: 1206 yards --- (2.0 kW/(sq m) = pain within 60 sec)

APPENDIX C-3

Pinch Point Martinez #3

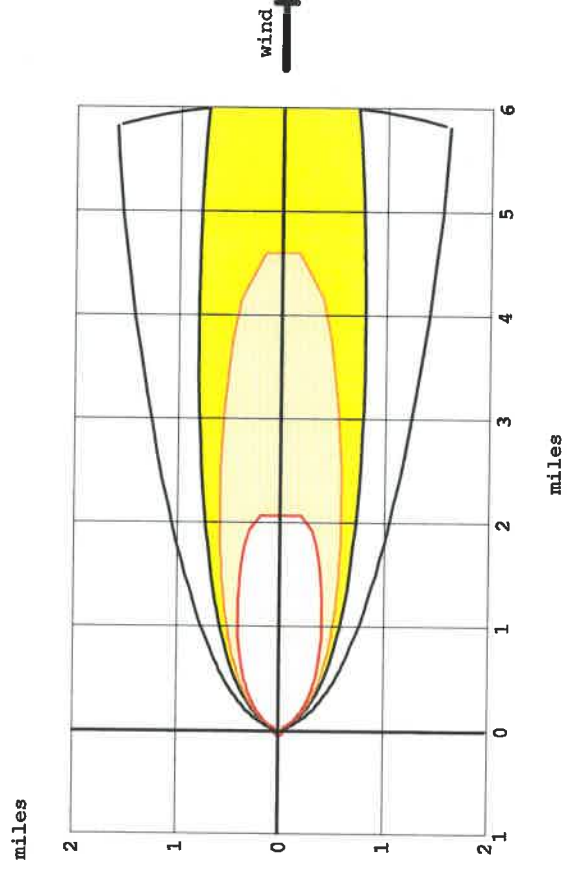


ALOHA® 5.4.7

Toxic Threat Zone

Time: July 18, 2019 1200 hours PDT (user specified)
Chemical Name: AMMONIA
Wind: 9 miles/hour from w at 3 meters

THREAT ZONE:
Model Run: Heavy Gas
Red : 2.1 miles --- (1100 ppm = AEGL-3 [60 min])
Orange: 4.6 miles --- (160 ppm = AEGL-2 [60 min])
Yellow: greater than 6 miles --- (30 ppm = AEGL-1 [60 min])



- greater than 1100 ppm (AEGL-3 [60 min])
- greater than 160 ppm (AEGL-2 [60 min])
- greater than 30 ppm (AEGL-1 [60 min])
- wind direction confidence lines

Note: Threat zone picture is truncated at the 6 mile limit.

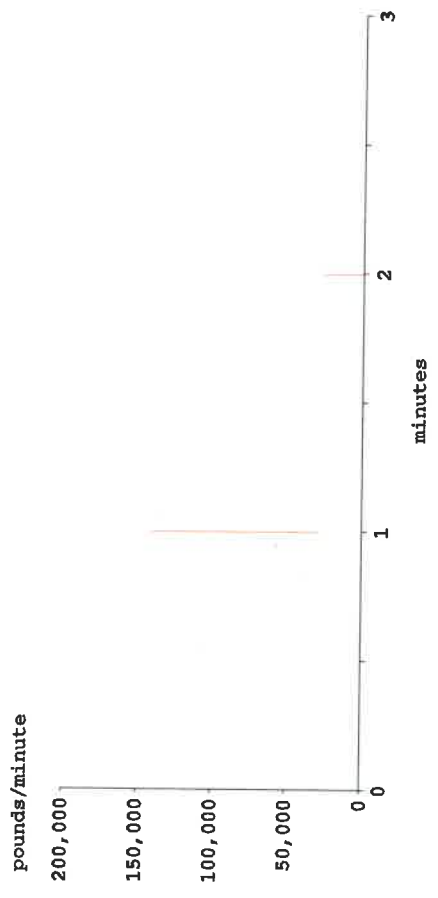


ALOHA® 5.4.7

Source Strength (Release Rate)

Time: July 18, 2019 1200 hours PDT (user specified)
Chemical Name: AMMONIA

SOURCE STRENGTH:
Leak from hole in horizontal cylindrical tank
Flammable chemical escaping from tank (not burning)
Tank Diameter: 10.66 feet
Tank Length: 51.5 feet
Tank Volume: 3497 gallons
Tank contains liquid
Chemical Mass in Tank: 83.5 tons
Internal Temperature: 85° F
Tank is 98% full
Circular Opening Diameter: 10 inches
Opening is 5 inches from tank bottom
Release Duration: 2 minutes
Max Average Sustained Release Rate: 140,000 pounds/min
(averaged over a minute or more)
Total Amount Released: 167,000 pounds
Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).



Text Summary

SITE DATA:
 Location: MARTINEZ, CALIFORNIA
 Building Air Exchanges Per Hour: 0.85 (unsheltered single storied)
 Time: July 18, 2019 1200 hours PDT (user specified)

CHEMICAL DATA:
 Chemical Name: AMMONIA
 CAS Number: 7664-41-7
 Molecular Weight: 17.03 g/mol
 AEGL-1 (60 min): 30 ppm AEGL-2 (60 min): 160 ppm AEGL-3 (60 min): 1100 ppm
 IDLH: 300 ppm LEL: 150000 ppm UEL: 280000 ppm
 Ambient Boiling Point: -28.2° F
 Vapor Pressure at Ambient Temperature: greater than 1 atm
 Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
 Wind: 9 miles/hour from w at 3 meters
 Cloud Cover: 5 tenths
 Ground Roughness: urban or forest
 Air Temperature: 85° F
 Stability Class: D
 No Inversion Height
 Relative Humidity: 50%

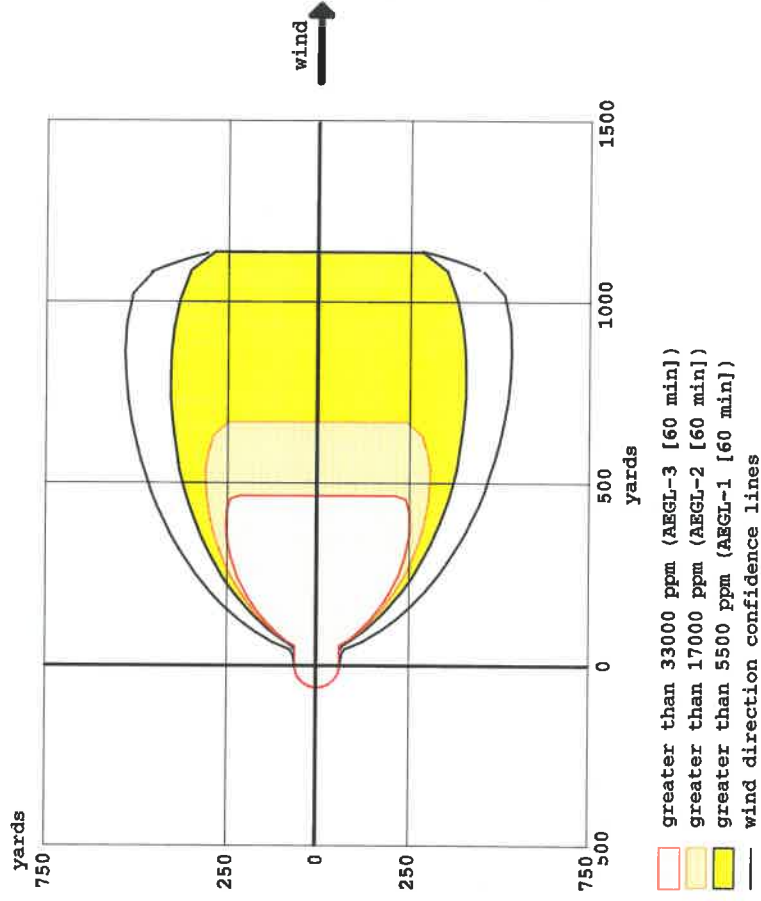
SOURCE STRENGTH:
 Leak from hole in horizontal cylindrical tank
 Flammable chemical escaping from tank (not burning)
 Tank Diameter: 10.66 feet
 Tank Length: 51.5 feet
 Tank Volume: 34397 gallons
 Tank contains liquid
 Chemical Mass in Tank: 83.5 tons
 Circular Opening Diameter: 10 inches
 Opening is 5 inches from tank bottom
 Release Duration: 2 minutes
 Max Average Sustained Release Rate: 140,000 pounds/min
 (averaged over a minute or more)
 Total Amount Released: 167,000 pounds
 Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).

THREAT ZONE:
 Model Run: Heavy Gas
 Red : 2.1 miles --- (1100 ppm = AEGL-3 [60 min])
 Orange: 4.6 miles --- (160 ppm = AEGL-2 [60 min])
 Yellow: greater than 6 miles --- (30 ppm = AEGL-1 [60 min])

Toxic Threat Zone

Time: July 18, 2019 1200 hours PDT (user specified)
 Chemical Name: PROPANE
 Wind: 9 miles/hour from w at 3 meters

THREAT ZONE:
 Model Run: Heavy Gas
 Red : 469 yards --- (33000 ppm = AEGL-3 [60 min])
 Orange: 671 yards --- (17000 ppm = AEGL-2 [60 min])
 Yellow: 1142 yards --- (5500 ppm = AEGL-1 [60 min])

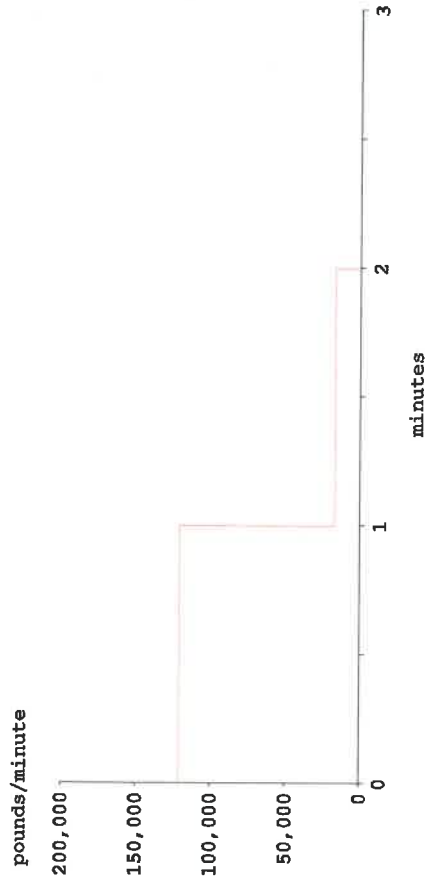


Source Strength (Release Rate)

Time: July 18, 2019 1200 hours EDT (user specified)

Chemical Name: PROPANE

SOURCE STRENGTH:
 Leak from hole in horizontal cylindrical tank
 Flammable chemical escaping from tank (not burning)
 Tank Diameter: 10.66 feet Tank Length: 51.5 feet
 Tank Volume: 34397 gallons Internal Temperature: 85° F
 Tank contains liquid Tank is 98% full
 Chemical Mass in Tank: 68.1 tons
 Circular Opening Diameter: 10 inches
 Opening is 5 inches from tank bottom
 Release Duration: 2 minutes
 Max Average Sustained Release Rate: 120,000 pounds/min
 (averaged over a minute or more)
 Total Amount Released: 136,200 pounds
 Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).



Text Summary

SITE DATA:
 Location: MARTINEZ, CALIFORNIA
 Building Air Exchanges Per Hour: 0.85 (unsheltered single storied)
 Time: July 18, 2019 1200 hours EDT (user specified)

CHEMICAL DATA:
 Chemical Name: PROPANE Molecular Weight: 44.10 g/mol
 CAS Number: 74-98-6
 AEG1-1 (60 min): 5500 ppm AEG1-2 (60 min): 17000 ppm AEG1-3 (60 min): 33000 ppm UEL: 95000 ppm
 IDLH: 2100 ppm IEL: 21000 ppm
 Ambient Boiling Point: -43.7° F
 Vapor Pressure at Ambient Temperature: greater than 1 atm
 Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
 Wind: 9 miles/hour from W at 3 meters
 Ground Roughness: urban or forest Cloud Cover: 5 tenths
 Air Temperature: 85° F Stability Class: D
 No Inversion Height Relative Humidity: 50%

SOURCE STRENGTH:
 Leak from hole in horizontal cylindrical tank
 Flammable chemical escaping from tank (not burning)
 Tank Diameter: 10.66 feet Tank Length: 51.5 feet
 Tank Volume: 34397 gallons Internal Temperature: 85° F
 Tank contains liquid Tank is 98% full
 Chemical Mass in Tank: 68.1 tons
 Circular Opening Diameter: 10 inches
 Opening is 5 inches from tank bottom
 Release Duration: 2 minutes
 Max Average Sustained Release Rate: 120,000 pounds/min
 (averaged over a minute or more)
 Total Amount Released: 136,200 pounds
 Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).

THREAT ZONE:
 Model Run: Heavy Gas
 Red : 469 yards --- (33000 ppm = AEG1-3 [60 min])
 Orange: 671 yards --- (17000 ppm = AEG1-2 [60 min])
 Yellow: 1142 yards --- (5500 ppm = AEG1-1 [60 min])

Thermal Radiation Threat Zone

Time: July 18, 2019 1200 hours PDT (user specified)

Chemical Name: PROPANE

Wind: 9 miles/hour from w at 3 meters

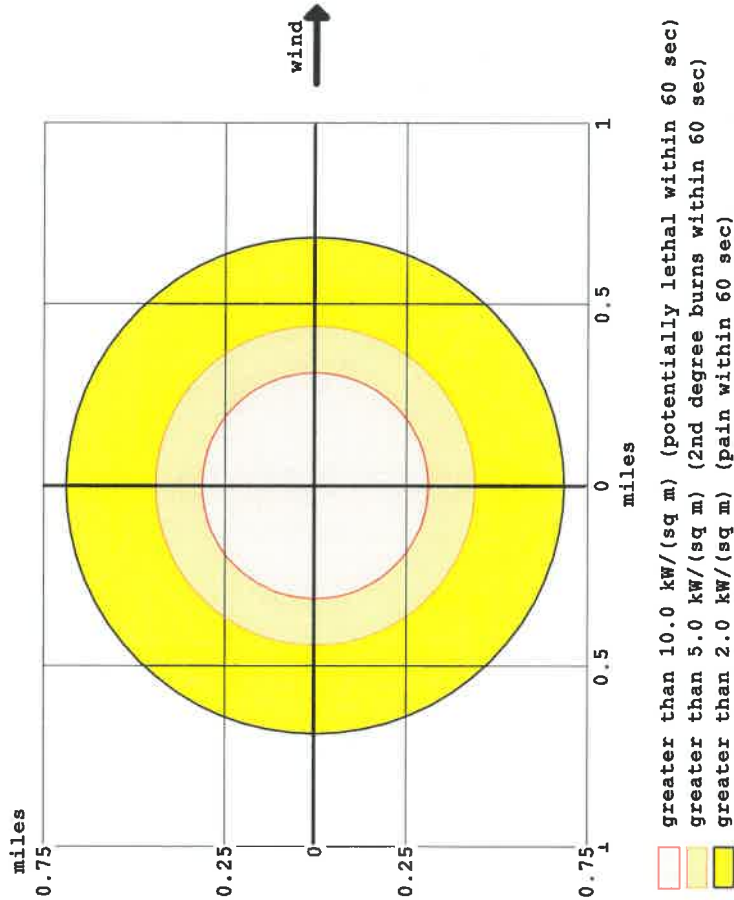
THREAT ZONE:

Threat Modeled: Thermal radiation from fireball

Red : 549 yards --- (10.0 kW/(sq m) = potentially lethal within 60 sec)

Orange: 775 yards --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)

Yellow: 1206 yards --- (2.0 kW/(sq m) = pain within 60 sec)



Text Summary

SITE DATA:

Location: MARTINEZ, CALIFORNIA

Building Air Exchanges Per Hour: 0.85 (unsheltered single storied)

Time: July 18, 2019 1200 hours PDT (user specified)

CHEMICAL DATA:

Chemical Name: PROPANE

CAS Number: 74-98-6

AEGL-1 (60 min): 5500 ppm AEGL-2 (60 min): 17000 ppm AEGL-3 (60 min): 33000 ppm

IDLH: 2100 ppm IEL: 21000 ppm UEL: 95000 ppm

Ambient Boiling Point: -43.7° F

Vapor Pressure at Ambient Temperature: greater than 1 atm

Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 9 miles/hour from w at 3 meters

Ground Roughness: urban or forest

Air Temperature: 85° F

No Inversion Height

Cloud Cover: 5 tenths

Stability Class: D

Relative Humidity: 50%

SOURCE STRENGTH:

BLEVE of flammable liquid in horizontal cylindrical tank

Tank Diameter: 10.66 feet

Tank Volume: 34397 gallons

Tank contains liquid

Internal Storage Temperature: 85° F

Chemical Mass in Tank: 68.1 tons

Percentage of Tank Mass in Fireball: 100%

Fireball Diameter: 251 yards

Burn Duration: 14 seconds

THREAT ZONE:

Threat Modeled: Thermal radiation from fireball

Red : 549 yards --- (10.0 kW/(sq m) = potentially lethal within 60 sec)

Orange: 775 yards --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)

Yellow: 1206 yards --- (2.0 kW/(sq m) = pain within 60 sec)



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Toxic Threat Zone

Time: July 18, 2019 1200 hours PDT (user specified)

Chemical Name: AMMONIA

Wind: 9 miles/hour from w at 3 meters

THREAT ZONE:

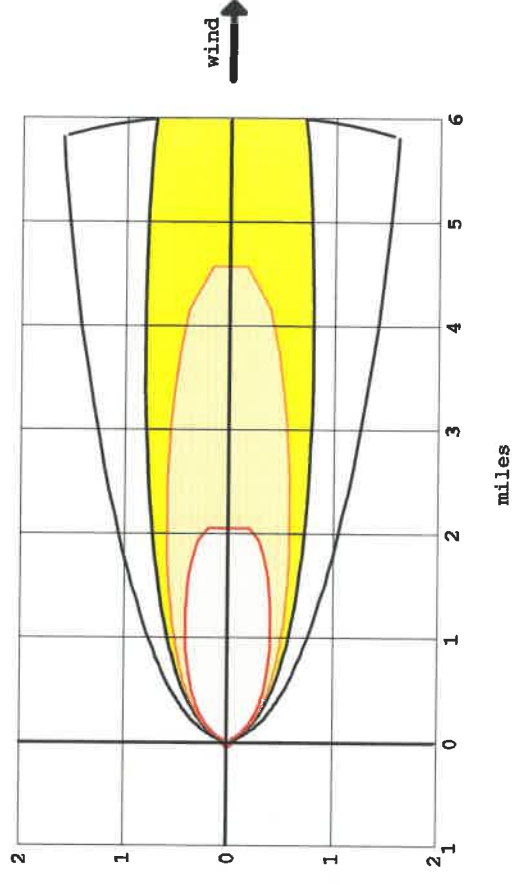
Model Run: Heavy Gas

Red : 2.1 miles --- (1100 ppm = AEGL-3 [60 min])

Orange: 4.6 miles --- (160 ppm = AEGL-2 [60 min])

Yellow: greater than 6 miles --- (30 ppm = AEGL-1 [60 min])

miles



- greater than 1100 ppm (AEGL-3 [60 min])
- greater than 160 ppm (AEGL-2 [60 min])
- greater than 30 ppm (AEGL-1 [60 min])
- wind direction confidence lines

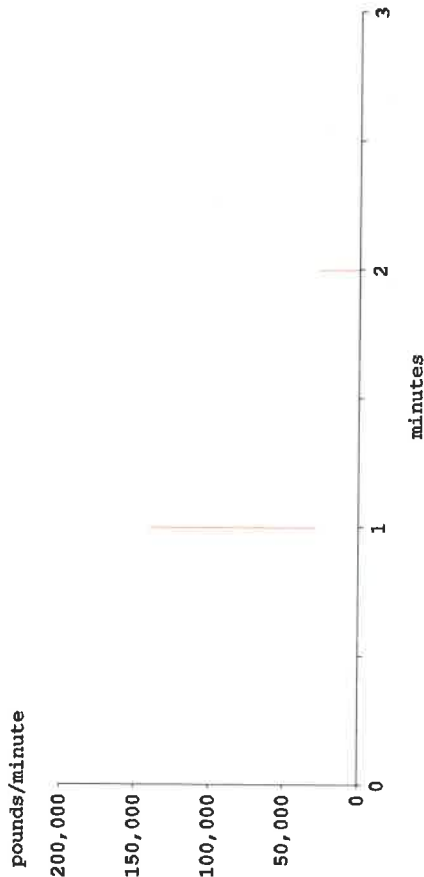
Note: Threat zone picture is truncated at the 6 mile limit.

APPENDIX C-4

Pinch Point Bay Point #4

Source Strength (Release Rate)

Time: July 18, 2019 1200 hours PDT (user specified)
Chemical Name: AMMONIA
SOURCE STRENGTH:
Leak from hole in horizontal cylindrical tank
Flammable chemical escaping from tank (not burning)
Tank Diameter: 10.66 feet Tank Length: 51.5 feet
Tank Volume: 34397 gallons Internal Temperature: 85° F
Tank contains liquid Tank is 98% full
Chemical Mass in Tank: 83.5 tons
Circular Opening Diameter: 10 inches
Opening is 5 inches from tank bottom
Release Duration: 2 minutes
Max Average Sustained Release Rate: 140,000 pounds/min
(averaged over a minute or more)
Total Amount Released: 167,000 pounds
Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).



Text Summary

SITE DATA:
Location: BAY POINT, CALIFORNIA
Building Air Exchanges Per Hour: 0.85 (unsheltered single storied)
Time: July 18, 2019 1200 hours PDT (user specified)
CHEMICAL DATA:
Chemical Name: AMMONIA
CAS Number: 7664-41-7 Molecular Weight: 17.03 g/mol
AEGL-1 (60 min): 30 ppm AEGL-2 (60 min): 160 ppm AEGL-3 (60 min): 1100 ppm
IDLH: 300 ppm IEL: 150000 ppm UEL: 280000 ppm
Ambient Boiling Point: -28.3° F
Vapor Pressure at Ambient Temperature: greater than 1 atm
Ambient Saturation Concentration: 1,000,000 ppm or 100.0%
ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
Wind: 9 miles/hour from w at 3 meters Cloud Cover: 5 tenths
Ground Roughness: urban or forest Air Temperature: 85° F Stability Class: D
No Inversion Height Relative Humidity: 50%
SOURCE STRENGTH:
Leak from hole in horizontal cylindrical tank
Flammable chemical escaping from tank (not burning)
Tank Diameter: 10.66 feet Tank Length: 51.5 feet
Tank Volume: 34397 gallons Internal Temperature: 85° F
Tank contains liquid Tank is 98% full
Chemical Mass in Tank: 83.5 tons
Circular Opening Diameter: 10 inches
Opening is 5 inches from tank bottom
Release Duration: 2 minutes
Max Average Sustained Release Rate: 140,000 pounds/min
(averaged over a minute or more)
Total Amount Released: 167,000 pounds
Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).
THREAT ZONE:
Model Run: Heavy Gas
Red : 2.1 miles --- (1100 ppm = AEGL-3 [60 min])
Orange: 4.6 miles --- (160 ppm = AEGL-2 [60 min])
Yellow: greater than 6 miles --- (30 ppm = AEGL-1 [60 min])



Toxic Threat Zone

ALOHA® 5.4.7

Time: July 18, 2019 1200 hours PDT (user specified)

Chemical Name: PROPANE

Wind: 9 miles/hour from w at 3 meters

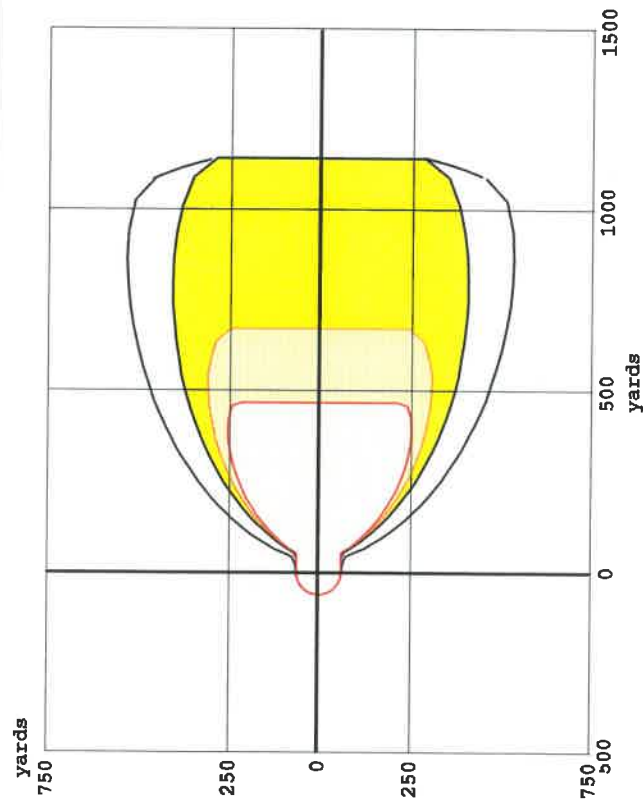
THREAT ZONE:

Model Run: Heavy Gas

Red : 468 yards --- (33000 ppm = AEGL-3 [60 min])

Orange: 671 yards --- (17000 ppm = AEGL-2 [60 min])

Yellow: 1142 yards --- (5500 ppm = AEGL-1 [60 min])



- greater than 33000 ppm (AEGL-3 [60 min])
- greater than 17000 ppm (AEGL-2 [60 min])
- greater than 5500 ppm (AEGL-1 [60 min])
- wind direction confidence lines



Source Strength (Release Rate)

ALOHA® 5.4.7

Time: July 18, 2019 1200 hours PDT (user specified)

Chemical Name: PROPANE

SOURCE STRENGTH:

Leak from hole in horizontal cylindrical tank

Flammable chemical escaping from tank (not burning)

Tank Diameter: 10.66 feet Tank length: 51.5 feet

Tank Volume: 34397 gallons

Tank contains liquid

Chemical Mass in Tank: 68.1 tons Internal Temperature: 85° F

Circular Opening Diameter: 10 inches Tank is 98% full

Opening is 5 inches from tank bottom

Release Duration: 2 minutes

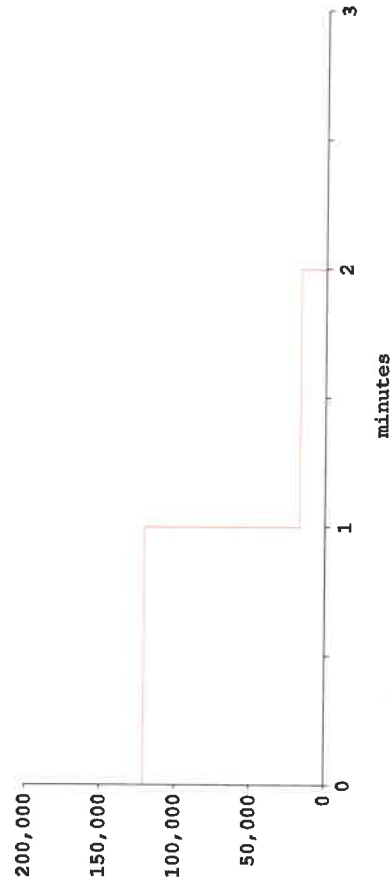
Max Average Sustained Release Rate: 120,000 pounds/min

(averaged over a minute or more)

Total Amount Released: 136,200 pounds

Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).

pounds/minute



Text Summary

SITE DATA:
 Location: RAY POINT, CALIFORNIA
 Building Air Exchanges Per Hour: 0.85 (unsheltered single storied)
 Time: July 18, 2019 1200 hours PDT (user specified)

CHEMICAL DATA:
 Chemical Name: PROPANE
 CAS Number: 74-98-6
 Molecular Weight: 44.10 g/mol
 AEGL-1 (60 min): 5500 ppm AEGL-2 (60 min): 17000 ppm AEGL-3 (60 min): 33000 ppm
 IDLH: 2100 ppm LEL: 21000 ppm UEL: 95000 ppm
 Ambient Boiling Point: -43.9° F
 Vapor Pressure at Ambient Temperature: greater than 1 atm
 Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
 Wind: 9 miles/hour from w at 3 meters
 Ground Roughness: urban or forest
 Air Temperature: 85° F
 Cloud Cover: 5 tenths
 Stability Class: D
 Relative Humidity: 50%
 No Inversion Height

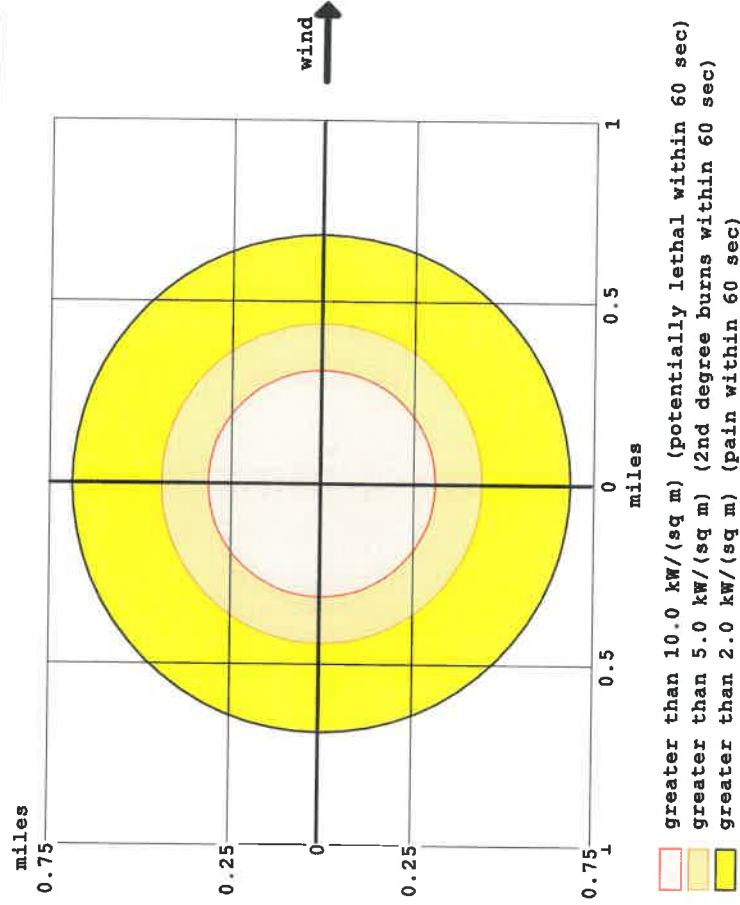
SOURCE STRENGTH:
 Leak from hole in horizontal cylindrical tank
 Flammable chemical escaping from tank (not burning)
 Tank Diameter: 10.66 feet
 Tank Length: 51.5 feet
 Tank Volume: 34397 gallons
 Tank contains liquid
 Chemical Mass in Tank: 68.1 tons
 Circular Opening Diameter: 10 inches
 Opening is 5 inches from tank bottom
 Release Duration: 2 minutes
 Max Average Sustained Release Rate: 120,000 pounds/min
 (averaged over a minute or more)
 Total Amount Released: 136,200 pounds
 Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).

THREAT ZONE:
 Model Run: Heavy Gas
 Red : 468 yards --- (33000 ppm = AEGL-3 [60 min])
 Orange: 671 yards --- (17000 ppm = AEGL-2 [60 min])
 Yellow: 1142 yards --- (5500 ppm = AEGL-1 [60 min])

Thermal Radiation Threat Zone

Time: July 18, 2019 1200 hours PDT (user specified)
 Chemical Name: PROPANE
 Wind: 9 miles/hour from w at 3 meters

THREAT ZONE:
 Threat Modeled: Thermal radiation from fireball
 Red : 549 yards --- (10.0 kW/(sq m) = potentially lethal within 60 sec)
 Orange: 775 yards --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
 Yellow: 1206 yards --- (2.0 kW/(sq m) = pain within 60 sec)





ALOHA® 5.4.7

Text Summary

SITE DATA:

Location: RAY POINT, CALIFORNIA
Building Air Exchanges Per Hour: 0.85 (unsheltered single storied)
Time: July 18, 2019 1200 hours PDT (user specified)

CHEMICAL DATA:

Chemical Name: PROPANE
CAS Number: 74-98-6
Molecular Weight: 44.10 g/mol
AEGL-1 (60 min): 5500 ppm AEGL-2 (60 min): 17000 ppm AEGL-3 (60 min): 33000 ppm
IDLH: 2100 ppm LEL: 21000 ppm UEL: 95000 ppm
Ambient Boiling Point: -43.9° F
Vapor Pressure at Ambient Temperature: greater than 1 atm
Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 9 miles/hour from W at 3 meters
Ground Roughness: urban or forest
Air Temperature: 85° F
No Inversion Height
Cloud Cover: 5 tenths
Stability Class: D
Relative Humidity: 50%

SOURCE STRENGTH:

BLEVE of flammable liquid in horizontal cylindrical tank
Tank Diameter: 10.66 feet
Tank Volume: 34397 gallons
Tank contains liquid
Internal Storage Temperature: 85° F
Chemical Mass in Tank: 68.1 tons
Percentage of Tank Mass in Fireball: 100%
Fireball Diameter: 251 yards
Burn Duration: 14 seconds

THREAT ZONE:

Threat Modeled: Thermal radiation from fireball
Red : 549 yards --- (10.0 kW/(sq m) = potentially lethal within 60 sec)
Orange: 775 yards --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
Yellow: 1206 yards --- (2.0 kW/(sq m) = pain within 60 sec)

APPENDIX C-5

Pinch Point Antioch #5

Toxic Threat Zone

Time: July 18, 2019 1200 hours PDT (user specified)

Chemical Name: AMMONIA

Wind: 9 miles/hour from w at 3 meters

THREAT ZONE:

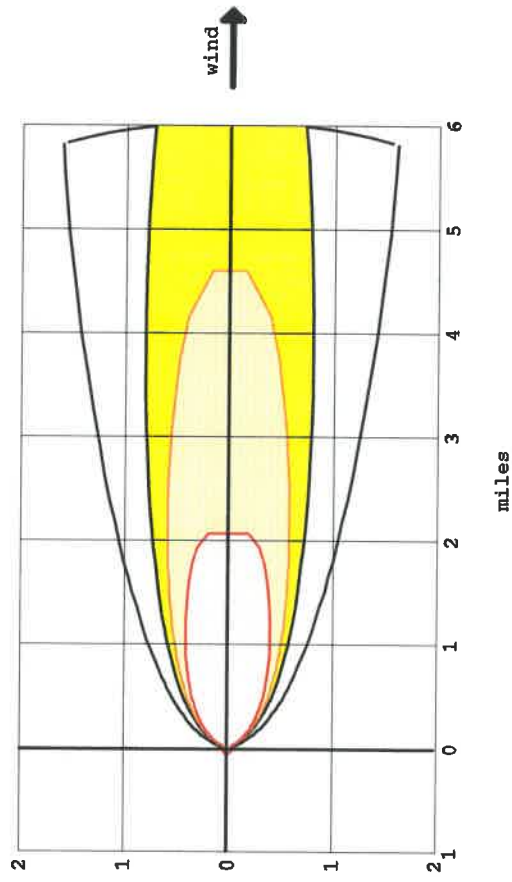
Model Run: Heavy Gas

Red : 2.1 miles --- (1100 ppm = AEGL-3 [60 min])

Orange: 4.6 miles --- (160 ppm = AEGL-2 [60 min])

Yellow: greater than 6 miles --- (30 ppm = AEGL-1 [60 min])

miles



- greater than 1100 ppm (AEGL-3 [60 min])
- greater than 160 ppm (AEGL-2 [60 min])
- greater than 30 ppm (AEGL-1 [60 min])
- wind direction confidence lines

Note: Threat zone picture is truncated at the 6 mile limit.

Source Strength (Release Rate)

Time: July 18, 2019 1200 hours PDT (user specified)

Chemical Name: AMMONIA

SOURCE STRENGTH:

Leak from hole in horizontal cylindrical tank

Flammable chemical escaping from tank (not burning)

Tank Diameter: 10.66 feet Tank Length: 51.5 feet

Tank Volume: 34397 gallons

Chemical Mass in Tank: 83.5 tons Internal Temperature: 85° F

Circular Opening Diameter: 10 inches Tank is 98% full

Opening is 5 inches from tank bottom

Release Duration: 2 minutes

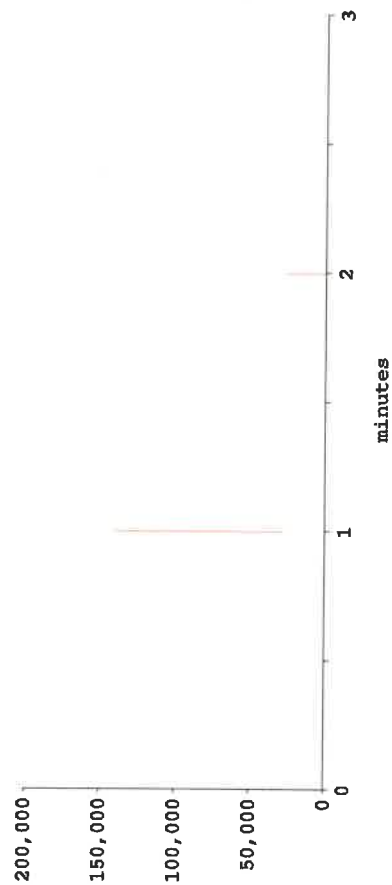
Max Average Sustained Release Rate: 140,000 pounds/min

(averaged over a minute or more)

Total Amount Released: 167,000 pounds

Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).

pounds/minute



Text Summary

SITE DATA:
 Location: ANTIPOCH, CALIFORNIA
 Building Air Exchanges Per Hour: 0.85 (unsheltered single storied)
 Time: July 18, 2019 1200 hours PDT (user specified)

CHEMICAL DATA:
 Chemical Name: AMMONIA
 CAS Number: 7664-41-7
 AEG1-1 (60 min): 30 ppm AEG1-2 (60 min): 160 ppm AEG1-3 (60 min): 1100 ppm
 IDLH: 300 ppm LEL: 150000 ppm UEL: 280000 ppm
 Ambient Boiling Point: -28.2° F
 Vapor Pressure at Ambient Temperature: greater than 1 atm
 Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
 Wind: 9 miles/hour from w at 3 meters
 Ground Roughness: urban or forest
 Air Temperature: 85° F
 No Inversion Height
 Cloud Cover: 5 tenths
 Stability Class: D
 Relative Humidity: 50%

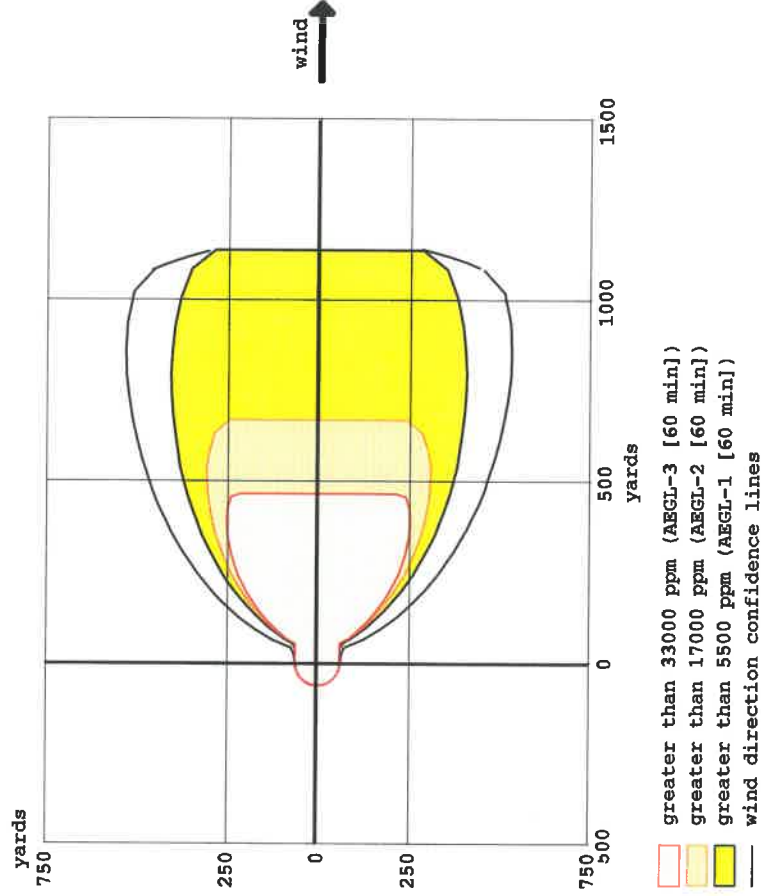
SOURCE STRENGTH:
 Leak from hole in horizontal cylindrical tank
 Flammable chemical escaping from tank (not burning)
 Tank diameter: 10.66 feet Tank length: 51.5 feet
 Tank volume: 34397 gallons
 Tank contains liquid
 Chemical Mass in Tank: 83.5 tons
 Circular Opening Diameter: 10 inches
 Opening is 5 inches from tank bottom
 Release Duration: 2 minutes
 Max Average Sustained Release Rate: 140,000 pounds/min
 (averaged over a minute or more)
 Total Amount Released: 167,000 pounds
 Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).

THREAT ZONE:
 Model Run: Heavy Gas
 Red : 2.1 miles --- (1100 ppm = AEG1-3 [60 min])
 Orange: 4.6 miles --- (160 ppm = AEG1-2 [60 min])
 Yellow: greater than 6 miles --- (30 ppm = AEG1-1 [60 min])

Toxic Threat Zone

Time: July 18, 2019 1200 hours PDT (user specified)
 Chemical Name: PROPANE
 Wind: 9 miles/hour from w at 3 meters

THREAT ZONE:
 Model Run: Heavy Gas
 Red : 469 yards --- (33000 ppm = AEG1-3 [60 min])
 Orange: 671 yards --- (17000 ppm = AEG1-2 [60 min])
 Yellow: 1142 yards --- (5500 ppm = AEG1-1 [60 min])





Source Strength (Release Rate)

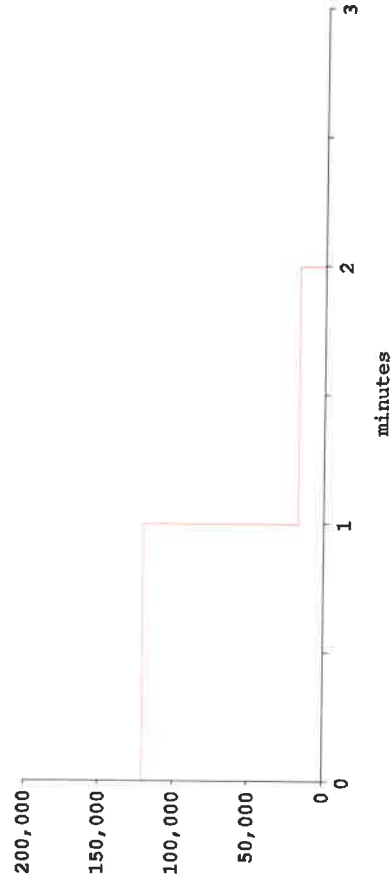
Time: July 18, 2019 1200 hours PDT (user specified)

Chemical Name: PROPANE

SOURCE STRENGTH:

Leak from hole in horizontal cylindrical tank
Flammable chemical escaping from tank (not burning)
Tank Diameter: 10.66 feet
Tank Volume: 34397 gallons
Tank contains liquid
Chemical Mass in Tank: 68.1 tons
Circular Opening Diameter: 10 inches
Opening is 5 inches from tank bottom
Release Duration: 2 minutes
Max Average Sustained Release Rate: 120,000 pounds/min
(averaged over a minute or more)
Total Amount Released: 136,200 pounds
Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).

pounds/minute



Text Summary

SITE DATA:

Location: ANTIOCH, CALIFORNIA
Building Air Exchanges Per Hour: 0.85 (unsheltered single storied)
Time: July 18, 2019 1200 hours PDT (user specified)

CHEMICAL DATA:

Chemical Name: PROPANE
CAS Number: 74-98-6
Molecular Weight: 44.10 g/mol
AEGL-1 (60 min): 5500 ppm AEGL-2 (60 min): 17000 ppm AEGL-3 (60 min): 33000 ppm
IDLH: 2100 ppm IEL: 21000 ppm UEL: 95000 ppm
Ambient Boiling Point: -43.78 F
Vapor Pressure at Ambient Temperature: greater than 1 atm
Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 9 miles/hour from W at 3 meters
Ground Roughness: urban or forest
Air Temperature: 85° F
No Inversion Height
Cloud Cover: 5 tenths
Stability Class: D
Relative Humidity: 50%

SOURCE STRENGTH:

Leak from hole in horizontal cylindrical tank
Flammable chemical escaping from tank (not burning)
Tank Diameter: 10.66 feet
Tank Volume: 34397 gallons
Tank contains liquid
Chemical Mass in Tank: 68.1 tons
Circular Opening Diameter: 10 inches
Opening is 5 inches from tank bottom
Release Duration: 2 minutes
Max Average Sustained Release Rate: 120,000 pounds/min
(averaged over a minute or more)
Total Amount Released: 136,200 pounds
Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).

THREAT ZONE:

Model Run: Heavy Gas
Red : 469 yards --- (33000 ppm = AEGL-3 [60 min])
Orange: 671 yards --- (17000 ppm = AEGL-2 [60 min])
Yellow: 1142 yards --- (5500 ppm = AEGL-1 [60 min])



Thermal Radiation Threat Zone

Time: July 18, 2019 1200 hours PDT (user specified)

Chemical Name: PROPANE

Wind: 9 miles/hour from w at 3 meters

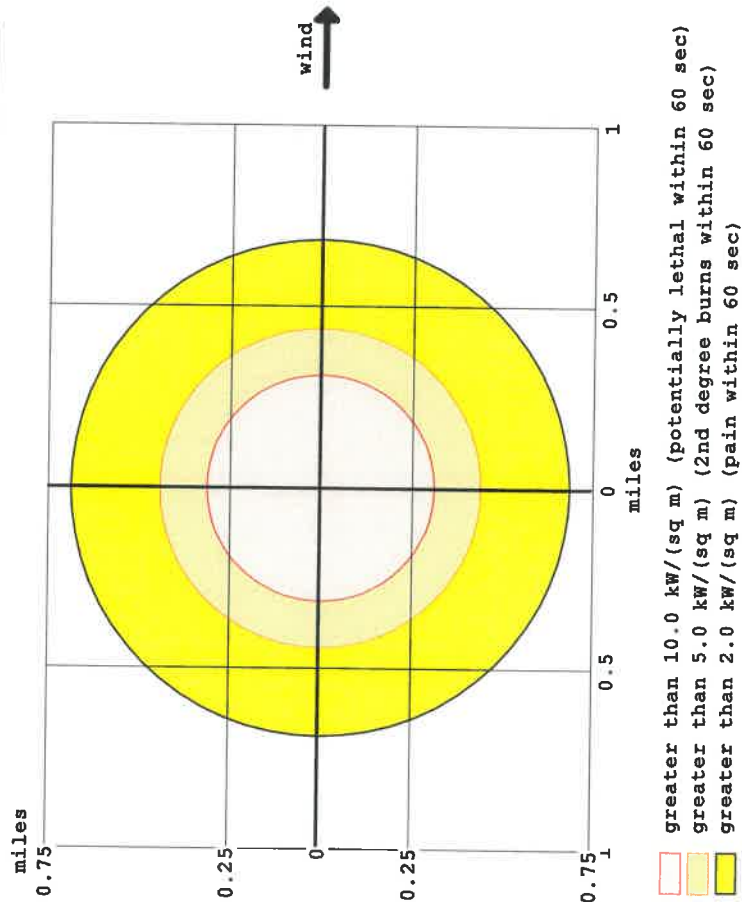
THREAT ZONE:

Threat Modeled: Thermal radiation from fireball

Red : 549 yards --- (10.0 kW/(sq m) = potentially lethal within 60 sec)

Orange: 775 yards --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)

Yellow: 1206 yards --- (2.0 kW/(sq m) = pain within 60 sec)



Text Summary

SITE DATA:

Location: ANTIOCH, CALIFORNIA

Building Air Exchanges Per Hour: 0.85 (unsheltered single storied)

Time: July 18, 2019 1200 hours PDT (user specified)

CHEMICAL DATA:

Chemical Name: PROPANE

CAS Number: 74-98-6

Molecular Weight: 44.10 g/mol

AEGL-1 (60 min): 5500 ppm AEGL-2 (60 min): 17000 ppm AEGL-3 (60 min): 33000 ppm

IDLH: 2100 ppm

UEL: 95000 ppm

Ambient Boiling Point: -43.7° F

Vapor Pressure at Ambient Temperature: greater than 1 atm

Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 9 miles/hour from w at 3 meters

Ground Roughness: urban or forest

Air Temperature: 85° F

No Inversion Height

SOURCE STRENGTH:

BLEVE of flammable liquid in horizontal cylindrical tank

Tank Diameter: 10.66 feet

Tank Volume: 34397 gallons

Tank contains liquid

Internal Storage Temperature: 85° F

Chemical Mass in Tank: 68.1 tons

Percentage of Tank Mass in Fireball: 100%

Fireball Diameter: 251 yards

Burn Duration: 14 seconds

THREAT ZONE:

Threat Modeled: Thermal radiation from fireball

Red : 549 yards --- (10.0 kW/(sq m) = potentially lethal within 60 sec)

Orange: 775 yards --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)

Yellow: 1206 yards --- (2.0 kW/(sq m) = pain within 60 sec)

Attachment

Item 2

**Proposed County Legislative Platform General Principle Statements from Planning and Policy
Development Committee – January 15, 2020**

Exposure

- 1) Support legislative efforts to reduce or eliminate lead and toxic substances in consumer products, particularly those used by infants and children.
- 2) Support legislative efforts to reduce exposure to toxic air pollutants and reduction of greenhouse gases.

Land Use

- 3) Support legislative efforts to evaluate, clean up and redevelop contaminated sites.
- 4) Support legislative efforts that address the illegal dumping of household hazardous wastes through incentives and enforcement.

Pipeline Safety

- 5) Support legislative efforts that increase the safety of the shipment of hazardous materials by pipeline through better monitoring, detection, operational practices and equipment.

School Siting

- 6) Support legislative efforts that reduce the risk to students from the accidental release of hazardous materials by requiring risk assessments that account for all sources of hazardous materials as part of school siting and re-building decisions.

Goods Movement

- 7) Support legislative efforts to increase and improve waterborne transportation of goods when it increases safety.

Rail Safety

- 8) Support legislative efforts that improve the safety of the shipment of hazardous materials by rail through training for local first responders, increased sharing of data, reduction of material hazards, and appropriate speed limits.

Waste Management

- 9) Support legislative efforts that establish producer responsibility for management at the end of their useful life of products, including pharmaceuticals, batteries, sharps and veterinary medicine.

- 10) Support legislative efforts to allow third parties, under specific circumstances and conditions, to collect and transport household hazardous waste to collection facilities.
- 11) Support legislative efforts that reduce the amount of harmful pharmaceuticals (including veterinary medicine) that ultimately enter waste water treatment facilities, bodies of water, and landfills.

Attachment

Item 3

2019 State Legislative Platform

Health Care

112. SUPPORT legislative efforts to reduce or eliminate lead and toxic substances in consumer products, particularly those used by infants and children.

113. SUPPORT legislative efforts to reduce exposure to toxic air pollutants and the reduction of greenhouse gases.

Land Use/Community Development

224. SUPPORT efforts to promote economic incentives for "smart growth," in Priority Development and Priority Production Areas including in-fill and transit-oriented development. *Balancing the need for housing and economic growth with the urban limit line requirements of Measure J (2004) will rely on maximum utilization of "smart growth" and Sustainable Community Strategy principles. Priority Production Areas are locally designated zones where manufacturing, warehousing, distribution and repair services would be a priority consideration in determining future land use.*

246. SUPPORT legislation that funds programs to remediate brownfield sites in the County and modifies existing programs to make implementation easier or apply more broadly. Specifically:

- ☐ Consider modification to the Cleanup Loans and Environmental Assistance to Neighborhoods (CLEAN) program that would simplify the approval process for applications;
- ☐ Broaden the criteria for sites that are eligible for California Land Reuse and Revitalization Act (CLRRA) to include all sites that are listed by the State or Federal Government as contaminated; and
- ☐ Fully fund the California Recycle Underutilized Sites (CALReUse) program.

Law and Justice System

248. SUPPORT legislation that provides a practical and efficient solution to addressing the problem of abandoned and trespassing vessels and ground tackle in an administrative process that allows the California State Lands Commission to both remove and dispose of such vessels and unpermitted ground tackle. *Boat owners in increasing numbers are abandoning both recreational and commercial vessels in areas within the Commission's jurisdiction. Our state waterways are becoming clogged with hulks that break up, leak, sink and add pollutants to our waterways and marine habitat.*

Pipeline Safety

267. SUPPORT legislation that contains specific mitigations or solutions for installation of Automatic Shutoff Valves for both High Consequence Areas (HCA) and for those that transverse Active Seismic Earthquake Faults for all intrastate petroleum pipelines. *State Fire Marshal Annual Inspections of all Intrastate Petroleum Pipelines do not contain the specific mitigations or solutions for installation of Automatic Shutoff Valves for both High Consequence Areas (HCA) and for those that traverse Active Seismic Earthquake Faults that are mandated for Gas Pipelines under AB 2856. The County has several petroleum pipelines that should be classified under these categories and present the same explosive nature as gas pipelines do.*

268. SUPPORT legislation that contains specific language for protection of all seasonal and all year creeks and all State Waterways where petroleum pipelines are present. *New and replacement pipelines near environmentally and ecologically sensitive areas should use the best available technology including, but not limited to, the installation of leak detection technology, automatic shutoff systems or remote controlled sectionalized block valves, or any combination of these technologies to reduce the amount of oil released in an oil spill to protect state waters and wildlife.*

Transportation

278. SUPPORT efforts to coordinate planning between school districts, the state, and local jurisdictions for the purposes of: (1) locating and planning new schools, (2) funding programs that foster collaboration and joint use of facilities, and (3) financing off-site transportation improvements for improved access to existing schools. *The County will urge the California Department of Education's current Title 5 update effort to include removing the current conflict between current school siting policies and sustainable communities. Related to this effort, the County supports reform of school siting practices by way of legislative changes related to any new statewide school construction bond authorization. The County takes the position that reform components should include bringing school siting practices and school zone references in the vehicle code into alignment with local growth management policies, safe routes to school best practices, State SB 375 principles, and the State Strategic Growth Council's "Health in All Policies Initiative." The County will also urge DOE's current Title 5 update effort to apply the requirements of Title 5, as they pertain to evaluating the risks from hazardous materials, to schools being rebuilt on the site of existing schools and to charter schools, and to include the evaluation of risks from hazardous materials potentially released from nearby industrial facilities due to fire, explosions or accidental releases to school siting criteria. Related to this, the County supports the development of guidelines for assessing and mitigating the risks of siting new schools near industrial facilities and rail lines due to potential explosions and fires from the use, storage, manufacture and transportation of hazardous materials, similar to the guidelines they have established for assessing and mitigating the risks from the transportation of hazardous materials through pipelines. State financial and/or technical support to offset the cost of adhering to new guidelines or requirements should be provided.*

280. SUPPORT efforts to increase waterborne transport of goods and obtaining funds to support this effort. *The San Francisco to Stockton Ship Channel is a major transportation route for the region, providing water access to a large number of industries and the Ports of Sacramento and Stockton. A project is underway to deepen the channel, providing additional capacity to accommodate increasing commerce needs of the Ports and providing better operational flexibility for the other industries. Increased goods movement via waterways has clear benefits to congestion management on highways and railroads (with resultant air quality benefits).*

281. SUPPORT legislative and administrative measures to enhance rail safety, increase state oversight of railroad bridges, provide funding for the training of first responders, and implement regulations that increase tank car safety standards for cars transporting crude oil and other hazardous materials, and regulations that require railroads to share data with state emergency managers and local responders.

Waste Management

288. SUPPORT legislation that establishes producer responsibility for management at the end of their useful life of products, including pharmaceuticals, batteries, sharps and veterinary medicine.

290. SUPPORT legislative and regulatory efforts to allow third parties, under specific circumstances and conditions, to collect and transport household hazardous waste to collection facilities.

295. SUPPORT legislation that can reduce the amount of harmful pharmaceuticals (including veterinary medicine) that ultimately enter waste water treatment facilities, bodies of water, and landfills.

June 25 recs to Board

- 1) Support federal legislation that improves leak detection systems in pipelines.
- 2) Support federal legislation that requires pipeline operators to contract for an independent technical seismic vulnerability study on HCA pipelines affected by potentially active faults to feed into the pipeline risk analysis, and make the study available to the public.

Attachment

Item 4



INDUSTRIAL SAFETY ORDINANCE ANNUAL PERFORMANCE REVIEW AND EVALUATION REPORT February 27, 2020

By Contra Costa Health Services Hazardous Materials Programs

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Executive Summary

Contra Costa County's Industrial Safety Ordinance (ISO), adopted in 1998 by the Board of Supervisors, requires regulated facilities in the county to implement comprehensive safety programs to prevent chemical accidents. The ISO's requirements are some of the most stringent in the United States, if not the world. The goal is for facilities to implement comprehensive safety programs, instill a safety culture at the work place and create management systems that prevent incidents that could have detrimental impacts to surrounding communities. The ISO also mandates outreach and participation from industries, agencies, elected officials and the public.

Three major oil refineries and three chemical facilities are required to comply with ISO requirements. Two facilities (one refinery and one chemical plant) within the City of Richmond are required to comply with the Richmond Industrial Safety Ordinance (RISO), which mandates the same requirements from a separate municipal authority. Both ordinances are administered by Contra Costa County's Hazardous Materials Programs (CCHMP), a division of Contra Costa Health Services. CCHMP annually evaluates and reports on ISO performance to the Board of Supervisors.

There were no Major Chemical Accidents or Releases (MCAR) as defined in the ISO at any regulated facility in this reporting period and, while there have been Community Warning System (CWS) Level II and CWS Level III incidents that caused community concern over the past two decades, there is an overall observable trend of fewer and less severe incidents in the county. CCHMP believes that ISO is a major contributor to the safety records of these facilities.

It can be a challenge to stay vigilant and ensure continuous safe facility operations in mature prevention programs, but recent amendments to program requirements have helped the ISO and RISO programs continue to improve the thoroughness and completeness of audits and inspections. In 2014, for example, the Board of Supervisors adopted amendments to the ISO as recommended by the U.S. Chemical Safety and Hazard Investigation Board (CSB). In 2015, CCHMP staff piloted procedure walk-downs and field verifications of Piping and Instrumentation Diagrams (P&IDs) at ISO facilities. These field activities have since been incorporated into the audit activities at other hazardous materials regulated facilities.

CCHMP also worked closely with Department of Industrial Relations (DIR), California Office of Emergency Services (Cal OES) and California Environmental Protection Agency (CalEPA) to develop two new, statewide petroleum refinery safety regulations: The California Accidental Release Prevention Program (Program 4) and the Process Safety Management requirement for Petroleum Refineries. Both were developed from requirements in Contra Costa's ISO and were adopted into regulation by the state in October 2017. CCHMP believes these new regulations will further improve safety programs at all California petroleum refineries as demonstrated here in Contra Costa County. CCHMP is also working closely with other Certified Unified Program Agencies (CUPA) in the development and implementation of these regulations for refineries.

CCHMP's Accidental Release Prevention (ARP) Program engineers oversee the ISO and RISO programs and work with other agencies such as the U.S. Environmental Protection Agency (EPA), the California Occupational Safety and Health Administration (Cal-OSHA), CSB and other local program agencies. This interagency collaboration includes sharing of incident and inspection results, discussion of regulatory interpretations and joint training.

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Public Participation

CCHMP has an established public outreach process and is continually looking for ways to improve it. The following community engagement efforts took place in this reporting period:

- Public outreach information booths at existing venues
 - Safety audits for Shell Martinez Refinery, Air Products Shell and Air Products Marathon Martinez Refinery were shared at Alhambra Christmas Tree Farm, Martinez, During National Night Out, August 6, 2019
 - Chevron Richmond Refinery and Chemtrade Richmond's safety plans and safety audits were shared at the Cinco De Mayo celebration in Richmond on May 5, 2019
 - CCHMP staff answered questions and shared information regarding the CalARP/ISO/RISO programs at the John Muir Birthday and Earth Day celebration at the John Muir National Historic Site in Martinez on April 20, 2019
- Presentations to Interested Groups
 - Presentation of the safety audit to the Marathon Martinez Refinery Community Advisory Panel (CAP) on August 28, 2019
 - Presentation of the safety audit to the Shell Refinery's Community Advisory Panel (CAP) on May 13, 2019
 - Presentation of the safety audit to the Phillips 66's Community Advisory Panel (CAP) on August 27, 2018
- Attend public meetings after major incidents
 - There were no Severity III incidents in this reporting period
 - The most recent audit findings are summarized in an easily read format in English and Spanish and posted at cchealth.org/hazmat
- Information on regulated businesses is presented in an easily read format in English and Spanish
- Industrial Safety Ordinance Information Sheets are prepared in English and Spanish

The Board of Supervisors also requested that staff provide copies of the annual report to communities through the Community Advisory Panels (CAP). This 2019 Annual Report is available on our website and will be sent to CAP representatives for distribution.

Audits

Audits of regulated businesses are required at least once every three years to ensure that the facilities are implementing required programs. We completed two ISO and RISO audits in 2019:

- Chevron Richmond Refinery — June 2019
- Marathon Martinez Refinery — September 2019

Major Chemical Accidents or Releases

There were no MCAR events at ISO-regulated facilities in this reporting period.

Conclusion

The severity of MCAR events in Contra Costa County has declined since the implementation of the ISO, with a few minor irregularities in the trend. The ISO has improved regulated facilities' safety programs and operations.

CCHMP has sought assistance from stakeholders, including regulated facilities, workers and community members, to include the CSB-recommended improvements to the ordinance that the Board of Supervisors adopted in 2014. These further reduce likelihood of chemical accidents at these industrial facilities.

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Background

The Board of Supervisors adopted the ISO due to significant accidents that occurred at oil refineries and chemical plants in the county in the 1990s. The effective date of the ISO was January 15, 1999. The ordinance applies to oil refineries and chemical plants with specified North American Industry Classification System (NAICS) codes that were required to submit a Risk Management Plan to the U.S. EPA and are Program Level 3 Stationary Sources as defined by the U.S. EPA Risk Management Program. The ordinance specified the following:

- Stationary sources had one year to submit a safety plan to CCHMP stating how they are complying with the ordinance, except the Human Factors portion (completed January 15, 2000)
- CCHMP would develop a Human Factors Guidance Document (completed January 15, 2000)
- Stationary sources had one year to comply with the Human Factors Guidance Document (compliance date: January 15, 2001)
- After an MCAR event, stationary sources are required to perform a root cause analysis as part of their incident investigations (ongoing)
- CCHMP may perform its own incident investigation, including a root cause analysis (ongoing)
- All processes at stationary sources are covered as Program Level 3 (now Petroleum Refineries Program Level 4 processes as defined by the CalARP program)
- Stationary sources are required to consider inherently safer systems for new processes or facilities and for mitigations identified in a process hazard analysis
- CCHMP reviewed all the submitted safety plans and inspected all the stationary sources' safety programs within one year of receipt (completed January 15, 2001) and every three years after the initial audit or inspection



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CCHMP issued the first Contra Costa County Safety Program Guidance Document on January 15, 2000. The stationary sources were required to comply with the Human Factors section of this guidance document by January 15, 2001. CCHMP performed a specialized audit for all the stationary sources for their Human Factors programs and for Inherently Safer Systems in 2002.

The 2006 amendments to the ISO required:

1. Expanding the Human Factors Program to include Maintenance
2. Expanding the Management of Organizational Change to include Maintenance and all of Health and Safety positions
3. Requiring stationary sources to perform safety culture assessments one year after CCHMP developed guidance (completed November 2009)
4. Requiring stationary sources to perform Security Vulnerability Analysis

Hazardous Materials Programs staff worked with the regulated facilities to develop a Safety Culture Assessment Guidance Document, which was finalized and issued on November 10, 2009. Staff began reviewing these assessments in December 2010. A revised Safety Program Guidance Document that reflects the ISO amendments and additional clarifications based on the audit findings was issued in July 2011.

In June 2014, the Board of Supervisors approved an amendment to the ISO to address recommendations by CSB, set forth in the Chevron refinery fire interim investigation report (August 2012), that broadened the goals of the regulation by requiring:

1. Use of performance indicators in the evaluation of process safety systems and to provide required contents in the annual performance review and evaluation report provided to the Board of Supervisors
2. Expand the implementation of inherently safer systems as much and as soon as possible. Stationary sources are now required to evaluate and document inherently safer system analysis:
 - a. Every five years for existing covered processes,
 - b. In the development and analysis of recommended action items identified in a process hazard analysis,
 - c. As part of a management of change review, whenever a major change is proposed at a facility that could reasonably result in a major chemical accident or release,
 - d. When an incident investigation report recommends a major change that could reasonably result in a major chemical accident or release,
 - e. When a root cause analysis report recommends a major change that could reasonably result in a major chemical accident or release, and
 - f. During the design of new processes, process units and facilities.
3. Conduct, document and complete a safeguard protection analysis for all processes by June 30, 2019, and every five years thereafter.

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Regulated Stationary Sources Listing

The six stationary sources covered by the ISO are:

1. Air Liquide Rodeo Hydrogen Plant at Phillips 66
2. Air Products at the Shell Martinez Refining Company
3. Air Products at the Marathon (formerly Tesoro Golden Eagle Refinery)
4. Shell Martinez Refining Company
5. Phillips 66 Rodeo Refinery (formerly Conoco-Phillips Rodeo)
6. Marathon Martinez Refinery (formerly Tesoro Golden Eagle Refinery)

The facilities covered by RISO are:

- Chevron Richmond Refinery
- Chemtrade West Richmond Works (formerly General Chemical Richmond)

Status of Safety Plans and Programs

The status of each of the regulated stationary sources is given in Table I and includes:

- When the latest updated safety plans were submitted
- When notices of deficiencies were issued
- When plans were determined to be complete by CCHMP
- When public meetings were held about safety plans
- When audits were complete
- When public meetings were held on preliminary audit findings
- When safety plans were revised to include human factors programs
- When notices of deficiencies were issued for human factors-revised safety plans
- When human factors components of safety plans were determined to be complete
- When audit/inspections were completed
- When human factors audit preliminary findings/public meetings were held



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Table I
Industrial Safety Ordinance Stationary Source Status

NAME	Safety Plan (SP) Received	Notice of Deficiencies (NOD) Issued-SP	Safety Plan Complete	SP Public Meeting Date	Audit/Inspection	Audit Public Meeting
Air Liquide Rodeo Hydrogen Plant	7/10/09	12/13/12	3/01/13	7/21/13	6/01/10	10/08/11
	7/14/10	1/03/13	11/12/13	10/05/13	5/28/13	10/05/13
	1/03/13			10/14/17	2/29/16	10/14/17
	1/23/17				1/22/19	
Air Products—Shell & Tesoro	1/14/00	6/15/00	8/30/00	9/13/00	11/22/00	5/08/03
	1/16/01 (HF update)	5/10/01 (HF update)	6/19/01 (HF update)	5/08/03	5/03/02 (HF)	9/24/06
	6/26/03	8/24/07	9/14/07	9/23/07	2/27/04	9/23/07
	7/14/05	3/14/11	7/01/08	6/19/10	1/22/07	6/19/10
	12/01/06	7/11/14	7/14/14	4/21/12	7/20/09	4/20/13
	6/20/08			4/15/15	4/16/12	4/23/15
	6/30/10			8/06/19	3/30/15	4/23/16
	6/30/14				1/11/18	8/06/19
	12/01/17					
Phillips 66 (formerly ConocoPhillips) – Rodeo	1/15/00	3/14/00	5/30/00	6/15/00	6/30/00	4/09/02
	1/12/01 (HF update)	9/10/01	3/18/02	5/09/02	1/05/01	6/22/04
	8/10/05	(HF update)	(HF update)	10/07 &	(HF)	7/08/04
	8/7/09	3/28/06	8/9/02	10/13/07	8/01/03	10/07 &
	8/07/12	11/22/10	11/5/07	10/08/11	8/15/06	10/13/07
	8/07/15	6/05/17	1/27/11	10/05/13	10/06/08	7/18/10
	8/06/18		7/03/13	7/21/2013	8/01/11	10/09/10
			8/04/17	10/14/17	4/28/14	10/08/11
					7/21/13	7/21/13
					10/05/13	10/05/13
Shell Martinez Refinery	1/14/00	7/19/00	4/09/01	5/8/03	10/31/00	5/08/03
	1/16/01 (HF update)	11/9/01	1/03/02	9/24/06	4/29/02 (HF)	9/24/06
	7/22/02	(HF update)	(HF update)	9/23/07	11/26/04	9/23/07
	1/11/06	3/21/03	9/15/03	4/21/12	10/23/06	6/19/10
	9/03/10	8/15/06	11/2/06	4/18/15	4/30/09	4/20/13
Marathon Martinez Refinery	9/03/13	10/25/11	3/27/12	4/22/17	2/13/12	4/23/16
	8/26/16		3/30/17		5/11/15	
	8/23/19				2/28/18	

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Locations of the Regulated Stationary Sources Safety Plans

Regulated stationary sources are required to update their safety plans at least once every three years. These plans are available for public review at the Hazardous Materials Programs office, 4585 Pacheco Blvd., Suite 100, Martinez. When CCHMP determines that a safety plan update is complete, prior to the required 45-day public comment period, staff places the updated plan in the Contra Costa Library branch or branches closest to the regulated stationary source so it is easily accessible for public review. Table II lists each safety plan location.

Table II
Location of Safety Plans—Libraries

Regulated Stationary Source	Location 1	Location 2	Location 3
Air Liquide Large Industries	Hazardous Materials Programs Office	Rodeo Public Library	Crockett Public Library
Air Products at Shell	Hazardous Materials Programs Office	Martinez Public Library	
Air Products at at Marathon (formerly Tesoro)	Hazardous Materials Programs Office	Martinez Public Library	
Shell Refining-Martinez	Hazardous Materials Programs Office	Martinez Public Library	
Phillips 66 (formerly ConocoPhillips) Rodeo Refinery	Hazardous Materials Programs Office	Rodeo Public Library	Crockett Public Library
Marathon (formerly Tesoro Golden Eagle Refinery)	Hazardous Materials Programs Office	Martinez Public Library	

Effectiveness of Implementation of the Industrial Safety Ordinance

Contra Costa Hazardous Materials Programs has developed policies, procedures, protocols and questionnaires to implement the California Accidental Release Prevention (CalARP) Program and the Industrial Safety Ordinance. The policies, procedures, protocols and questionnaires for these programs are listed below:

- Audits/Inspections Policy
- Conducting the Risk Management Plan/Safety Plan Completeness Review Protocol
- Risk Management Plan Completeness Review Questionnaires
- Safety Plan Completeness Review Questionnaires
- Conducting Audits/Inspections Protocol
- Safe Work Practices Questionnaires
- CalARP Program Audit Questionnaires
- Conducting Employee Interviews Protocol
- Employee Interview Questionnaires
- Procedure Field Verification Protocol
- Piping and Instrumentation Diagram Field Verification Protocol
- Public Participation Policy

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- Dispute Resolution Policy
- Reclassification Policy
- Covered Process Modification Policy
- CalARP Internal Performance Audit Policy
- Conducting the Internal Performance Audit
- CalARP Internal Audit Performance Audit Submission
- Fee Policy
- Notification Policy
- Unannounced Inspection Policy
- Risk Management Plan Public Review Policy

Hazardous Materials Programs also developed the Contra Costa County CalARP Program Guidance Document and the Contra Costa County Safety Program Guidance Document, which was updated and reissued to regulated facilities on July 22, 2011. All policies, procedures, protocols and questionnaires are available through Hazardous Materials Programs office, and the guidance documents are available electronically at: <http://cchealth.org/hazmat/calarp/guidance-document.php> and http://cchealth.org/groups/hazmat/industrial_safety_ordinance_guidance.php.

CCHMP staff is working with regulated facilities and labor representatives to revise the Safety Program Guidance Document based on audit results and set expectations for compliance with the ordinance.

Effectiveness of the Procedures for Records Management

CCHMP has digital files for each stationary source. The files include:

1. Annual status reports
2. Audits & inspections
3. Communications
4. Completeness review
5. Emergency response
6. Incident investigation
7. Trade secret information

Digital copies of the files are stored on the Hazardous Materials Programs network and are accessible to the Accidental Release Prevention Program engineers, supervisor and the Environmental Health and Hazardous Materials Chief. Portable document format (PDF) versions of these files are also available for public viewing at the CCHMP office. The Accidental Release Prevention Program files contain regulations, policies, information from the U.S. EPA, the Governor's Office of Emergency Services, CSB, and other information pertinent to the engineers. The risk management and safety plans are received in hard copy, scanned and kept at the CCHMP office.

Number and Type of Audits and Inspections Conducted

In fall of 2019, CCHMP began required audits at each of the ISO and RISO facilities. It is the eighth round of audits since 2000.

When CCHMP ARP engineers review a safety plan, a notice of deficiencies is issued documenting any changes the stationary source must make before the plan is determined to be complete. The stationary source has 60 to 90 days to respond. The ARP engineer will work with the stationary source until the plan contains the required changes. When the plan is complete, the ARP engineer will open a public comment period and make the plan available in a public

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meeting or venue as well as at the public library branch closest to the stationary source. The ARP engineer will respond to all written comments in writing and, when appropriate, use the comments in upcoming audit/inspections of the regulated stationary source.

An ARP engineer will issue a Preliminary Audit Findings report after each facility audit/inspection. The stationary source will have 90 days to respond and the ARP engineer will review the response. The stationary source must submit an action plan to correct any uncovered ISO compliance issues, which the ARP Engineer will review. If the ARP Engineer agrees with the action plan, CCHMP will issue the preliminary audit findings for public comment and make them available in a public meeting or venue and at the public library branch closest to the stationary source. The ARP engineer will consider comments received during the public comment period and may revise the Preliminary Audit Findings report. When the public review process is complete, the ARP engineer will issue the Final Audit Findings report and respond in writing to any written public comments received. Table I lists the status of each stationary source's safety plan, audit and inspections of their safety programs, and public meetings.

Root Cause Analyses and/or Incident Investigations Conducted by CCHMP

CCHMP performed no root cause analyses or incident investigations in the past year. A historical listing of MCAR events starting in 1992 is available at http://cchealth.org/groups/hazmat/accident_history.php. This list also includes major accidents that occurred prior to the adoption of the ISO.

Annual Performance Review and Evaluation Report

The ISO specifies that this report must contain:

- A brief description of how CCHMP is meeting the requirements of the ordinance including:
 - The program's effectiveness in getting regulated businesses to comply
 - Effectiveness of the procedures for records management
 - Number and type of ISO-required audits and inspections conducted by CCHMP
 - Number of root cause analyses and/or incident investigations conducted by CCHMP
 - CCHMP's process for public participation
 - Effectiveness of the Public Information Bank
 - Effectiveness of the Hazardous Materials Ombudsperson
 - Other required program elements necessary to implement and manage the ordinance
- A listing of stationary sources covered by the ordinance, including for each:
 - The status of the stationary source's safety plan and program
 - A summary of safety plan updates and where they are publicly available
 - ISO-required annual accident history reports submitted by regulated stationary sources
 - A summary and status of any ISO-required root cause analyses and incident investigations conducted or being conducted by the stationary sources, including the status of implementation of recommendations
 - A summary and status of any audits, inspections, root cause analyses and/or incident investigations conducted by CCHMP, including the status for implementing the recommendations

- Description of Inherently Safer Systems implemented by regulated stationary sources
- Legal enforcement actions initiated by CCHMP, including administrative, civil and criminal actions
- Total fees, service charges and other assessments collected specifically for the support of the ordinance
- Total personnel and personnel years used by the jurisdiction to directly implement or administer the ordinance
- Comments that raise public safety issues from interested parties regarding the effectiveness of the local program
- The impact of the ordinance in improving industrial safety

CCHMP's Process for Public Participation

CCHMP continues the practice of sharing results of safety plans and preliminary audit findings and receiving public comment about them at community events, as recommended by community members in 2005. Based on a 2012 recommendation from the Board of Supervisors, CCHMP also shares ISO annual reports and makes presentations to Community Advisory Panels.

Effectiveness of the Public Information Bank

The Hazardous Materials Programs section of the Contra Costa Health Services website (cchealth.org/hazmat) includes:

- Industrial Safety Ordinance
 - Description of covered facilities
 - Risk Management Chapter discussion
 - » Copy of the ordinance
 - » Land Use Permit Chapter discussion
 - » Copy of the ordinance
 - Safety Program Guidance Document
 - Frequently Asked Questions
 - Public Outreach strategies
- California Accidental Release Prevention (CalARP) Program
 - Contra Costa County's California Accidental Release Prevention Program Guidance Document
 - Program Level description
 - Discussion on Public Participation for both CalARP Program and the Industrial Safety Ordinance
 - A map locating the facilities that are subject to the CalARP Program and are required to submit a Risk Management Plan to Hazardous Materials Program. The map links to a description of each of the facilities and the regulated substances handled
 - A link to the Office of Emergency Services (OES) website for the CalARP regulation
- Hazardous Materials Inventories and Emergency Response Program
 - Descriptions
 - Forms
- Underground Storage Tanks
 - Description of the program
 - Copies of the Underground Storage Tanks Health & Safety Code sections
 - Underground Storage Tanks forms
- Green Business Program

- Description of the Green Business Program with a link to the Association of Bay Area Government's website on the Green Business Program
- Hazardous Materials Incident Response Team
 - Including information of the Major Chemical Accidents or Releases that have occurred
 - The County's Hazardous Materials Incident Notification Policy
- A link to the Phillips 66 and Chevron Fenceline Monitors
- Unannounced Inspection Program
 - Lists the facilities that are subject to unannounced inspections under the Unannounced Inspection Program
- Hazardous Materials Interagency Task Force
 - Includes a matrix of who has what hazardous materials and regulatory responsibilities
 - Minutes from past meetings
 - Presentations from past meetings
- Incident Response
 - Accident history that lists summaries of major accidents from industrial facilities in Contra Costa County from 1992 to the most recent
 - Additional resource links for more information
- Incidents
 - Information on the July 6, 2018 Shell flaring incident, including the Root Cause report
 - Relevant 72-hours and 30-day incident report for MCAR events

Effectiveness of the Hazardous Materials Ombudsperson

The Hazardous Materials Ombudsperson is a conduit for the public to express their concerns about how CCHMP personnel are performing their duties. Attachment A is a report from the Hazardous Materials Ombudsperson on the effectiveness of the position for this reporting period.

Other Required Program Elements Necessary to Implement and Manage the ISO

The CalARP Program is administered in Contra Costa County by CCHMP. Stationary sources are required to submit risk management plan similar and in addition to ISO safety plans. An ARP engineer reviews risk management plans and performs CalARP Program audits simultaneously with ISO audits.

CCHMP staff also perform unannounced inspections of CalARP program stationary sources that are also required to submit a risk management plan to the U.S. EPA. These inspections aim to exercise how a facility will respond to an incident, including notifying emergency response agencies and CCHMP.

Annual Accident History Report and Inherently Safer Systems Implemented as Submitted by the Regulated Stationary Sources

The ISO requires stationary sources to update their accident history in their safety plans and include how they have used inherently safer processes within the last year. Table III summarizes Inherently Safer Systems that have been implemented during this reporting period. Attachment B includes individual reports from stationary sources that also include the required reporting of four common process safety performance indicators.

**Table III
Inherently Safer Systems Contra Costa County Facilities**

Regulated Stationary Source	Inherently Safer System Implemented	Design Strategy	Approach
Air Liquide Large Industries	No new/inherently safer systems have been implemented		
Air Products at Shell	No new inherently safer systems have been implemented		
Air Products at Marathon (formerly Tesoro)	Reduced potential of exposure by changing layout or design, equipment (1 time)	Passive	Moderate
Phillips 66 (formerly ConocoPhillips) —Rodeo Refinery	Reduced inventory by changing equipment in process (12 times)	Inherent	Moderate
	Reduced potential of exposure by changing layout or design, equipment (10 times)	Passive	Moderate
	Reduced potential unit upset by changing equipment or adding alarms (4 times)	Active	Moderate
	Reduced potential of exposure by changing equipment layout or design (1 time)	Active	Simplify
	Reduced potential of error by adding administrative controls (2 times)	Procedural	Simplify
Shell Martinez Refinery	Eliminated equipment from process(2 times)	Inherent	Simplify
	Reduced potential of exposure by changing design, equipment metallurgy (21 times)	Inherent	Moderate
	Simplified unit design and chemical by changing equipment (1 time)	Active	Simplify
	Reduced potential unit upset by changing equipment or adding alarms (6 times)	Active	Moderate
	Reduced potential of error in procedure (1 time)	Procedural	Moderate
	Reduced potential of error by changing service in procedure (3 times)	Procedural	Simplify
Marathon (formerly Tesoro Golden Eagle Refinery)	Reduced potential for escalation of an incident, (5 times)	Inherent	Moderate
	Reduced potential of the hazardous condition by equipment design features (5 times)	Passive	Moderate

Status of the Incident Investigations, including the Root Cause Analyses Conducted by the Regulated Stationary Sources

The ISO requires regulated stationary sources to conduct an incident investigation including a root cause analysis (RCA) after each MCAR incident. MCAR incidents meet the definition of a Level 3 or Level 2 incident in the Community Warning System incident level classification system defined in the Hazardous Materials Incident Notification Policy, as determined by Contra Costa Health Services; or result in the release of a regulated substance and meet one or more of the following criteria:

- Results in one or more fatalities
- Results in greater than 24 hours of hospital treatment of three or more persons
- Causes on-and/or off-site property damage (including cleanup and restoration activities) initially estimated at \$500,000 or more. On-site estimates shall be performed by the regulated stationary source, Off-site estimates shall be performed by appropriate agencies and compiled by Health Services



15

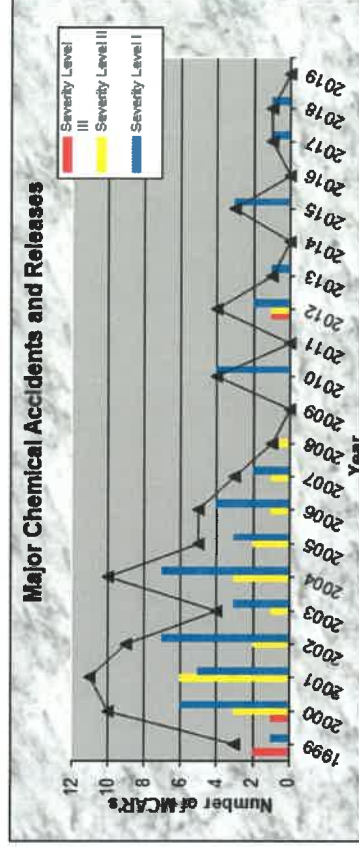
- Results in a vapor cloud of flammables and/or combustibles that is more than 5,000 pounds
- The regulated stationary source is required to submit a report to CCHMP 30 days after the root cause analysis is complete. There was no MCAR incident that occurred within this reporting period in Contra Costa County at an ISO facility. All RCA reports for MCAR incident reports are available at the CCHMP office and website.

Major Chemical Accidents or Releases

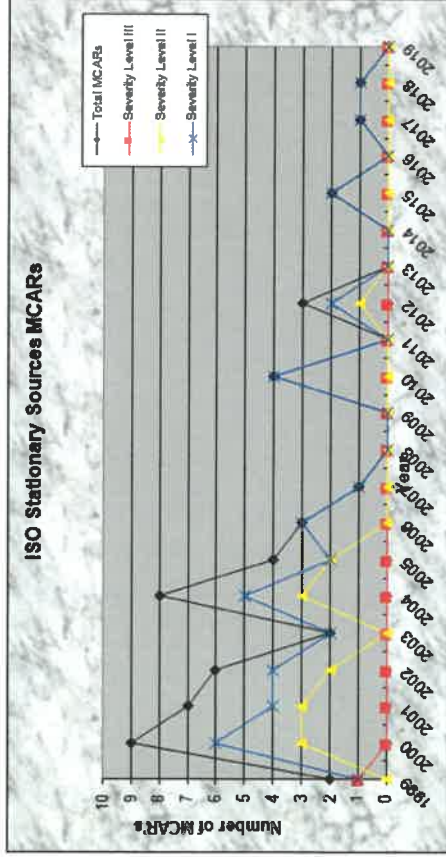
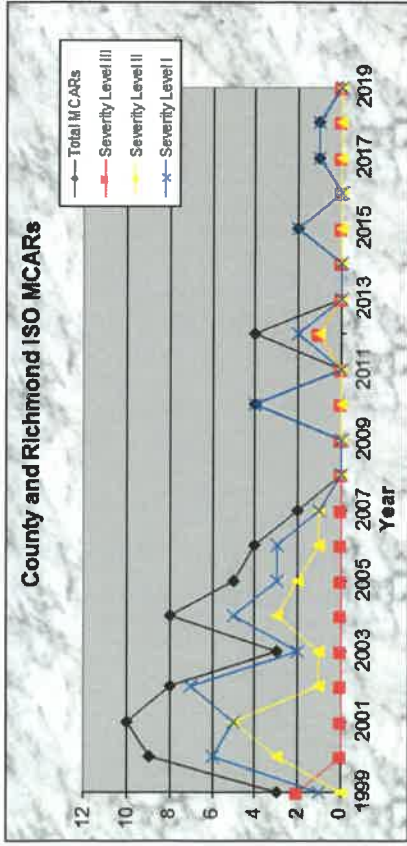
CCHMP analyzed the number and severity of MCARs that occurred since the implementation of the ISO:

- *Severity Level III — Resulted in a fatality, serious injuries or major on-site and/or off-site damage*
- *Severity Level II — Resulted in an impact to the community, or could easily have become a Level III incident if the situation was slightly different, or it is a recurring type of incident at that facility*
- *Severity Level I — Resulted in no or minor injuries, no or slight impact to the community, and no or minor on-site damage*

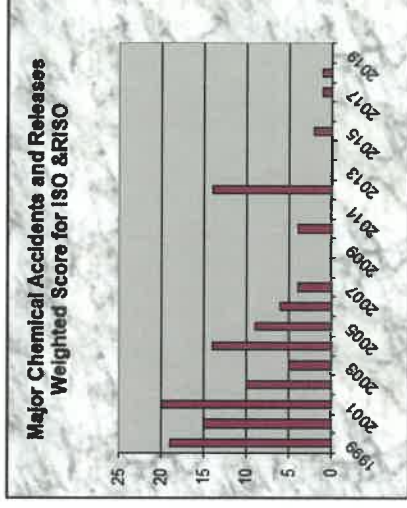
These charts show MCARs from January 1999 through October 2017 for all stationary sources in Contra Costa County, MCARs at stationary sources regulated by the ISO, and MCARs at stationary sources regulated by the ISO or by the RISO. The charts include MCARs at stationary sources only, none that occurred during transportation.



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The graph below uses a weighted score developed by CCHMP as an overall process safety metric for facilities regulated by ISO and RISO. This metric assigns a severity level III incident 9 points, a severity level II incident 3 points and a severity level I incident 1 point.



Legal Enforcement Actions Initiated by Contra Costa Hazardous Materials Programs
As part of the enforcement of the ISO and CalARP Program, CCHMP staff may issue notices of deficiency on the safety and risk management plans of ISO-regulated facilities and may issue audit findings detailing what a stationary source is required to change to come into compliance with the regulations. CCHMP has taken no legal enforcement actions on the ISO facilities during this reporting period.

Penalties Assessed as a Result of Enforcement

No penalties have been assessed in this period for noncompliance with the ISO.

Total Fees, Service Charges and Other Assessments Collected Specifically for the ISO

Fees charged for the ISO cover the time ARP engineers use to enforce the ordinance, the position of the Hazardous Materials Ombudsperson, outreach material and to cover a portion of the overhead for CCHMP. Fees charged for administering this ordinance for fiscal year 2018-2019 total \$ 585,721.

Total Personnel and Personnel Years Used by Hazardous Materials Program to Implement the Industrial Safety Ordinance

ARP engineers review resubmitted Safety Plans, prepare and present information for public meetings, perform audits of stationary sources for compliance with both the CalARP Program and ISO and do follow-up work after MCARs. During the current reporting period:

- Three ISO/CalARP Program facility audits were performed in 2018, requiring four to five engineers four weeks to perform the on-site portion of each audit. The audit process encompasses off-site time that includes report preparation, a quality assurance review process, working with the facility to address any questions, assessing the facility's proposed remedies for completeness, preparing communication materials and posting public notices, attending a public forum to share audit findings, addressing any questions from the public and issuing the final

reported. The total time taken to perform these audits was 3,600 hours. Approximately one-third of the time was dedicated to the ISO, or 1,200 hours. This year, CCHMP used larger teams that included recently hired ARP engineers, who participated in audits as part of their training for an additional 850 hours.

- Reviewing information for the website—180 hours
- Reviewing safety plans and following up with the facilities on any deficiencies—650 hours
- Reviewing and participating in investigation, root cause analysis and proposed recommendations—500 hours
- Preparing material for presentations and public meetings – 450 personnel hours.
- Approximately 3,828 hours total of CCHMP personnel time was spent on the ISO during the current reporting period.

The total does not include ombudsperson time spent preparing for public meetings, working with engineers on questions arising from the ISO, and answering questions from the public on the ISO.

Comments from Interested Parties Regarding the Effectiveness of the Industrial Safety Ordinance

No comments were received by CCHMP regarding ISO or RISO during current reporting period.

The Impact of the ISO on Improving Industrial Safety

The ISO is one of four programs that work together to reduce the risk of accidental release from a regulated stationary source that could impact communities in Contra Costa County. Those programs are:

- the Process Safety Management Program administered by Cal/OSHA
- the Federal Accidental Release Prevention Program administered by the U.S. EPA
- the California Accidental Release Prevention Program administered by CCHMP
- the Industrial Safety Ordinance, also administered by CCHMP

Each of the programs is very similar in requirements. On October 1, 2017, California petroleum refineries are required to comply with requirements of CalARP Program 4 and OSHA PSM for refineries. Both are based on the ISO. CalARP Program 3 differs from the Federal Accidental Release Prevention Program in the following ways:

- The number of chemicals regulated
- The threshold quantity of these chemicals
- An external events analysis, including seismic and security and vulnerability analysis, is required
- Additional information in the Risk Management Plan
- CCHMP is required to audit and inspect stationary sources at least once every three years
- The interaction required between the stationary source and CCHMP

The ISO differs from CalARP Program 3, which the chemical facilities are required to follow, in the following ways:

- Stationary sources are required to include a root cause analysis with the incident investigations for Major Chemical Accidents or Releases
- The stationary sources are required to consider inherently safer systems for existing processes, in the development and analysis of recommended action items identified in a process hazard analysis, as part of a management of change review, as part of incident investigation or root cause analysis development of recommendation, and during the design of new processes, process units and facilities.
- All of the processes at the regulated stationary sources are covered
- The implementation of a Human Factors Program evaluation of latent conditions in existing units, operating and maintenance procedures and in root cause analysis
- Managing changes in the organization for operations, maintenance and emergency response

- A requirement that the stationary sources perform a Security and Vulnerability Analysis and test the effectiveness of the changes made as a result of the Security and Vulnerability Analysis
- The stationary sources perform Safety Culture Assessments
- Conduct, document and complete safeguard protection analysis for process hazard analysis to reduce catastrophic releases
- Use and report of process safety performance indicators in the annual performance review and evaluation report

Major Program difference of ISO from CalARP Program 4 and PSM for Refineries is that the Program 4 requirements include:

- Mechanical Integrity must include assessment of Damage Mechanism Review base on operating history and industry experience
- Process Hazard Analysis must include review of Damage Mechanism Review report compiled as part of process safety information
- Contractor and any subcontractors use a skilled and trained workforce pursuant to Health and Safety Code Section 25536.7
- Require a Management system with specific requirement for managing and communicating recommendations from the prevention program elements
- Require a Stop Work procedure and an anonymous hazard reporting system

The Safety Culture Assessment guidance chapter was finalized in November 2009. The Industrial Safety Ordinance Guidance Document was updated to reflect all the updates in September 2010. The Accidental Release Prevention Engineers have participated with the Center for Chemical Process Safety on developing the second edition of Inherently Safer Chemical Processes, a book that is referenced in the ordinance and with the Center for Chemical Process Safety on developing process safety metrics for leading and lagging indicators. CCHMP is currently participating in the third edition of CPCS: Inherently Safer Chemical Processes to further clarify and promote the practice and consideration of Inherently Safer System.

The success of Contra Costa's programs at reducing MCARs and improving facility safety practices have been frequently cited as exemplary or model policies within the regulatory community:

- Contra Costa County was recognized as an alternative model for doing process-safety inspections by the CSB in its report on a 2005 refinery accident in Texas City, TX. The board also mentioned Contra Costa in its DVD, "Anatomy of a Disaster: Explosion at BP Texas City Refinery," as a model resource.
- CSB Chair Carolyn W. Merritt also recognized Contra Costa County in testimony to the House of Representatives Committee on Education and Labor.
- Senator Barbara Boxer, during a 2007 hearing to consider John Bresland's nomination to chair of the CSB Board, asked Mr. Bresland about the Contra Costa County program for process safety audits of refineries and chemical companies.
- In its final investigation report of a 2008 incident at the Bayer CropScience Institute in West Virginia, the CSB recommended that regulatory agencies in the area audit their chemical facilities using Contra Costa County's process. CCHMP staff and a representative from the local United Steelworkers Union were part of a panel when the CSB presented this report to the Kanawha Valley community.
- CCHMP was asked to give testimony at a June 2010 hearing on "Work Place Safety and Worker Protections in the Gas and Oil Industry" before the U.S. Senate Committee on Health, Education, Labor, and Pensions Subcommittee on Employment and Workplace Safety regarding the success of Accidental Release Prevention

Programs in place in Contra Costa County.

- In September 2012, CCHMP was asked to present at the "Expert Forum on the Use of Performance-based Regulatory Models in the U.S. Oil and Gas Industry: Offshore and Onshore" in Texas City, Texas to share the regulatory experience at Contra Costa County and give testimony on how local, state and Federal agencies can work together and have an unprecedented alignment on regulations that is required for the same facilities. This meeting was spearheaded by Federal Occupational Safety and Health Administration and attended by Bureau of Safety and Environmental Enforcement, U.S. Coast Guard, U.S. EPA, Pipeline and Hazardous Materials Safety Administration, United Steelworkers, American Petroleum Institute, academia and industry representatives.
- CCHMP staff also testified at a June 2013 hearing on "Oversight of Federal Risk Management and Emergency Planning Programs to Prevent and Address Chemical Threats, Including the Events Leading up to the Explosions in West, TX and Geismar, LA" before the U.S. Senate's Committee on Environment and Public Works.

City of Richmond Industrial Safety Ordinance

The Richmond City Council passed its version of the ISO on December 18, 2001. Richmond's Industrial Safety Ordinance (RISO) mirrors the ISO, covering two stationary sources: Chevron Richmond Refinery (Chevron) and Chemtrade West Richmond, (Chemtrade, formerly General Chemical). CCHMP administers RISO for the city.

The sixth RISO/CalARP audit at Chevron was completed in August 2016 and in July 2017 for Chemtrade. CCHMP received an annual performance update from Chevron and Chemtrade in June 2017. CCHMP will begin the seventh RISO/CalARP audit at Chevron in June 2020. CCHMP worked with U.S. EPA, Cal OSHA, BAAQMD and CSB in CSB's independent investigation of the August 6, 2012.

Table V Richmond Industrial Safety Ordinance Stationary Source Status

Name/ Location of copies	Safety Plan (SP) Received	Notice of Deficiencies (NOD) Issued-SP	Safety Plan Complete	SP Public Meeting Date	Audit/ Inspection	Audit Public Meeting
Chevron Richmond/ Point Richmond and Richmond Main Public Library	1/21/03 6/21/04 9/29/06 9/25/09 9/24/12 9/30/15 6/28/18	4/23/03 11/08/12	10/10/03 6/22/04 5/21/07 11/04/09 11/12/13 7/25/18	10/14/03 6/24/04 6/02/07 9/25/10 10/05/13 10/24/15 5/05/19	1/11/01 (Non-RISO) 9/29/03 2/13/06 4/14/08 2/08/11 10/03/13 7/18/16 6/03/19	6/24/04 6/02/07 4/25/09 9/24/11 10/24/15 5/05/19
Chemtrade Richmond Works/Point Richmond and Richmond Main Public Library	1/17/03 6/21/04 4/17/09 8/05/14 11/26/18	4/11/03 2/18/10 7/10/15	10/10/03 4/17/06 5/26/10	10/14/03 6/02/07 9/25/10 5/01/16 5/05/19	5/29/01 (Non-RISO) 4/24/06 8/18/03 1/05/09 1/05/12 9/08/14 7/17/17	6/24/04 6/02/07 9/25/10 10/05/13 10/24/15 5/05/19

Inherently Safer Systems Richmond Facilities

Regulated stationary source	Inherently Safer System Implemented	Design Strategy	Approach
Chevron Richmond Refinery	Reduce the inventory of hazardous substance by minimizing piping and equipment (2 times)	Inherent	Minimization
	Eliminated chemicals in new process (1 time)	Inherent	Eliminate
	Reduced the potential of exposure by equipment design (1 time)	Inherent	Moderate
	Eliminated equipment from process (1 time)	Inherent	Simplify
	Reduced potential of exposure and hazard by equipment design (1 time)	Passive	Moderate
Chemtrade Richmond Works	Reduced potential of exposure and hazard by equipment design (3 times)	Active	Moderate
	Reduced potential of exposure with steps to include maximum target (1 time)	Procedural	Simplify
	Reduced potential of exposure and hazard by equipment/piping upgrade (1 time)	Passive	Moderate



I. INTRODUCTION

On July 15, 1997 the Contra Costa County Board of Supervisors authorized creation of an Ombudsman position for the County's Hazardous Materials Programs. The first Hazardous Materials Ombudsman began work on May 1, 1998. The Contra Costa County Board of Supervisors adopted an Industrial Safety Ordinance on December 15, 1998. Section 450-8.022 of the Industrial Safety Ordinance requires the Health Services Department to continue to employ an Ombudsman for the Hazardous Materials Programs. Section 450-8.030(B)(viii) of the Industrial Safety Ordinance requires an annual evaluation of the effectiveness of the Hazardous Materials Ombudsman, with the first evaluation to be completed on or before October 31, 2000.

The goals of section 450-8.022 of the Industrial Safety Ordinance for the Hazardous Materials Ombudsman are:

1. To serve as a single point of contact for people who live or work in Contra Costa County regarding environmental health concerns, and questions and complaints about the Hazardous Materials Programs.
2. To investigate concerns and complaints, facilitate their resolution, and assist people in gathering information about programs, procedures, or issues.
3. To provide technical assistance to the public.

The Hazardous Materials Ombudsman currently accomplishes these goals through the following program elements:

1. Continuing an outreach strategy so that the people who live and work in Contra Costa County can know about and utilize the program.
2. Investigating and responding to questions and complaints, and assisting people in gathering information about programs, procedures, or issues.
3. Participating in a network of environmental programs for the purpose of providing technical assistance.

This evaluation covers the period from November 2018 through November 2019 for the Hazardous Materials Ombudsman program. The effectiveness of the program shall be demonstrated by showing that the activities of the Hazardous Materials Ombudsman meet the goals established in the Industrial Safety Ordinance.

II. PROGRAM ELEMENTS

1. Continuing an Outreach Strategy

This period efforts were focused on maintaining the outreach tools currently available. The web page was maintained for the program as part of Contra Costa Health Services website. This page contains information about the program, links to other related websites, and information about upcoming meetings and events. A toll-free phone number is published in all three Contra Costa County phone books in the Government section.

2. Investigating and Responding to Questions and Complaints, and Assisting in Information Gathering
During this period, the Hazardous Materials Ombudsman received 137 information requests. Over 95 percent of these requests occurred via the telephone, and have been requests for information about environmental issues. Requests via e-mail are slowly increasing, mainly through referrals from Health Services main web page. Most of these requests concern problems around the home such as asbestos removal, household hazardous waste disposal, pesticide misuse, mold and lead contamination.

Information requests about environmental issues received via the telephone were generally responded to within one business day of being received. Many of the information requests were answered during the initial call. Some requests required the collection of information or written materials that often took several days to compile. Telephone requests were responded to by telephone unless written materials needed to be sent as part of the response.

This year the Ombudsman began facilitating monthly debriefings of the Hazardous Materials Program Incident Response team incidents.

3. Participating in a Network of Environmental Programs for the Purpose of Providing Technical Assistance.

Technical assistance means helping the public understand the regulatory, scientific, political, and legal aspects of issues. It also means helping them understand how to effectively communicate their concerns within these different arenas. This year, the Ombudsman continued to staff a number of County programs and participate in other programs to be able to provide technical assistance to the participants and the public.

- **CAER (Community Awareness and Emergency Response)**—This non-profit organization addresses industrial accident prevention, response and communication. The Ombudsman participated in the Emergency Notification subcommittee of CAER.
- **Hazardous Materials Commission**—In 2001, the Ombudsman took over as staff for the Commission. As staff to the Commission, the Ombudsman conducts research, prepared reports, drafts letters and provides support for 3 monthly Commission meetings. During this period the Commission sent letter a letter to the Board of Supervisors concerning pipeline safety, developed the criteria for adding an ad-hoc student seat to the Commission and held a workshop on cybersecurity for businesses and government agencies.
- **Integrated Pest Management Advisory Committee**—During this period the Ombudsman represented the Health Department on the County Integrated Pest Management Advisory Committee. This Committee brings Department representatives and members of the public together to help implement the County's Integrated Pest Management policy.
- **Asthma Program**—The Ombudsman participated in the Public Health Department's Asthma Program as a resource on environmental health issues. The Ombudsman represented the Asthma Program on a regional collaborative related to asthma issues, the Ditching Dirty Diesel Collaborative. The Ombudsman served on the

Technical Advisory Board for RAMP, the Regional Asthma Management Prevention program, and supported the Public Health Department's participation in the AB 617 Community Air Quality program in Richmond. The Ombudsman provided a presentation to an after-school High School program about air pollution and asthma. The Ombudsman completed a Technical Assistance grant with MCE, the new energy provider for 14 of the 19 jurisdictions in Contra Costa County and the Department of Conservation and Development, to develop a business plan for performing in-home asthma trigger assessments. The Ombudsman collaborated with the same partners to apply for a second Technical Assistance grant to secure stable funding for the assessment program.

• **Climate Change**

During this period the Ombudsman provided technical assistance to the Public Health department on a variety of climate change issues. He completed a report with RAMP about the pilot project he conducted with the Public Health Nursing program to help their clients apply to the County's Weatherization program. The Ombudsman assisted 8 Public Health Nursing Clients complete their weatherization application. The Ombudsman, together with the Energy Efficiency Program in the Department of Conservation and Development, hired a Civic Spark intern to expand this effort to 15 other programs in CCHS and EHSD. The Ombudsman made 9 presentations about the Weatherization program to CCHS and EHSD programs the clients of which could benefit from the program. The Ombudsman coordinated the effort to develop an Excessive Heat Response Plan for Contra Costa Health Services which was completed during the year. The Ombudsman represented the Public Health Department in local, regional and state efforts to address the impacts of Climate Change, including the revision of the County's Climate Action Plan, a Bay Conservation and Development Commission-led effort to address sea level rise issues in East Contra Costa County and regionally, the Bay Area Regional Health Inequities Initiative's Built Environment committee which addresses climate change, the Contra Costa Sustainability Exchange, the California Local Health Departments Climate Change Community of Learning, and the Delta Conservancy's Climate Action Plan Technical Advisory Committee. The Ombudsman also made presentations to the Bay Area Regional Energy Network, the California Public Utilities Commission and the Alameda County Public Health Department on the connection between energy efficiency, Climate Change and Public Health. The Ombudsman helped to evaluate the capstone projects of the Public Health Solutions students and hosted a Public Health Solutions intern who worked on climate change issues.

The Hazardous Materials Ombudsman also attended workshops, presentations, meetings and trainings on a variety of environmental issues to be better able to provide technical assistance to the public. Topics included Environmental Justice, Air Quality, emergency management, energy policy and land-use planning for greenhouse gas reduction.

III. PROGRAM MANAGEMENT

The Hazardous Materials Ombudsman continued to report to the Public Health Director on a day-to-day basis during this period, while still handling complaints and recommendations about the Hazardous Materials Programs through the Health Services Director. The Ombudsman was also a member of Health Services Emergency Management Team (EMT), participated in EMT trainings and drills, and participated on its HEEP management team.

IV. GOALS FOR THE 2019-2020 PERIOD

In this period, the Ombudsman will provide essentially the same services to Contra Costa residents as was provided in the last period. The Ombudsman will continue respond to questions and complaints about the actions of the Hazardous Materials Programs; answer general questions that come from the public and assist them in understanding regulatory programs; staff the Hazardous Materials Commission; represent the Public Health Department in the Ditching Dirty Diesel Collaborative and the Integrated Pest Management Advisory Committee; and participate in the CAER Emergency Notification committee. The Ombudsman will continue to be part of the Health Department's HEEP team and the Emergency Management Team.

During this period the Ombudsman will continue to provide technical assistance to the Public Health Department on Climate Change issues by being on the County-wide work group updating the Climate Action Plan, providing input on the BCDHC regional ART project, and representing the Public Health Department on the BARHII Built Environment Committee. The Ombudsman will continue to work with collaborators at the local, regional and state level. If the Health Department is successful in receiving the Technical Assistance grant to develop reimbursement strategies for assessing in-home asthma triggers, the Ombudsman will take a lead role in implementing the grant and applying for funding to implement the program.





Annual Performance Review and Evaluation Submittal June 30, 2019

*Attach additional pages as necessary

1. **Name and address of Stationary Source:** Air Liquide Rodeo Hydrogen Plant, 1391 San Pablo Ave., Rodeo, California 94572
2. **Contact name and telephone number (should CCHMP have questions):** Dave Steffens (510) 245-7285 x 2204
3. **Summarize the status of the Stationary Source's Safety Plan and Program (450-8.030(B)(2)(ii)):**
The Rodeo SMR utilizes the programs and processes identified in the ISO Safety Program/Plan. Better execution of the Plan occurs as the organization continuously works to implement the different requirements.
4. **Summarize Safety Plan updates (i.e., brief explanation of update and corresponding date) (450-8.030(B)(2)(iii)):** No updates of the Plan occurred in 2018. The next revision of the ISO Safety Program is due 12/1/2019.
5. **List of locations where Safety Plans are/will be available for review, including contact telephone numbers if the source will provide individuals with copies of the document (450-8.030(B)(2)(iii)):** CCHMP Office at 4585 Pacheco Boulevard, Suite 100, Martinez; Martinez Public Library, Rodeo Public Library, Crockett Public Library.
6. **Provide any additions to the annual accident history reports (i.e. updates) submitted pursuant to Section 450-8.016(E)(2) of County Ordinance 98-48 (450-8.030(B)(2)(iii)) (i.e., provide information identified in Section 450-8.016(E)(1) for all major chemical accidents or releases occurring between the last annual performance review report and the current annual performance review and evaluation submittal (12-month history)):** There were no major chemical accidents or releases during the past 12 months.
7. **Summary of each Root Cause Analysis (Section 450-8.016(C)) including the status of the analysis and the status of implementation of recommendations formulated during the analysis (450-8.030(B)(2)(iv)):** There were no Root Cause Analyses performed specific to major chemical accidents or releases during the last 12 months.
8. **Summary of the status of implementation of recommendations formulated during audits, inspections, Root Cause Analyses, or Incident Investigations conducted by the Department (450-8.030(B)(2)(v)):** 1) Incorporated MCAR levels into the SMR Emergency Response and Notification Procedure, 2) Initiated contractor reviews for crafts working on covered processes, 3) Incorporated ISS evaluation & change methodology into selected MOC's for the 2019 TAR.
9. **Summary of inherently safer systems implemented by the source including but not limited to inventory reduction (i.e., intensification) and substitution (450-8.030(B)(2)(vi)):** Inherently Safer System evaluation for the SMR was performed on 6/18-6/20/2019. This requirement is captured in ISO Audit Ensure Action Item #A34-11.
10. **Summarize the enforcement actions (including Notice of Deficiencies, Audit Reports, and any actions turned over to the Contra Costa County District Attorney's Office) taken with the Stationary Source pursuant to Section 450-8.028 of County Ordinance 98-48 (450-8.030(B)(2)(vii)):** There were no enforcement actions during this period.

18. Common Process Safety Performance Indicators:

Overdue inspection for piping and pressure vessels based on total number of circuits

2018	Overdue	Repeat
January	16	16
February	16	16
March	16	16
April	16	16
May	16	16
June	16	16
July	16	16
August	16	16
September	117	117
October	117	117
November	117	117
December	117	117
TOTAL	117	117

1. RBI study completed September, 2018. The Increase in "Overdue" inspections is based on RBI methodology although not implemented in 2018.
2. Total number of circuits: 187 piping circuits & 36 vessels (# circuits increased from 2018 ISO Update)
- Report due to changes in new RBI methodology).
3. 65 RBI inspections completed in Q1, 2019
4. Total number of annual planned circuit inspection: dependent on data from RB

11. Summarize total penalties assessed as a result of enforcement of this Chapter (450-8.030(3)):
No penalties have been assessed against this facility.

12. Summarize the total fees, service charges, and other assessments collected specifically for the support of the ISO (450-8.030(B)(4)):
The total CalARP Program fees for the eight facilities subject to the Industrial Safety Ordinance was \$922,604. The total Industrial Safety Ordinance program fees for these eight facilities was \$578,390. (NOTE: These fees include those for the County and City of Richmond ISO facilities).

13. Summarize total personnel and personnel years utilized by the jurisdiction to directly implement or administer this Chapter (450-8.030(B)(5)):
3,828 hours were used to audit/inspect and issue reports on the Risk Management Chapter of the Industrial Safety Ordinance.

14. Copies of any comments received by the source (that may not have been received by the Department) regarding the effectiveness of the local program that raise public safety issues(450-8.030(B)(6)):
None

15. Summarize how this Chapter improves industrial safety at your stationary source (450-8.030(B)(7)):
This chapter reinforces the need to maintain, follow, and continuously improve our structured safety program to help ensure the safety of our employees and the community in which we operate.

16. List examples of changes made at your stationary source due to implementation of the Industrial Safety Ordinance (e.g., recommendations from PHA's, Compliance Audits, and Incident investigations in units not subject to CalARP regulations; recommendations from RCA's) that significantly decrease the severity or likelihood of accidental releases.
(1) Completed our first round of contractor safety audits in 2018, with the next round of contractor safety audits to be completed in 2019, 2) Working to conduct a Site Safety Assessment to be completed after the 2019 TAR. This assessment will include input from the majority of contractors working during the TAR, 3) Risk Management is incorporating ISS methodology at other Air Liquide PSM locations.

17. Summarize the emergency response activities conducted at the source (e.g., CWS or TEN activation) in response to major chemical accidents or releases:
Conducted two EAP drills with the local fire department within the last 12 mo. The 3/28/2019 drill also included personnel from the P66 refinery.

Past due PHA recommended actions, includes seismic and LCC recommended actions

2018	Overdue	Repeat
January	37	37
February	37	37
March	34	34
April	33	33
May	24	24
June	21	21
July	19	19
August	17	17
September	14	14
October	11	11
November	8	8
December	5*+	5*+
TOTAL	5	5

* Two AIs reopened after the Feb. 2019 ISO audit.

+ Five AIs deferred until the October, 2019 TAR

Past due investigation recommended actions for API/ACC Tier 1 and Tier 2 incidents

2018	Overdue	Repeat
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	0	0
October	0	0
November	0	0
December	0	0

API/ACC TIER 1 & TIER 2 INCIDENTS AND RATES STARTING 2011

Year	2011	2012	2013	2014	2015	2016	2017	2018
No. Tier 1 LOPC	0	0	0	0	0	0	0	0
Incident rate for Tier 1	0	0	0	0	0	0	0	0
Refinery or Industry Rate ¹	0.1553	0.0995	0.0947	0.0925	0.1038	0.0627		
Refinery or Industry Mean ²	*	1.49	1.30	1.38	1.55	1.01		
Tier 2 LOPC	0	0	0	0	0	0	0	0
Incident rate for Tier 2	0	0	0	0	0	0	0	0
Refinery Rate ¹	*	0.2405	0.2531	0.2380	0.2063	0.1726		
Refinery Mean ²	*	*	*	*	3.08	2.78		

¹Petroleum refineries to report publicly available refinery rate for API Tier 1 and Tier 2 classification. Chemical plants to report publicly available mean only for ACC Tier 1 and Tier 2 classification.

²Petroleum refineries to report publicly available refinery mean for API Tier 1 and Tier 2 classification. Chemical plants to report publicly available mean only for ACC Tier 1

*Refinery industry rates or means are not publicly available

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*Attach additional pages as necessary

1. **Name and address of Stationary Source:**
Air Products—Shell Martinez Refinery, 110 Waterfront Road, Martinez, CA 94553
2. **Contact name and telephone number (should CCHMP have questions):**
Andrew Celin 925-723-2861
3. **Summarize the status of the Stationary Source's Safety Plan and Program (450-8.030(B)(2)(i)):** The stationary source's safety plan is complete per the CCHS requirement. The program was audited in January 2018 by CCHS as part of the three year CCHS site audit, and in October 2015 as part of an unannounced inspection.
4. **Summarize Safety Plan updates (i.e., brief explanation of update and corresponding date) (450-8.030(B)(2)(iii)):**
5. **List of locations where Safety Plans are/will be available for review, including contact telephone numbers if the source will provide individuals with copies of the document (450-8.030(B)(2)(ii)):** CCHMP Office at 4585 Pacheco Boulevard, Suite 100, Martinez; Martinez Library (libraries closest to the stationary source).
6. **Provide any additions to the annual accident history reports (i.e. updates) submitted pursuant to Section 450-8.016(E)(2) of County Ordinance 98-48 (450-8.030(B)(2)(iii)) (i.e., provide information identified in Section 450-8.016(E)(1) for all major chemical accidents or releases occurring between the last annual performance review report and the current annual performance review and evaluation submittal (12-month history)):** There were no major accidents or injuries to report.
7. **Summary of each Root Cause Analysis (Section 450-8.016(C)) including the status of the analysis and the status of implementation of recommendations formulated during the analysis (450-8.030(B)(2)(iv)):** There are no outstanding recommendations.
8. **Summary of the status of implementation of recommendations formulated during audits, inspections, Root Cause Analyses, or Incident Investigations conducted by the Department (450-8.030(B)(2)(vi)):** Final recommendations from the 3 year CCCHS audit are in progress.
9. **Summary of inherently safer systems implemented by the source including but not limited to inventory reduction (i.e., intensification) and substitution (450-8.030(B)(2)(vii)):**
10. **Summarize the enforcement actions (including Notice of Deficiencies, Audit Reports, and any actions turned over to the Contra Costa County District Attorney's Office) taken with the Stationary Source pursuant to Section 450-8.028 of County Ordinance 98-48 (450-8.030(B)(2)(viii)):** There were no enforcement actions during this period.
11. **Summarize total penalties assessed as a result of enforcement of this Chapter (450-8.030(3)):** No penalties have been assessed against this facility.

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12. **Summarize the total fees, service charges, and other assessments collected specifically for the support of the ISO (450-8.030(B)(4)):** The total CalARP Program fees for the eight facilities subject to the Industrial Safety Ordinance was \$1,006,798. The total Industrial Safety Ordinance program fees for these eight facilities was—\$535,535. (NOTE: These fees include those for the County and City of Richmond ISO facilities).
13. **Summarize total personnel and personnel years utilized by the jurisdiction to directly implement or administer this Chapter (450-8.030(B)(5)):** 3,828 hours were used to audit/inspect and issue reports on the Risk Management Chapter of the Industrial Safety Ordinance.
14. **Copies of any comments received by the source (that may not have been received by the Department) regarding the effectiveness of the local program that raise public safety issues(450-8.030(B)(6)):** None.
15. **Summarize how this Chapter improves industrial safety at your stationary source (450-8.030(B)(7)):** Air Products is committed to the safer operation of our facilities and has implemented applicable requirements outlined in the ISO and CalARP regulations. Both the ISO and Human Factors programs are an integral part of our five year Operating Hazard Review revalidations and ongoing management of change process. The most recent OPHR was conducted in for April 2018. There have been no incidents resulting in an offsite impact. The Chapter has helped reinforce the need to maintain and follow a structured safety program to help ensure the safety of our employees and the communities in which we operate.
16. **List examples of changes made at your stationary source due to implementation of the Industrial Safety Ordinance (e.g., recommendations from PHA's, Compliance Audits, and Incident Investigations in units not subject to CalARP regulations; recommendations from RCA's) that significantly decrease the severity or likelihood of accidental releases.**
The Air Products facility is tracking various metrics (leading and lagging). These include those called out in ISO API/ACC Tier 1 and 2 events, past due PHA recommendations and past due incident investigation recommendations. A baseline was developed and metrics are tracked for the facility on a company share site.
17. **Summarize the emergency response activities conducted at the source (e.g., CWS or TEN activation) in response to major chemical accidents or releases:** There were no emergency response activities to this site.
18. **Date the last Safety Culture Assessment was completed:** January 2015
Survey method: August 2019.
19. **Date the results of the Safety Culture Assessment were reported to the workforce and management:** Sept. 16-18, 2019.

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20. Answer the following regarding the Safety Culture Evaluation previous to the one listed in 18:

- Survey method: Electronic
- Areas of improvement being addressed: Quality of APT, improving field safety contact among regional engineering support, better implementing safety drills in the JSA process, and improvement in the shift logs
- Action Plan made Progress on the identified areas of improvement?: (Yes or No) No
 - If Yes, did the improvements meet the goals and if not was the action plan amended to address what is being done to meet the goals?
 - If No, has a new action plan been developed to address the identified areas of improvement? Yes, and action plan has been developed with routine check ins to determine the effectiveness of the actions.

21. Have milestones and metrics been developed to determine how the Safety Culture Assessment actions are being implemented? No. Currently under development. Actions are tracked as part of recurring meeting focused on implementation of the actions.

22. Describe the process that included employees and their representatives used to determine if the action items effectively changed the expected culture items: Employees were involved in the development of the survey, collection of the data, analysis of the data, and distribution of the findings. Additionally, the same team of cross functional employees were responsible for developing the action plan, and double clicking on the potential areas for improvement. Steps were taken to develop SMART goals.

23. Date of the mid-cycle progress evaluation: Target completion in the August 2021 timeframe

» Did the action plan (for no 18) make progress on the identified areas of improvement? Not yet.

24. Describe the process that included participation of employees or their representatives used to determine whether the action items from the SCA and the mid-cycle progress effectively changed the expected culture items: Not applicable.

25. Common Process Safety Performance Indicators:

Overdue inspection for piping and pressure vessels based on total number of circuits

2018	Overdue	Repeat
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	0	0
October	0	0
November	0	0
December	0	0

Total number of circuits: 91 completed during calendar year 2018

Total number of annual planned circuit inspections: 91

Past due PHA recommended actions, includes seismic and LCC recommended actions

2018	Overdue	Repeat
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	0	0
October	0	0
November	0	0
December	0	0

Past due investigation recommended actions for API/ACC Tier 1 and Tier 2 incidents

2018	Overdue	Repeat
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	0	0
October	0	0
November	0	0
December	0	0

API/ACC TIER 1 & TIER 2 INCIDENTS AND RATES STARTING 2011

Year	2011	2012	2013	2014	2015	2016	2017	2018
No. Tier 1 LOPC	0	0	0	0	0	0	0	0
Incident rate for Tier 1	0	0	0	0	0	0	0	0
Refinery or Industry Rate ¹	0.155	0.099	0.094	0.092	0.103	0.062		0.053
Refinery or Industry Mean ²	1.49	1.30	1.38	1.55	1.01			
Tier 2 LOPC	0	0	0	0	0	0	0	0
Incident rate for Tier 2	0	0	0	0	0	0	0	0
Refinery Rate ¹	0.24	0.253	0.238	0.206	0.172			
Refinery Mean ²	3.08	2.78						

¹Petroleum refineries to report publicly available refinery rate for API Tier 1 and Tier 2 classification. Chemical plants to report publicly available mean only for ACC Tier 1

²Petroleum refineries to report publicly available refinery mean for API Tier 1 and Tier 2 classification. Chemical plants to report publicly available mean only for ACC Tier 1

³Refinery Industry rates or means are not publicly available

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*Attach additional pages as necessary

- Name and address of Stationary Source:**
Air Products Marathon Martinez Refinery, 150 Solano Way, 3rd & F Streets, Inside Tesoro Refinery, CA 94553
- Contact name and telephone number (should CCHMP have questions):**
Joseph Delengowski 925-316-9415
- Summarize the status of the Stationary Source's Safety Plan and Program (450-8.030(B)(2)(j)):** The stationary source's safety plan is complete per the CCHS requirement. The program was audited in January 2018 by CCHS as part of the three year CCHS site audit, and in October 2015 as part of an unannounced inspection.
- Summarize Safety Plan updates (i.e., brief explanation of update and corresponding date) (450-8.030(B)(2)(iii)):**
- List of locations where Safety Plans are/will be available for review, including contact telephone numbers if the source will provide individuals with copies of the document (450-8.030(B)(2)(iii)):** CCHMP Office at 4585 Pacheco Boulevard, Suite 100, Martinez; Martinez Library (libraries closest to the stationary source).
- Provide any additions to the annual accident history reports (i.e. updates) submitted pursuant to Section 450-8.016(E)(2) of County Ordinance 98-48 (450-8.030(B)(2)(iii)) (i.e., provide information identified in Section 450-8.016(E)(1) for all major chemical accidents or releases occurring between the last annual performance review report and the current annual performance review and evaluation submittal (12-month history)):** There were no major accidents or injuries to report.
- Summary of each Root Cause Analysis (Section 450-8.016(C)) including the status of the analysis and the status of implementation of recommendations formulated during the analysis (450-8.030(B)(2)(iv)):** There are no outstanding recommendations.
- Summary of the status of implementation of recommendations formulated during audits, inspections, Root Cause Analyses, or Incident Investigations conducted by the Department (450-8.030(B)(2)(v)):** Final recommendations from the 3 year CCHS audit are in progress.
- Summary of inherently safer systems implemented by the source including but not limited to inventory reduction (i.e., intensification) and substitution (450-8.030(B)(2)(vi)):**
- Summarize the enforcement actions (including Notice of Deficiencies, Audit Reports, and any actions turned over to the Contra Costa County District Attorney's Office) taken with the Stationary Source pursuant to Section 450-8.028 of County Ordinance 98-48 (450-8.030(B)(2)(viii)):** There were no enforcement actions during this period.

11. Summarize total penalties assessed as a result of enforcement of this Chapter (450-8.030(3)):
No penalties have been assessed against this facility.

12. Summarize the total fees, service charges, and other assessments collected specifically for the support of the ISO (450-8.030(B)(4)): The total CalARP Program fees for the eight facilities subject to the Industrial Safety Ordinance was \$1,006,798. The total Industrial Safety Ordinance program fees for these eight facilities was - \$535,535. (NOTE: These fees include those for the County and City of Richmond ISO facilities).

13. Summarize total personnel and personnel years utilized by the jurisdiction to directly implement or administer this Chapter (450-8.030(B)(5)): 3,828 hours were used to audit/inspect and issue reports on the Risk Management Chapter of the Industrial Safety Ordinance.

14. Copies of any comments received by the source (that may not have been received by the Department) regarding the effectiveness of the local program that raise public safety issues(450-8.030(B)(6)): None.

15. Summarize how this Chapter improves industrial safety at your stationary source (450-8.030(B)(7)):
Air Products is committed to the safer operation of our facilities and has implemented applicable requirements outlined in the ISO and CalARP regulations. Both the ISO and Human Factors programs are an integral part of our five year Operating Hazard Review revalidations and ongoing management of change process. The most recent OPHR was completed in April 2018, and attended by CCHS personnel. There have been no incidents resulting in an offsite impact. The Chapter has helped reinforce the need to maintain and follow a structured safety program to help ensure the safety of our employees and the communities in which we operate.

16. List examples of changes made at your stationary source due to implementation of the Industrial Safety Ordinance (e.g., recommendations from PHA's, Compliance Audits, and Incident Investigations in units not subject to CalARP regulations; recommendations from RCA's) that significantly decrease the severity or likelihood of accidental releases.

The Air Products facility is tracking various metrics (leading and lagging). These include those called out in ISO API/ACC Tier 1 and 2 events, past due PHA recommendations and past due incident investigation recommendations. A baseline was developed, and metrics are tracked for the facility on a company share site.

17. Summarize the emergency response activities conducted at the source (e.g., CWS or TEN activation) in response to major chemical accidents or releases: There were no emergency response activities to this site since the previous Annual Performance review associated with a chemical accident. However, the emergency response team was deployed in response to a series of personal medicals that resulted in the individual being treated for non-work related conditions. Each each condition, the response time was stellar.

18. Date the last Safety Culture Assessment was completed: August 2019.

19. Date the results of the Safety Culture Assessment were reported to the workforce and management:
Sept. 16-18, 2019

20. Answer the following regarding the Safety Culture Evaluation previous to the one listed in 18: Survey method: Electronic

- Areas of improvements being addressed: Quality of APT, improving field safety contact among regional engineering support, better implementing safety drills in the JSA process, and improvement in the shift logs
- Action Plan made Progress on the identified areas of improvement?: (Yes or No) No
 - If Yes, did the improvements meet the goals and if not was the action plan amended to address what is being done to meet the goals?
 - If No, has a new action plan been developed to address the identified areas of improvement? Yes, and action plan has been developed with routine check ins to determine the effectiveness of the actions.

21. Have milestones and metrics been developed to determine how the Safety Culture Assessment actions are being implemented? No. Currently under development. Actions are tracked as part of recurring meeting focused on implementation of the actions.

22. Describe the process that included employees and their representatives used to determine if the action items effectively changed the expected culture items: Employees were involved in the development of the survey, collection of the data, analysis of the data, and distribution of the findings. Additionally, the same team of cross functional employees were responsible for developing the action plan, and double clicking on the potential areas for improvement. Steps were taken to develop SMART goals.

23. Date of the mid-cycle progress evaluation: Target completion in the August 2021 timeframe
» Did the action plan (for no 18) make progress on the identified areas of improvement? Not yet

24. Describe the process that included participation of employees or their representatives used to determine whether the action items from the SCA and the mid-cycle progress effectively changed the expected culture items: Not applicable.

25. Common Process Safety Performance Indicators:

Overdue inspection for piping and pressure vessels based on total number of circuits

2018	Overdue	Repeat
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	0	0
October	0	0
November	0	0
December	0	0

Total number of circuits: 91
Total number of annual planned circuit inspections: 17

Past due PHA recommended actions, includes seismic and LCC recommended actions

2018	Overdue	Repeat
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	0	0
October	0	0
November	0	0
December	0	0

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Past due investigation recommended actions for API/ACC Tier 1 and Tier 2 incidents

2018	Overdue	Repeat
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	0	0
October	0	0
November	0	0
December	0	0

API/ACC TIER 1 & TIER 2 INCIDENTS AND RATES STARTING 2011

Year	2011	2012	2013	2014	2015	2016	2017	2018
No. Tier 1 LOPC	0	0	0	0	0	0	0	0
Incident rate for Tier 1	0	0	0	0	0	0	0	0
Refinery or Industry Rate ¹	0.155	0.099	0.094	0.092	0.103	0.062		0.053
Refinery or Industry Mean ²	1.49	1.30	1.38	1.55	1.01			
Tier 2 LOPC	0	0	0	0	0	0	0	0
Incident rate for Tier 2	0	0	0	0	0	0	0	0
Refinery Rate ¹	0.24	0.253	0.238	0.206	0.172			
Refinery Mean ²				3.08	2.78			

¹Petroleum refineries to report publicly available refinery rate for API Tier 1 and Tier 2 classification. Chemical plants to report publicly available mean only for ACC Tier 1
²Petroleum refineries to report publicly available refinery mean for API Tier 1 and Tier 2 classification. Chemical plants to report publicly available mean only for ACC Tier 1
³Refinery industry rates or means are not publicly available

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*Attach additional pages as necessary

1. **Name and address of Stationary Source:** Phillips 66 Rodeo Refinery, 1380 San Pablo Avenue, Rodeo, CA 94572
2. **Contact name and telephone number (should CCHMP have questions):** Morgan Walker 510-245-4665
3. **Summarize the status of the Stationary Source's Safety Plan and Program (450-8.030(B)(2)(i)):**
The Safety Plan was last updated in August of 2018.
4. **Summarize Safety Plan updates (i.e., brief explanation of update and corresponding date) (450-8.030(B)(2)(iii)):** The original Safety Plan for this facility was filed with Contra Costa Health Services on January 14, 2000. A revised plan was filed on April 7, 2000 with the updated recommendations requested by CCHS. A Human Factors Amendment was submitted on January 15, 2001. In conjunction with CCHSs required 2nd public meeting on our plan and audit findings, we submitted a complete revision of the plan to reflect the change in ownership of our facility and to update where needed. We took this opportunity to include Human Factors within the plan instead of having it as an amendment. On August 9, 2002 the plan was resubmitted. Public meetings for our plans were held on June 22, 2004 in Rodeo and July 8, 2004 in Crockett. As required the Plan was fully updated in August 2005 on the 3 year cycle. The Plan was reviewed by CCHS and was revised on July 28, 2006 with recommended changes. The Safety Plan was updated in July 2009 per the 3 year cycle. Recommendations requested by CCHMP were incorporated into the Safety Plan on November 4, 2010. Safety Plan was updated in August 2012 and August 2015 per the 3 year cycle. Recommendations requested by CCHMP on May 22, 2017 were incorporated into the plan on August 4, 2017. An updated Safety Plan was submitted in August 2018.
5. **List of locations where Safety Plans are/will be available for review, including contact telephone numbers if the source will provide individuals with copies of the document (450-8.030(B)(2)(iii)):** CCHMP Office at 4585 Pacheco Boulevard, Suite 100, Martinez; Crockett and Rodeo Libraries (closest to the stationary source).
6. **Provide any additions to the annual accident history reports (i.e. updates) submitted pursuant to Section 450-8.016(E)(2) of County Ordinance 98-48 (450-8.030(B)(2)(iii)) (i.e., provide information identified in Section 450-8.016(E)(1) for all major chemical accidents or releases occurring between the last annual performance review report and the current annual performance review and evaluation submittal (12-month history)):** There were no major chemical accidents or releases at the Rodeo Refinery in the 2018-2019 time period.
7. **Summary of each Root Cause Analysis (Section 450-8.016(C)) including the status of the analysis and the status of implementation of recommendations formulated during the analysis (450-8.030(B)(2)(iv)):** There were no root cause analysis of major chemical accidents or releases at the Rodeo Refinery in the 2018-2019 time period.
8. **Summary of the status of implementation of recommendations formulated during audits,**

Inspections, Root Cause Analyses, or Incident Investigations conducted by the Department (450-8.030(B)(2)(vi)): There is one "ensure" item and one "consider" item remaining from the 2017 CalARP ISO audit. Both items will be closed with the 2019 revision to the Risk Management Plan.

9. **Summary of inherently safer systems implemented by the source including but not limited to inventory reduction (i.e., intensification) and substitution (450-8.030(B)(2)(vi)):** See ATTACHMENT 1 for the listing of Inherently Safer Systems Improvements.
10. **Summarize the enforcement actions (including Notice of Deficiencies, Audit Reports, and any actions turned over to the Contra Costa County District Attorney's Office) taken with the Stationary Source pursuant to Section 450-8.028 of County Ordinance 98-48 (450-8.030(B)(2)(vii)):** There were no enforcement actions during this period.
11. **Summarize total penalties assessed as a result of enforcement of this Chapter (450-8.030(3)):**
No penalties have been assessed against this facility.
12. **Summarize the total fees, service charges, and other assessments collected specifically for the support of the ISO (450-8.030(B)(4)):** The total CalARP Program fees for the eight facilities subject to the Industrial Safety Ordinance was \$1,006,798. The total Industrial Safety Ordinance program fees for these eight facilities was -\$535,535. (NOTE: These fees include those for the County and City of Richmond ISO facilities).
13. **Summarize total personnel and personnel years utilized by the jurisdiction to directly implement or administer this Chapter (450-8.030(B)(6)):** 3,828 hours were used to audit/inspect and issue reports on the Risk Management Chapter of the Industrial Safety Ordinance.
14. **Copies of any comments received by the source (that may not have been received by the Department) regarding the effectiveness of the local program that raise public safety issues(450-8.030(B)(6)):** No comments were received.
15. **Summarize how this Chapter improves industrial safety at your stationary source (450-8.030(B)(7)):** In addition to the Phillips 66 Corporate Health Safety Environment Management Systems the ISO provides another tool for the improvement of process safety performance.
16. **List examples of changes made at your stationary source due to implementation of the Industrial Safety Ordinance (e.g., recommendations from PHA's, Compliance Audits, and Incident Investigations in units not subject to CalARP regulations; recommendations from RCA's) that significantly decrease the severity or likelihood of accidental releases.** Units that were not covered by RMP, CalARP, and PSM are covered under the ISO and PHAs are scheduled and performed on all these units. Recommendations from the PHAs are implemented at an accelerated rate. A list of inherently safer system improvements, required by the ISO for PHA recommendations and projects, are listed in Attachment 1.
17. **Summarize the emergency response activities conducted at the source (e.g., CWS or TEN**

activation) in response to major chemical accidents or releases: There were no major chemical accidents or releases at the Rodeo Refinery in the 2018-2019 time period.

18. Date the last Safety Culture Assessment was completed: 4/15/2016 Survey method: written survey

19. Date the results of the Safety Culture Assessment were reported to the workforce: 6/24/16
management: 4/15/16

20. Answer the following regarding the Safety Culture Evaluation for no. 18:

- SURVEY METHOD: written survey
- Areas of improvements being addressed:
 - » No areas were identified as scoring significantly below normal values.
 - » Improvements require too many reviews/approvals.
 - » Employees are reluctant to reveal problems or errors.
 - » Having enough qualified people to do the work in their area.
- Action Plan made Progress on the identified areas of improvement? YES
 - » If Yes, did the improvements meet the goals and if not, was the action plan amended to address what is being done to meet the goals? Yes, Progress was made and improvements observed in the subsequent SCA. Improvement opportunities were identified in the most recent SCA and recommendations identified.
 - » If No, has a new action plan been developed to address the identified areas of improvement? (Yes or No)

21. Have milestones and metrics been developed to determine how the Safety Culture Assessment actions are being implemented? Yes or if not, Why not? YES. Specific improvements were identified by a management & union team and implemented.

22. Describe the process that included employees and their representatives used to determine if the action items effectively changed the expected culture items: A midcycle written survey will be utilized to evaluate the effects on the culture. The evaluation team will include management and union representatives per policy.

23. Date of the mid-cycle progress evaluation: Scheduled in 2019

- » Did the action plan (for no 18) make progress on the identified areas of improvement? Yes or if not, has a new action plan been developed? (Yes or No) (to be determined)

24. Describe the process that included participation of employees or their representatives used to determine whether the action items from the SCA and the mid-cycle progress effectively changed the expected culture items: By policy, our process will include management and union representatives to review the results and develop modified recommendations as appropriate.

25. Common Process Safety Performance Indicators:

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Overdue inspection for piping and pressure vessels based on total number of circuits

2018	Overdue	Repeat
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	0	0
October	0	0
November	0	0
December	0	0

Total number of circuits: 22,424

Total number of annual planned circuit inspections: 5,037

Past due PHA recommended actions, includes seismic and LCC recommended actions

2018	Overdue	Repeat
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	0	0
October	0	0
November	0	0
December	0	0

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Past due investigation recommended actions for API/ACC Tier 1 and Tier 2 incidents

2018	Overdue	Repeat
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	0	0
October	0	0
November	0	0
December	0	0

API/ACC TIER 1 & TIER 2 INCIDENTS AND RATES STARTING 2011

Year	2011	2012	2013	2014	2015	2016	2017	2018
No. Tier 1 LOPC	2	3	0	0	2	0	0	0
Incident rate for Tier 1	0.17	0.29	0	0	0.21	0	0	0
Refinery or Industry Rate ¹	0.15	0.09	0.09	0.09	0.10	0.06	0.07	0.06
Refinery or Industry Mean ²	*	1.49	1.30	1.38	1.55	1.01	1.13	0.92
Tier 2 LOPC	5	3	0	1	2	2	2	0
Incident rate for Tier 2	0.43	0.29	0	0.10	0.21	0.17	0.22	0
Refinery Rate ¹	*	0.24	0.25	0.23	0.20	0.17	0.18	0.17
Refinery Mean ²	*	*	*	*	3.08	2.78	2.73	2.79

¹ Petroleum refineries to report publicly available refinery rates for API Tier 1 and Tier 2 classification.

² Chemical plants to report publicly available refinery rates for API Tier 1 and Tier 2 classification. Chemical plants to report publicly available mean only for ACC Tier 1

*At the time of the submittal, these Refinery Industry rates or means are not publicly available. A revised report will be sent when they are published to the public.

26. Process Safety Performance Indicators for refineries only:

I. Number of Major Incidents in 2018: 0

II. The number of temporary piping and equipment repairs that are installed on hydrocarbon and high energy/utility systems that are past their date of replacement with a permanent repair:

2018	Total*	Overdue	Repeat
January	57	0	0
February	58	0	0
March	58	0	0
April	59	0	0
May	59	0	0
June	59	0	0
July	60	0	0
August	60	0	0
September	60	0	0
October	42	0	0
November	43	0	0
December	44	0	0
TOTAL	44	4	1

Attachment 1: June 2017–June 2018 ISS improvements			
Reference	Approach	ISS Category	Key Description
IMP226913	Moderate	Passive	Heat exchanger had been re-rated bnce w/ process design conditions this addresses the PHA recommendation. All pertinent PSI information is to reflect the new conditions.
IMP226903	Moderate	Passive	Piping has been re-rated, which addresses the LOPA recommendation.
IMP226891	Moderate	Passive	Secondary containment built for F-256 Silicone Tank.
IMP226568	Simplify	Passive	SIL calculations performed to provide additional IPLS to protect against a fuel rich firebox in B-4 Heater.
IMP226567	Simplify	Passive	The piping on the pump-outline was extended so that the valve on the pump-outline and the adjacent valve do not create a pinch point.
IMP226562	Moderate	Procedural	New procedure added to limit loaned rate 5 minutes before shutdown to minimize lifting relief valves.
IMP226563	Moderate	Inherent	Added check valves to critical Check Valve List and removing three out of service valves.
IMP226849	Moderate	Passive	A closed loop sampling station was installed with septum-capped bottles to minimize operator exposure to high H2S vapors.
IMP227654	Simplify	Procedural	New alarms added to address 8 HAZOP recommendations and 45 LOPA recommendations.
IMP220030	Moderate	Active	Two new SIL-1 rated shutdowns added to prevent accumulation of unburned fuel in B-4 firebox after a loss of fuel gas or pilot gas.
IMP226880	Moderate	Active	Installed redundant independent level indicator and alarm on F-57 Phase Separator to notify operators of potential sour gas release.
IMP226845	Moderate	Active	Installed new shutdown trip voting logic (1oo4) to prevent potential tube failure from low flow conditions in B-202 Convection heater.
IMP226874	Simplify	Procedural	Revised locked open valve list to decrease likelihood for human error.
IMP226848	Minimize	Passive	Installed cover on E-101A/B/C to protect operators from potential exposure to hot water and H2S in the event of tube leak or increased temperature.
IMP227651	Moderate	Active	Installed two new PSV's to provide enhanced overpressure protection to G-811A/B pump discharge piping.
IMP226848	Minimize	Passive	Installed dual mechanical seals with API Plan 53B sealing system on Stabilizer Feed Pumps 5p-503A/B to reduce the likelihood of loss of containment.

M2016308-001	Moderate	Inherent	Replaced butane cooler cooling water return with upgraded metallurgy pipe.
M20161236-001	Moderate	Inherent	Upgraded metallurgy case installed on G-116C pump.
M20176355-001	Moderate	Inherent	Upgrade E-206 Salt Water Outlet Spool Piece to Monel.
M20176004-001	Moderate	Inherent	Upgrade DSO Piping on Meridhem to 316L SS
M20175710-001	Moderate	Inherent	F-302 Froth Chute Metallurgy Upgrade
M20176686-001	Moderate	Inherent	E-303 Bundle Metallurgy Upgrade from carbon steel to stainless steel.
M20173980-001	Moderate	Inherent	Upgrade G-221 Jet Pump Bypass Spool Piece to Inconel 625
M20173012-001	Moderate	Inherent	Upgrade D-601 Overhead Vapor Bypass Line from carbon steel to C276 overlay carbon steel.
M20172446-001	Moderate	Inherent	Upgrade F-540 Brides to 316 SS
M20172359-001	Moderate	Inherent	Replacement of F-805 with 304SS
M20171966-001	Moderate	Inherent	Upgrade the exchanger metallurgy to 317 LSS to provide resistance to naphthenic acid as well as high temperature sulfidation.
M20171704-002	Moderate	Passive	Upgrade U215/U267 Naphtha Sample Stations to Closed Loop
M20165957-001	Moderate	Passive	Upgrade U250 D-713 and D-714 Sample Stations to Closed Loop
M20101727-005	Moderate	Passive	Upgrade sample stations D201B, D-202, and D-203 effluent and rec. gas
M20176266-001	Moderate	Passive	Change Amine Service Fin Fan Tube Plug Gasket Type
M20164066-002	Simplify	Active	Upgrade B-101 and B-102 Heater O2 Analyzers.

Annual Performance Review and Evaluation Submittal June 30, 2019

*Attach additional pages as necessary

1. **Name and address of Stationary Source:** Shell Oil Products U.S. Martinez Refinery, 3485 Pacheco Blvd., Martinez, CA 94553
2. **Contact name and telephone number (should CCHIMP have questions):** Nicola Maher: 925-229-6175
3. **Summarize the status of the Stationary Source's Safety Plan and Program (450-8.030(B)(2)(i)):**
SMR's Safety Plan was last updated in August 2016. SMR's Safety Plan is due for update in August 2019.
4. **Summarize Safety Plan updates (i.e., brief explanation of update and corresponding date) (450-8.030(B)(2)(iii)):** SMR's Safety Plan was last updated in August 2016. The changes addressed actions from the CCHS 2015 audit. SMR's August 2019 submittal will address actions from the CCHS 2018 audit.
5. **List of locations where Safety Plans are/will be available for review, including contact telephone numbers if the source will provide individuals with copies of the document (450-8.030(B)(2)(iii)):** CCHIMP Office at 4585 Pacheco Boulevard, Suite 100, Martinez; Martinez Library (library closest to the stationary source).
6. **Provide any additions to the annual accident history reports (i.e. updates) submitted pursuant to Section 450-8.016(E)(2) of County Ordinance 98-48 (450-8.030(B)(2)(iii)) (i.e., provide information identified in Section 450-8.016(E)(1) for all major chemical accidents or releases occurring between the last annual performance review report and the current annual performance review and evaluation submittal (12-month history)):** There was one MCAR for the reporting period on July, 6 2018, Release at LOP (Light Oil Processing) Flare.
7. **Summary of each Root Cause Analysis (Section 450-8.016(C)) including the status of the analysis and the status of implementation of recommendations formulated during the analysis (450-8.030(B)(2)(iv)):** 7/6/18 - Release at LOP Flare MCAR root cause analysis was completed and a final report submitted to CCHMD. Four actions are open and on schedule for 1/2020 completion. All other actions (37) were completed as scheduled.
8. **Summary of the status of implementation of recommendations formulated during audits, inspections, Root Cause Analyses, or Incident Investigations conducted by the Department (450-8.030(B)(2)(v)):** T2018 County ISO/CalARP audit action items have been finalized and final responses sent June 2019. Due dates for action items accepted by County. Approximately 40% of action items complete. Remaining action items to be completed per agreed upon schedule.
9. **Summary of inherently safer systems implemented by the source including but not limited to inventory reduction (i.e., intensification) and substitution (450-8.030(B)(2)(vi)):** See Attachment 1
10. **Summarize the enforcement actions (including Notice of Deficiencies, Audit Reports, and any actions turned over to the Contra Costa County District Attorney's Office) taken with the Stationary Source pursuant to Section 450-8.028 of County Ordinance 98-48 (450-8.030(B)(2)(vii)):** There were no enforcement actions during this period.

11. **Summarize total penalties assessed as a result of enforcement of this Chapter (450-8.030(3)):**
No penalties have been assessed against this facility.
12. **Summarize the total fees, service charges, and other assessments collected specifically for the support of the ISO (450-8.030(B)(4)):** The total CalARP Program fees for the eight facilities subject to the Industrial Safety Ordinance was \$1,006,798. The total Industrial Safety Ordinance program fees for these eight facilities was—\$535,535. (NOTE: These fees include those for the County and City of Richmond ISO facilities).
13. **Summarize total personnel and personnel years utilized by the jurisdiction to directly implement or administer this Chapter (450-8.030(B)(6)):** 3,828 hours were used to audit/inspect and issue reports on the Risk Management Chapter of the Industrial Safety Ordinance.
14. **Copies of any comments received by the source (that may not have been received by the Department) regarding the effectiveness of the local program that raise public safety issues(450-8.030(B)(6)):** None received
15. **Summarize how this Chapter improves industrial safety at your stationary source (450-8.030(B)(7)):** SMR has integrated requirements of the Industrial Safety Ordinance into our Health, Safety, and Environment Management System; in the context of our HSE MS, the ISO requirements drive continual improvement in our HSE performance.
16. **List examples of changes made at your stationary source due to implementation of the Industrial Safety Ordinance (e.g., recommendations from PHA's, Compliance Audits, and Incident Investigations in units not subject to CalARP regulations; recommendations from RCA's) that significantly decrease the severity or likelihood of accidental releases. All process units are now covered under CalARP Program 4. Examples of changes made to the stationary source are summarized in Table 1 (see question 9).**
17. **Summarize the emergency response activities conducted at the source (e.g., CWS or TEN activation) in response to major chemical accidents or releases:** 7/6/18 - Release at LOP Flare - Shell activated the Emergency Operations Center, which brings together Environmental, Health & Safety, Security, Operations, and Management to assist in coordinating the response. In addition, Shell's Community Sampling Team was deployed to the community to monitor for potential offsite impacts (noise, odors, etc). The refinery's Ground Level Monitors located on the facility fence-line showed no detection of H2S or SO2 above background levels and the community sampling did not detect any offsite readings.
18. **Date the last Safety Culture Assessment was completed:** 3/31/19 (survey conducted Q4, 2018)
19. **Date the results of the Safety Culture Assessment were reported to the workforce and management:** 4/10/19 and beyond (4/24/19 sitewide distribution, various meetings to discuss results).
20. **Answer the following regarding the Safety Culture Evaluation for no. 18:**
 - Survey method: Anonymous computer based and paper based survey
 - Areas of improvements being addressed: Incident reporting and Learnings from incidents and Rewards and Recognition

- Action Plan made Progress on the identified areas of improvement?: (Yes or No) YES
 - » If Yes, did the improvements meet the goals and if not was the action plan amended to address what is being done to meet the goals? Too early to assess. Adjustments will be made to the action plan as needed.
 - » If No, has a new action plan been developed to address the identified areas of improvement? (Yes or No)

21. Have milestones and metrics been developed to determine how the Safety Culture Assessment actions are being implemented? Yes or if not, Why not? Yes.

22. Describe the process that included employees and their representatives used to determine if the action items effectively changed the expected culture items: Quarterly meetings with a Safety Culture team that includes represented employees to discuss progress of Culture action items and determine if a change to the action item is required. Small group surveys or reviews will occur as needed.

23. Date of the mid-cycle progress evaluation? TBD

- » Did the action plan (for no 18) make progress on the identified areas of improvement? Yes or if not, has a new action plan been developed? (Yes or No) N/A

24. If a mid-cycle progress evaluation was performed during this reporting year, describe the process that included participation of employees or their representatives that determined whether the action items effectively changed the expected culture items: N/A

25. Common Process Safety Performance Indicators:

Overdue inspection for piping and pressure vessels based on total number of circuits

2018	Overdue	Repeat
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	0	0
October	0	0
November	0	0
December	0	0

Total number of circuits: 12,478

Total number of annual planned circuit inspections: 1,577

Past due PHA recommended actions, includes seismic and LCC recommended actions

2018	Overdue	Repeat
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June	0	0
July	4	0
August	0	0
September	0	0
October	0	0
November	0	0
December	0	0
TOTAL	4	0

**Past due investigation recommended actions
for API/ACC Tier 1 and Tier 2 incidents**

2018	Overdue	Repeat
January	0	0
February	0	0
March	0	0
April	1	0
May	0	0
June	0	0
July	0	0
August	0	0
September	1	0
October	1	1
November	0	0
December	0	0
TOTAL	2	1

**API/ACC TIER 1 & TIER 2
INCIDENTS AND RATES
STARTING 2011**

Year	2011	2012	2013	2014	2015	2016	2017	2018
No. Tier 1 LOPC	1	1	1	0	1	0	2	1
Incident rate for Tier 1	0.07	0.07	0.08	0.00	0.07	0.00	0.11	0.06
Refinery or Industry rate ¹	0.15	0.09	0.09	0.09	0.10	0.06	0.07	0.06
Refinery or Industry mean ²	*	1.49	1.30	1.38	1.55	1.01	1.13	0.92
No. Tier 2 LOPC	2	0	5	2	5	1	2	2
Incident rate for Tier 2	0.14	0	0.41	0.11	0.42	0.06	0.11	0.11
Refinery rate ¹	*	0.24	0.25	0.23	0.20	0.17	0.18	0.17
Refinery mean ²	*	*	*	*	3.08	2.78	2.73	2.79

¹Petroleum refineries to report publicly available refinery rate for API Tier 1 and Tier 2 classification.

Chemical plants to report publicly available mean only for ACC Tier 1

²Petroleum refineries to report publicly available refinery mean for API Tier 1 and Tier 2 classification.

Chemical plants to report publicly available mean only for ACC Tier 1

* Refinery Industry rates or means are not publicly available.

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26. Process Safety Performance Indicators for refineries only:

I. Number of Major Incidents in 2018: 0

II. The number of temporary piping and equipment repairs that are installed on hydrocarbon and high energy utility systems that are past their date of replacement with a permanent repair:

2018	Overdue	Repeat
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	0	0
October	0	0
November	0	0
December	0	0
TOTAL	0	0

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Attachment 1

Table 1: Summary of Implemented ISS

Project	ISS Description
Active/Moderate	Added High Level Alarms to HP and LP Blowdown Drums in Utility
2nd order Inherent/Moderate	Upgraded the metallurgy in heater in Alkylation Plant
2nd order Inherent/Moderate	Replaced cyclone trickle valves for the reactor with upgraded metallurgy in the Cat Cracker Plant
2nd order Inherent/Moderate	Upgraded metallurgy on identified piping in the Cat Gas Hydrotreater Plant
2nd order Inherent/Moderate	Upgraded metallurgy in pump Case in Hydrocracker Plant
2nd order Inherent/Moderate	Upgraded P2951 Seal Bellow Assembly Retaining Band Material In Hydrocracker plant
2nd order Inherent/Moderate	Upgraded disaster bushing in seal for caustic recycle pump in Sat Gas Plant.
Inherent/Simplify	Hydrogen and Corrosion Probes Removed in the Delayed Coker Unit
Active/Simplify	Installed actuated interlocked valves to coke drums in Delayed Coker Unit to reduce opportunity for human error
Active/Moderate	Upgraded DCU Wet Gas Compressor Control System in the Delayed Coker Unit
2nd order Inherent/Moderate	Heater Metallurgy Upgraded and Die-rate in the Distillate Hydrotreater
Active/Moderate	Installed vibration shutdown system on Distillation Hydrotreater compressors.
Active/Moderate	Installed trip systems for high CO/CH ₄ TDL on 14 heaters across site
Active/Moderate	Installed Foam System on tank in tank farm
2nd order Inherent/Moderate	Upgraded Main Frac Slurry Piping Metallurgy in Cat Cracker Unit
Active/Moderate	Added Seal Oil Flow Indication in Sat Gas Plant
2nd order Inherent/Moderate	Upgraded pump material for pumps in Alkylation Unit
2nd order Inherent/Moderate	Upgraded Mechanical Seal O-ring for pumps in Alkylation service
2nd order Inherent/Moderate	P2195 Materials Upgrade and Flush Modification
2nd order Inherent/Moderate	Upgraded metallurgy for stripper reflux pumps in Sulfur Recovery Unit
2nd order Inherent/Moderate	Upgraded pump seal in Logistics

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Table 1: Continued

Project	ISS Description
2nd order Inherent/Moderate	Upgraded acid boot Piping from vessel in Alkylation unit
Inherent/Simplify	Replaced sight glass with a magnetic level indicator on a vessel in the Flexicoker unit
2nd order Inherent/Moderate	Upgraded piping spool metallurgy in Hydrogen Plant.
2nd order Inherent/Moderate	Upgraded reclaiming pump o-ring in amine service.
2nd order Inherent/Moderate	Metal Gasket Modification and upgrade in Cat Cracker Unit.
2nd order Inherent/Moderate	Upgraded Lubric Oil Filler Housing and added pressure indication in Logistics.
2nd order Inherent/Moderate	Upgraded pump o-ring material in Straight Run Hydrotreater plant.
2nd order Inherent/Moderate	Upgraded metallurgy of Spent Acid Line in Alkylation Unit
2nd order Inherent/Moderate	Upgraded Metallurgy and design of piping for the flare lighting system in LOP
Procedural/Simplify	Change in Start-up procedure for CO Boilers in Utilities
Procedural/Simplify	Change in loading procedure in Tank Storage Area
Procedural/Simplify	Change in draining process to reduce draining in Tank storage area.
Procedural/Moderate	Change in fuel gas treater procedure to reduce set points and update step

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Annual Performance Review and Evaluation Submittal June 30, 2019

*Attach additional pages as necessary

1. **Name and address of Stationary Source:** Tesoro Golden Eagle Refinery, 150 Solano Avenue, Martinez, CA 94553
2. **Contact name and telephone number (should CCHS have questions):** James Jeter 925-370-3279 or Sabiha Gokcen at 925- 370-3620.
3. **Summarize the status of the Stationary Source's Safety Plan and Program (450-8.030(B)(2)(vi)):** The most recent Safety Plan was submitted to Contra Costa Hazardous Materials Program (CCHMP) in June 2017. CCHMP has completed seven audits on the safety programs. The first audit was in September 2000 on the Safety programs. The second audit was in December 2001 and focused on Inherently Safer Systems and Human Factors. CalARP/ISO audits were conducted in August 2003, November-December 2005, August-October 2008, April-May 2011, January, 2014 and most recently October 2016. All safety program elements required by the ISO have been developed and are implemented.

4. **Summarize Safety Plan updates (i.e., brief explanation of update and corresponding date) (450-8.030(B)(2)(iii)):** The original Safety Plan for this facility was filed with CCHMP on January 14, 2000. An amended plan, updated to reflect CCHS recommendations and ownership change, was filed on November 30, 2000. A Human Factors Amendment was submitted on January 15, 2001. A Power Disruption Plan was submitted, per Board of Supervisor request, on June 1, 2001. An amended Safety Plan, updated to reflect ownership change was submitted on June 17, 2002.

The Safety Plan for this facility is updated whenever changes at the facility warrant an update or every three years. In addition, the accident history along with other information is updated every year on June 30 in the Annual ISO Update to CCHMP. The most recent Safety Plan was submitted in June, 2017.

5. **List of locations where Safety Plans are/will be available for review, including contact telephone numbers if the source will provide individuals with copies of the document (450-8.030(B)(2)(iii)):** CCHMP Office at 4585 Pacheco Boulevard, Suite 100, Martinez; Martinez Library (library closest to the stationary source).
6. **Provide any additions to the annual accident history reports (i.e. updates) submitted pursuant to Section 450-8.016(E)(2) of County Ordinance 98-48 (450-8.030(B)(2)(iii)) (i.e., provide information identified in Section 450-8.016(E)(1) for all major chemical accidents or releases occurring between the last accident history report submittal (January 15) and the annual performance review and evaluation submittal (June 30)):** There have been no MCARS during the last year.
7. **Summary of each Root Cause Analysis (Section 450-8.016(C)) including the status of the analysis and the status of implementation of recommendations formulated during the analysis (450-8.030(B)(2)(iv)) Status of Root Cause Analysis Recommendations:** The recommended action items for all MCARs are closed.

8. **Summary of the status of implementation of recommendations formulated during audits, inspections, Root Cause Analyses, or Incident Investigations conducted by the Department (450-8.030(B)(2)(vi)):** "CCHS Information": CCHS completed an audit on September 15, 2000, December 2001, August 2003, November/December 2005, August-October 2008, April-May 2011, January 2014 and October 2016. There are no RCA or Incident Investigations that have been conducted by the Department.
- Facility status of audit recommendations: All recommendations from CCHMP audits prior to 2016 are closed, here are 3 open audit recommendations from the 2016 audit which are on target regarding due dates.
9. **Summary of inherently safer systems implemented by the source including but not limited to inventory reduction (i.e., intensification) and substitution (450-8.030(B)(2)(vii)):** The refinery is submitting a list of the Inherently Safer Systems (ISS) that meet the criteria for Inherent or Passive levels only and that were completed within the last year (see attached).
10. **Summarize the enforcement actions (including Notice of Deficiencies, Audit Reports, and any actions turned over to the Contra Costa County District Attorney's Office) taken with the Stationary Source pursuant to Section 450-8.028 of County Ordinance 98-48 (450-8.030(B)(2)(viii)):** There were no enforcement actions during this period.
11. **Summarize total penalties assessed as a result of enforcement of this Chapter (450-8.030(3)):** No penalties have been assessed against this facility.
12. **Summarize the total fees, service charges, and other assessments collected specifically for the support of the ISO (450-8.030(B)(4)):** "CHCMP Information": The total CalARP Program fees for the eight facilities subject to the Industrial Safety Ordinance was \$1,006,798. The total Industrial Safety Ordinance program fees for these eight facilities was \$535,535. (NOTE: These fees include those for the County and City of Richmond ISO facilities).
13. **Summarize total personnel and personnel years utilized by the jurisdiction to directly implement or administer this Chapter (450-8.030(B)(5)):** "CCHMP Information": 3828 hours were used to audit/inspect and issue reports on the Risk Management Chapter of the Industrial Safety Ordinance.
14. **Copies of any comments received by the source (that may not have been received by the Department) regarding the effectiveness of the local program that raise public safety issues (450-8.030(B)(6)):** This facility has not received any comments to date regarding the effectiveness of the local program.
15. **Summarize how this Chapter improves industrial safety at your stationary source (450-8.030(B)(7)):** Chapter 450-8 improves industrial safety by expanding the safety programs to all units in the refinery. In addition, the timeframe is shorter to implement recommendations generated from the Process Hazard Analysis (PHA) safety program than state or federal law. This has resulted in a faster implementation of these recommendations.

- If No, has a new action plan been developed to address the identified areas of improvement? (Yes or No)

21. Have milestones and metrics been developed to determine how the Safety Culture Assessment actions are being implemented? Yes or if not, Why not? Yes
22. Describe the process in place that includes employees and their representatives that will determine if the action items effectively changed the expected culture items: Once the initial report was received on the survey from the 3rd party consultant, the PSM Superintendent and USW Process Safety Representative reviewed the data and recommendations from the consultant in great detail as well as the 2013 survey. A preliminary action plan was developed from the in-depth analysis. The consultant's report and the preliminary action plan were reviewed with management, the Jt. H&S Committee and the union negotiation committee for input. In addition, the USW Process Safety Representative held several sessions with USW leadership to review the data in more detail. After this process was completed, it was determined the preliminary action plan was the final action plan.

23. Date of the mid-cycle progress evaluation: 2019 for SCA dated 2016

» Did the action plan (for no 18) make progress on the identified areas of improvement? N/A midcycle scheduled for this year

» Yes or if not, has a new action plan been developed? (Yes or No) N/A

24. If a mid-cycle progress evaluation was performed during this reporting year, describe the process that included participation of employees or their representatives that determined whether the action items effectively changed the expected culture items: Please refer to above question detailing development of action plan. Mid-cycle will occur in 2019.

Overdue inspection for piping and pressure vessels based on total number of circuits

2018	Overdue	Repeat
January	1	0
February	3	0
March	0	0
April	0	0
May	0	0
June	0	0
July	1	0
August	1	1
September	0	1
October	0	0
November	0	0
December	0	0
TOTAL	6	2

Total number of circuits: 7423

Total number of annual planned circuit inspections: 1,249 in the year 2018

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Chapter 450-8 also includes requirements for inherently safer systems as part of implementing PHA recommendations and new construction. This facility has developed an aggressive approach to implementing inherently safer systems in these areas.

Chapter 450-8 has requirements to perform root cause analyses on any major chemical accidents or releases (MCAR). This facility has applied that rigorous methodology to investigate any MCARs that have occurred since January, 1999.

Chapter 450-8 requires a human factors program. This facility has developed a comprehensive human factors program and is in the process of implementing the program.

Chapter 450-8 requires a safety culture assessment. This facility has developed a safety culture assessment program that meets the requirements in the ordinance..

16. List examples of changes made at your stationary source due to implementation of the Industrial Safety Ordinance (e.g., recommendations from PHA's, Compliance Audits, and Incident Investigations in units not subject to CalARP regulations; recommendations from RCAs) that significantly decrease the severity or likelihood of accidental releases.

This question was broadly answered under question 15 above. Some examples of changes that have been made due to implementation of the ordinance are as follows. There are some units that were not covered by RMP, CalARP or PSM. Those units are now subject to the same safety programs as the units covered by RMP, CalARP and PSM. They have had PHAs performed on them according to the timeline specified in the ISO and the PHA recommendations have been resolved on the timeline specified in the ISO. A list of inherently safer systems as required by the ISO for PHA recommendations and new construction is attached to this filing as mentioned in the response to question 9. With respect to Compliance Audits, there was a compliance audit performed in April 2015 in addition to the CCHMP audits mentioned above. All audit findings are being actively resolved. Root Cause Analysis findings and recommendations for MCARs are listed in the response under question 6.

17. Summarize the emergency response activities conducted at the source (e.g., CWS or TEN activation) in response to major chemical accidents or releases: Please refer to #6 which has the CWS classifications for the major chemical accidents and releases as well as any information regarding emergency responses by agency personnel.

18. Common Process Safety Performance Indicators: 8/8/16-9/1/16

19. Date the results of the Safety Culture Assessment were reported to the workforce and management: 4/4/17-5/15/17 and 11/17/16

20. Answer the following regarding the Safety Culture Evaluation Previous to the one listed in 18:

» Survey method: Survey

» Areas of improvements being addressed: The safety culture areas of improvement identified are: the maintenance work process, procedures, leadership of process safety, resources for process safety, and new hire training

» Action Plan made Progress on the identified areas of improvement?: (Yes or No) Yes

- If Yes, did the improvements meet the goals and if not was the action plan amended to address what is being done to meet the goals? There was improvement from 2013 to 2016 in some of the identified areas. The action plan for 2016 included the work that was performed previously and addressed continuing the effort to completion.

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25. Common Process Safety Performance Indicators:

Past due PHA recommended actions, includes seismic and LCC recommended actions

2018	Overdue	Repeat
January	0	0
February	6	0
March	6	6
April	1	1
May	0	0
June	13	0
July	29	6
August	51	27
September	76	46
October	67	63
November	66	64
December	75	64
TOTAL	390	411

Past due investigation recommended actions for API/ACC Tier 1 and Tier 2 incidents

2018	Overdue	Repeat
January	2	1
February	0	3
March	0	2
April	0	1
May	0	1
June	1	1
July	0	1
August	0	1
September	0	0
October	1	0
November	0	1
December	1	1
TOTAL	5	4

¹Petroleum refineries to report publicly available refinery rate for API Tier 1 and Tier 2 classification. Chemical plants to report publicly available mean only for ACC Tier 1.
²Petroleum refineries to report publicly available refinery rate for API Tier 1 and Tier 2 classification. Chemical plants to report publicly available mean only for ACC Tier 1.

API/ACC TIER 1 & TIER 2 INCIDENTS AND RATES STARTING 2011

Year	2011	2012	2013	2014	2015	2016	2017	2018
No. Tier 1 LOPC	0	0	0	1	1	0	1	1
Incident rate for Tier 1	0	0	0	0.05	0.06	0	0.04	0.04
Refinery or Industry rate ¹	0.15	0.09	0.09	0.09	0.10	0.06	0.07	0.06
Refinery or Industry mean ²	*	1.49	1.30	1.38	1.55	1.01	1.13	0.92
Tier 2 LOPC	1	1	2	3	3	0	3	4
Incident rate for Tier 2	0.06	0.05	0.12	0.16	0.17	0	0.12	0.17
Refinery rate ¹	*	0.24	0.25	0.23	*	0.20	0.18	0.17
Refinery mean ²	*	*	*	*	3.08	2.78	2.73	2.79

¹Petroleum refineries to report publicly available refinery rate for API Tier 1 and Tier 2 classification.
²Chemical plants to report publicly available mean only for ACC Tier 1
³Petroleum refineries to report publicly available refinery mean for API Tier 1 and Tier 2 classification.
⁴Chemical plants to report publicly available mean only for ACC Tier 1
⁵Petroleum refineries to report publicly available refinery mean for API Tier 1 and Tier 2. Chemical plants to report publicly available mean only for ACC Tier 1
⁶Data is not publicly available; report from AFPM only went back to 2012.
⁷***Data not available at the time of reporting

26. Process Safety Performance Indicators for refineries only:

- Number of Major Incidents in 2018; One (1)
- The number of temporary piping and equipment repairs that are installed on hydrocarbon and high energy utility systems that are past their date of replacement with a permanent repair.

2018	Total	Overdue	Repeat
January	111	56	0
February	112	0	56
March	105	4	55
April	106	1	59
May	105	2	58
June	107	0	60
July	108	1	60
August	109	6	61
September	110	3	67
October	98	0	58
November	96	2	56
December	97	3	58
TOTAL	97	78	67

Inherently Safer Systems Implemented

Item Identifier	Implementation Category	Risk Reduction Category	ISS Approach
AO01-2016-028	PHA	Passive	Moderate—Modification of physical conditions to less hazardous conditions.
AO 19-2016-001	PHA	Passive	Moderate—Modification of physical conditions to less hazardous conditions.
AO 19-2016-016	PHA	Passive	Moderate—Modification of physical conditions to less hazardous conditions.
A039-2018-008	PHA	Inherent	Second Order Inherent Safety -The hazard associated with emergency response equipment was resolved through the application of inherently safer principles to reduce the potential escalation of an incident.
A056-2017-013	PHA	Passive	Moderate—Modification of physical conditions to less hazardous conditions.
A102-2017-013	PHA	Inherent	Second Order Inherent Safety -The hazard associated with emergency response equipment location was resolved through the application of inherently safer principles to reduce the potential escalation of an incident.
A102-2017-018	PHA	Inherent	Second Order Inherent Safety Application of inherently safer principles to reduce the likelihood of an incident.
A102-2017-019	PHA	Inherent	Second Order Inherent Safety Application of inherently safer principles to reduce the likelihood of an incident.
A102-2017-020	PHA	Inherent	Second Order Inherent Safety Application of inherently safer principles to reduce the likelihood of an incident.
A102-2017-021	PHA	Passive	Moderate—Modification of physical conditions to less hazardous conditions.



Annual Performance Review and Evaluation Submittal June 30, 2019

*Attach additional pages as necessary

- 1. Name and address of Stationary Source:** Chevron U.S.A. Inc. (CUSA), Richmond Refinery, 841 Chevron Way, Richmond, California 94802
- 2. Contact name and telephone number (should CCHMP have questions):** Greg Shockley, 510-242-362
- 3. Summarize the status of the Stationary Source's Safety Plan and Program (450-8.030(B)(2)(i)):**
The CUSA Richmond Refinery (Refinery) initial Site Safety Plan (SSP) was completed in 2003, and the most recent revision is dated July 24, 2018. The SSP was prepared in accordance with the City of Richmond Industrial Safety Ordinance (RISO), which was adopted by the Richmond City Council on January 17, 2002.
- 4. Summarize Safety Plan updates (i.e., brief explanation of update and corresponding date) (450-8.030(B)(2)(ii)):** The SSP was updated in 2018. The next revision will be shared in 3Q2021.
- 5. List of locations where Safety Plans are/will be available for review, including contact telephone numbers if the source will provide individuals with copies of the document (450-8.030(B)(2)(iii)):** CCHMP Office at 4585 Pacheco Boulevard, Suite 100, Martinez; Richmond Public Library at 325 Civic Center Plaza Richmond, CA 94804; and Point Richmond Public Library at 135 Washington Ave., Richmond, CA 94801.
- 6. Provide any additions to the annual accident history reports (i.e. updates) submitted pursuant to Section 450-8.016(E)(2) of County Ordinance 98-48 (450-8.030(B)(2)(iii)) (i.e., provide information identified in Section 450-8.016(E)(1) for all major chemical accidents or releases occurring between the last annual performance review report and the current annual performance review and evaluation submittal (12-month history)):** There were no major chemical accidents or releases ("MCAR") as defined in Section 450-8.014(h) between June 1, 2018 and June 1, 2019.
- 7. Summary of each Root Cause Analysis (Section 450-8.016(C)) including the status of the analysis and the status of implementation of recommendations formulated during the analysis (450-8.030(B)(2)(iv)):** There were no MCAR events between June 1, 2018 and June 1, 2019, and accordingly there were no Root Cause Analyses conducted under section 450-8.016(c) during this period.
- 8. Summary of the status of implementation of recommendations formulated during audits, inspections, Root Cause Analyses, or Incident Investigations conducted by the Department (450-8.030(B)(2)(v)):** The 2013 Cal ARP/ISO Audit had 73 ensure and consider recommendations, from which 85 total action items were created, and 85 of those action items are complete. The final report and action plans from the 2013 Cal ARP/ISO audit were accepted by the County and Richmond Refinery in 2015. The 2013 Cal ARP/ISO audit had 163 ensure and consider recommendations, from which 177 total action items were created, and 170 of those action items are complete. The remaining action items are in progress, some with multiyear timelines for completion. The report and action plans from the 2016 Cal ARP/Richmond ISO audit had 74 ensure and consider recommendations, from which 80 total action items were created, and 80 of those action items are complete. The ensure and consider items for the 2016 audit were finalized on November 6, 2017.

9. **Summary of inherently safer systems implemented by the source including but not limited to inventory reduction (i.e., intensification) and substitution (450-8.030(B)(2)(v)):** See Attachment 1 on page 5.
10. **Summarize the enforcement actions (including Notice of Deficiencies, Audit Reports, and any actions turned over to the Contra Costa County District Attorney's Office) taken with the Stationary Source pursuant to Section 450-8.028 of County Ordinance 98-48 (450-8.030(B)(2)(v)):** There were no enforcement actions during this period.

11. **Summarize total penalties assessed as a result of enforcement of this Chapter (450-8.030(3)):**
No penalties have been assessed against this facility.

12. **Summarize the total fees, service charges, and other assessments collected specifically for the support of the ISO (450-8.030(B)(4)):** The total CalARP Program fees for the eight facilities subject to the Industrial Safety Ordinance was \$1,006,798. The total Industrial Safety Ordinance program fees for these eight facilities was—\$535,535. (NOTE: These fees include those for the County and City of Richmond ISO facilities).

13. **Summarize total personnel and personnel years utilized by the jurisdiction to directly implement or administer this Chapter (450-8.030(B)(5)):** 3,828 hours were used to audit/inspect and issue reports on the Risk Management Chapter of the Industrial Safety Ordinance.

14. **Copies of any comments received by the source (that may not have been received by the Department) regarding the effectiveness of the local program that raise public safety issues(450-8.030(B)(6)):** No comments were received during this period regarding the effectiveness of the local program that raise public safety issues.

15. **Summarize how this Chapter improves industrial safety at your stationary source (450-8.030(B)(7)):** Operating safely is one of CUSA's core values and underpins our commitment to enhancing our process safety programs. The RISO assists CUSA in improving our process safety performance. We have worked closely with CCHIMP in its implementation of the RISO and its oversight of our operations, including during its periodic reviews of our operations. Consistent with this commitment, and as part of the company's efforts to continually improve its process safety performance, CUSA will continue to confer with the CCHIMP as it refines and implements these actions.

16. **List examples of changes made at your stationary source due to implementation of the Industrial Safety Ordinance (e.g., recommendations from PHAs, Compliance Audits, and Incident Investigations in units not subject to CalARP regulations; recommendations from RCAs) that significantly decrease the severity or likelihood of accidental releases.**

In addition to the Inherently Safer Systems implemented in Question 9, CUSA has also made other changes to the facility pursuant to the RISO and beyond to decrease the severity or likelihood of accidental releases. A few examples include the following:

- Changes implemented based on findings from Tier 1 and Tier 2 Incident Investigation with solutions due between June 2018 to June 2019

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- » Added a new requirement during the mechanical-run testing to measure and record with accelerometers the vibration of piping supported solely by the compressor casing (e.g. balance lines, etc.).
- » Completed initial review of 13 major compressor balance lines with resonance testing to confirm natural frequencies that could be excited by the compressor running speed as well as reviewed existing bracing
- » Identified all CS seal overhead vessels and piping in sour gas services to be upgraded to SS.
- » sRCM (Streamlined Reliability-Centered Maintenance) continued implementing studies to set up ITPM's (inspection, testing, and preventative maintenance tasks) refinery wide.
- » The Fixed Equipment Asset Strategies Project (piping) Improves the refinery's existing asset strategy, designed to prevent and mitigate loss of containment in piping systems and to describe the process for creating and maintaining these strategies.
- » Completed Damage Mechanism Reviews on PSM-covered equipment and piping.
- » Continued performing Safeguard Protection Analysis (Layers of Protection Analysis) consistent with the RISO.
- » Equipment and procedural changes implemented to reduce risks identified during PHAs, including:
 - » Implementing program to upgrade centrifugal pump seals to reduce or eliminate potential consequences that may result from seal failures.
 - » Completed project to install vibration monitoring and shutdown systems on API Class I pumps to minimize potential loss of containment
 - » Continued effort to conduct procedural PHAs across refinery units to identify and mitigate potential human factors that may lead to loss of containment; with a focus on emergency, startup, and shutdown procedures.

17. **Summarize the emergency response activities conducted at the source (e.g., CWS or TEN activation) in response to major chemical accidents or releases:** There were no level two or three CWS or TENS activations between June 1, 2018 and June 1, 2019.

18. **Common Process Safety Performance Indicators:** Data collected Sept 2015 reported to work force June 2016

19. **Date the results of the Safety Culture Assessment were reported to the workforce:** June 2016

20. **Answer the following regarding the Safety Culture Evaluation to the one listed in 18:**

- **Survey method: Focus Groups**
- **Areas of improvements being addressed: Communication and resource planning**
- **Action Plan made Progress on the identified areas of improvement?: (Yes or No) Yes**
 - » If Yes, did the improvements meet the goals and if not was the action plan amended to address what is being done to meet the goals? Yes, the improvements met the goals.
 - » If No, has a new action plan been developed to address the identified areas of improvement? (Yes or No) N/A

21. **Have milestones and metrics been developed to determine how the Safety Culture Assessment actions are being implemented? Yes or if not, Why not?**
Yes, Milestones are tracked in the Chevron Database system of record.

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22. Describe the process that included employees and their representatives used to determine if the action items effectively changed the expected culture items: Employees and their representatives were involved in the review of data, development of the improvement suggestions as well as the development of the final action items. Through the process of meeting with the representatives we came to agreement on what data needed an action and what action would solve the milestones.

23. Date of the mid-cycle progress evaluation: None were conducted as they were not required at the time for SCA dated: June 2016
 a Did the action plan (for no 18) make progress on the identified areas of improvement? Yes or if not, has a new action plan been developed? (Yes or No) N/A

24. If a mid-cycle progress evaluation was performed during this reporting year, describe the process that included participation of employees or their representatives that determined whether the action items effectively changed the expected culture items: N/A. Mid-cycle progress evaluation was not performed in this reporting year.

25. Common Process Safety Performance Indicators:

Overdue inspection for piping and pressure vessels based on total number of circuits

2018	Overdue	Repeat
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	0	0
October	0	0
November	0	0
December	0	0

Total number of circuits: 8,414*

Total number of annual planned circuit inspection: 1,979*

*An ongoing project is re-evaluating piping circuit designations to align each circuit with the anticipated damage mechanisms. As the project progresses, the total number of piping circuits and subsequently, the number inspected, will change to accommodate the long-term strategy for inspections and reliability.

Past due PHA recommended actions, includes seismic and LCC recommended actions

2018	Overdue	Repeat
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	0	0
October	0	0
November	0	0
December	0	0

Past due investigation recommended actions for API/ACC Tier 1 and Tier 2 incidents

2018	Overdue	Repeat
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	0	0
October	0	0
November	0	0
December	0	0

API/ACC TIER 1 & TIER 2 INCIDENTS AND RATES STARTING 2011

Year	2011	2012	2013	2014	2015	2016	2017	2018
No. Tier 1 LOPC	4	3	0	1	2	1	1	1
Incident rate for Tier 1	0.14	0.11	0.00	0.02	0.05	0.02	0.02	0.01
Refinery or Industry rate ¹	0.1553	0.095	0.0947	0.0925	0.1038	0.0627	0.076	0.0570
Refinery or Industry mean ²	**	1.49	1.30	1.38	1.55	1.01	1.13	0.92
No. Tier 2 LOPC	5	8	6	3	1	3	5	4
Incident rate for Tier 2	0.18	0.29	0.19	0.07	0.02	0.07	0.10 ³	0.06
Refinery or Industry rate ¹	**	0.2405	0.2531	0.2380	0.2063	0.1726	0.1843	0.1728
Refinery or Industry mean ²	**	**	**	**	3.08	2.78	2.73	2.79

¹Petroleum refineries to report publicly available refinery rate for API Tier 1 and Tier 2 classification. Chemical plants to report publicly available mean only for ACC Tier 1 (data from AFPM website: <https://www.afpm.org/754-reporting/>).

²Petroleum refineries to report publicly available refinery mean for API Tier 1 and Tier 2 classification. Chemical plants to report publicly available mean only for ACC Tier 1 (data from AFPM website: <https://www.afpm.org/754-reporting/>).

** Refinery Industry rates or means are not publicly available at this time and will be provided when available or released.

26. Process Safety Performance Indicators for refineries only:

- Number of Major Incidents in 2018: One (1)
- The number of temporary piping and equipment repairs that are installed on hydrocarbon and high energy utility systems that are past their date of replacement with a permanent repair.

2018	Total	Overdue	Repeat
January	49	0	0
February	53	0	0
March	53	0	0
April	55	0	0
May	57	0	0
June	57	0	0
July	72	0	0
August	74	0	0
September	75	0	0
October	74	0	0
November	63	0	0
December	61	0	0
TOTAL	61	0	0

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Attachment 1—Question 9

Risk Reduction Category	ISS Approach	Description
Inherent	Minimize	New amine plant was located next to the SRUs to minimize piping runs of acid gas containing H2S.
Inherent	Minimize	Cautic Scrubbers located close to plant to minimize the length of the H2S piping and to take advantage of elevated caustic tank location eliminating the need for caustic pumps.
Inherent	Moderate	The design pressure of a drum has been increased to reduce the potential for overpressure in the event of a blocked outlet relief case.
Inherent	Simplify	Removed abandoned 500 psi steam line and all obsolete equipment from plot plan of new plant.
Inherent	Eliminate	MEA and arsenic (in the form of sodium arsenite) has been eliminated from decommissioning plants and are not used in the new plants. This includes process piping and equipment, routine storage external to the process unit(s), and hazardous waste generation from maintenance activities.
Inherent	Substitute	Richmond Refinery can convert a portion of the existing anhydrous ammonia inventory into Hydrogen and Nitrogen and this will lead to a reduction in anhydrous ammonia inventory within the refinery.
Active	Moderate	Furnace Trip added to reduce the operating pressures and temperatures in an overpressure scenario.
Active	Moderate	Added high vibration shutdown to pumps to reduce the risk of a potential loss of containment.
Passive	Moderate	Splash guards were added to a pump to reduce the consequence of a loss of containment.
Active	Moderate	Low flow SIS system installed on pump.
Procedural	Simplify	Procedure updated to clarify maximum target levels in sphere to reduce the likelihood of a loss of containment.

Annual Performance Review and Evaluation Submittal June 30, 2019

*Attach additional pages as necessary

1. **Name and address of Stationary Source:** Chemtrade Logistics West US, LLC, 525 Castro St. Richmond, CA 94801
2. **Contact name and telephone number (should CCHMP have questions):** Andrew Hornbeck 979-650-0257.
3. **Summarize the status of the Stationary Source's Safety Plan and Program (450-8.030(B)(2)(i)):**
The sites Safety Plan was submitted to the Hazardous Materials Program on 11/21/19 and is currently up to date.
4. **Summarize Safety Plan updates (i.e., brief explanation of update and corresponding date) (450-8.030(B)(2)(ii)):** The recent Safety Plan submission included a substantial amount of updates. Major updates included updating the plan to current safety practices and included changes to the sites investigation and corrective action plans, human factors program, process hazard analysis procedures and document control procedures.
5. **List of locations where Safety Plans are/will be available for review, including contact telephone numbers if the source will provide individuals with copies of the document (450-8.030(B)(2)(iii)):** CCHMP Office at 4585 Pacheco Boulevard, Suite 100, Martinez; Richmond Public Library, (135 Washington Ave., Richmond, CA 94801).
6. **Provide any additions to the annual accident history reports (i.e. updates) submitted pursuant to Section 450-8.016(E)(2) of County Ordinance 98-48 (450-8.030(B)(2)(iii)) (i.e., provide information identified in Section 450-8.016(E)(1) for all major chemical accidents or releases occurring between the last annual performance review report and the current annual performance review and evaluation submittal (12-month history)):** No major chemical releases requiring a Root Cause Analysis since the last annual performance report.
7. **Summary of each Root Cause Analysis (Section 450-8.016(C)) including the status of the analysis and the status of implementation of recommendations formulated during the analysis (450-8.030(B)(2)(iv)):** 135 of 136 action items written as a result of the 2017 CCHMP audit have been completed.
8. **Summary of the status of implementation of recommendations formulated during audits, inspections, Root Cause Analyses, or Incident Investigations conducted by the Department (450-8.030(B)(2)(v)):** Site recently replaced old piping on the oleum system to meet current Chemtrade oleum piping specifications.
9. **Summarize the enforcement actions (including Notice of Deficiencies, Audit Reports, and any actions turned over to the Contra Costa County District Attorney's Office) taken with the Stationary Source pursuant to Section 450-8.028 of County Ordinance 98-48 (450-8.030(B)(2)(vi)):** There were no enforcement actions during this period.

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10. **Summarize total penalties assessed as a result of enforcement of this Chapter (450-8.030(3)):**
No penalties have been assessed against this facility.
11. **Summarize the total fees, service charges, and other assessments collected specifically for the support of the ISO (450-8.030(B)(4)):** The total CalARP Program fees for the eight facilities subject to the Industrial Safety Ordinance was \$1,006,798. The total Industrial Safety Ordinance program fees for these eight facilities was - \$535,535. (NOTE: These fees include those for the County and City of Richmond ISO facilities).
12. **Summarize total personnel and personnel years utilized by the jurisdiction to directly implement or administer this Chapter (450-8.030(B)(5)):** 3,828 hours were used to audit/inspect and issue reports on the Risk Management Chapter of the Industrial Safety Ordinance.
13. **Copies of any comments received by the source (that may not have been received by the Department) regarding the effectiveness of the local program that raise public safety issues(450-8.030(B)(6)):** No formal comments have been received. The site continues to host bi-monthly CAP meetings with community members.
14. **Summarize how this Chapter improves industrial safety at your stationary source (450-8.030(B)(7)):** Significant improvements have been made in the sites human factors program and inherently safer system reviews as a result of this chapter.
15. **List examples of changes made at your stationary source due to implementation of the Industrial Safety Ordinance (e.g., recommendations from PHA's, Compliance Audits, and Incident Investigations in units not subject to CalARP regulations; recommendations from RCAs) that significantly decrease the severity or likelihood of accidental releases.**
Site has improved it's human factors program and PHA system improvements have been implemented as a result of the Industrial Safety Ordinance. Chemtrade has adopted ISS reviews across the company as a result of ISO. A standardized Safety Culture Assessment has been developed.
16. **Summarize the emergency response activities conducted at the source (e.g., CWS or TEN activation) in response to major chemical accidents or releases:** No major chemical accidents or releases since the last report.
17. **Date the last Safety Culture Assessment was completed:** 8/14/18
18. **Date the results of the Safety Culture Assessment were reported to the workforce and management:** 9/19/18
19. **Answer the following regarding the Safety Culture Evaluation previous to the one listed in 18:**
 - Survey method: Anonymous multiple choice survey developed with comments available for each question
 - Areas of improvements being addressed: Improve safety incentives and improve including hourly employees when conducting investigations
 - Action Plan made Progress on the identified areas of improvement?: (Yes or No)

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- » If Yes, did the improvements meet the goals and if not was the action plan amended to address what is being done to meet the goals? Yes, in progress. SCA to be conducted again in 2019 to review progress
- » If No, has a new action plan been developed to address the identified areas of improvement? (Yes or No)

20. Have milestones and metrics been developed to determine how the Safety Culture Assessment actions are being implemented? Yes or if not, Why not? Yes

21. Describe the process that included employees and their representatives used to determine if the action items effectively changed the expected culture items: SCA will be conducted again in 2019 and the results will be compared to 2018.

22. Date of the mid-cycle progress evaluation: August 2019

- » Did the action plan (for no 18) make progress on the identified areas of improvement? Yes or if not, has a new action plan been developed? (Yes or No)

23. If a mid-cycle progress evaluation was performed during this reporting year, describe the process that included participation of employees or their representatives that determined whether the action items effectively changed the expected culture items. N/A

24. Common Process Safety Performance Indicators:

Overdue inspection for piping and pressure vessels based on total number of circuits

2018	Overdue	Repeat
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	0	0
October	0	0
November	0	0
December	0	0

Total number of circuits: 351

Total number of annual planned circuit inspections: 273

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Past due PHA recommended actions, includes seismic and LCC recommended actions

2018	Overdue	Repeat
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	0	0
October	0	0
November	0	0
December	0	0

Past due investigation recommended actions for API/ACC Tier 1 and Tier 2 incidents

2018	Overdue	Repeat
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	0	0
October	0	0
November	0	0
December	0	0

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API/ACC TIER 1 & TIER 2 INCIDENTS AND RATES STARTING 2011

Year	2011	2012	2013	2014	2015	2016	2017	2018
No. Tier 1 LOPC	0	0	0	0	0	0	0	0
Incident rate for Tier 1	0	0	0	0	0	0	0	0
Refinery or Industry rate ¹	0.1553	0.0995	0.0947	0.0925	0.1038	0.0627	0.0761	
Refinery or Industry mean ²	*	1.49	1.30	1.38	1.55	1.01	1.13	
No. Tier 2 LOPC	0	0	0	0	0	0	0	1
Incident rate for Tier 2	0	0	0	0	0	0	0	1.8
Refinery rate ³								
Refinery mean ²								

¹Petroleum refineries to report publicly available refinery rate for API Tier 1 and Tier 2 classification.

²Chemical plants to report publicly available mean only for ACC Tier 1.

³Petroleum refineries to report publicly available refinery mean for API Tier 1 and Tier 2 classification.

Chemical plants to report publicly available mean only for ACC Tier 1).

*Refinery industry rates or means are not publicly available.



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